

FORD OWNER

For Dealers and Owners

MILWAUKEE, WIS.

JANUARY, 1920

10c A COPY

Save 30 cents from every dollar!

THIRTY per cent of all you spend on your Ford Passenger Car or One-Ton Truck for repairs, tires, and depreciation! Think of such a saving—surely, it must be worth while—it must be worth an investment of only a few dollars. That is exactly what you accomplish when you secure Hassler Shock Absorbers.

For Every Ford Car and the Ford One-Ton Truck

Easier riding—that alone is worth far more than the cost of Hasslers. Then, too, you get increased gasoline mileage, the car steers easier and is more satisfactory in every way. Furthermore, we make the Hassler prove these claims to you at our risk. You bring your car to the Hassler dealer—he puts on Hasslers—you drive for 10 days—and if you are not delighted with them, bring back your car and he'll take them off and refund every cent you paid.



Make your Ford Ride like the Highest Priced Cars



Nearly a Million Sets in Use Today!

Shock Absorbers

PATENTED

Bring Your Car to the Hassler Dealer—Try Them 10 Days

You'll want Hasslers this season—and right now is the time to find out what they will do. Bring your car today and let him put them on for your 10-day trial. Only takes a few minutes—doesn't tie up your car.

The Hassler Guarantee: "Absolute Satisfaction or Your Money Back."

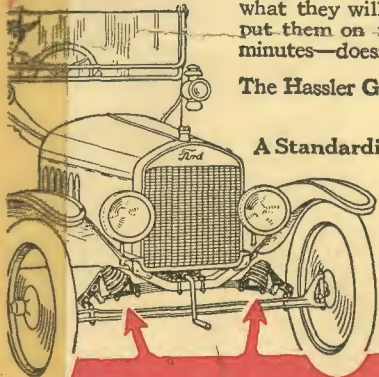
A Standardized Quality Product—worth the price.

Write for Trial Blank to

Robert H. Hassler, Inc.
Naomi St.

Indianapolis, Ind.

Good territory still open. Write.



HASSLERS "DOUBLE or TWINS"
For Ford One Ton Trucks, Too!



UTILITY Protected Heaters
for ALL CARS
UTILITY Jr. *for Fords*

JOBBERS—almost all of them, and everywhere—stock, catalogue and sell **UTILITY** Protected Heaters.

That in itself is a tremendous **UTILITY** recommendation to you.

It is positive proof—if you still need it—that a persistent, ever-growing demand **makes** **UTILITY** Protected Heaters sell.

Moving through your stock in the winter time they leave valuable profits worth while.

Your jobber knows it. Ask him, if **you** don't already know, and see why you should place your order with him today.

Jobbers—get in touch with us.

HILL PUMP VALVE COMPANY

Mfrs. of **UTILITY** Protected Heaters, **UTILITY** Pedals for Fords, **UTILITY** Pumps, **UTILITY** Universal Rim Wrenches and **UTILITY** Universal Wrenches

Archer Avenue and Canal St.

CHICAGO, ILL.

SALES DEPARTMENT

THE ZINKE CO., 1323 S. Michigan Ave., CHICAGO

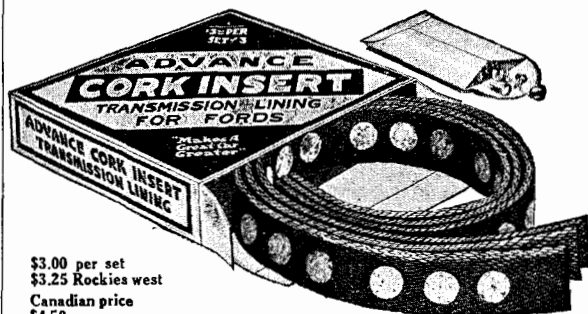
FORDS do not have to RATTLE and JAR!

IT has been proven that Fords don't have to rattle and shake. But the majority of Ford owners don't know this. They don't realize that the Ford is made of better stuff and is better assembled than most cars. They blame the car for what is really the fault of the lining used for stopping and starting.

Advance Cork Insert does away with this shaking and rattling. You can prove this. Take a chattering, shaking Ford and install Advance Cork Insert. Notice how smoothly it stops—how evenly it goes into low or reverse.

Ordinary linings get a hard, slick surface from friction and oil. This slick surface hasn't any grip—it grips and slips, grips and slips, repeatedly. This slipping and gripping causes the chattering and vibration—it loosens the whole car and makes it rattle.

Advance Cork Insert Linings grip smoothly—are unaffected by oil—hold their smooth gripping power—never get a hard, slick surface—outwear three sets of any other lining.



\$3.00 per set
\$3.25 Rockies west
Canadian price
\$4.50


Dealers

You'll never know how much business you can do with Advance Cork Inserts until you get them in stock. It is a fact, they are the best selling lining you can buy. Ford owners want Advance Cork Inserts. They insist on them. It will pay you to sell your customers what they want. Advance Cork Inserts are widely advertised. Ask your jobber—or write us, direct.

Advance Automobile Accessories Corp., 56 E. Randolph St., Chicago

GOES ON LIKE A HUBCAP

NO DRILLING NO PINNING



Special Ford Model—fits every Model T Ford

Buy it over the counter, take it out to the curb, unscrew a front hub cap, and screw the Automatic Drive Dread naught Indestructible Hub Odometer in place. From that minute you get a continuous mileage record.

Guaranteed against leakage of grease or destruction by collision for the life of the vehicle.

The American Taximeter Co.
16 West 61st Street, New York, N. Y.

Sales-Service.

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FORDOWNER

For Dealers and Owners

Entered as second-class matter, January 29, 1916, at the Post Office at Milwaukee, Wisconsin, under the Act of March 3, 1879.

Vol. 12 JANUARY, 1920 No. 4

The FORDOWNER is an independent monthly journal having no connection with the Ford Motor Company. We are trying to serve the best interests of the dealers and owners of Ford Cars and propose to "hew to the line, let the chips fall where they may."

10 cents a copy, \$1.00 a year. \$1.50 Canada and foreign.

Published Monthly by
THE TRADE PRESS PUBLISHING CO.

Montgomery Building
MILWAUKEE, WISCONSIN

BRANCH OFFICES

NEW YORK OFFICE—
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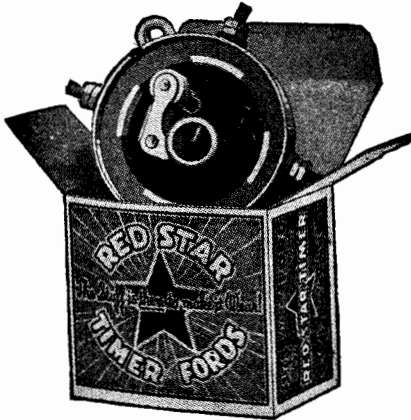
WESTERN REPRESENTATIVE—
C. M. MINIER,
510 Title Insurance Bldg.
Los Angeles, Cal.

To save delay send all general and subscription communications to the main office at Milwaukee, Wis.

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The Red Star Trademark Stands for Timer Quality the World Over



Each Red Star is packed in a red and blue printed carton.

THE Ford owner everywhere has learned that the timer with the Red Star on the shell will make his Ford hit on all four—give him a smooth-running, powerful motor—with pep and pick-up.

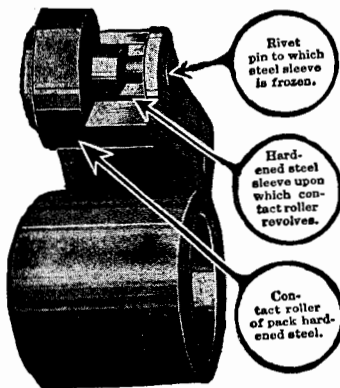
The roller-on-a-roller, a special Red Star feature, guarantees a smooth-working accurate timer. The roller can't drag or wear angular—it rolls in perfect contact with the race all the time.

Red Star Timer
FOR FORD CARS-TRUCKS AND TRACTORS

The perfectly surfaced, hard fibre race, with mortised-in contact shoes, wears evenly and smoothly. It does not pit or get bumpy.

\$2.00 in United States
In Canada, \$2.75

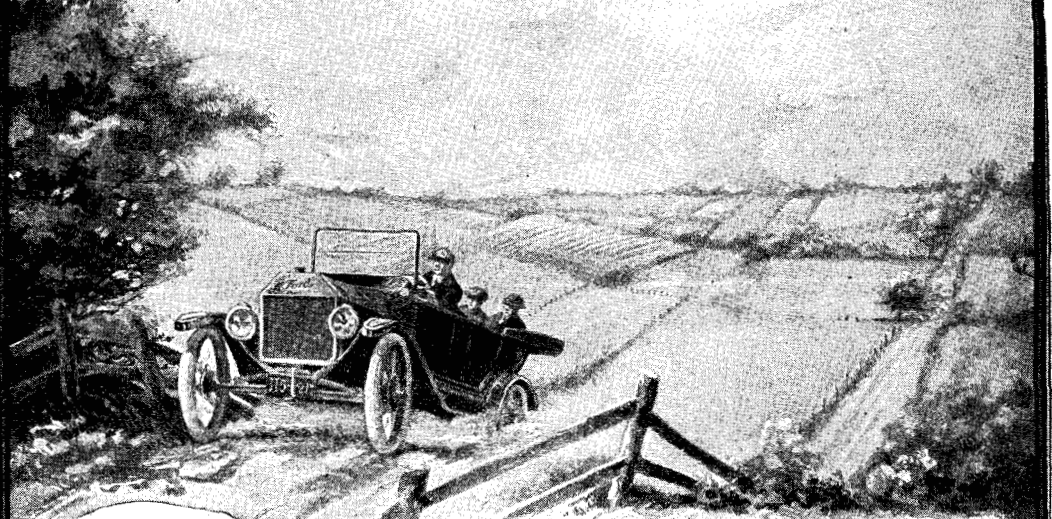
DEALERS—Ford owners are asking for the timer with the Red Star trademark. The Red Star quality and our advertising have made them extremely popular. Get a Red Star display sign in your window. Write us about it. It brings in the business. Your jobber has Red Stars. If he doesn't quote you quickly, write us.



Study the construction of the Red Star Roller.

Auto Components, Inc.
56 E. Randolph Street, Chicago, Ill.

Up Hill or Down Dale



It's all the same to the Ford that is equipped with an

EISEMANN

MAGNETO

It Doubles the Power of Your Ford!

By a simple and rugged attachment, which becomes an integral part of the motor, the standard G4 Eisemann Magneto may be used as the source of ignition for Ford cars.

When attached the Magneto is driven through two gears, not three or more as are those of some other attachments, nor by chain drive.

There is absolutely no machining, drilling, cutting or tapping of any nature whatsoever. You can install the outfit yourself, very quickly and without difficulty; and at all times it is instantly accessible.

The supreme simplicity and ruggedness of construction will please you, but you will derive your greatest satisfaction from the increased power, greater flexibility, more rapid acceleration, greater fuel economy, increased hill-climbing ability and freedom from ignition troubles in general. **Write us about it.**



THE
EISEMANN
MAGNETO CORPORATION

Sales and General Offices:
32 Thirty-third St., Brooklyn, N. Y.
Chicago, 910 S. Michigan Ave.
Detroit, 85 Willis Ave., West.

White Stripe Lining For Fords Brings In Business

It is true—

*White Stripe is the
fastest selling plain
lining on the market.*

“White Stripe brings in business,” said one dealer. Thousands find this true, for the fame of White Stripe has spread from coast to coast, north and south.

White Stripe is famous for its smoothness of action and long wear. It will stop a Ford car with twice the ease and smoothness—and out-wears several sets of any plain lining.

White Stripe is a wonderful combination of weave and treatment. The strongest, most expensive cotton is woven into a special weave—one that wears—wears—wears. Our specially built looms produce this weave.

Every strand of White Stripe weave is filled with a treatment that keeps it soft—protects it from the hardening effect of hot oil and friction. White Stripe never loses its softness—its smooth grip.

DEALERS—you need White Stripe. There is no plain lining the equal of it. It is a live item—a profitable article to sell. It will make and keep Ford customers for you—because it does for the Ford car what no other plain lining can do.

Get a stock of White Stripe now. Any jobber will quote you—or write us, direct.



*In sets of three, \$2.00. Rockies West, \$2.25.
Canadian price, \$3.00.*

*In Rolls, 250 feet, 32c per foot.
Rockies West, 35c. Canadian price, 40c.*

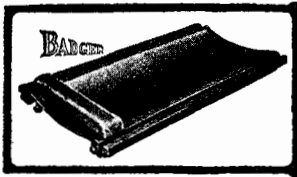
Advance Automobile Accessories Corp., 56 E. Randolph St., Chicago

Every foot of White Stripe Lining is marked with a White Stripe

When writing advertisers—Just say FORDOWNER

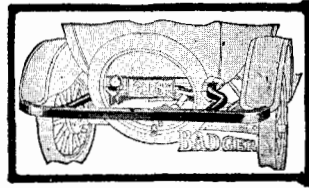
With These To Sell— no customer can fail to buy

Here are some items and prices that you, Mr. Dealer, cannot help but find most alluring. And, best of all, your customers will find them most inviting. These goods show well—and the prices are right.



All Steel Creeper..... \$7.50

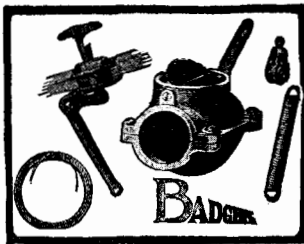
*"they sell—
they, also,
repeat"*



Rear Bumper
1¾" Channel—Nickel..\$10.95
Black .. 10.55

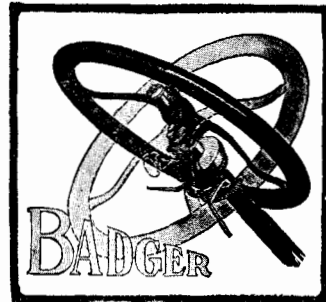


Isn't it half the battle to be able to buy the goods right? And isn't the battle won when the goods *look* right, and price right to the customer?



Cutout
Style "M" Pedal..... \$1.40

*"worthy
the Car
we name
them for"*



Steering Wheels Tilt Sta.
17" Plain Rim, Walnut or Black \$6.20 \$4.62
17" Cor. Rim, Walnut or Black 6.92 5.24

■ Send for our 40 page illustrated Catalog Today. ■

BADGER MFG. CORPORATION

(the House that has the Goods)

MILWAUKEE

WISCONSIN

If It's Gemco It's Good

THOUSANDS of motorists and dealers need no further assurance of quality in bumpers and Ford supplies than the name Gemco. To them it stands for correct design, finest materials and workmanship, and dependable service.

Gemco Ford Supplies are standard throughout the trade, thoroughly service-tested, typically



At the right are shown several of the most popular Gemco supplies for the "Universal Car." These devices are inexpensive, yet they are worth many dollars in service, comfort and convenience. Ford owners who put Gemco equipment on their cars make a permanent addition to their investments. These supplies are constructed to outlast the life of any Ford car.

Dealers who sell Gemco supplies can vouch for their quality and durability with certainty. Remember "If it's Gemco, it's good." Write today for new 1920 Gemco catalog—just off the press.

Gemco Mfg. Co.
750 So. Pierce St., Milwaukee, Wis.

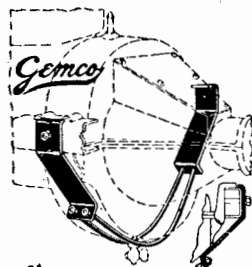


Jem Coe, the Traffic Cop, says:

"They're getting real money for Fords these days, so it pays to safeguard 'em with bumpers, and give 'em the conveniences that other good cars have."

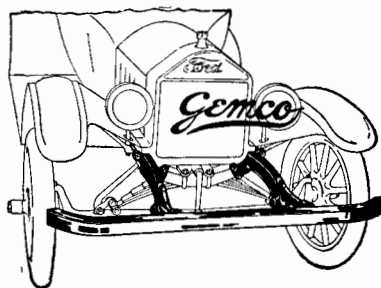
FOR FORDS

(ALL MODELS)



Crank Case Support

A clamping truss support that holds the crank case arms firmly together. Applied in a few minutes. Outlasts the life of any Ford. Retail price, \$2.50.



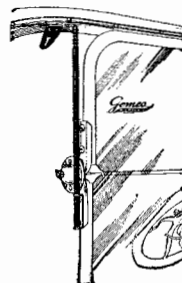
Front Frame Type Bumper

Quickly and easily clamps to frame; no bolts to be removed or holes to be drilled. Compact and strong; furnishes ample protection; cannot loosen. Channel or Diamond Bar, Nickel or Black Finish. Retail prices, \$9.10 to \$12.50.



Tilt or Non-Tilt Steering Wheel

with 17-inch rim to replace standard 15-inch. Malleable and aluminum spiders. Rims, ebony or walnut finish, corrugated or plain. Retail price, \$4.30 to \$8.48.

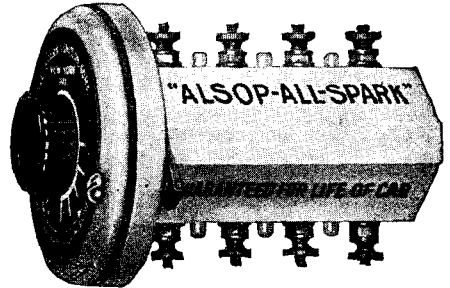


Metal Strap Top Holder

To replace flimsy web strap top holder. Easily adjusted—positively will not rattle. Does not obstruct side view. Attaches to lower screws of wind-shield hinge. Improves appearance of car and will outlast any Ford. Retail price per pair, \$1.50.

ALSOP-ALL-SPARK

*This Test
Proves—*



Action Reply to Duplicate to
DIRECTOR OF MILITARY AERONAUTICS
Washington, D. C.

IN REPLY PLEASE QUOTE
FILE NO. _____

WAR DEPARTMENT
OFFICE OF THE DIRECTOR OF MILITARY AERONAUTICS
WASHINGTON January 16, 1919.

From: O'Wynn Robinson, First Lieut., A.S.M.A., St. Louis, MO.
To: Commanding Officer, Air Service Depot.
Subject: Test of Alsop Ignition Device

1. Test was made December 13th and 14th, a Ford truck being used, motor was in such bad condition that the spark-plugs became quickly carbonized, and would seldom fire regularly, frequently going absolutely dead from poor ignition, changing the plugs was then necessary to again start motor. Great care was required not to exceed a certain amount of oil in crank-case, as a very slight excess resulted in almost immediate stoppage of the motor from carbonization of spark-plugs.

2. The motor just previous to attaching the ignition device was firing irregularly, the power being barely sufficient to propel the car. No alterations were made in the carburetor, spark-plugs or other parts of car. The device was attached and the motor was started, no misfiring could be detected, and power of engine was increased to such an extent that grades which the car could not previously negotiate were easily driven up.

3. The device was then taken off the car, the plugs inspected and found to be entirely clean and free from carbon. Fifteen quarts of mobile grade #1 oil was put into the crank case, above the prescribed amount. The motor was started and ran for twelve minutes before beginning to misfire, all cylinders went absolutely dead, one after the other, twenty-eight minutes later. We endeavored to start car by cranking and towing, with no success.

4. The ignition device was again attached, the motor was cranked and immediately started running perfectly almost at once. The motor was kept running with the excess amount of oil in the crank-case for several hours and no trouble was noticed.

5. Four other plugs badly carbonized with broken porcelain, which had been discarded as worthless were installed. The motor was run for six days with no ignition trouble. Increased power was apparent under all conditions, starting which had formerly been very difficult was made easy. The device was under my observation seven days and was giving the results set forth when I last saw it.

O'Wynn Robinson
First Lieut., A.S.M.A.

That our claims are **too** conservative. What the War Department found to be true about the All-Spark is proven every day — Wherever this wonderful little device is installed owners enthuse over it. They find it will cause old, cracked, carbonized, and oil soaked plugs to give powerful sparks. It eliminates carbon, saves gas, develops greater power and insures continued driving without misfires.

**DEALERS—
HERE'S YOUR
CHANCE**

There's a constant and growing demand for such a device—one that is absolutely guaranteed—one that has no dangerous ex-

posed spark gaps, which may set a car afire, one that does not make a car hard to start or cause uneven timing.

Send for our catalogue of Convincing Government tests.

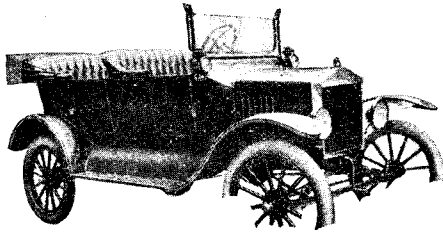
DEALERS—AGENTS—SALESMEN—WANTED.

ALL-SPARK IGNITION CO., Inc. 13 Water St. New York

DORIC Radiator

For FORD CARS

That there is a big market for the Doric Radiator in your locality is certain; for Ford owners the world over have very much in common and the eagerness for a better looking, more efficient and more substantial radiator that has made the Doric Radiator so profitable to others will insure its success with dealers in your locality.



The Doric Radiator gives a Ford owner just what he needs for his car—an exceptionally handsome radiator of the Rolls-Royce type, with a highly polished, permanently beautiful, nickel-silver alloy shell. It has a strong, compact, leak-resisting core of the diagonal

cellular type affording high cooling efficiency and requiring minimum repairs. It is easily installed. It fits the Ford chassis and hood exactly. The cap is indestructible, made of Bakelite to protect the fingers when the radiator is hot.

Another Radiator That Dealers Will Find Profitable to Handle

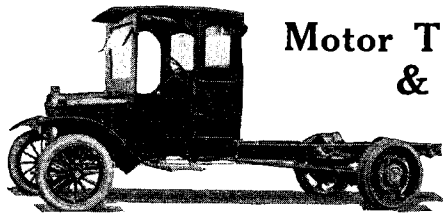
is the Emco (Ford Type) Radiator—a truck radiator of the highest quality designed to replace the Ford radiator on Ford Trucks.

The Emco has proved itself the biggest money-saver that can be put on a Ford Truck—it prevents overheating and boiling, resists damage, is easily repaired and practically everlasting. It is of the tubular type with malleable tanks and frame. It will pay every Ford Truck owner to equip his truck with one.

Dealers and distributors should write us for prices, terms and discounts on our complete line or any part of it.

Motor Truck Radiator & Mfg. Co.

2 Co'umbus Circle
New York City



EMCO Radiator

For FORD TRUCKS

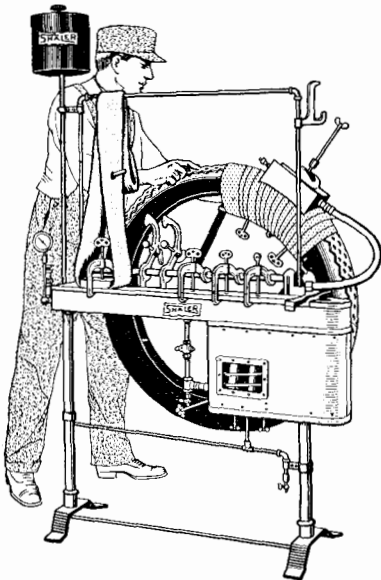


Make Big Profits This Winter

Tire repairing has no dull season—millions of tires must be repaired this winter before they can be used next spring.

Hard wear during winter and extreme cold have a detrimental effect on tires—they need greater care—more careful attention and frequent repairing.

A few feet of space in any spare corner devoted to vulcanizing will bring in enough money to pay all your overhead—and even more.



Type "NPR" Price \$70,
subject to trade discount.

SHALER Shop Vulcanizer

is the most practical vulcanizer made for garages and tire repair shops. Complete outfit, vulcanizers, tools and repair material cost less than \$100—and this vulcanizer will do just as much work—and as good work—as machines that cost five or six times as much.

Large capacity—you can mend 12 casings and 200 tubes in one day. Uses Wrapped-Tread method used by large tire manufacturers. Automatic Heat Control saves time and trouble—prevents damaging tires.

SHALER Vulcanizing Plants are equipped either with gas or with gasoline burners—or you can get a SHALER Electric Vulcanizer that can be attached to any electric light socket. A boy can learn to operate it.

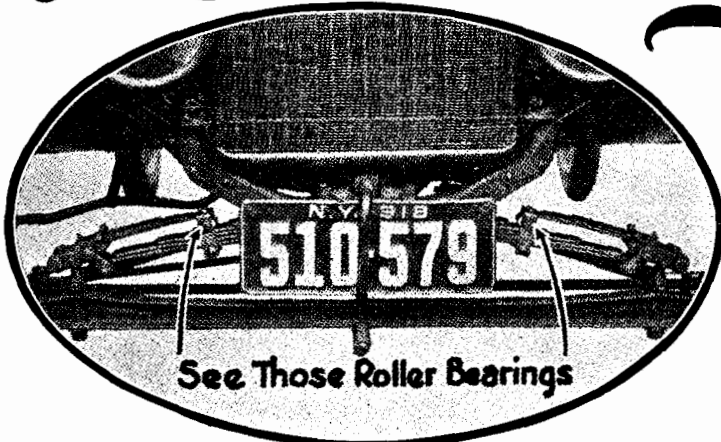
Your Jobber Sells SHALER Vulcanizers

Place your order with him now—or write him for full information about the SHALER Type NPR Vulcanizer. Write us quick for catalog of the complete line of SHALER Vulcanizers for Tire Repair Shops, Garages and Motorists' Use.

C. A. Shaler Co., 2611 Fourth St., Waupun, Wis.
Oldest and largest Manufacturers of Vulcanizers
in the World.

When writing advertisers—Just say FORDOWNER

Defender Spring Shock Absorbers



For
FORD CARS

Fully protected against infringement and licensed under patents No. 1,140,671; 1,293,425

Protect Fords from the Wear and Tear That Ruins

“THEY HAVE THE ROLLER BEARINGS”

DEFENDER Spring Shock Absorbers give Ford owners 100 per cent efficiency in smoothing the roads. That's why the percentage of re-orders from dealers is so great. They turn over quickly.

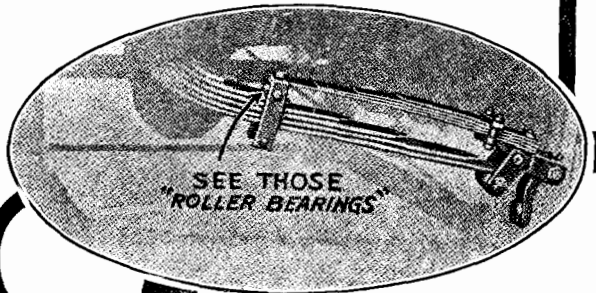
Write today for a sample set. Install them on one of your cars and try them out for 30 days. If unsatisfactory, return at our expense. What could be fairer?

We also make DEFENDER locks for Fords. The new G model, locked by 18 tumblers, is absolutely thief proof and “forget proof.”

The unusual DEFENDER sales plan makes a desirable proposition for dealers. Get in touch with us at once.

Defender Auto Lock Company

Fifth Floor, Marquette Bldg.
Detroit, Mich.



Essenkay

THE TIRE FILLER

Essenkay is the final solution to the tire problem. It makes punctures, blowouts and tire troubles impossible. No air is used, therefore no inner tubes are required.

Essenkay is a flexible, highly resilient material that looks like rubber and possesses practically all the desirable physical characteristics of fine Para rubber, yet actually contains no rubber in any form, therefore has none of the imperfections of rubber. Essenkay is guaranteed against being affected by heat, cold, atmospheric, or climatic conditions—crumbling or flattening. The use of Essenkay is an economy in that Essenkay filled tires run from two to five times as far as air filled tires. The usual delays, inconveniences, discomforts and expense incident to punctures, blowouts, etc., are entirely done away with.

The perfection of Essenkay is a fitting climax to the magical development of the colossal automobile industry which in a few short years has grown from practically nothing to one of the largest industries in the world.

Doubles Tire Mileage

It should be possible to get from two to four times the usual mileage by the use of Essenkay. 10,000 to 20,000 miles is the rule, not the exception. Tires filled with Essenkay are kept at constant pressure, cannot be deflated or run flat, thus they wear down to the last layer of fabric.

First Cost—Last Cost

Essenkay does not wear out like tires, but lasts many years—as long as the car itself. When one set of tires has worn down to the last layer of fabric, simply transfer the Essenkay to new casings.



MORE than 100,000 owners of passenger cars, trucks, tractors and trailers have already paid over \$6,000,000.00 for Essenkay The Tire Filler. These Essenkay users travel more than 500,000,000 miles annually over all kinds of streets and roads WITHOUT A PUNCTURE OR BLOWOUT. These Essenkay users include farmers, bankers, doctors, retail merchants, municipalities, departments of government and great industrial concerns in nearly every country of the world. This is final proof of Essenkay success

"Over 100,000 Users"

See Us At The Show
 New York Automobile Show
 Space D204-D207
 Chicago Automobile Show
 Space No. 12
 Coliseum Gallery

Member



Guarantee

Essenkay is guaranteed against being affected by heat, cold, water, friction, atmospheric or climatic conditions; flattening, hardening, crumbling, deteriorating or changing its consistency in any way in accordance with the standard guarantee of the American Tire Filler Industry (Inc.)

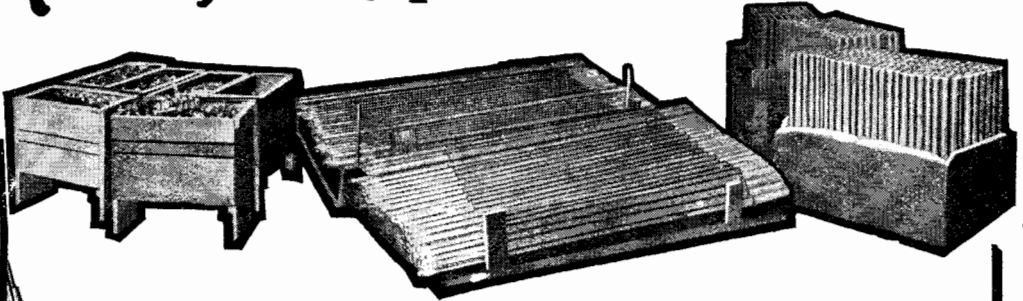
FREE BOOK Without obligation we will send you details of our 10 day free trial offer on Essenkay Tire Filler, copy of testimonial letters and free booklet, "The Story of Essenkay."

THE ESSENKAY PRODUCTS COMPANY
 8-220 W. Superior St. Chicago, Illinois

DEALERS—Write for proposition in open territory.
 When writing advertisers—Just say FORDOWNER

SPENCER

The Name That Guarantees Quality On Replacement Parts



YOU dealers who handle replacement parts have got to stand back of those parts or lose your reputation for service.

That's why you will appreciate Spencer Guaranteed Replacement Parts—machined with care and accuracy from the best of material and stamped with the name "*Spencer*" as a guarantee of quality.

The present modern, finely equipped Spencer factory is the development of the firm belief that Quality pays dividends.

When you sell any Spencer guaranteed product, you can be absolutely certain that it is the equal of the original part in every respect and will give entire and lasting satisfaction.

Spencer Guaranteed Parts are sold only through jobbers—stamped with the "*Spencer*" trademark—made in sufficient quantities to insure prompt delivery at all times—*Unconditionally Guaranteed*.

Spencer Guaranteed Products include:

- Axle shafts and drive shafts for all popular makes of cars.*
- Connecting rods, radius rods, fans and mufflers for Fords.*
- Gilliam take-down taper roller bearings for light cars and commercial trucks.*

THE SPENCER METAL PRODUCTS CO.

624 S. Michigan Avenue, Chicago
and 16 to 24 West 61st St., New York

Spencer
Quality
Costs
You no
More



FORDOWNER

For Dealers and Owners

*The National Monthly Magazine
of the FORD CAR Field*

100% Efficient Circulation

Announcing Our Unusually Big

Chicago Automobile Show Number

This issue—the February number—comes out *in advance* of the Chicago Auto Show to be held in the Coliseum and Armory, January 24-31.

This big number will be looked forward to by Ford Dealers, Automobile Accessory Jobbers, Supply Dealers, etc., as well as thousands of Ford Owners everywhere.

This is your opportunity to test out the remarkable “pulling power” of this big National Ford Field Monthly Magazine. Fordowner advertising pays!

Send in your reservations TODAY. Choice positions to early copy. Forms close January 10th. Copy on which proofs are required must be in Milwaukee on or before January 5th. Next!

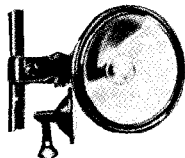
FORDOWNER

For Ford Dealers and Owners

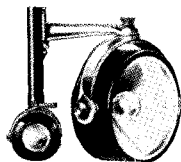
505 Montgomery Bldg., Milwaukee, Wis.

Presenting **Stewart** Necessities
Custombilt

for 1920



Stewart Searchlight
Model 155-A - - \$4.75



Stewart Searchlight
Model 156-A - - \$15.00



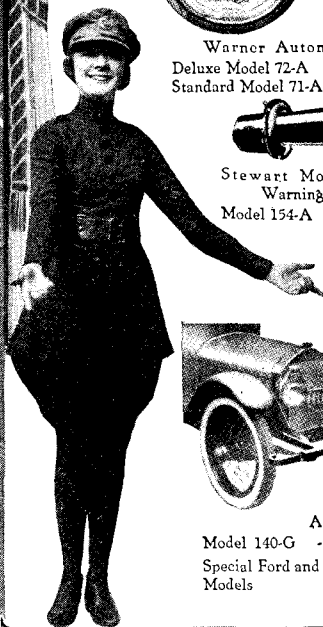
Warner Autometer
Deluxe Model 72-A - \$75.00
Standard Model 71-A - \$40.00



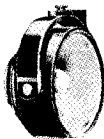
Stewart Hand Operated
Warning Signal
Model 151-B - - \$3.75



Stewart Speedometer
Model 131-A - \$25.00



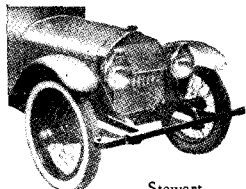
Stewart Motor-Driven
Warning Signal
Model 154-A - - \$6.50



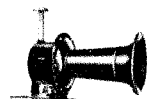
Stewart Searchlight
Model 139-C - - \$6.50



Stewart Motor-Driven
Warning Signal
Model 136-A - \$10.00
Model 157-A - \$15.00



Stewart
Autoguard
Model 140-G - \$10.00
Special Ford and Chevrolet
Models \$10.00



Stewart Hand Operated
Warning Signal
Model 114 - - - \$4.75



Stewart Speedometers
For Ford Cars
Model 160-A - \$12.50



Stewart
Vacuum System
\$13.50

THE year 1920 ushers in what is certain to be the biggest year in the automotive industry. More and better cars will be made and sold. In keeping with the industry's progress, the Stewart-Warner line for 1920 is the most complete ever offered motordom.

During the past year the Stewart Engineering Department and Research Laboratory have labored ceaselessly perfecting and preparing for production the new products that now take their place in the Stewart family.

Better accessories were never

manufactured. Each one is truly "custombilt" the Stewart Quality Way. Each one is true to its name—a real "necessity."

The cars produced during 1920 will thus be more universally Stewart-equipped than ever before—and that means something.

Stewart-Warner Speedometer Corporation, Chicago, U. S. A.

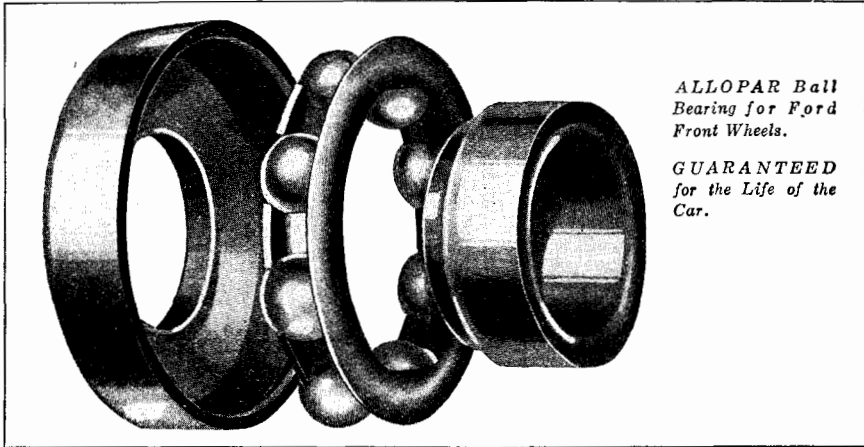
How About the Front Wheel Bearings of Your Ford?

ALLOPAR BEARINGS

Cup, Cone and Ball Type Made of
High Carbon Chrome-Vanadium
Alloy Steel

Make Your Ford Front Wheels

PERMANENTLY SAFE



*ALLOPAR Ball
Bearing for Ford
Front Wheels.*

*GUARANTEED
for the Life of the
Car.*

This is the first announcement ever made of ALLOPAR Products. The Bearing shown above is made of light Armor-plate Steel from formulae and processes developed during the war. Tested for 25,000 miles under service conditions without perceptible wear. Guaranteed for the Life of Car, with normal care and lubrication.

Alloparr
TRADE MARK

**PRESSED ALLOY
STEEL PRODUCTS**

The Company is now making delivery of these Bearings in quantities and is prepared to fulfill large contracts promptly. Other products will be announced as soon as prompt deliveries can be made.

ALLOY PARTS MANUFACTURING CO. Canton, Ohio

A big field for Progressive Dealers. Write for proposition.

ZELNICKER *Ever-Tyte* The Piston Ring for All Engines

Performance — Guaranteed

Install **ZELNICKER Ever Tyte** Piston Rings in Autos, Trucks, Motorcycles, on Gas, Oil or Steam Engines, Air and Ammonia Compressors and Refrigerating Machines. On Pumps, Fire Engines, Steamships, Aeroplanes. In any engine cylinder up to 36-inch diameter—and their performance is guaranteed!

For they are made on sound mechanical principles that are unailing.

Six Point Circular Expansion and Zelnicker's Patented Right Angle Interlock construction insure perfect combustion and maximum compression; besides, they give maximum power efficiency on less fuel and oil.

They will do all claimed for them. The broad earnest guarantee reproduced here removes all doubt. They are giving satisfaction to unnumbered thousands—daily.

Every live dealer and repairman cannot overestimate the significance of this nation-wide advertising campaign. Here is the list of publications that will carry **ZELNICKER Ever Tyte** Piston Ring ads.

Saturday Evening Post	Successful Farming
Literary Digest	Country Gentleman
Progressive Farmer	Sunset Magazine

They aggregate over 17,579,284 readers. The demand for Piston Rings will be overwhelming. Live dealers will order early.

Satisfied customers and bigger profits for you. Write for our proposition.

THE EVER TIGHT PISTON RING CO.,
Saint Louis, Mo.



GUARANTY BOND

We guarantee **ZELNICKER Ever Tyte** Piston Rings to produce higher compression, develop more power, and use less fuel and lubricating oil, you to be the sole judge

We will refund the full purchase price to any purchaser upon the return of the rings if they fail to give absolute satisfaction within a period of twelve months from date of installation.

THE EVER TIGHT PISTON RING CO. ST. LOUIS

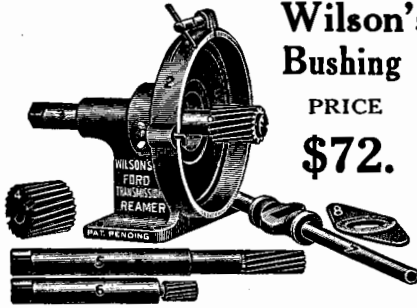
No 2,628,243

M. Zelnicker
PAULS

SAVE $\frac{2}{3}$ OF YOUR LABOR COSTS

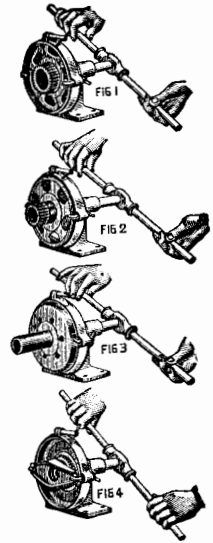
Wilson's Transmission Bushing Reaming Machine

PRICE
\$72.

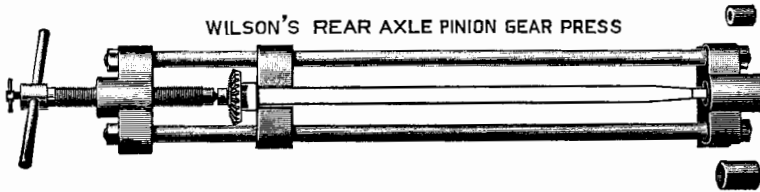


reamer that will cut a perfectly true hole with a highly polished finish. Other types of plain or expanding reamers cut on a 1 to 2 inch surface, are not held rigid and in alignment with Drum, therefore impossible to ream bushings true, resulting in a very Noisy transmission and usually a Dissatisfied customer.

Assuming your labor cost is 50 cents per hour (usually higher) 30 minutes' labor costs you 25 cents to completely, and perfectly remanufacture a complete transmission, by any other method. A poor job, at your best, 4 hours' labor costs you \$2.00. Saving by using Wilson machine, \$1.75; on 300 jobs \$525. Complete machine costs \$72.00. Pays for itself in actual saving of time 7 times in one year. Eliminates all come-backs. Makes satisfied customers. This machine is recommended by the Service Department of the Ford Motor Company. We have doubled our output 4 times in 11 months to supply the demand. Every customer satisfied.



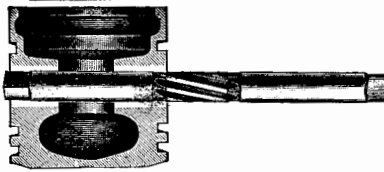
WILSON'S REAR AXLE PINION GEAR PRESS



\$22.00
Complete
Shipping
Weight
60 Lbs.
Crated

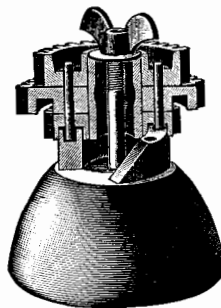
The only press of its kind made that will **pull-off** or **put-on** a Ford Pinion Gear. No matter how tight, they will move easily. A workmanlike job is assured every time. No hammering or damaging of parts with consequent loss of time. Leverage 168 to 1.

You can't afford to be without it, no matter if you have a large arbor press. This tool is always ready for this one job, and will do it quicker and better than any other way. Actually pays for itself by saving of time 8 times in one year, figuring 300 axles.



SELF-ALIGNING
PISTON BUSHING REAMER
Price \$5.00
FULLY GUARANTEED

Wilson's Self-aligning piston bushing reamer is absolutely perfect. Cuts highly polished hole through bushings in perfect alignment. Front Pilot 10 Thousandths Undersize, good fit for unreamed bushing. Rear Pilot Standard Wrist Pin size. **Guaranteed to satisfy.**



Triple Gear Riveting Jig
Price \$4.00
Makes old triple gears good as new with 8 Minutes' labor. Enough said.



K.R.WILSON, BUFFALO, N.Y.
Cam Shaft Aligning Reamer
For Rear Bearings
"Takes Out the Knock."
Price \$12.00

Wilson's cam shaft aligning reamer is especially designed to ream the rear bearing in perfect center line with the front and center bearings. Cam shaft knocks are frequent, and very disagreeable. This will eliminate most of them. It is the only accurate method of doing a real job that satisfies your customer. Price low enough so you can't afford to go without it. Well made Hardened and Ground Bearing surfaces.

K. R. WILSON, 10-16 Lock St., Buffalo, N. Y.

Facts About Main Bearing Reamers

"Wilson's Perfected Main Bearing and Connecting Rod Aligning Reamer is the only one made that will do Perfect Work."

UNFAIR TRADE COMPETITION by three other manufacturers prompts me to submit a few facts for your interest.

SPIRAL FLUTED REAMERS WILL NOT CHATTER. Straight fluted reamers will. Main bearings and connecting rods in Fords have a relieved surface at the parting line of bearings, which causes straight fluted reamers to jump as the tooth of reamer passes this gap, while **SPIRAL FLUTES** will start to cut with front end of tooth on one half of bearing before the heel of the tooth leaves the opposite half.

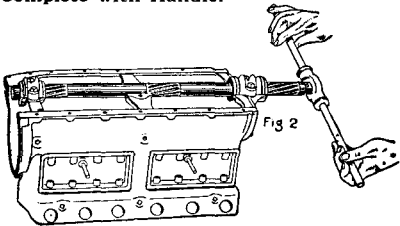
SPIRAL FLUTES CUT WITH SHEARING MOTION, require very little power to turn them, and deliver a highly polished, perfect fitting bearing. A straight fluted reamer Pushes the babbitt and requires ten times as much power to turn it after little use.

IMPOSSIBLE TO REAM MAIN BEARINGS AND CONNECTING RODS AT SAME TIME. Every reamer has a certain amount of "Thrust" and as you turn the reamer it will force the Rods away from you so that they will be reamed at an angle, and if assembled into a motor would cause piston to side slap at every explosion.

WILSON'S PERFECTED MAIN BEARING REAMER WILL GIVE SATISFACTORY SERVICE AND OUTLAST ALL OTHERS AT ANY PRICE. A New steel has been developed, which we are able to temper so perfectly that the edges of the flutes will

Price \$28.00

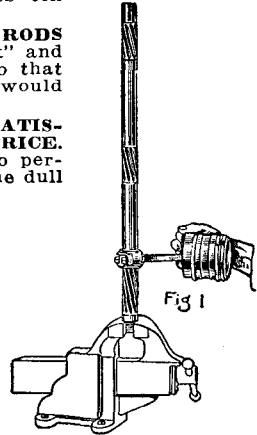
Complete with Handle.



after a few operations. The Land on each reamer tooth is equal to one-third its width, insuring a highly polished bearing, and holding its diameter and clearance indefinitely.

Guaranteed to work perfectly, stand up indefinitely. Defective reamers replaced free or charge.

30 minutes to perfectly fit main bearings and connecting rods. Saving 8 hours over hand scraping. Only method of insuring perfect alignment.



Pays for Itself 40 Times on Actual Saving of time on 300 Motors. INSURES 300 Satisfied Customers.

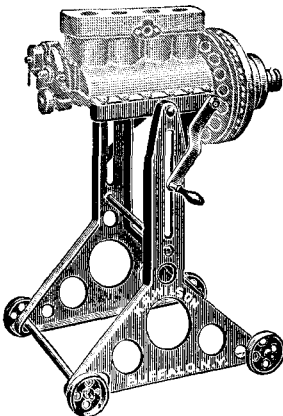


LIST OF BRANCHES:

- | | | |
|------------|--------------|------------|
| Albany | Detroit | Pittsburgh |
| Baltimore | Hartford | Providence |
| Boston | Newark | Rochester |
| Birmingham | New Orleans | Scranton |
| Bridgeport | New York | St. Louis |
| Buffalo | Paterson | Syracuse |
| Chicago | Philadelphia | Utica |

AND SEVENTY OTHER LEADING JOBBERS.

EXHIBITING AT NEW YORK AND CHICAGO SHOWS

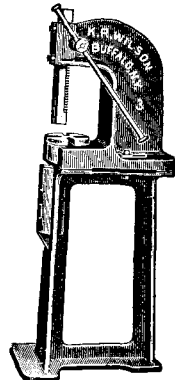


WILSON'S IMPROVED MOTOR STAND

Take Your Motor Where You Want It.

Price \$20. Shipped Knock-Down, Weight 95 Pounds.

Take the motor out of your car where most convenient, load it on the stand and roll it to your shop. Motor can be turned and locked in any position to work to best advantage, saving a great loss of time on every operation, over old methods and inaccessible positions. "No mechanic can deliver the goods standing on his head." These stands are well built, and extra heavy thruout, worth their cost in one month's use.



WILSON'S SENSITIVE ARBOR PRESS

"Feel the Pressure Being Applied."

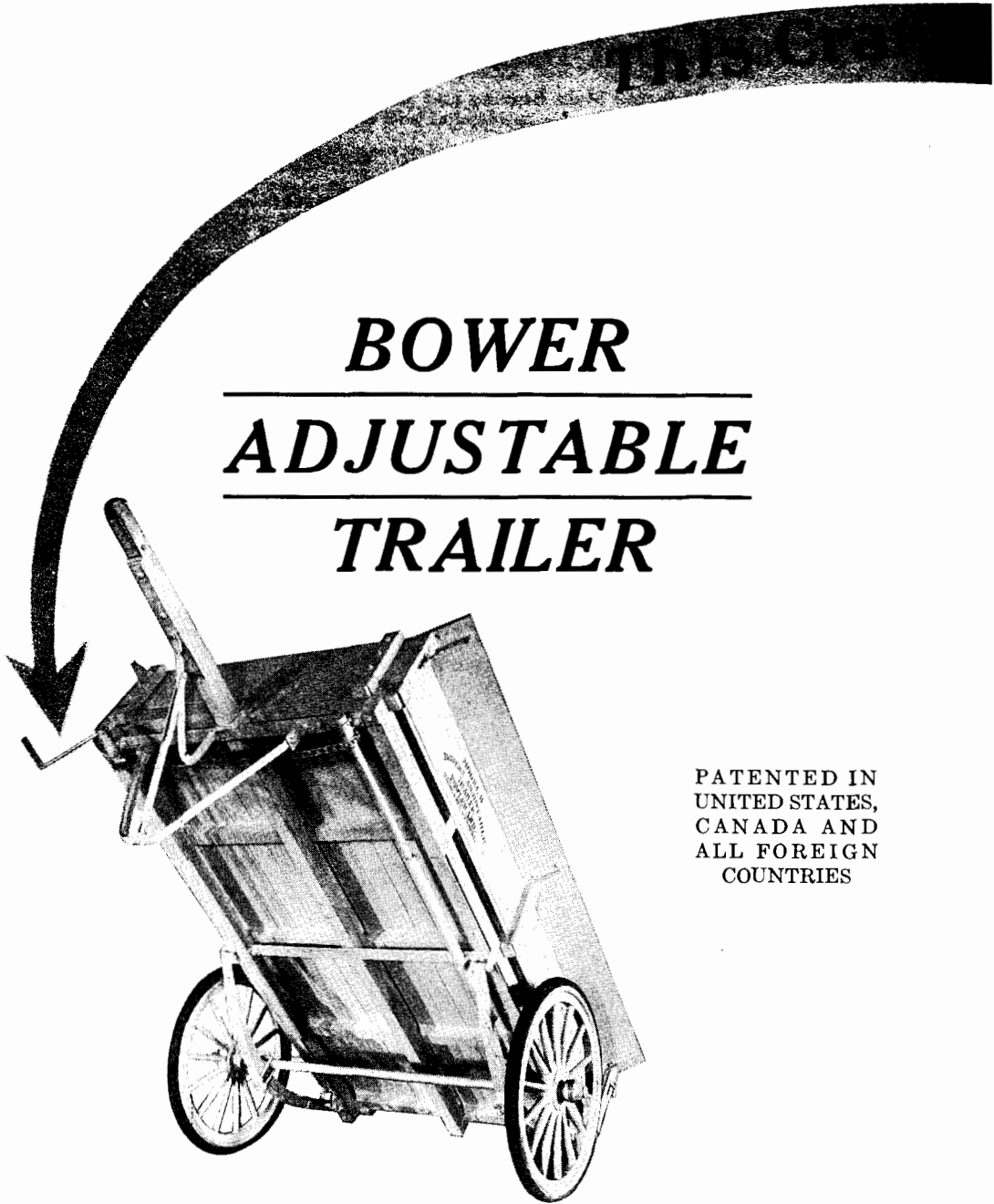
Price Complete as Shown.....\$45.
Price, Less Stand for Bench.....\$25.

All Ford shops need a sensitive arbor press. No matter if you have a large one, for pressing in and out transmission and piston bushings enables the operator to "feel" the exact amount of pressure being applied. Tight bushings on being forced by large press often break other parts causing unnecessary expense and delay. Make better mechanics by installing one of these presses. Actual saving thru loss of time and breakage of parts pays for it

SEND FOR COMPLETE CATALOG OF LABOR SAVING TOOLS FOR FORD REPAIR SHOPS.

K. R. WILSON, 10-16 Lock St., Buffalo, N. Y.

EXPORT DEPARTMENT, 98 PARK PLACE, NEW YORK, N. Y.



BOWER

ADJUSTABLE

TRAILER

PATENTED IN
UNITED STATES,
CANADA AND
ALL FOREIGN
COUNTRIES

Write to the

Bower Manufacturing Company

When writing advertisers—Just say FORDOWNER

*The Bower Is the Only
Adjustable Trailer Made*

*Note These Exclusive
Features*

THE BOWER is Adjustable.

THE BOWER has Rolling Shackles
on springs.

THE BOWER has Collapsible Stand.

THE BOWER has same size Bearings on inside and outside of wheel.

THE BOWER has 45-inch Tongue Extension.

THE BOWER will not Whip and Jerk.

THE BOWER gives Jobbers and Dealers Exclusive Territory Contracts.

Superior Features

THE BOWER is built of Oak and Red Gum.

THE BOWER has two distinct bodies, Rack and Flair-board.

THE BOWER Wheel Bearings are Heavy Duty Ball Type.

THE BOWER platform is Extra Large.

THE BOWER axle is made of 1½-inch Chrome Nickel Steel of 130,000 lbs. tensile strength to the square inch.

THE BOWER is painted with a Coach Body Finish.

THE BOWER tires are 32 x 2 Solid Clincher Type.

THE BOWER has a capacity of 1,500 lbs. at Automobile Speed.

THE BOWER Adjustable Auto Trailer is built in a factory that builds nothing but
Bower Adjustable Auto Trailers.

THE BOWER is guaranteed.

THE BOWER Manufacturing Company owns the Basic Patents in the United States
and Foreign Countries for Adjustable Trailers.

THE BOWER commissions are Inviting.

501 Washington Ave., Fowler, Ind.

When writing advertisers—Just say FORDOWNER

AUTOMOTIVE

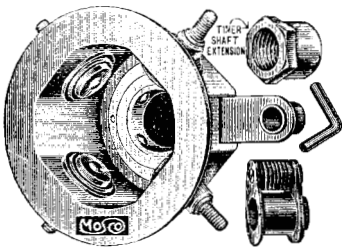


EQUIPMENT

Standard of the Motor Field!

Mosco products are manufactured from the finest of materials by the most skilled mechanics in our own big modern factory. They are the best that ingenuity and workmanship can produce. Demand and see that you get "Mosco" equipment—don't be fooled by "Just as good." The dealer who handles "Mosco" stands as a progressive merchant who cares for the good opinion of his customers.

"Largest Independent Manufacturers Of Timers For Ford Cars In The World"



\$3.00

Heavy Steel, Nickel Plated

Improved Bemus Ball Contact Timer

The BEMUS is the IDEAL TIMER, because form of contact is the only one which is correct electrically and mechanically. This is made of a hardened tool-steel brush coming in contact with steel balls which are kept in proper position by means of a spring with plug on the end pressing against them. The impact of the brush causes the balls to turn so that a fresh surface is presented for each contact.

The brush comes in contact only with the four balls, touching no fibre or insulation. The balls are so located that each has a track of its own on the brush, this insuring a maximum amount of wear.

MOUNTING is direct on the time shaft by means of an extension piece which is screw threaded on to shaft, and runs in ball-bearing placed in recess of Timer's shell. This means that each of the balls is equi-distant from the brush. RESULT—absolute precision of timing. Easier starting, smoother running, longer life and saves coil points.

Fibre Ring Timer

The case is extra heavy pressed steel, finished in aluminum. Gray bone fibre raceway, with steel inserts dovetailed in and all lathe finished to a polished surface. The threaded terminals are insulated by fibre washers all the way to contact points, removing cause of short circuiting. Oiler can be opened with tip of oil can, is self-closing and dust-proof. Brush assembly has die cast rotor, laminated pressed steel arm, and compression spring between roller and rotor.



\$1.50

Complete with Brush

New Catalog Ready

A post card brings it to You—Write for it today

MOTOR SPECIALTIES
WALTHAM

AUTOMOTIVE



EQUIPMENT

When writing advertisers—Just say FORDOWNER

AUTOMOTIVE



EQUIPMENT

Front Apron for Ford Cars!

For 1917-18-19-20 Models Only.

This apron makes a wonderful improvement in the appearance of the Ford Car, but it does more than that.

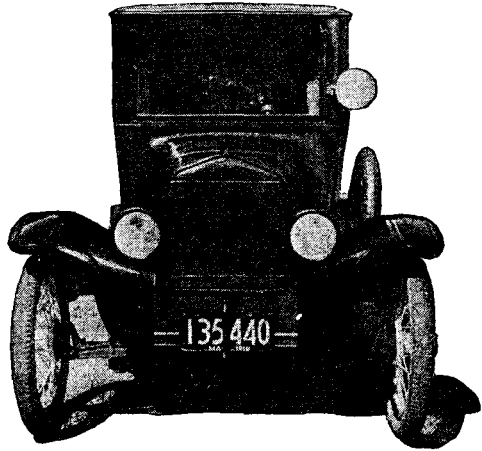
It Prevents Mud from Clogging Radiator.

Its Shape Induces a Larger Volume of Air to pass Through Radiator and Reduces Risk of Overheating.

It Keeps Lamps Clean.

It Prevents Vibration of Mud Guards.

Made of heavy steel, finished with two coats black enamel and baked. Furnished complete with bolts, nuts and washers. Easy to attach.



\$6.50 Each. \$7.50 West of Mississippi River.

BUSHING REMOVER

FOR FORD, DODGE, OVERLAND, CHEVROLET, MAXWELL, SAXON, DORT

And All Cars, Trucks, and Tractors using 1/2-in. spindle bolt

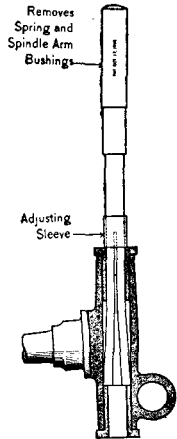
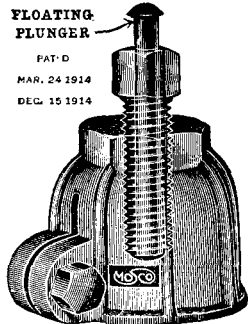
A PRACTICAL TOOL

Removes bushings from steering knuckle, spindle arm and springs, and does it so quickly that it pays for itself the first time used. Fitted with sleeve which keeps split end of tool compressed until properly located, when it is automatically released.

Mosco Floating Plunger Wheel Puller

Starts a "Frozen" or "Stuck" wheel instantly. Strike the plunger, turn the screw, strike again and the wheel comes off without injury to hub threads, spokes or axle.

Made for 200 models of 45 popular makes of cars.



MADE OF STEEL,
CASE HARDENED

\$1.50

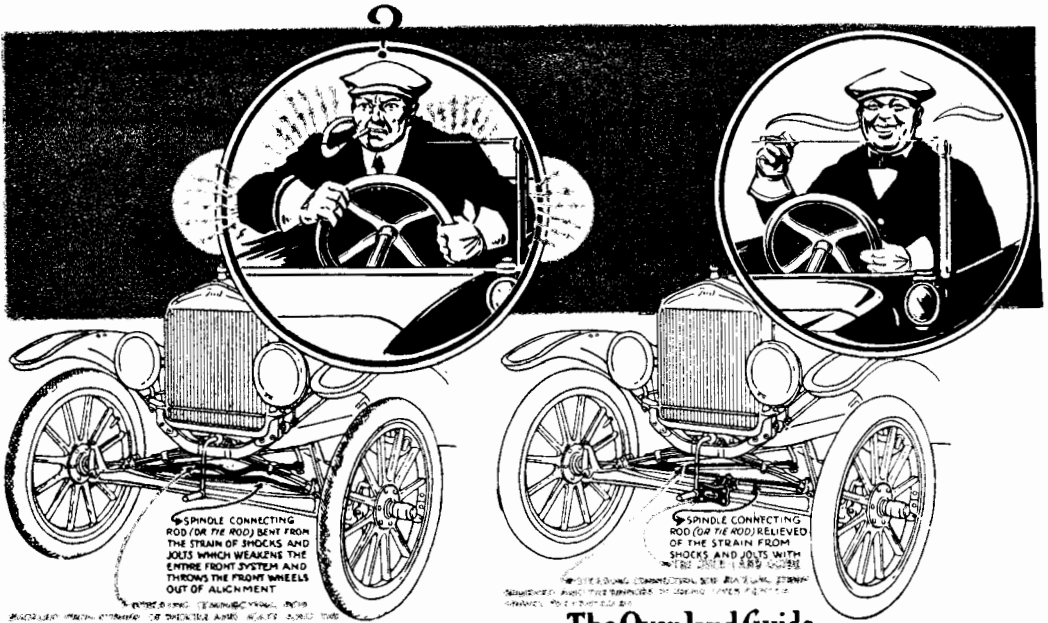
COMPANY, Manufacturers
MASS.

AUTOMOTIVE



EQUIPMENT

When writing advertisers—just say FORDOWNER



A Ford Controlling Itself

The Over-land Guide PATENTED Controlling the Ford

Every Ford Needs The OVER-LAND Guide

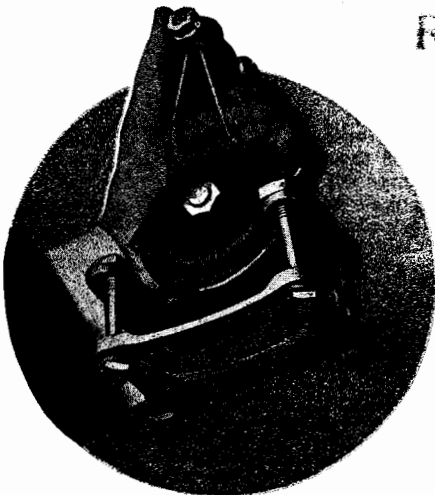
for easier, safer control — for smoother going

The OVER-LAND Guide is easily installed on your Ford. It will pay for itself ten times over — in saving of repairs alone.

The OVER-LAND Guide stops the wobbling and scooting of the front wheels, saving at least thirty (\$30.00) dollars a year in tires alone. It enables you to guide your Ford WITH THE TIPS OF YOUR FINGERS, relieving the strain of keeping a tight grip on the steering wheel. That alone is enough to make the OVER-LAND Guide necessary on your Ford!

The OVER-LAND Guide also reduces breaking and repairs of all the following parts: Such as spindle connecting rod (or tie rod). Spindle body arms and bushings. Spindle body and bushings. Ball and roller bearings and hub. Steering connecting rod and ball joints. Steering gear pinion. Steering gear internal gear case and bushings.

Also helps to keep axle from breaking or bending — and may save your entire car from destruction.



Reduces Risk of Accidents

The OVER-LAND Guide gives you the best insurance against danger of loss of life and destruction of your car through accidents that result from loss of control. For the OVER-LAND Guide concentrates control of your car in the steering wheel.

Your steering gears may get out of service, or the steering gear connecting rod may become locked over center travel—but the OVER-LAND Guide, with its grip on tie rod, will hold your Ford in the middle of the road until it is brought to a safe stop, avoiding the possibility of being ditched.

Satisfaction Guaranteed

The OVER-LAND Guide is guaranteed to do all we say. Use it, properly installed, twenty days and if, at the end of that time, you are not satisfied, return it and your money will be refunded.

Order the OVER-LAND Guide from your dealer—or

Write for circular

Giving full particulars and price. Get an OVER-LAND Guide for your Ford today.

THE MEIKELL COMPANY
216 Board of Trade Indianapolis, Ind.

Sole Foreign Distributors
Automobile Sundries Co., 18 Broadway, New York

When writing advertisers—Just say FORDOWNER

"It's easy" with a Morgan Red Pump

Just a few easy strokes with the Morgan Red Pump (practically one-half the number required with an ordinary hand pump) and your tires are inflated to their full capacity. No fatigue, no sustained effort. The special valve used in the Morgan Red Pump is an extraordinary point and is unusually light. This reduces air pressure to a minimum and lets the full barrel capacity of air be expelled into the tire on each down stroke of the piston. The complete vacuum thus created is filled with cold, fresh air on each up stroke. This feature is exclusive with the Morgan Red Pump and explains its remarkable speed and ease of operation.

The barrel is made of heavy, cold drawn steel base and top clamped together by strong steel braces. The leather inside can be easily renewed by drawing it through the bottom of the barrel when the base is detached. Each part of the Morgan Red Pump is accurately machined, and a carefully tempered spring is attached to the piston rod, preventing the piston from striking the barrel on the up stroke.

The hose is five-ply Goodrich, the best obtainable.

The steel foot strap allows the Morgan Red Pump to be used either vertically or at any angle. Finished in fire engine red enamel.

List Prices

17 inch barrel

\$350

22 inch barrel

\$400

PACKED FOR SHIPMENT IN LOTS OF 12.

Manufactured by
The Morgan Mfg. Co., Inc.
Sentinel Building
Keene, New Hampshire

DEALERS

Already without any selling effort the demand for the Morgan Red Pump has been tremendous. We are now ready to supply dealers throughout the United States. We offer an extraordinary proposition.



Keep Your Ford Warm —Use That Wasted Engine Heat

With a "Slip-On" Heater, fresh air heated by the exhaust pipe pours through a neat register in the floor, keeping your car comfortable even in zero weather. **No Opening in Exhaust Pipe**—Burnt gases and oily vapors

cannot reach you. The metal box of the "Slip-On" fits around the exhaust pipe. The warmed air is always fresh. In summer, register is closed and special device keeps floor-boards cool. Your car is warm in winter and cool in summer.

Sullivan

"Slip-On" Heater for Fords

Costs only \$10.00. Can be installed in half an hour. Costs nothing to operate. **Send No Money**—Just tell us to send the "Slip-On" by parcel post collect. If you do not find it just as represented, return it to us at our expense.



Dealers—Every Ford Owner Is a Prospect
The low price and convenience of this heater make an unusually strong sales appeal. Its ease of installation means that you can make sales in big volume without tying up your shop man. Write for discounts.

**WINTER COMFORT
HEATER CO.**
137 GRAND AVE.
MILWAUKEE
WIS.

**NICKEL
PLATED**

When writing advertisers—Just say **FORDOWNER**

JUELSON

The PROPERLY COOLED ENGINE *Gets to the Top*

THE Juelson Two-Bladed fan keeps your engine at proper running temperature under ALL conditions—winter, or summer; on the level or up the steepest grades.

Proper air circulation makes proper water circulation.

The Juelson Two-Bladed Fan throws the air currents in a *PARALLEL SHAFT*, and directs and applies them *INTELLIGENTLY* on your engine—over all the surfaces of all the cylinders, instead of chilling the first cylinder, and then scattering out through the louvres.

Proper water circulation is thus assured. With the Juelson Two-Bladed fan the temperature of the water in the radiator will not vary two degrees between winter and summer.

Dealers and Distributors

Send for Full Particulars. Let us tell you of our liberal Selling plan.

Juelson Fans for Ford Cars are now available through your jobber.


American Aero Company
GENERAL OFFICES
Peoples Gas Building.
CHICAGO, ILLINOIS

BRANCHES

New York Atlanta San Francisco Winnipeg
Baltimore Dallas Toronto Vancouver



“CARBON BRUSH” TIMER

Accepted Principle

Electrical Engineers approve the wipe contact principle. The Carbon Brush used exclusively in Zenite Timers has proven advantages. Oil troubles are eliminated—Zenite Timers are oil-less.

Construction and Guarantee

Constructed of highest grade materials obtainable. All parts are machined, fitted and assembled with absolute precision and are rigidly inspected mechanically and electrically. Zenite Timers are built complete in our own factory and are backed by the Zenite reputation. They are fully guaranteed.

Packing

Zenite Timers are packed singly in strong rigid boxes with attractive lithographed covering.

Right In Price

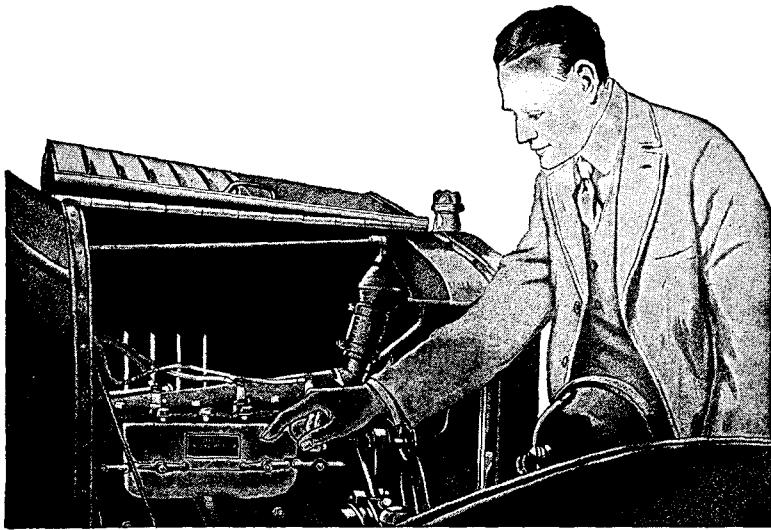
Liberal discounts to the trade. Jobbers and Dealers quoted on application.

Manufactured by

ZENITE METAL COMPANY

203 N. West St.

Indianapolis, Ind.



Product and Market Combine to Make
a Real Dealer Opportunity

The price alone, one dollar, will sell the Jiffy Intake
Manifold Heater for Ford cars

So great is the demand for these accessories that automobile man-
ufacturers are being forced to adopt one kind or another

It can be bolted on by the motorist in five minutes.

No installation expense for the dealer.

Held in place by the two central manifold clamps.

Easily removed in hot weather.

Reduces gasoline consumption and increases power and pick-up.

Saves 25 cents to \$1 every time the gasoline tank is filled.

The Jiffy Retail Price is One Dollar

You know the selling qualities of the Twin Fire Spark Plug.

The Jiffy Heater is made by the same firm to sell in the same big way.

In spite of the low retail price the dealer receives a large margin of profit.

He will be backed by an extensive campaign of sales helps.

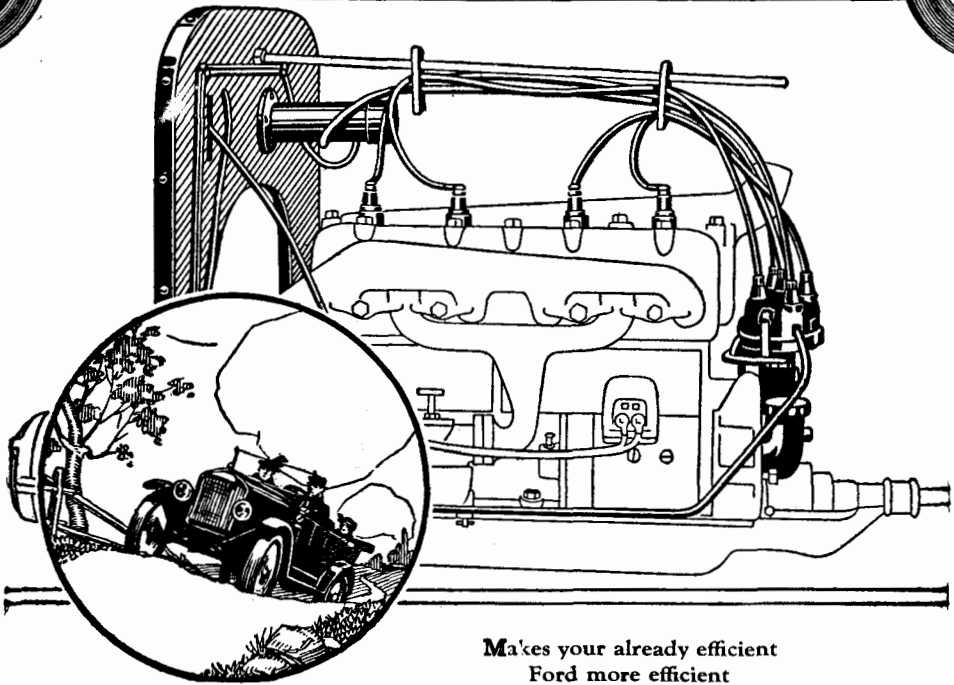
A wire or letter will bring you full information by return mail.

Twin Fire Spark Plug Company

726 Grand River Avenue, Detroit, Mich.

JIFFY

Intake Manifold Heater for Fords



Makes your already efficient
Ford more efficient

ATWATER

ADVANTAGES
of Atwater Kent Ignition on the
FORD

- 1 The same hot spark at all speeds from cranking to maximum. Not dependent on motor speed like a magneto.
- 2 This hot spark at low speeds permits throttling down to three or four miles per hour.
- 3 Makes starting easy in all weathers by furnishing a hot, fat spark as soon as contact is broken, regardless of motor speed.
- 4 This easy starting prolongs the life of the storage battery.
- 5 Automatic spark advance reduces gear shifting to a minimum, increases mileage per gallon and adds to ease of driving.
- 6 Auxiliary spark lever permits of manual spark advance.
- 7 Fool-proof in construction—one adjustment only and that made with an ordinary screw-driver.

KENT

TYPE CA IGNITION
for the FORD

Equipped with electric starting and lighting
1919 and later models.

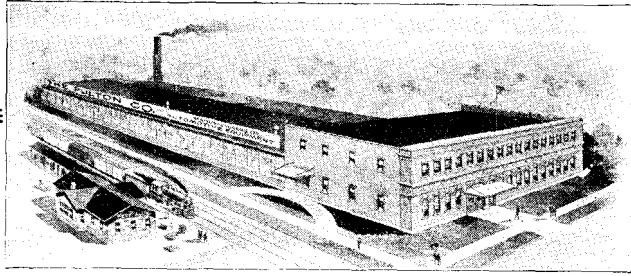
No complicated parts—no magnets—a simple high-grade device that does its work faithfully winter or summer, rain or shine—and will outlast the car.

ATWATER KENT MFG. COMPANY

Philadelphia

A big field for live dealers

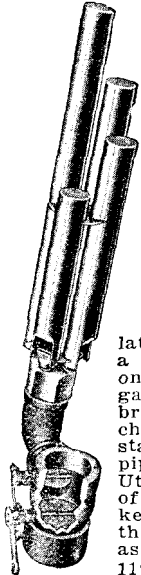
Write factory for proposition



THE **FULTON** MILWAUKEE LINE

The **AERMORE** Exhaust Horn

"The Signal With a Smile"



A horn that gives a pleasant, musical, effective warning without offending. So regulated that it may be easily heard a block or a mile away. Built on the principle of the pipe organ with four heavily nicked brass pipes and a harmonious chord. Can not clog. Easily installed without cutting exhaust pipe or using batteries or wires. Utilizes the gas from the exhaust of the engine involving no up-keep expense. Original cost is the only cost. Will last as long as your car.

- 11" Aermore Horn for Ford Cars \$7.00
- 13" Aermore Horn for Cars of 25 H. P. 8.00
- 15" Aermore Horn for Cars of 30 H. P. and over..... 9.00

BULL DOG FOOT ACCELERATOR

The same easy control of the speed of Ford cars and cars under 25 H. P. as in higher powered cars, is assured with a Bull-Dog Foot Accelerator. Easily operated by a foot pedal. Speed can be regulated on the roughest of roads. Leaves the hands free to guide the car.

Practically unbreakable, simply constructed. Easily installed without car attention. Price complete **\$1.50.**

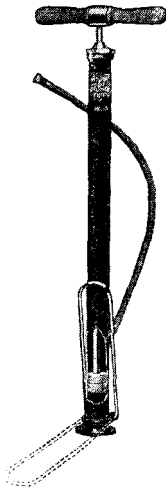


MONROE SELF-OILING PUMPS

Pumps quickly and easily

The life of a pump is entirely dependent upon its washer. One of the principal features of the Monroe Self Oiling Pump is the 1/8" felt washer—so treated with oil that the moisture and lubricant is retained for the plunger. Cup washer automatically oils assuring a maximum pressure with each stroke. Ball valve construction permits the free passage of air and saves fighting backward pressure of air. Finished in Japan, thoroughly baked, height 2 1/2 inches, weight 2 1/2 lbs. Packed in individual cartons, 30 cartons to the case.

Price \$2.50.

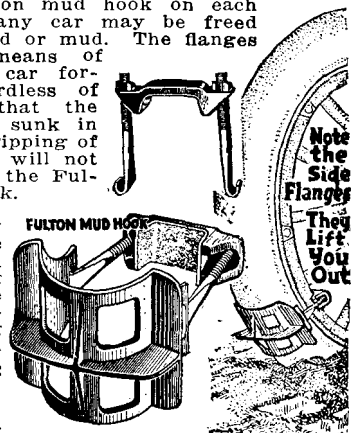


FULTON IMPROVED MUD HOOKS

With a Fulton mud hook on each rear wheel any car may be freed from the sand or mud. The flanges supply a means of forcing the car forward regardless of the depth that the wheels have sunk in the mud. Stripping of gears simply will not happen with the Fulton Mud Hook.

Strongly made. The padded steel clamp fitting the tire snugly without injuring the wheel. Made in 3 1/2, 4, 4 1/2 and 5" sizes.

\$3.00 per set.

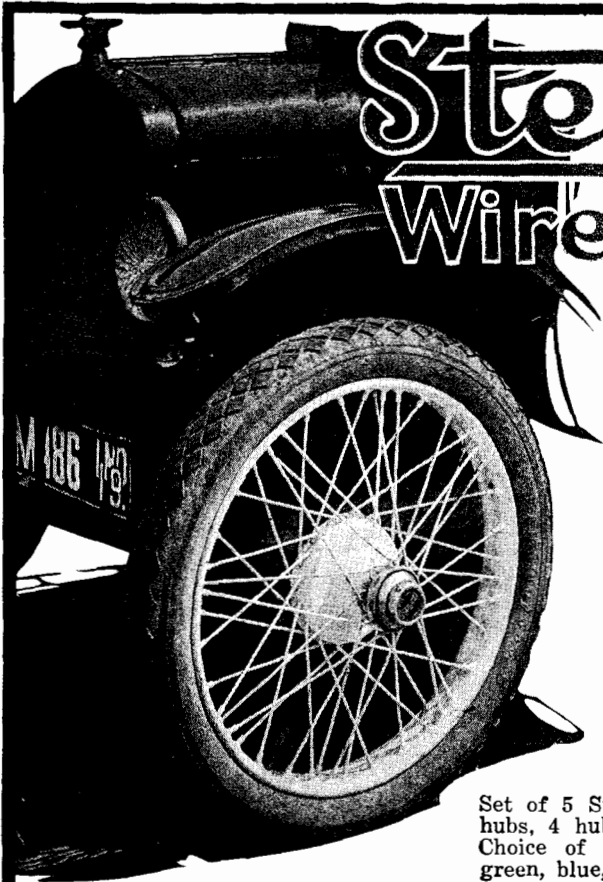


Write for Catalog Listing Prices, Discounts and Terms

THE FULTON CO.

1910 St. Paul Ave.

Milwaukee, Wis.



Stewart Wire Wheels

bring beauty, comfort and greatly increased economy of operation to your Ford. Stewart Wheels are clever, racy and distinctive. They absorb all road shocks with their springy resiliency so that you and your friends enjoy real "big car" luxury on city street and country road. By reducing the unsprung weight of the car they decrease wear on tires and increase gasoline mileage. Above all—Stewart Wire Wheels are *absolutely safe*, because, with their patented "reverse taper" construction inside the hub, they positively cannot come off by accident.

Put Stewart Wire Wheels on Your Ford

Set of 5 Stewart Wheels, with 4 inner hubs, 4 hub caps, hub-cap wrench, etc. **\$70**
 Choice of colors—black, white, cream, green, blue, red or khaki—
 For Ford Cars.....

Same equipment for Chevrolet "490" **\$80**
 and Overland "4".....

*The Wheel that
Won't Come Off*

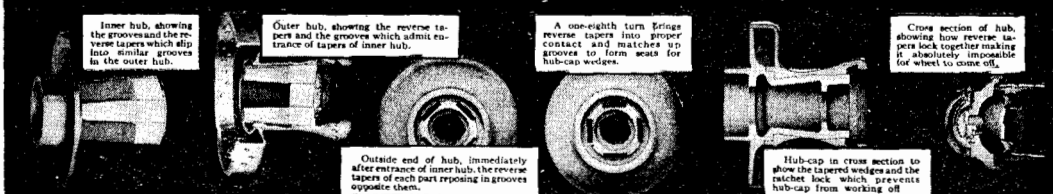
Read This Remarkable Guarantee

Every set of Stewart Wire Wheels and parts is guaranteed for one year from date of sale. Should the material or workmanship prove defective, or should any breakage or damage (except to enamel) be sustained in an unavoidable accident during that period, the wheels or parts thereof will be replaced by us without charge to the original retail purchaser.

TO FORD DEALERS—Stewart Wire Wheels offer a big selling opportunity. Our advertising is creating first sales and each set sold sells others. Write for our attractive dealer proposition.

Stewart Wire Wheel Company

501-537 W. Barner Street, Frankfort, Indiana, U. S. A.



Why the Stewart Hub Makes Safety Sure

GUARANTY Motor Repair Arm

(Pat. No. 1,289,100, December 31, 1918)
Note the date



Scientifically made in Rights and Lefts, extended prongs provide greatest bearing surface and strength reinforcement; saves time and expense. A wrench and a few minutes make a permanent repair. Loosen 6 bolts, tighten nuts, do not disturb motor.

Price \$1.50

GUARANTY PLIABLE-DRIVE

AND EXTENDED FRAMES FOR

FORD WORM DRIVE TRUCKS

REMOVES ALL LIMITATIONS

Without Propeller Shaft, Universal Joints, Ball Bearing Universal Motor Connection:

\$100.00 only

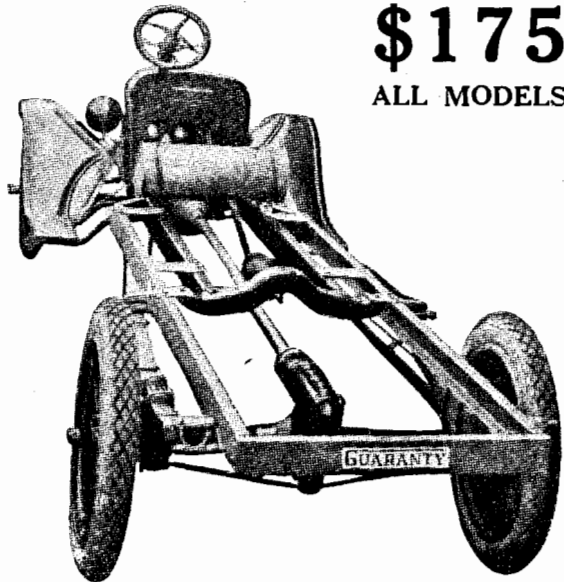
*Loading Space up to 10 feet
 Carrying Capacity up to 2 Tons
 Special Radius Rod Hangers included*

Ford Truck Demountable Wheels

Special price for immediate acceptance: **\$23.00 net.**

Tax included

Two 34x4½ demountable wheels (will also take 35x5 tires) 3 rims, 1 wrench.



Guaranty-Pliable-Drive and Extended Frame on Ford Truck

GUARANTY MOTORS COMPANY

436-438 MASSACHUSETTS AVENUE

CAMBRIDGE, MASS.

Manufacturers of the well known GUARANTY LINE

GUARANTY Internal Gear Drive Units for converting pleasure cars into trucks, GUARANTY Power Hoists, Pliable-Drive and Extended Frames for Ford Worm-Drive Trucks, Repair Arms, etc.

DEALERS: Liberal Discounts on the entire Guaranty Line. Continuous co-operation and publicity.

DUPLEX SPECIAL

PISTON RINGS

For
Fords



Duplex Special two-piece Piston Rings are the product of the largest manufacturer of Piston Rings in the world.

The outer ring is individually cast from tough, close-grained grey iron. This outer ring with its step joint, is in itself a most efficient snap ring. However, to eliminate any possible leakage, an inner piece of shock spring steel is used to seal joint and to insure an equal pressure on the cylinder walls.

Mechanics instantly recognize the superiority of Duplex Rings because they save on gasoline, oil and repairs; greatly increase power and eliminate carbon troubles.

Equip your motor with a complete set. Any live dealer will procure same for you or you can send direct to the factory.

THE *Piston* RING COMPANY
SPECIALISTS IN PISTON RINGS

116 SANFORD ST.

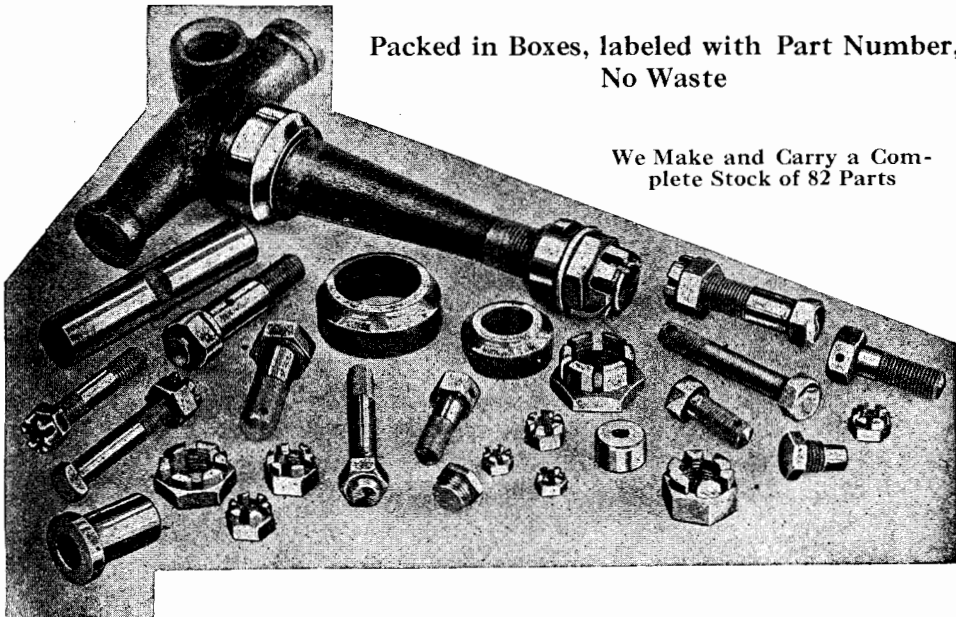
MUSKEGON MICH.

Mr. Dealer

You Can Buy

Dependable Parts for the FORD

Quality and Accuracy Guaranteed



Packed in Boxes, labeled with Part Number,
No Waste

We Make and Carry a Complete Stock of 82 Parts

They don't cost any more, our GUARANTEE tag attached to every spindle body and in every package is your protection, they are as good or better than the genuine.

Ask your Jobber, he can supply you. If not, write us.

**THE
CINCINNATI
SCREW
CO**



**Cincinnati, Ohio
P. O. Loveland,
Ohio**

Limo-Weather Proof Top

PATENT APPLIED FOR

Offers you the same Comforts as a Limousine
at a Cost within the Reach of All

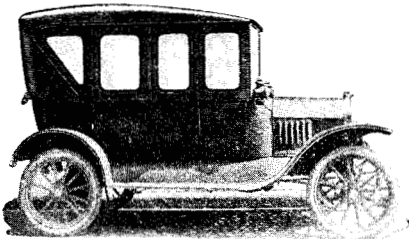


Illustration taken from photograph, showing our Limo Weather-proof Top complete with all curtains applied ready for cold winter's blasts. Note the general appearance as well as the fact that you are closed in. Any one can apply our top to car. It does not require a mechanic. Made to suit 1917-18-19-20 Ford Roadster or Touring cars.



Showing Ford touring car with doors open. Note curtain arrangement. Curtains open with doors. Curtains can be removed in sections.

Number 947 high grade Water Tight Cloth Limo Weather Proof Top; French style Back Curtain with Double Curtain Pocket, Pyrolin Lights, In Side Curtains, One Oval Beveled Plate Glass Light in rear Curtain. Top all complete with Curtain arrangement ready to set on 1917-18-19-20 Ford Touring Cars..... **\$87.60**

Number 1047 High Grade Water Tight Cloth Limo Weather Proof Top; French Style Back Curtain with Double Curtain Pocket, Pyrolin Lights, In Side Curtains, One Oval Beveled Plate Glass in rear Curtain. Top all complete with Curtain arrangement ready to set on 1917-18-19-20 Ford Roadsters..... **\$61.50**

Write for Discriptive Circular and Catalog.

BUOB & SCHEU

Auto Top Specialists

104-112 Webster St.

Cincinnati, Ohio



**Complete
with
Rings and Pin**

COCHRAN

Ford Pistons Increase Mileage 25%

In the opinion of experts who have made exhaustive tests, COCHRAN Ford Pistons are the best grey iron pistons built—from the standpoint of design, quality of material, and workmanship.

COCHRAN pistons eliminate as nearly as possible the vibratory forces set up by the weight of the reciprocating parts. Reducing the weight to a minimum, and still preserving sufficient weight to insure durability and long life, COCHRAN PISTONS are responsible for a smoother running motor, even at excessive engine speeds.

Furthermore, the COCHRAN design, and the high quality of metal used, provide ample surface and good conductivity for transmitting heat away from the piston.

The workmanship is exceptional—the machining so accurate that COCHRAN pistons fit exactly—not too large to lose explosion pressure—and not so tight that the piston seizes the cylinder wall.

Prompt Delivery—Price \$2.50

Detroit Metal Products Co.
Detroit, Michigan

Furnished in Standard Size.

Also in the following oversize:

.0025	.005	.010	.015
.020	.025	.03125	.045

County Distributors

Write for our territory proposition! Our selling plan is liberal—and a real opportunity awaits the right distributors.

Use the Coupon

Detroit Metal Products Co.
Detroit, Michigan

Gentlemen:

Kindly forward by return mail, full information describing COCHRAN PISTONS—the details of the COCHRAN selling plan. Complete set to garages and repair men, \$7.20 Detroit.

Dealer

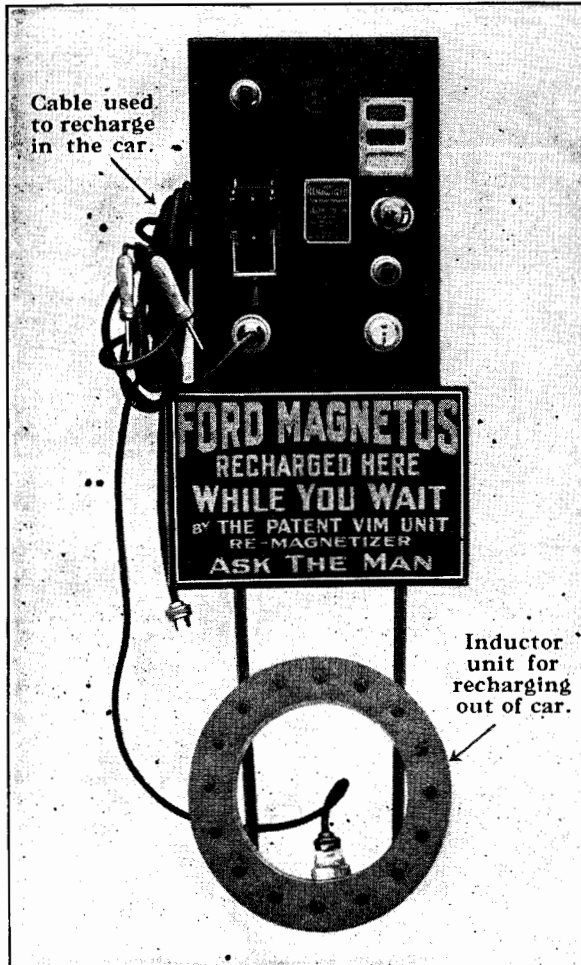
Jobber

Name _____

Address _____

Mister FORD Owner

This cut represents a patented electrical equipment which is being placed in the different FORD Service Stations throughout the country, especially for your benefit. Heretofore, when your magneto showed signs of weakness, you no doubt had it replaced with a new one, which of course meant a large repair bill for you. Now, with this equipment, we eliminate your ignition troubles while you wait and the Garage man only charges you \$3.00 for the job and gives you perfect satisfaction or refunds the money. If your Service Station has failed to install this up to date equipment, just ask him why he has not done so to give you the proper Service that you are entitled to.



The VIM
Eliminates
Hard
Starting,
Poor Lights,
Diminished
Power and
Ignition
Inefficiency.

Remagnetizing Ford
Magnetos in
the car is
not an
Experiment
now. It is a
Practical,
Proven Fact
with this
Patent.

MISTER GARAGE MAN

Are you aware of the fact that it is essential in all lines of business, in order to gain what we are all striving for—"SUCCESS"—to surround yourself with efficient methods to attain your goal? In the auto repair business it is necessary to have installed the very best Service equipments it is possible to obtain. With efficient mechanics applying same it places you on the straight road to success.

The VIM UNIT REMAGNETIZER is offered to bring your shop up to the very best Ignition Service that it is possible to have installed. The complete equipment sells for \$200 and is sold with a thirty day money back guarantee, if not satisfactory. Other garages in all parts of the country are using this equipment—**WHY NOT YOU?**

Write for our contract which protects you on exclusive territory.

This equipment will be exhibited at the New York, Boston and Chicago Auto Shows.

THE VIM UNIT REMAGNETIZER Factory: PATERSON, N. J., U. S. A.

All infringements will be prosecuted to the fullest extent of the law.



When Danger Demands a Quick Stop

Under the excitement of the moment, when collision or other accident faces you, is no time for calculating to a nicety the distance a foot pedal must be pushed to throw the car into neutral. In such a crisis, when danger threatens death or injury to yourself or loved ones, the natural tendency is to

“Just Jam Both Feet Down Hard”

To do so in a regularly equipped Ford car is to make the impending accident almost inevitable. Because, pushing both feet fully forward throws in the powerful low gear which greatly increases the resistance that the brake must overcome.

With the Porter Safety Neutral Stop applied to your Ford, the natural impulse can be safely followed and the pedal will be held in the neutral

position while the brakes are being applied—there is absolutely no possibility of pushing it past into low gear.

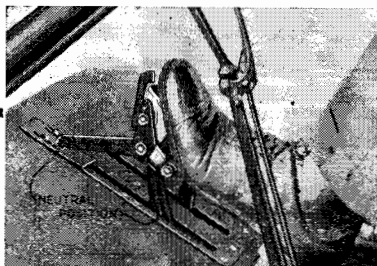
The illustration below shows how simply and surely the Porter Safety Neutral Stop operates. It shows also how, by rocking the foot slightly, the release latch lifts the stopping member above its obstruction and permits the pedal being pushed forward in the usual manner.

Send for circular describing the Porter Safety Neutral Stop in detail. Or better still, have one installed on your car at once. You will wonder how you ever did without it.

At your Dealers or direct from

GEORGE G. PORTER, Specialty Engineering and Manufacturing

General Offices
Keith Theatre Bldg., Syracuse, N. Y.



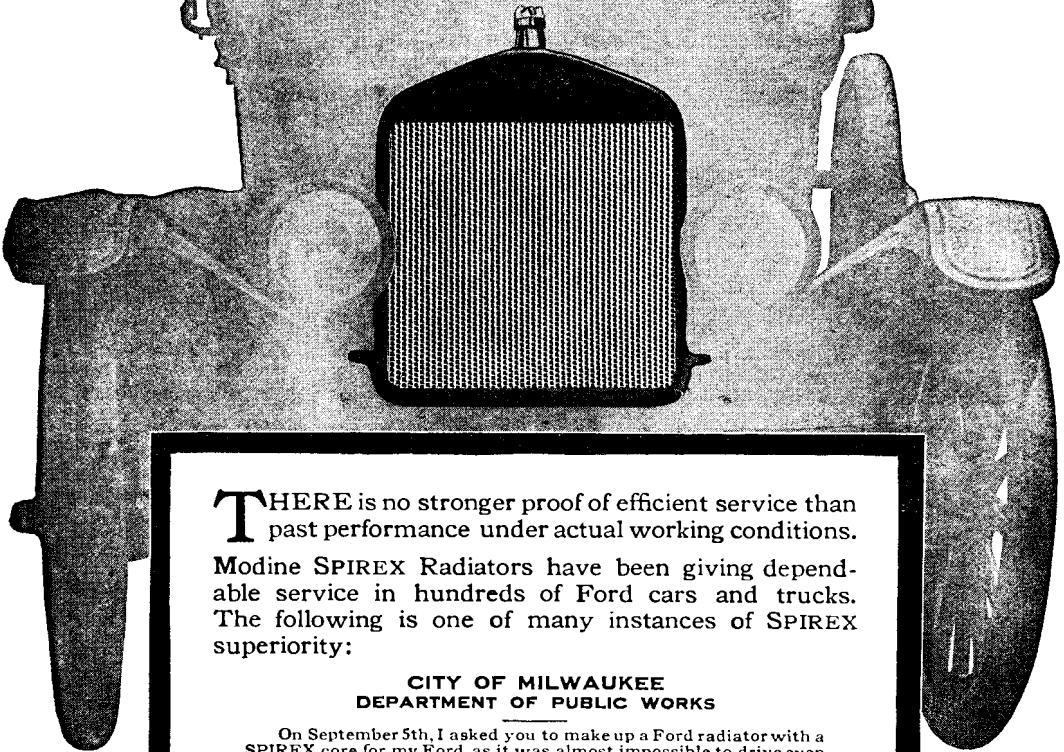
Price Complete
\$2.50

View shows the clutch securely stopped in neutral position

Circular on request

When writing advertisers—Just say FORDOWNER

PROOF of a Better Cooling Service



THERE is no stronger proof of efficient service than past performance under actual working conditions.

Modine SPIREX Radiators have been giving dependable service in hundreds of Ford cars and trucks. The following is one of many instances of SPIREX superiority:

**CITY OF MILWAUKEE
DEPARTMENT OF PUBLIC WORKS**

On September 5th, I asked you to make up a Ford radiator with a SPIREX core for my Ford, as it was almost impossible to drive even five miles with the original radiator without opening my side door and even taking off the hood in order to let the excess heat from my motor escape. My motor would pound terrifically and during one trip of 196 miles, it was necessary to refill with water three times.

Since using this SPIREX core radiator this excess heat has disappeared, the knocks are eliminated, miles per gallon of gasoline have increased and after driving 533 miles, one quart of water refilled my radiator.

In fact I am so well pleased with this radiator that I am today ordering four more to be used on our one-ton trucks. They are the best ever brought to my attention.

Very truly yours,

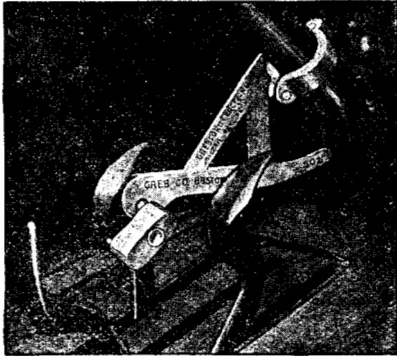
H. W. PARKER, Supt., Municipal Garage.

MODINE MANUFACTURING COMPANY
Racine, Wisconsin

MODINE
SPIREX
RADIATORS
for *Fords*

EQUIPMENT FOR FORD CARS

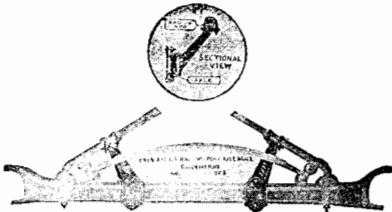
Grebford Auto Lock No. 502



Thousands of Ford cars have been stolen on account of having no protection against thieves. This lock will retain any Ford in neutral and can be easily attached.

Is secured to steering post by a double head hexagon screw. The outer head twists off flush when tightened enough.
Price, complete with padlock **\$2.50**
Price, without padlock **\$1.50**

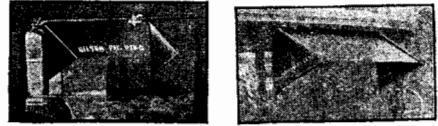
Grebford Radius Rod and Front Axle Brace—No. 503



Can be applied in a very few minutes. Prevents bending and breaking of radius rods, thereby eliminating accidents. Makes steering much easier and safer under all conditions. Safety first. Every Ford should be equipped with a pair. Shipping weight approx. 6 lbs.

Price per set (including left and right) **\$3.50**

Greb No-Glare Windshield Protector—No. 504



Can be attached or removed in a few seconds. It keeps rain and snow from covering the entire windshield and permits a clear vision ahead under all conditions and stops the glare from lights in the rear as well as those ahead.

Price complete **\$2.00**

Grebford Double Truss Radius Rod—No. 501



Can be easily attached in a few minutes without the aid of a mechanic. It strengthens the front axle on a Ford and holds it rigidly in position. It cannot buckle, lessens vibration, prevents accidents and makes steering much easier and safer. Will last indefinitely and save the cost of new radius rods. Shipping weight approx. 10 lbs.

Price **\$5.00**

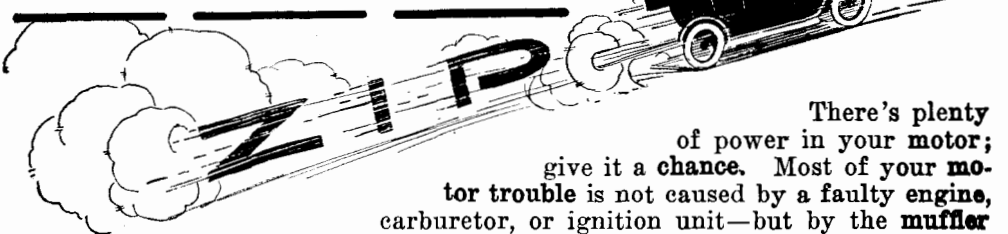
Other products for Fords—Greb Handy Glass. Grebford Extensions. Greb Automatic Grip Puller No. 3. Grebford Muffler. Greb P.B.B. Assembly. Grebfox Solder Cement. Greb Automatic Safety Oil Gauge.

Ask your dealer or jobber—or write us

The Greb Company 199 State Street
BOSTON, MASS.

N. Y. Show Space D50, Geo. L. Holmes
Also at Chicago Show

GET ALL THE POWER - YOU PAY FOR

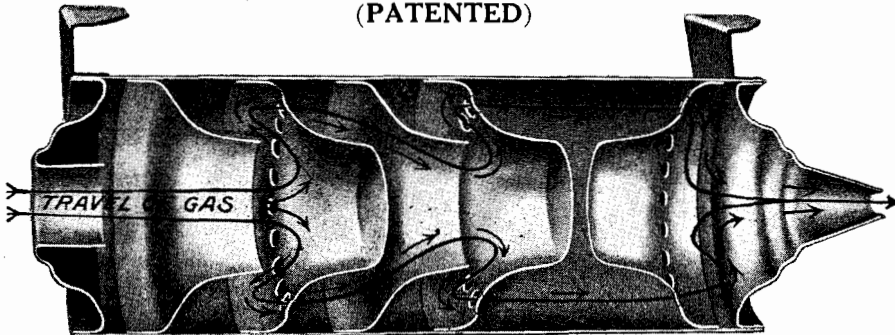


There's plenty of power in your motor; give it a chance. Most of your motor trouble is not caused by a faulty engine, carburetor, or ignition unit—but by the muffer because it was not built on principles permitting free exit of gases, having a tendency to stifle motor "impulses" causing a logy condition, robbing it of its perfect functioning possibilities.

Thousands of motorists have realized this fact and economically have turned to the

"U-VEE" MUFFLER

(PATENTED)



This type for FORD CARS at \$2.50 each. Other types for ALL CARS or TRACTORS at \$3.50 to \$5.00 each.

The "U-Vee" Muffer combines every correct scientific principle possible in the CONSTRUCTION of THIS IMPORTANT PART of ANY CAR or TRACTOR.

It provides a direct flow of the exhaust from the engine, allowing the gases to travel smoothly AWAY from the engine instead of "backing up" and increasing motor labor.

THE EJECTOR CUPS of the "U-Vee" Muffer dissipate the gases without interfering with the flow. Ample space and intimate contact between each cup and the outer shell permit quick COOLING and REDUCTION of PRESSURE.

The result is a positive saving of power; the motor will then develop the power you "pay for." The integral parts of the "U-Vee" Muffer are substantially electrically welded to each other; therefore, will NEVER rattle loose. The "U-Vee" is interchangeable with former assembly. Merely use a hammer and a wrench.

WE GUARANTEE EVERY "U-VEE" MUFFLER LEAVING OUR FACTORY BOTH AS TO WORKMANSHIP AND MATERIAL. YOU CAN'T "BUST 'EM."

The "U-Vee" Muffer has been adopted as standard equipment by several of the largest automobile manufacturers, and is saving money among thousands of users. Mail your check or money order today. Orders filled immediately.

Complete, ready to bolt on Ford cars, Price \$2.50 each.

Parcel post shipping weight, five pounds. Next two sizes larger, shipping weight, six pounds.

NOTICE: Accessory dealers (wholesale and retail) write today for terms and name your selling territory.

The International Steel Products Co., HARTFORD, WISCONSIN

FORDOWNER

Incorporating NEWSABOUT FORDS and FORDIST

For Ford Dealers and Owners

Vol. 12

JANUARY, 1920

No. 4

NEW YORK AUTO SHOW

**Immense Exhibit of Cars, Trucks and Accessories
Awaits Motorists**

Many New Features to Be Shown

The eyes of the Automotive World are turned eastward, and already many pilgrims of Motordom have begun their journey to their Mecca. After many months of preparation the big New York Automobile Show is ready to open its doors.

That the New York Automobile Show will constitute a more complete exposition of the automotive industry than ever before in the successful history of these shows is apparent from a statement issued by S. A. Miles, manager of the National Automobile Shows, that there will be on display 87 different makes of passenger cars, 70 of motor trucks and 284 accessories.

The New York passenger car and truck shows will be held during the week of January 3-10. Passenger cars will be exhibited on four floors of Grand Central Palace, while the truck exhibit will be held in the 8th Coast Artillery Armory, the largest in the United States.

In addition to this comprehensive display of cars and accessories a series of conferences on transportation problems has been incorporated in the Motor Truck divisions of the shows. These conferences have aroused general interest as a clearing house for ideas gained during the war and reconstruction periods and made concrete in new models of cars and accessories on display.

Conference sessions will be held each afternoon for those identified with the motor truck business—manufacturers, distributors,

dealers, salesmen, servicemen, etc., while the evening sessions will be designed for motor truck owners, operators, traffic managers, shippers, and all others interested in motor transportation, which has served to complete the great trinity of transportation—railways, waterways and highways. The tentative list of speakers includes the names of men from every section of the country who have won recognition for their qualification to speak authoritatively upon the respective subjects to be discussed at the conference. Motion pictures and lantern slides will be used extensively to illustrate the various talks. No effort will be spared to make this the most complete and successful conference of the kind ever held, in every way worthy of the great exhibition with which it is incorporated. Among those who will speak at the Highway Transport Conference on subjects having to do with highways and highway traffic are Arthur H. Blanchard, professor in charge of Highway Engineering and Highway Transport, University of Michigan and President of the National Highway Traffic Association; F. G. Thompson, Highway Engineer, State of New Jersey; M. O. Eldridge, Director of Roads, American Automobile Association; Harry S. Quine, Goodyear Tire & Rubber company; Robert C. Hargreaves, Goodrich Tire & Rubber company; Pyke Johnson, Secretary of Highways Committee, National Automobile Chamber of Commerce; George C. Diehl, Chairman of Good Roads

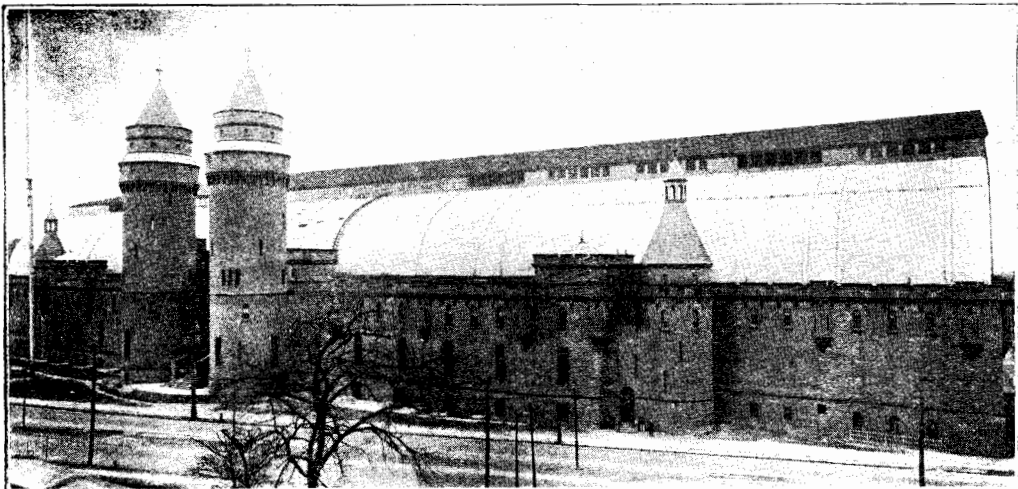
Board, American Automobile Association; J. E. Pennypacker, and S. M. Williams, Chairman of the Federal Highway Council.

It is said that the accessory exhibit will be most complete, and already accessory manufacturers with products representing

practically every motor appurtenance have their exhibits ready for display. With the impetus given to the accessory field through the ending of the world war many practical new items are listed and this department will undoubtedly be of great interest.



Grand Central Palace—Passenger Car Exhibit



8th Coast Artillery Armory—Truck Exhibit

The Men Behind the Automobile Show

—
Pres. CHARLES CLIFTON
of the National Automobile Chamber of
Commerce.



MR. ALFRED REEVES
Manager National Automobile Chamber
of Commerce.



S. A. MILES
General Manager National Auto Shows.



STARTING SOMETHING

Easy Starting Under Adverse Conditions

To "start something"—be it a Ford, or a hot time, in this the winter of our discontent—is often more easily said than done. Of course, if there is a long hill, extending downward from the door of one's garage, there is no need to worry about starting—all one has to do is to get into the Ford and coast down hill, using the inertia of the car to "crank her over"—when the high-speed gear is engaged.

In hilly districts, foxy drivers stop their Fords with the car's nose down hill. Then, when starting time comes—five minutes or five hours later—it is easy to let the inertia of the car crank the engine. This stunt is worth remembering—even if you can't stop exactly in front of your best girl's house.

When starting down hill, hold the clutch pedal out, and do not engage the high-speed gear until the car has attained some speed, so that the weight of the moving car will "break loose" the oil of the stiff Ford engine, and start the engine in motion.

Be sure that the headlights are turned off, and the carburetor adjusted for a very rich mixture, before starting to coast.

USING JERK START.

On very slight down grades—only enough to get the car up to a speed of three or four miles an hour, with the clutch pedal in neutral, one can often start the engine by jamming the clutch pedal suddenly and forcefully into forward, into low gear; thus giving the engine a few quick turns, before the resistance of the engine stops the car.

By using the low gear and spinning the engine fast, a much hotter spark and greater suction in the carburetor is secured—thus greatly increasing the chances of starting the engine; as compared with the languid, half-hesitating cranking of the combination of high-gear and low engine speed.

Of course, when this low-speed starting stunt is tried, one must be ready to disengage the clutch, in a snappy manner, as soon as the engine begins to fire. Otherwise, the car will probably stall the engine, and there will be severe jerking and strains, on both car and engine—due to the irregular firing of the engine when starting.

DON'T START IN REVERSE.

Don't try to start the engine by using the reverse gear, when backing down a hill. It is practically impossible to do this because, when in reverse gear, the engine makes so many turns, for each turn of the rear wheels,

and there is so darn much friction in the reverse gear, that the only result of trying the stunt is to lock and slide the rear wheels, causing terrific strains on the tires and wheels, and the rear axle system. It may result in shearing off the keys, or breaking one of the axle gears or axle shafts. Turn the car around, when you wish to start by coasting the car.

We will admit that cars, other than the Ford, can start the engine by using the reverse gear, when backing down hill. But, cars other than the Ford, have sliding gear transmissions, in which there is much less reverse gear friction than in the planetary transmission of the Ford. We've tried this enough to make certain that theory and practice agree, that it should never be done. We wouldn't even do it on another fellow's car!

When one "has a gang along," and they are of the useful sex, then it sometimes pays to have one or more men shove the car along the road, while the driver holds the clutch pedal in neutral, until the car has attained a speed of a couple of miles an hour.

Then the driver should "suddenly and forcefully" jam in the low speed pedal, to spin the engine before the car comes to a dead stop. Decisive action is necessary—and he who hesitates is stuck! The quick spinning of the engine, accomplished in this manner, will often effect a start, when no amount of persistent hand cranking will do any good.

In starting the motor, in really cold weather, spinning the motor will often effect a start when no amount of slow, pull-ups of the starting crank are of any value. When the motor is spun, the magneto generates a hotter spark, which is better able to fire the lean, cold mixture in the cylinders. Also, when the engine is cranked rapidly, there is better suction in the cylinders, and this draws the air and gasoline through the carburetor faster, and secures better vaporization.

BEWARE BACK KICKS.

Of course, when spinning the motor, one is more apt to be injured by a back-kick, than when merely pulling up on the starting crank. To avoid injury from this source, there are two small, but vital, little hints. One is to spin the motor with the elbow bent. The straight arm stunt is all right for football, but it is all wrong for cranking a Ford.

If one cranks the engine with the arm straight, and a back fire occurs, there is nothing to bend or flex, and the direct jerk is

very apt to break a wrist or arm, or dislocate the collar-bone.

However, with the elbow bent—then a back-fire merely bends the elbow more, and jerks the handle out of the cranker's hand.

If one isn't strong enough to spin the engine—without straight-arming—then one should not attempt to spin it at all.

Several years ago, before electric starters were in use on any cars, the writer used to wrestle with big, six-cylinder cars—and some of them had a nasty habit of back firing. A few cracks on the shin—by the swift flying handle of the starting crank—soon convinced the writer that there was nothing to be gained by standing too close to the radiator when cranking.

By standing far enough away from the radiator—so that a back fire can swing the starting crank handle completely around, without striking the driver—is another "Safety First" precaution that takes much of the danger out of the hand cranking of the Ford engine.

Another way, of reducing the dangers of a back kick, is not to open the throttle too wide. It stands to reason that, if the throttle is only open a few notches, any back-fire which occurs, will only be a slow, weak, half-hearted little kick; that is not nearly so apt to injure the driver as the big, mule-sized kick that sometimes occurs when the throttle is wide open.

Strange as it may seem, the timid cranker is the one most apt to be hurt. There is something rather feminine about the Ford engine (besides its sometimes contrariness) that seems to make the engine feel a contempt for the too-gentle cranker, and the engine kicks accordingly.

But, when the masterful, cave-man cranker firmly grasps the starting crank, and gives the crank a whirl—while the engine may make a few half-hearted attempts at a kick—it is more apt to start right off.

There are good mechanical reasons for this. The faster the engine is turning, the less apt it is to back-fire. When the engine is running fast, the spark control lever can be carried away down on the quadrant, at a position that would cause knocking and back-firing at very low speeds.

When the engine is cranked rapidly, the inertia, of the weight of the fly-wheel, tends to carry the engine on and past dead center, in spite of any small back kicks which may occur. At slow cranking speeds, the fly wheel has but little inertia to carry it over dead center, and the back firing explosion has a chance to reverse the direction of rotation of the engine, and get in its dirty work.

These points, in regard to cranking the Ford engine, are emphasized because cranking is so much more difficult in winter, and so much more dangerous—because, in one's anxiety to start the engine, one is so apt to start with wide open throttle, advanced spark, etc.

SPARK LEVER SETTING.

In connection with the use of batteries, we have been informed by our readers, and have checked this up with our own experiences,

that a spark setting that is perfectly all right—for use with the Ford magneto—may be entirely too darn far advanced for use with the batteries. This may seem strange, when we consider that the same timer, coils, and other parts are used.

If you have been accustomed to placing the spark lever down about 5 to 7 notches, when starting on the Ford magneto, then push the spark control lever all the way up—to full retard—when starting on the batteries.

If you have found it necessary to retard the spark lever all the way up, when starting on the Ford magneto; then it may be necessary to bend the commutator pull rod, in order to retard the spark more, for safer starting.

When starting on batteries, it is usually better and safer to start by pulling up on the starting crank for, when batteries are used, just as good a spark is secured at slowest cranking speeds, and it is not necessary to spin the motor to get a good spark.

The reason why the engine is so apt to kick on the batteries, even when safely spun on the magneto, lies partly in the fact that the magneto does not give enough spark to fire the charge, unless the engine is being turned so rapidly that it has enough inertia to carry it over dead center, in spite of a half-hearted back fire. Also, there seems to be a certain amount of lag, in the alternating current supplied by the Ford magneto, as compared with the direct current, supplied by the dry batteries.

HOT IGNITION FOR COLD WEATHER.

The colder the weather, the hotter the electric spark that is necessary to ignite and fire the cold, lean mixture of half-vaporized fuel and air.

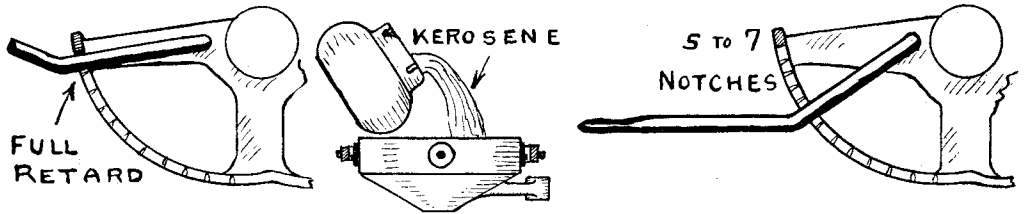
A thin, stringy spark may be so chilled by the gasoline vapor that it may fail to ignite the spark; while a shorter, hot spark—which has power and punch behind it may detonate and fire the charge.

There are two divisions, in easier starting. One is a good fuel mixture while the other is good ignition. They may be compared to the two fists of a boxer—and it is a sure thing that the boxer will be a better fighter if he "has a punch in both hands."

It is sadly true, and truly sad, that when we most need the good, hot spark; this same luscious spark is most difficult to obtain. The Ford magneto requires a fairly high cranking speed, before the magneto will generate enough current to supply the hot, fat spark.

But, when the motor is cold and stiff with congealed oil, then it is about all the driver can do to crank it at all—to say nothing about cranking the engine at a good rate of speed. At below zero temperatures, the writer's Armstrong starter has been sometimes only able to budge the engine, at a very low rate of speed.

This stiffness, of the Ford engine when cold, is largely due to the peculiar planetary transmission used in the Ford car, as there is no doubt that the cold Ford engine is far harder and stiffer to crank than other engines of the same size.



Battery Start.

Cleans Timer.

Magneto Start.

Some of the friction of the cold engine is due to the fact that the cold oil gums the pistons to the cylinder walls. As an experiment, the writer has removed the spark plugs of a stiff, cold Ford engine, and squirted kerosene onto the pistons, to cut the congealed oil that was gumming the pistons to the cylinder walls. Did it do much good? It did not! The difference was hardly noticeable.

TRANSMISSION OIL DRAG.

When the Ford engine is cranked, the slow speed drum, and the reverse drum spin around inside of their brake bands. Undoubtedly, when the oil is cold and stiff, there is quite a little drag, between the drums and the brake bands. But, the worst is yet to come—

Now the villain appears! Hist!

In the high-speed clutch, there are 25 discs or plates, in very close and intimate contact with each other. When the high-speed clutch is released, by the pulling back of the emergency brake lever, the clutch finger ends, which squeezes the discs of the high-speed clutch together, release a distance of less than $\frac{1}{4}$ of an inch.

Now there are about 25 points of contact, between the discs of the high-speed clutch. And this poor, little $\frac{1}{4}$ inch is divided up into these 25 spaces, giving a separation, between adjacent discs of the high-speed clutch, of less than .01 inch.

Now one-hundredth of an inch is not a whole lot of space. And this is easily filled by cold, congealed, glue-like oil; which tends to gum the discs of the high-speed clutch together and creates a tremendous drag.

The remedy, in part, is to use a thin, lighter grade of oil in winter than in summer. But, even more important, is to use a high quality, high grade oil, which has a low freezing point; and flows freely at zero—as the expression hath it.

A winter oil has the further advantage of preventing much engine wear in cold weather. If the oil congeals and freezes, it stands to reason that it will not flow to the bearings, until the engine has been warmed up.

Now, it may take some little time for a stone-cold crankcase to warm up to normal temperature in wintry weather, and, if the pistons and cylinder walls are allowed to run without lubrication, until the oil in the crankcase gets ready to move around, serious damage to cylinder walls and engine bearings may occur—simply due to the use of poor oil.

JACK UP WHEEL.

The fact that much of the drag in the Ford motor is due to friction and incomplete releasing of the discs of the high-speed clutch, is conclusively proven by the quite generally used stunt of jacking up one of the rear wheels of the Ford car, for easier cranking in cold weather.

Of course, this method is a darn nuisance—but Ford engines have to be started—somehow or other. One of the rear wheels should be securely jacked, so that the wheel just clear the ground, as the vibration, due to the running engine and wheel, sometimes drops the car off the jack. Of course, when there are chains on the tires, it is necessary to jack up the wheel, so that the chains will not catch on the ground and throw the car forward against the driver.

When using this method, it is better to only jack up one rear wheel for, while more complete elimination of friction is secured by lifting both rear wheels—still the rear end of the car is so wobbly and unsteady—when both wheels are jacked up, that jacking up one wheel only, is the most practical method. Also, only one jack is usually available.

The differential gears allow the jacked up wheel to spin, while the other wheel remains at rest upon the ground. If the grease in the rear axle housings is not too heavy, this will not cause undue friction.

Before attempting to start the engine by this method, the front wheels should be securely blocked, by about 4 inch by 4 inch blocks. There is sometimes so much friction and vibration when starting that the car will sometimes climb over a mere brick—especially if the brick is only placed in front of the other rear wheel.

And, if the car drops down off the jack, while the rear wheel is spinning, and the high-speed clutch is in gear, this may start the car forward, and run over the driver.

When it comes to getting run over, it is better to get run over by some one else's car—and then one can sue for damages.

Of course, the emergency brake lever is shoved forward, when the car is cranked. But, Fordwise drivers do not place the emergency brake lever quite all the way forward. If the emergency brake lever is just pulled back a couple of notches, from the extreme forward position, this partially releases the high-speed clutch.

The advantage of this is that, when the

engine starts with a jerk, as it usually does, the slipping of the partially released clutch, reduces the jerks and strains on both engine and transmission and rear axle parts. Also, in case the car should slip off the jack, and start forward, the partially released clutch makes it easier for the crankee to stop the car, by putting his shoulder firmly against the radiator.

When using this "jacked-up wheel method," it is better not to have the spark advanced too far, as a retarded spark tends to lessen the jerks and strains due to the uneven firing of the motor when it is starting.

Aside from using a light, free-flowing oil in cold weather, it seems to the writer that the engine cranks more easily if the oil level is not kept too high. With a high oil level, the cold congealed oil seems to gum up both transmission bands and crank case more, and seems to make the engine harder to start. This is a debatable point—we merely mentioned it—because experience at the handle of an ice cream freezer, has taught most of us the tiresomeness of churning a lot of stiff stuff.

BRAKE LEVER FORWARD.

Another stunt, with which the writer has had but little success—is to leave the emergency brake lever forward, when the car is left in the garage for the night.

According to theory, the squeezed clutch plates keep out the oil. Then, by pulling back the emergency brake lever, just when one is ready to crank the engine, there will be no oil between the clutch plates, to cause drag, and the engine can be cranked readily.

However, it seems that, without oil, the clutch plates still have about as much friction and drag, as when they are glued together with congealed oil. So this method does not work as well, on the Ford car, as it does on paper. But it is an easy method to try.

In using this method, there is a slight risk—very slight in cold weather—that the engine will fire the first shot out of the box, and the car start forward and injure the person cranking the car. Supposing that the car is cranked without the emergency brake lever having been pulled back.

TIMER LUBRICATION.

Scientists say that "dirt, is merely matter out of place." In cold weather, owners of Ford cars are apt to say that "oil, in the Ford timer, is —il, or worse!" And it surely does make starting hard.

The wide, flat surface, between the timer roller and the raceway, becomes covered with cold, congealed oil. This oil, being a perfect insulator, holds the roller out of contact with the metal segment and so no current passes through the contact, and there is no spark at the plugs.

This trouble can be determined by one person listening, at the coil box, while another person cranks the engine.

If the switch is turned "on" and still the coils fail to buzz, the trouble is very likely due to oil in the timer. In this case, the only remedy is to loosen the screw of the

clamp spring holding the timer in place, and remove the cotter pin from the commutator pull rod, and then take off the timer.

If the Ford is one of those provided with oil side and tail lamps, a little kerosene oil, from one of these lamps, will make it much easier to clean the timer. At any rate, the raceway, or surface on which the roller runs, should be wiped perfectly clean and dry.

A drop or two of oil on the pin, or axle, on which the roller runs, is all right. But, for cold weather use, it is better not to put any oil on the outer surface of the roller at all.

While the recommendation is usually made that the winter oiling of the timer consist of a mixture of cylinder oil, thinned with 25 per cent kerosene—we believe that, for really cold climates, a 50-50 mixture, of kerosene and cylinder oil, is better.

For lubricating the timer, very thin, light oils, such as sewing machine oil, Three-in-One oil, and castor oil, are sometimes recommended.

Other drivers believe that the best solution of the trouble is not to oil the timer at all, during the cold weather months, when hard-starting is naturally to be expected. They believe that the extra wear, due to the lack of lubrication of the timer roller, is more than repaid for by the easier starting, several times a day.

As a matter of fact, the commutator usually receives some oil, which leaks through from the front end bearing of the camshaft, in spite of the oil retaining washers. Also, the oil breather of the crank case is near by, and this sprays the outside of the timer with oil—some of which gradually works its way inside.

Commutator oiling trouble may cause very hard starting, yet not appreciably affect the running of the warmed-up engine. This is due to the fact that when the engine is running at normal speed, the effect of the centrifugal force of the weight of the roller and the roller arm, slings the roller outward, into more forceful contact with the commutator segments, and insures better contact.

Also, after the engine has been running for a short time, the roller wipes off most of the gummed oil, and the heat and friction thins the oil, so that better contact is made. A good timer is an important help to easier starting.

SPARK PLUG SETTING.

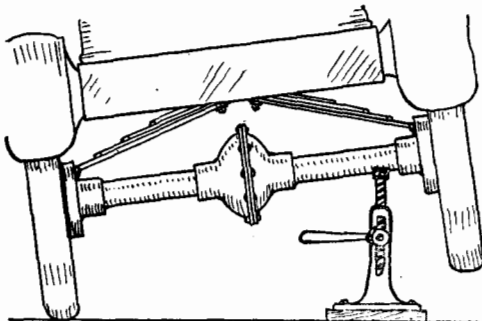
The condition of the spark plugs sometimes makes starting more difficult. If the points of the spark plugs are too far apart, it stands to reason that the Ford engine will have to be cranked fairly fast, before the magneto can generate enough current to jump the wide gap. For easier starting, it is often of considerable help to have the spark plug points rather close together.

The trouble with having the spark plug points too close together is that they are then more apt to become fouled with oil on down grades, and then cause misfiring. Also, too short a gap produces such a short spark, that it does not fire the charge so well.

As 1-32 inch is the standard gap, this can

be made a wee bit less—care being taken to see that the gap is not greater than this, on any of the plugs. This spark plug gap always tends to become greater with use—due to the burning away of the metal of the spark plug points.

Clean spark plug insulators may help easier starting a little. If the insulators are covered with soot and carbon—which carry the current—then the weak current available at cranking speeds is apt to leak through the carbon, and escape. This means that the spark does not jump the gap between the points, and fire the charge in the cylinders as it should.



Jack Up Wheel.

Remove, take apart and clean the spark plugs, and then carefully set the spark plug points to 1-32 inch, or a little less.

COIL UNIT ADJUSTMENT.

When there is so little current available, from the Ford magneto, at slow cranking speeds, we must make the most of it by careful adjustment of the coil unit points. Coil point adjustment has an important influence on easier starting in cold weather.

Whenever possible, the coil units should be tested and adjusted on a coil unit testing machine, with which many Ford Agencies and Service Stations are equipped. As one of these machines costs \$50.00, it is not to be considered as available equipment for the individual car owner. The testing and adjusting of coil units is usually done free of charge, the Service Station making a profit on the sale of the new coil points, which are quite often required.

Inspection of the coil unit points shows that only the top half of the points is of Tungsten metal. When this much has been burned away, it is impossible to get a satisfactory adjustment on the remaining points. For this reason, it is quite often true that it is necessary to replace the points. Good coil points will repay their cost in an easier starting and smoother and more powerful running engine.

While standard practice, for summer use, is to adjust the coil unit vibrators to take from 1.4 to 1.6 amperes of current, this means that the engine has to be cranked faster, for the magneto to deliver this much current, than it does if the coil units are so set that they will start to buzz when the ammeter, on the coil unit testing machine, shows about 1 to 1.2 amperes.

At the same time, it takes great care and very careful adjusting to get the coil units to give a good spark at one ampere. Even if the coil units do take as much as 1.2 to 1.4 amperes, this may be considered as very good.

There is some reason to believe that, when adjusted to consume from 1.4 to 1.6 amperes, there is a hotter spark at the plugs. This would tend to make for better running of the engine, after it has once been started.

The vital point is that none of the coil units should take more than about 1.5 amperes, to ensure easy starting and good running in cold weather.

If one does not have a coil unit tester, then the coil points should be filed clean, smooth and true, so that they make good broad contact, over their entire surface, with each other.

The points should separate about 1-32 inch, when the blade is pulled down against the core of the coil. And the tension of the vibrator spring should be enough to give a clear, steady buzz—yet light enough to allow the weak current, from the Ford magneto at slow cranking speeds, to start the vibrators buzzing easily.

TURN HEAD LIGHTS OFF.

While, under favorable conditions, the Ford engine can be started with the head lights turned on, still, for cold weather starting, one should invariably switch off the head lights, spot lights, hand warmers, and other current consuming devices, before attempting to start the engine.

After the engine has started and is running smoothly, at a fair rate of speed, these current consuming devices can be again switched on, without stopping the motor. This makes a big difference in the ease with which a Ford engine can be started on the magneto in cold weather.

MAGNETO STARTING.

While the 1917 and later Ford engines, which are fitted with the $\frac{3}{4}$ inch magnetos, are supposed to give a better spark at cranking speeds, it is the writer's opinion that the chief advantage of the later type magneto, is in its ability to carry the load of the Ford head lights without trouble. Easy starting can be obtained with the old-style Ford magneto, provided, of course, that the magneto is in good condition.

If the rear main bearing of the Ford engine is so worn that it permits end play of the crank shaft, this will tend to allow a greater distance between the magnets and the cores of the magneto coil assembly, when the high-speed clutch is disengaged by pulling back on the emergency brake lever. (By the way, this may be one of the reasons for the success of the method of starting the Ford engine with one wheel jacked up, as then the high-speed clutch is engaged.)

The closer the magnets revolve to the cores of the magneto coil assembly, the stronger the current of the Ford magneto will be. Other causes, of a weak Ford magneto, which would tend to cause hard starting, are weak,



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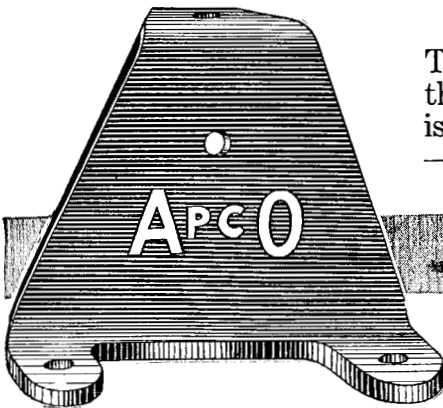
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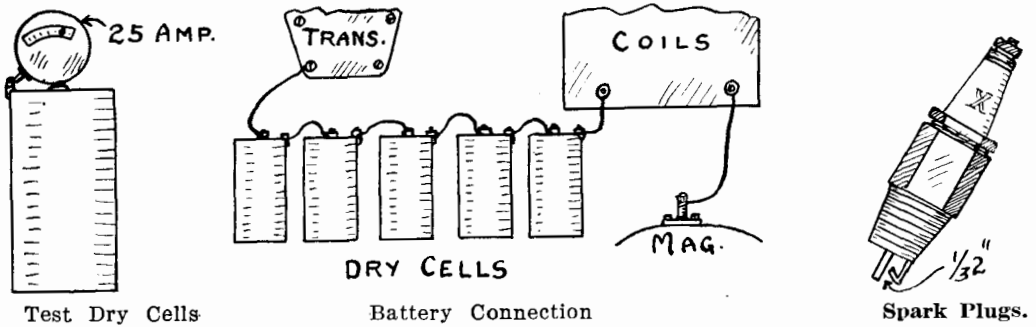
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or partially demagnetized magnets, or short-circuits in the windings of the magneto coil assembly, or dirt under the contact point of the magneto. The strength of the magneto can be tested with a volt-meter, or by the brilliancy of the head lights.

Any broken wires, or poor contact, in the magneto-to-coil wire, or in the switch on the coil box, or even in the contacts between the coil box and the coil units, may tend to make starting more difficult.

One of our readers told us that the trouble with hard starting on his car, had been due to the coil box holding the coil units so loosely that the units had sagged forward, towards the switch side of the coil box, and were making poor contact with the springs in the back of the coil box. This was remedied by placing a piece of card board between the coil units and the switch side of the coil box, so as to wedge the units firmly back against the contact springs.

One of the whimsicalities of the Ford engine, is that it will often start much better on an advanced spark, than it will on a retarded spark. For this reason, the spark lever should be advanced as much as may be, without causing the motor to back fire and kick.

This position varies, on different Ford cars, according to the adjustment of the commutator pull rod, and the amount of "play" or "back lash" in the joints and connections of the spark control operating mechanism.

Only trial and experiment can determine the best starting position for the spark lever, on each individual Ford car. Roughly, we should guesstimate this at about 5 notches for the spark lever, when the commutator pull rod has been correctly adjusted.

The reason why the motor starts better on an advanced spark, is that then the spark occurs at the top of the stroke of the piston, when the compression is greatest, and when the weak mixture is most apt to fire. Also, with the advanced spark, the explosion develops more power, and so the engine is more apt to keep going, until another "shot" occurs.

BATTERY STARTING.

If the car is fitted with a storage battery, for an electric starting and lighting system, or with a storage battery for electric lights, one should connect this battery to the "battery" post of the coil box, and use this battery current as an aid to easier starting.

A 6-volt storage battery gives just the right current for use with the Ford magneto, and is convenient for electric lamps, which save the driver the trouble of wading around in the snow and fussing with oil lamps—which seldom stay lit—in bad weather.

If the electric starting and lighting system is of the 12-volt type, then the connection, to the battery post of the coil box, should be made to the middle of the storage battery, so that a current of just 6 volts will be sent to the coil box. Using the full 12 volts to the coil box would cause severe sparking and burning of the contact points and would be apt to break down the coil units.

DRY CELLS FOR STARTING.

The use of 5 or 6 dry cells, for starting, is a recommended practice, and ensure a good, hot spark, no matter how slowly the engine is cranked. Four or 5 dry cells will buzz the coil units, when the batteries are new and strong, and the car is under a warm shop or store room. But, one must not forget that cold slows down chemical activity, and the dry battery, being a chemical device for producing electricity—does not generate as much current at low temperatures. Also the batteries weaken with age.

In order to have a really adequate current for starting, under all conditions, at least 5, and preferably 6, good dry cells should be used. These dry cells should be connected in series; that is, zinc to carbon, zinc to carbon, and so on, throughout the set.

One terminal (it does not matter which one) of the set of dry cells, should be connected to the battery post of the coil box, and the switch turned to the battery side, when one wishes to start the engine.

The other wire, from the batteries, should be "grounded" on the chassis frame. This means that the wire should be in good metallic contact with some part of the steel chassis frame or engine. One of the screws, holding the transmission cover door in place, offers a convenient location for the attachment of the "ground" wire. Rust and oil are insulators, and will prevent good, metallic contact being made.

The battery post of the coil box, is on the side nearest to the carburetor, and is the binding post to which the magneto-to-coil wire is **not** connected. If the battery wire is connected to the same post as the wire from the magneto, then the battery current will flow through the Ford magneto, and



B A N G !!

B A N G!

B A N G

B A N G

B A N G

purr-r-r-r-r-r-r

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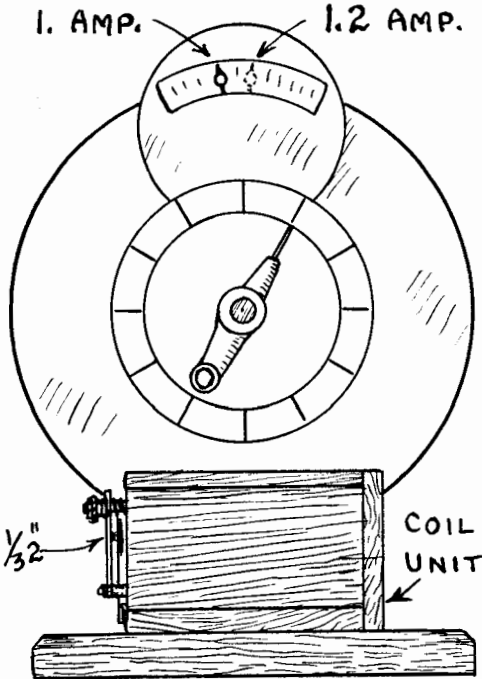
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may ruin it. Also, this would run down the batteries.

As soon as the engine has started, switch right over to the magneto side and save the dry cells for starting only.



Adjust Coil Units.

The dry cells will not last long, if they are used for running on. But, if used only for starting, the dry cells will last about a year. The beginning of winter is the best

time to install the dry cells—for then they will be new and strong, when most needed. During the touring season, the batteries will form a convenient stand-by, and may enable you to reach your destination, even if the Ford magneto should fail, while crossing the mountains.

A set of dry cells, or a storage battery in the car, is often of great help in locating engine or ignition troubles, especially if the driver does not have anyone else to crank the engine, while he is testing to locate the trouble.

If the motor starts to mis-fire, after the car has been driven a short distance—glance at the coil box switch, and see if you haven't forgotten to turn the switch over to the magneto side, after having started the engine. The battery becomes weaker, under steady driving and is very apt to mis-fire.

There are two varieties of dry cells in general use. One type is made for door bells, and other light work. This type usually shows from 18 to 20 amperes, when tested with an ammeter. They supposed to last for several years. But they hardly give enough current for easy starting in automobile use.

Then, there is the regular, automobile type of dry cell, which gives, when new and fresh, from 25 to 30 amperes, when tested with an ammeter. It is a good plan to test every battery purchased, as one or two weak cells will cut down the power of the entire battery—just as a chain is no stronger than its weakest link, so no set of batters is stronger than the weakest cell.

And it is usually better not to buy dry cells that do not show 25 amperes or more. These batteries should last for about a year, if used for starting and emergency and stand-by use only.

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He bought a little car to run,
'Way back in Nineteen-seven;
Of children then he had but one,
Today he counts eleven.

And every separate girl and boy
(They came a year between),
Took their initial ride of joy
In that same old machine.

That car such mileage has achieved,
And stood the strain so well,
Our figures would not be believed
Should we the record tell.

And if your guess we should invite—
"What make, such record scored?"
A million owners would unite
To yell the name of "FORD!"

Yet while of that quite proud we are,
Truth bids us to reveal
The simple truth. That baby-car
Was just a "Pushmobile."

Frederick Moxon.



Does Your Motor Stay Cool on a Long, Hard Grind?

WHEN you drop from high to low to finish that hard climb or to crawl along through congested traffic — what happens under the hood?

Your motor speeds up, requiring additional cooling capacity. You lose the cooling effect of the rapid movement of the car. Your cooling system is greatly dependent upon your fan, and your fan is dependent on the belt.

Will it slip, or will it deliver the necessary power to make the fan keep pace with the motor? Remember, it requires 27 times the power to increase the speed 3 times.

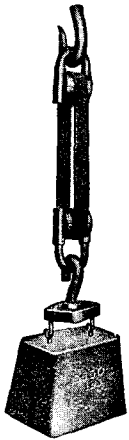
If it's a Tilton, the same efficient cooling is maintained at any motor speed; there's no slip, stretch, or knock to a Tilton Endless Woven Fan Belt. If your fan belt stretches, constant adjustment is necessary to assure you of proper cooling capacity. You will experience a new efficiency from your cooling system when you install a Tilton.

Tilton Belts are made exactly to the car builders' specifications. They are the exact width and the exact length.

*Be sure that the name **TILTON** is on every belt you buy*

SALES DEPARTMENT
EDWARD A. CASSIDY CO., Inc.
280 Madison Ave., N. Y.

Arthur S. Brown Manufacturing Co.



Actual test at the Massachusetts Institute of Technology proved the Tilton Fan Belt able to withstand a pull up to 2550 lbs., over 1¼ tons, before breaking. There was no perceptible stretch. Tilton Belts have a tensile strength of nearly 3 tons per sq. inch.

**ENDLESS
TILTON FAN
WOVEN BELTS**

101-47



A Handy Ford Dictionary

Compiled by Edward Fountain Penn.

Air—Sixty in front, seventy-five behind.
Anti-Rattler—A Ford with engine dismantled.
Blow Out—(See puncture.)
Brake—Stop skip system.
Breather Pipe—An oil well going dry.
Carburetor—An apparatus which is never adjusted just right.

Clutch—A foot rest.

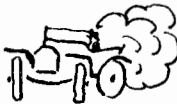


Coil—The plaything of garage men.
Commutator—(See timer.)
Crank Handle—Your boss.
Dammit—Pass word of the Ford fraternity.
Differential—A hidden secret.
Enamel—Soft tender outerskin of the animal.

Engine—Mule power disguised as horse power.



Exhaust—Where your gas money goes up in smoke.



Flat Tire—The end of a perfect day.
Garage—The wood shed with the alley door enlarged.

Gasoline—Ford stimulant.



Grease—Hub decoration.
High—Not low.
Hood—Metal concealer of all the turmoil.
Ignition—A tamed bolt of lightning.

Inner Tube—A pin cushion.



Junk—After seven faithful years.
Kick—Playful antic of kittenish crank.

Knock—Any other noise but a rattle.



Lean Mixture—Not a rich mixture.
License Number—Tin medal presented by the state for your bravery.
Lizzie—Family name of Miss Tin.
Low—Not high.
Magneto—The car's heart.
Manifold—The car's lungs.
Oil—Fluid to place in oil can.

Oil Can—Can to place oil in.



Oil Cup—Place to place oil can filled with oil.

Patch—Reseat for tire pants.



Priming Rod—A rfiend in need.

Pump—Back breaking attachment for weak lunged tires.



Puncture—(See blowout.)
Quarter Turn—Gymnastic exercise which will not start car on cold day.
Radiator—Hot water bag for Lizzie's stomach.

Radius Rod—One of a half hundred iron bars somewhere underneath.
Rattle—Song of the moving Ford.

Rear Wheels—Front Wheels while reversing car.

Rich Mixture—Not a lean mixture.
Road Hog—The other fellow on a narrow lane.

Self Starter—One who can start his Ford without calling in the neighbors.

Shock Absorbers—Passengers in the rear seat.



Skidding—Dodging dry spots on a wet road.
Spark Plugs—Carbon collecting queensware.

Switch—The key to success.
Tank—A bottomless gasoline can under the front seat.

Timer—(See commutator.)
Tires—Lizzie's rubber heeled slippers.
Tire Pressure Guage—An instrument which usually points to No. 45.
Uproar—Starting out.

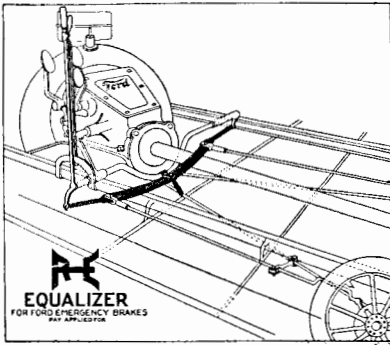
Undertaker—The final driver.



Valve—Part of the engine.
Vibrator—Part of the coil.
Vulcanizer—One who vulks.
X—Mysterious symbol on spark plug, meaning "You are it."
Yap—Country constable.

Two Practical Needs for the Ford

Here are two really practical needs for your car. They add safety and economy and at a cost that makes them about the biggest investment you can make.



The R-E Emergency Brake Equalizer

It is almost impossible to keep the emergency brakes properly adjusted. The result is continuous rattling, danger of accidents and the frequent adjustment and renewal of brake rods and shoes. With improperly adjusted brakes there is constant danger of the car starting suddenly when cranked, and of the brake lever jumping into neutral while driving.

Always affords a firm, steady and powerful grip on both wheels alike, regardless of the adjustment of the brakes or rods. It eliminates the necessity of adjusting the brakes,

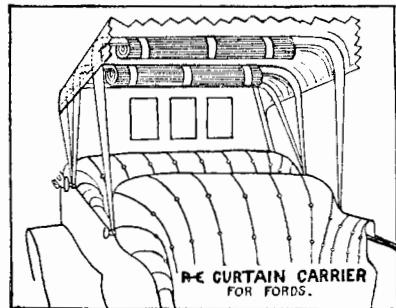
prevents wear and does away with all rattling of the brakes, rods, etc. It provides efficient brake service at all times and under all conditions and by gripping both wheels alike it prevents locking one wheel, skidding and the consequent wear and strain on tires, tubes, wheels, differential, etc. It is made of cold rolled bar iron with highly tempered coil springs which prevent rattle and assure a prompt release of the brakes when the lever is advanced. It may be installed in ten minutes by anyone without any tools whatever.

The cost of the R-E Emergency Brake Equalizer is \$1.50 complete with printed instructions for installing.

The R-E Curtain Carrier

Thousands of dollars are lost each year through damage to side curtains caused by carrying them under the cushions and seats with tools, tubes, etc.

The R-E Curtain Carrier is made in both the regular rubber Ford top material and domestic Mohair and comes in an individual carton complete with all necessary fasteners, straps, etc., ready for installation. They are quickly and easily attached to the top bows and carry the curtains rolled up against the top,



keeping them safe, dry and clean, but ready for immediate use without the necessity of disturbing passengers in the car. Set consists of two for Touring Car and one for Roadster.

THE COST

FOR TOURING CARS

Ford Rubber, Stock No. 5. Price Per Set.....\$3.00
 Mohair, Stock No. 7. Price Per Set..... 3.00

FOR ROADSTERS

Ford Rubber, Stock No. 6. Price Per Set.....\$1.75
 Mohair, Stock No. 8. Price Per Set..... 1.75

DEALERS: Big Sellers, these, and good profits, too. Write for proposition.

THE ROOSE MANUFACTURING COMPANY

LOUISVILLE

KENTUCKY

'Ware Certain Spots on Dixon Highway

If You Plan to Drive South for Winter
Pick Your Route Carefully



Helping Each Other Out of the Mud.

All mendicant motorists who may be contemplating a winter tour through the south via the Dixie highway will be interested in learning about the present and prospective condition of that thoroughfare.

The Cumberlands in Kentucky and Tennessee, heretofore a barrier to enjoyable motoring, have been conquered by the construction of 300 miles of newly completed road of the Dixie highway. However, the road beyond Knoxville is not in the best of condition just now.

Officials of the Dixie association have just completed an inspection tour of the section between Cincinnati and Knoxville. A continued downpour of rain on many miles of new grade, together with long stretches of first course rock surfacing and almost impassable detours around new bridge construction, made the tour one of the most strenuous which has ever been attempted by a highway inspection party.

At the end the conclusion was reached that the highway will be made usable under all weather conditions within one year. Until that time, however, motorists traveling via the Dixie highway must expect to experience some difficulties, but they can get through without much delay or serious mis-



"Rocky Road to Dublin."

SEATED ALL AROUND

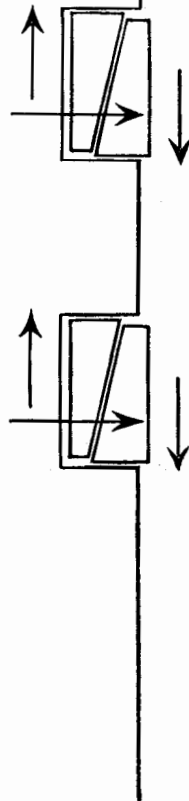
A used cylinder is rarely perfectly round and straight. Expansion is unequal in different places; the metal warps slightly; there is wear from use. Perfect flexibility in the piston ring is necessary so that it may seat against the cylinder at all points.

Two thin flat pieces of metal will bend more readily than a thick one. The Yale Piston Ring is in two parts, a spring steel expansion ring compressed inside a soft cast iron bearing ring. (See Illustration.) The even pressure of the live spring seats the bearing ring tightly against the cylinder wall at every point.

The flexibility and the even seal of Yale Piston Rings for Ford Cars give increased power and "pick-up," with lower oil consumption.

8 FORD SPECIAL Rings
postage prepaid . \$6.50

YALE PISTON RING CO., Inc.
560 West 36th Street, New York



DEALERS: The rapidly growing demand for these rings means quick turnover and steady trade. Our policy of liberal discounts gives the dealer his fair share of the profits. Write for information.

When writing advertisers—Just say FORDOWNER



A Fair Stretch Along the Dixie Highway.

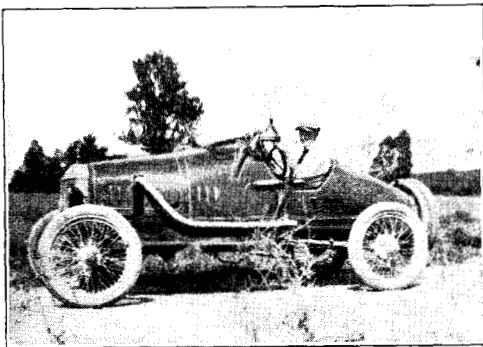
hap. The accompanying photographs taken by the pathfinders, who traveled in a Buick Six, will give an idea of the present condition of the road.

While the Dixie highway to Atlanta, Macon and Jacksonville is now travelable, extensive improvements financed and under

way, will insure a good road travelable under all weather conditions with much of the mileage permanently improved by the summer and fall of 1920. On account of the large amount of construction planned it will require two years before the highway to Florida can be traveled without detours.

THERE IS SPEED IN THIS CAR.

Here is a Ford car rebuilt into a model whose very appearance denotes potential speed. Even when at rest it looks anxious for the touch from it's driver that will allow it to spring away and show what it can do on the road.



This speedster was built by Phil M. Kepley, New Albany, Indiana. It's equipment includes Roof 16 valve head, Lynite pistons, Dunn Counterbalances, Bosch Magneto, 3 to 1 gears, Kemco lighting system, Spranger wheels and Miller carburetor.

YES, WE HAVE BEEN THERE .

We know, without asking, that E. D. Loane of Baltimore, Md., has been trying to start his car on a cold morning. Here is an excerpt from a letter which he has written to **FORDOWNER:**

"In my opinion the lack of priming cups on the automobile engine, including the Ford, warrants legislation making it a misdemeanor for any person to design, make or sell any fuel oil engine without priming cups, conviction by jury to carry with it a minimum sentence of \$500.00 fine and 30 days' confinement in the house of correction or similar institution, where the convicted party would have time to meditate over the tortures he had inflicted on the public through his inexcusable neglect."

We have all been in such a state of mind at times. Sometimes we have almost wished that the inventor of motor cars might swing at the yard arms or become the principal figure in a firing squad party at sunrise. But, fortunately, this soon passes and we realize that we own "the best little car in the world."

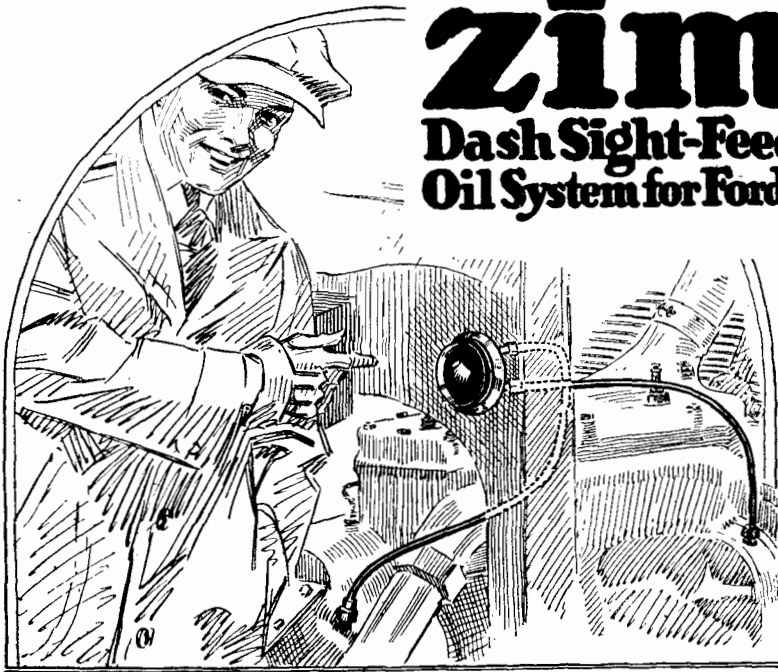
"Stranger give us a lift in your Liz, will you?"

"Sure, hope in."

"Got a car of my own, but she's, er, laid up."

"Ford?"

"N—o."



PATENTS PENDING

Lengthens the Life of Your Car

Here is a device that will add years to the life of your engine and reduce engine repair costs 50 to 60% by insuring proper lubrication. It eliminates guess work—a steady stream of oil flows through the gauge on your dash where you can see it. When you need oil this stream stops. There is no chance of your supply running out without your knowing it.

Circulation of oil is positive and operates regardless of the condition of the regular Ford lubricating system. No fussing with pet cocks. Shows when oil is dirty and should be drained. Insures the efficient operation of your car.

Dealers—The Zim Oil System (formerly the well known M-B System) is now being handled exclusively by us. There is still some choice territory open for dealers and jobbers. Write or wire.

Price \$8.50

zim Auto-Tractor-Aircraft **Accessories**

Corn Exchange Bank Building
CHICAGO, ILLINOIS

Adjusting the Rear Main Bearings Through Crank Case Lower Cover Door

By Edgar E. Brenton.

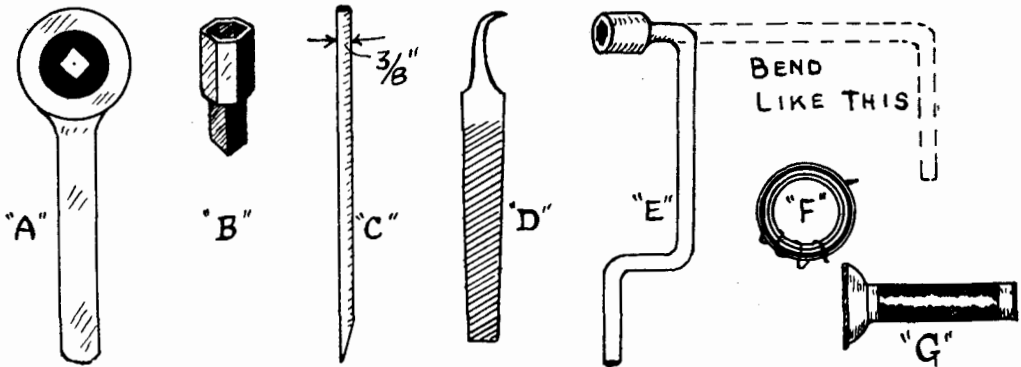
While it is not generally considered possible, to remove and adjust the Ford rear main bearing cap, through the crank case lower cover door—yet this “stunt” can be done by any “fan” mechanic, equipped with the proper tools, and patience. I have done the job in less than 3 hours, with the following tool equipment:

- A—Mossburg ratchet wrench handle.
- B—Socket, $\frac{3}{4}$ inch, to fit main bearing nuts.
- C—Cold chisel, 16 inches long, made from $\frac{3}{8}$ inch steel, sharp.

- D—Flat file, 10-inch.
- E—Walden-Worcester fly wheel cap screw wrench.
- F—Small supply No. 20, annealed iron wire.
- G—Small flash lamp, or portable electric light.

The shank of the file should be bent over to a curve and sharpened.

The Walden-Worcester fly-wheel cap screw wrench is to be reshaped, as shown in the dotted lines of the sketch.



Tools for Rear Main Bearing.

PROCEDURE.

After removing the crank case lower cover, place the portable electric light inside of the crank case, and cut the wire holding the fly-wheel clamp screws with the long cold chisel. Cut the wire, between each cap screw, and remove the pieces of iron wire—being careful not to drop the pieces of wire into the crank case, as this might short circuit the Ford magneto and cause trouble.

Remove the electric light, each time the engine is turned, when cutting the wires between the different bolts.

Turn the engine, so that the piston, in the No. 3 cylinder, is about one inch from the bottom of its stroke. Take the fly-wheel cap screw wrench “E,” and remove the bottom fly-wheel cap screw. If this bolt screw is “burred,” from having been tightened with a chisel—then cut off the “burrs” with the long cold chisel.

Now turn the engine, so that all the pistons are on the same level. Take the shank of the file, and run this hooked end through the eyes of the cotter pins on the main bearing bolts, and pull these cotter pins out.

Use the Mossburg wrench “A,” and the $\frac{3}{4}$ inch socket “B,” to remove the nuts on the rear main bearing bolts.

Now turn the engine very slowly, until the hole, from which the fly-wheel cap screw has been removed—is straight down. Then, the main bearing cap should come off easily.

Dress down the rear main bearing cap, with the file “D,” and replace, making several trials, until a “just-rite” fit is obtained.

After getting a proper fit, of the main bearing cap, replace the cap on bearing, and replace nuts, and draw the nuts down tightly. Use a piece of wire, instead of the cotters, and twist the ends of the wire together tightly with the fingers.

Next, replace the fly-wheel cap screw. Then comes the part which requires the patience—putting the wire through the fly-wheel cap screws. Cut a piece of iron wire, about 10 inches long, and bend this U-shaped. Wire 2 screws together, and twist the ends of the wires together firmly with the fingers. Arrange these wires so that the tendency of the strain of the wires is to tighten—rather than to loosen—the fly-wheel cap screws.

Bad Roads!

Snow, Slush, Mud

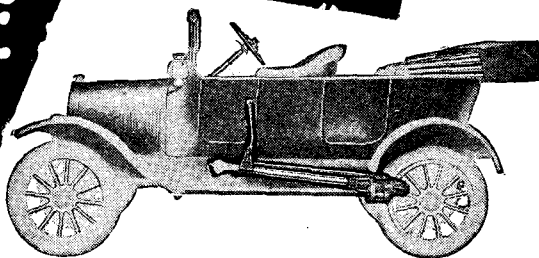
*Will Not
Stall a*

"Moore"

Equipped
Ford

!

Have you wanted an agency that will "fill in" and hold up your profits?



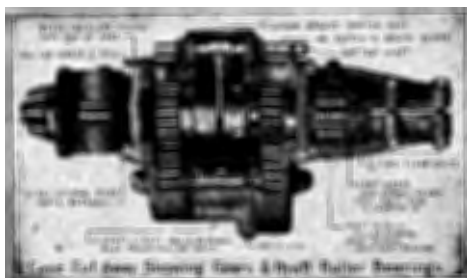
THERE IS A

"MOORE"

Auxiliary Transmission

to double the original power of every Ford Car and Truck

All "MOORE" Equipped Fords Have 4 Forward and 2 Reverse Speeds



*Insist Upon
a Moore
Auxiliary
Transmission*

*The Transmission
That Stays Sold*

"MOORE" AUXILIARY TRANSMISSION
TRACTOR-TRAIN CO., 1346 WALL ST.,—Los Angeles, Cal., U. S. A.

IF YOUR DEALER OR JOBBER CANNOT SUPPLY YOU, WRITE US

Sole Manufacturers

TRACTOR-TRAIN COMPANY

1346 WALL STREET, LOS ANGELES, CAL., U. S. A.

When writing advertisers—Just say FORDOWNER



The Modern Lochinvar



(With Apologies to Sir Walter Scott.)

By MIRIAM SHEFFEY.

O say! Have you heard of the young Lochinvar?
O say! Have you heard of his wonderful car?
It was painted a lovely and artistic green, the
jim-dandiest motor that ever was seen.
It was swift as the wind, and so carefully
geared, go fast as you pleased, you
were never afear'd.
It had a soft cushioned seat, and a hood,
like a carriage. (The very best car
for a runaway marriage!)

O young Lochinvar sped like mad o'er the
plain! He cared not for lightning, nor
thunder, nor rain!
He cared not for rivers—he'd Ford them or
die! He cared not for mountains, no
matter how high!
Up this side, down that side, he recklessly
scooted, while his horn gaily tooted
and tooted and tooted!
He flew by the edge of ravines deep and wide
Skid? Mercy! That car couldn't skid
if it tried!

And what was the cause of this haste and
bother? Why, he'd heard his fair
Ellen would soon wed another!
It was up to him now to estop the proceed-
ing, and so he went speeding and
speeding and speeding.
'Twas awful to hear him say "Blankety-
blank!" when he had to climb out and
replenish the tank.
And O how he sweated and ranted and cursed
and foamed at the mouth when he
heard a tire bust!

A SHORT STORY.

Betty danced with Mortimer all evening.
Jake watched them wistfully from the
doorway.

* * * * *

Next afternoon Jake's motorcycle stopped
beside Mortimer's Ford Sedan. After several
aimless remarks, Jake said:

"Betty has lovely eyes, hasn't she?"

Mortimer grimly concealed a smile, broke
a date with Betty, and she rode on the motor-
cycle thereafter.—Murray Fahnestock.

As he entered the Hall, Ellen's papa drew
near, and thundered, "Pray, why have
you butted in here."
Quoth Lochinvar, "Sir, I crave but to dance
with Ellen, your daughter. I am just
back from France."
So simple a favor could scarce be denied,
and Lochinvar flew to his fair Ellen's
side.
They quaffed each a brave cocktail, then the
two-step and cheek they danced in a
manner which could scarce be called
meek.

How papa and mamma and bridegroom were
hipped as they watched the young pair
who so gracefully skipped!
Down the long shining room they went whirl-
ing and hopping, as if they had really
no idea of stopping.
At the door the car waited, impatiently puff-
ing. "Ellen, dear, are you game? Did
you think I was bluffing?"
Young Lochinvar whispered. "I'm GAME!"
she replied. "They'll have feet cars
that follow!" young Lochinvar cried.
They leaped to their places! So fast the car
sped, you couldn't tell whether 'twas
green or 'twas red!

O how papa and mamma and bridegroom
were peev'd when they saw that thus
basely they had been deceived!
In a great gleaming car of a wonderful make,
they followed the lovers through forest
and brake.
The guests and the ushers and bridesmaids
went, too, in cars of gay colors, pink,
red, yellow, blue.
But in all that array there was never a car
that could follow the Ford of young
Lochinvar!

THE CONQUERORS.

"The German tanks didn't seem to do much
damage during the war."

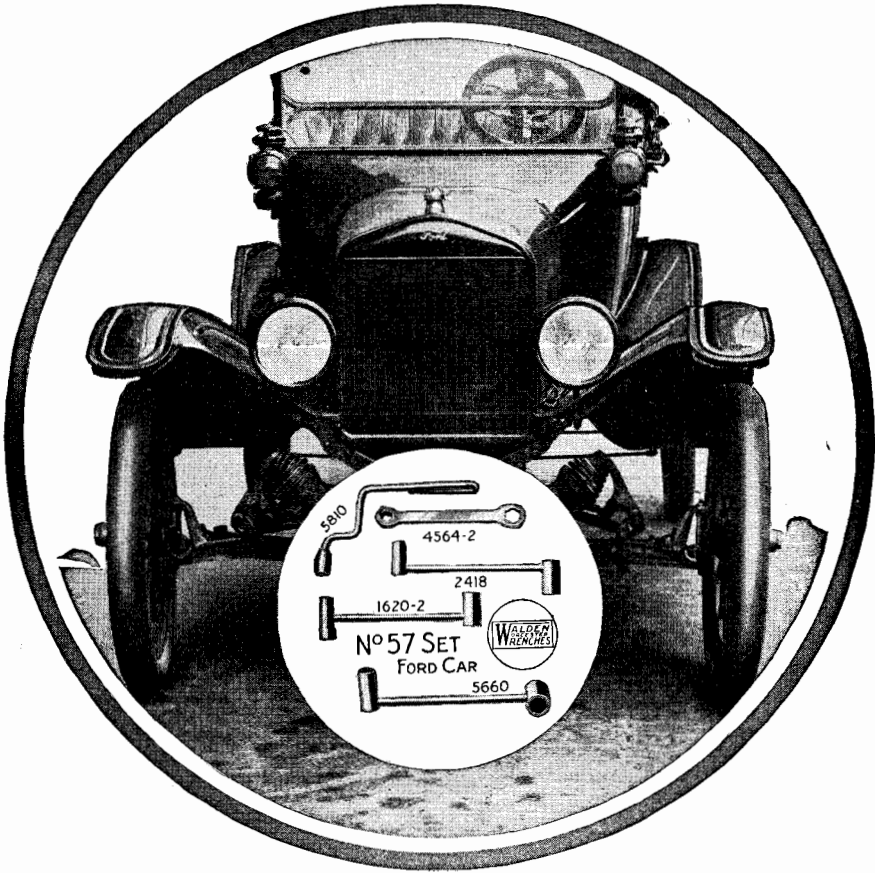
"That's because the Americans probably
sent some Fords out to fight them."

GOOD IDEA.

"I'm surprised at the citizens of Detroit."

"Why?"

"Because they haven't changed the name
of their city to Fordtown."



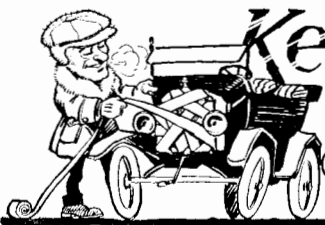
THIS SET OF WRENCHES NEEDED BY EVERY FORD OWNER

PRICE \$4.20

COMPLETE LINE OF WRENCHES FOR GARAGE SERVICE



WRITE FOR CATALOG NO. 800



Keeping The Radiator From FREEZING

“Overcoating” the Cooling System

In order to maintain the Ford engine at summer efficiency, during the winter months, it is desirable to use some form of protective covering, to prevent the too-rapid radiation of the heat.

These radiator coverings serve a two-fold purpose; first, they enable the engine to warm up to its normal working temperature much more quickly and effectively, and give the engine a chance to develop its full power and efficiency.

Second, after the engine has once been running, they tend to hold the heat, so that subsequent starts are much more easy, and less fuel is wasted.

In moderate climates, it may be possible to “get-along” without using any anti-freeze solution at all, if the radiator is effectively covered with a radiator and hood cover, when the car is left standing on the street. And, if the water is drained when the car is left over-night in a cold garage.

But it is even better, in this uncertain American climate of ours, to use both methods, and to combine the protection-against-freezing, as provided by the anti-freeze solution, with the protection-against hard-starting and bum running, which these radiator and hood covers afford.

Why Freezing Wrecks Ford Radiator.

As a rule, the effect of cold is to make metals, and other substances contract and occupy less space. Unfortunately, however, it happens that, when water freezes, it expands. As a result of this expansion, at the time of freezing, water tends to burst pipes.

When water freezes in a round pipe, like those used in the Ford radiator, it naturally splits the pipe open at the seams, as that is the only way the freezing water can obtain more room.

However, if the pipe or tube is of flattened cross-section, then the pipe can swell out to a more nearly circular form, and so affords the necessary volume for the free expansion of the ice.

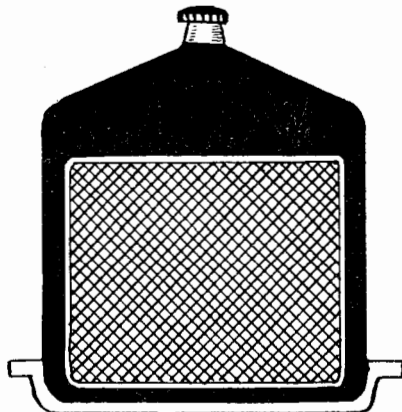
To try this for yourself, make a tube of paper, and seal one end. Now flatten the tube, and then blow into the open end. The flattened tube will swell up, as the air pressure increases, to a more nearly round cross-section.

Now, this flattened tube may be bent and twisted in zig-zag form, or the water tube may be flattened out, until the water chambers are of very broad and flat, holding the water in thin, flat sheets—but still the principle remains the same.

Special-Type Radiators.

And so the claim of the makers of the various types of zig-zig, and other flattened tube, and honey-comb radiators, that these radiators will withstand freezing, becomes easily true; especially if the cooling section of the radiator is made of good, elastic metal, and is properly put together.

Thus, we see that the installation of a special type of radiator, may give proof against damage



Special Type Radiator.

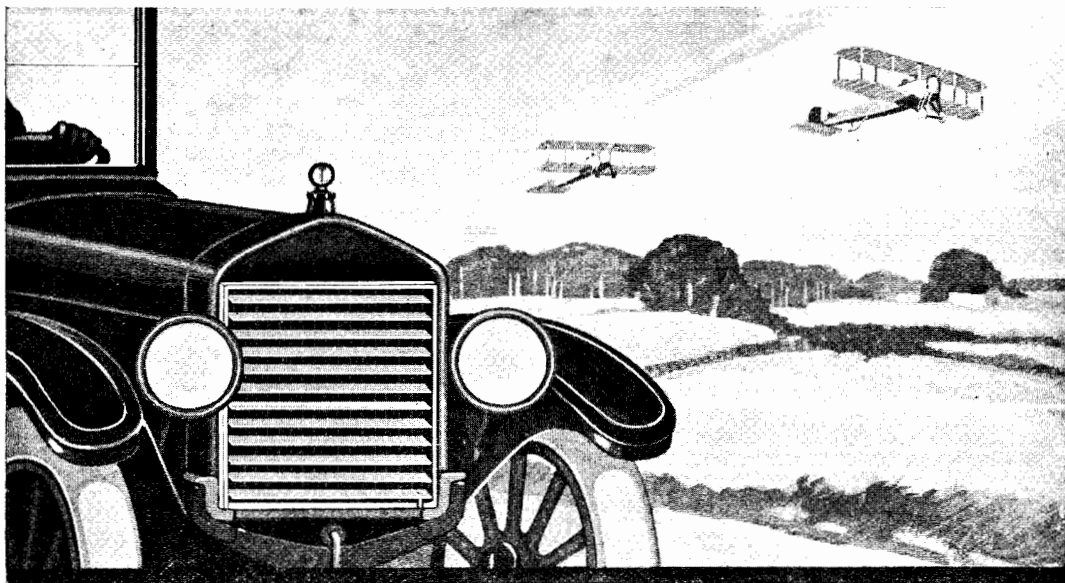
by freezing, though it may not prevent the water in the radiator from freezing. Also, the freezing of the water may crack the water jacket of the cylinder block, if the engine is allowed to become very cold.

These special, proof-against-freezing radiators have another advantage for cold weather use. As they have much more heat radiating surface than the usual Ford radiator, they tend to keep the cooling solution cooler and prevent boiling. If an anti-freezing solution contains alcohol, this alcohol will evaporate very quickly indeed, if the solution is allowed to boil. And then the expensive alcohol must be replaced.

SPECIAL FANS AFFORD BETTER COOLING

When the little Ford is “snow-bucking,” the engine develops lots of heat, and the anti-freeze solution will soon boil, if all possible means is not used to keep it cool.

In addition, to the use of a special radiator, a special, “more-wind” type of fan is helpful in cooling the engine “when the engine needs it.” When the engine is stopped, the fan stops also, and so the engine does not cool off too rapidly.



Is Your Ford 100% Efficient?

Equip it with The **UNIVERSAL Radiator Shutter** and conserve your engine heat. All the aeroplanes in the recent trans-continental flight used shutters. Several leading makes of cars now come factory equipped with shutters.

Don't try to heat a cool motor with the cold air rushing through the radiator cooling it off almost as fast as the fuel you burn can radiate heat. You only waste fuel. Without a shutter your motor, never in winter and very seldom in summer reaches the proper temperature of 185 degrees. The

UNIVERSAL **RADIATOR SHUTTER**

enables you to regulate the flow of air so that just enough of it strikes the motor to keep it operating at 185 degrees—not too hot—not too cool—but just at the point where all the fuel vaporizes and makes power in your cylinders instead

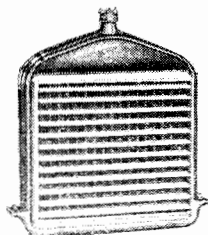
of kerosene in your lubricating oil and carbon in your motor. The **UNIVERSAL** operates from your driving seat just as simply as turning on your lights or ignition.

You need a **UNIVERSAL**. Get one today. Drive with greater economy and satisfaction. Your dealer has the **UNIVERSAL** or can get one for you. Circulars sent on request.

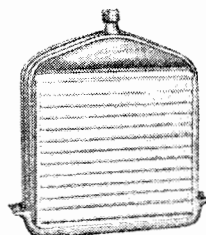
Auto Metal Parts Company

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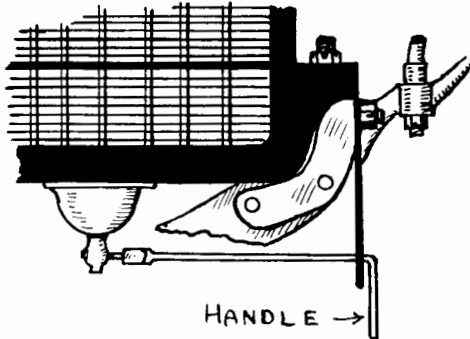
CLOSED

When writing advertisers—Just say **FORDOWNER**

Some owners of Ford cars, loosen the fan bracket adjusting screw, and allow the fan belt to slip on the pulleys, so that the fan does not run during the winter months. But, this causes some wear of the belt, and it is better to remove the fan belt entirely, if the fan is not to be used.

However, in our opinion, it is "better to use the fan" as this tends to prevent the overheating and boiling away of the cooling solution, when the engine is running; and tends to equalize the temperature of the engine, at all times.

It is better to use the fan, when the engine is pulling hard; and to cover up both hood and



Draining Radiator.

radiator, when the engine is stopped—then there is less danger of damaging the engine, through overheating, on a long, hard pull.

By pulling the air through the radiator more rapidly, when the engine is running; these fans remove the heat from the radiator "at the right time;" and, by preventing boiling, save the cooling solution.

Some of these cooling solutions do not circulate as easily and as rapidly as pure water, and few of them conduct the heat away from the engine quite as well, so it is necessary to use every possible means to increase the cooling efficiency, in winter, as well as in hot, summer weather.

Fan Belts.

A good, non-slipping fan belt is another simple and effective method of increasing the efficiency of the cooling system, and saving anti-freeze solution.

DRAINING THE RADIATOR.

Some owners go to the trouble of draining out the radiator every night, before allowing the car to stand in the cold garage. As a rule, they do this "every night, but one," and that night the radiator freezes and busts, and then they have a large bill for repairs.

Aside from the unpleasantness of handling icy water in icy weather, there is always the danger that one or more of the tubes may be clogged with a bit of sediment or solder. If it is, then the water in that tube will fail to drain, and will freeze and burst the tube. The next morning, when one fills up the radiator from the top, this tube will show a joyous leak, and the car owner will "wonder how it happened."

Other, more careful owners, always pour some

alcohol into the radiator each night, after the water has been drained out—but this method is too bothersome for every-night use, and is only advised when putting the Ford into cold storage for the winter. Also, the alcohol may fail to reach some of the tubes.

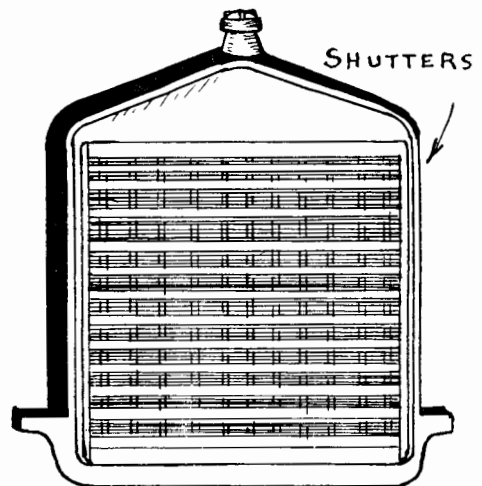
Sometimes, when the radiator is left to drain, the radiator pet cock becomes clogged with sediment, and the water stops running out, even though there may be still some water in the radiator. The only safe way is to clean out the radiator drain cock again, after the water has stopped running.

To make it easier to drain the radiator, one manufacturer makes an extension handle and bracket, for the radiator drain cock. This makes it easier to drain the radiator, without getting all messed up and dirty by reaching through the front spring.

For cold weather use, one important requisite is cooling the radiator *while the engine is running*. The other, vital consideration, is to *retain the heat, when the motor is stopped*. For this purpose, such heat retaining devices as radiator shutters, and radiator and hood covers are very useful indeed.

RADIATOR SHUTTERS.

Most of us have had the usual experience of apologizing, for a poorly running engine, by saying "The engine is too cold, but it will soon warm up." After a mile or so, it does—and then runs all right for a while. Then we strike some snow-drifts and hills, and we open a new line of apology that "The motor is too hot," forgetting



Radiator Shutters.

that a clock, that is too fast, or too slow, is equally out of time.

But, radiator shutters are effective heat retaining and heat controlling devices that enable us to maintain a more nearly "just-rite" temperature of the engine at all times.

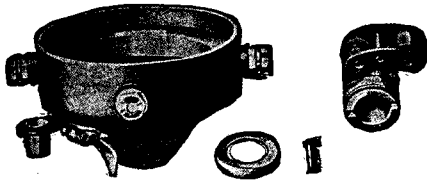
When the car is stopped, the shutters are closed, and the heat is retained—making for easier starting and the quick attaining of a normal temperature and smooth running condition.

When the car is running over easy roads, these

Ford Owners Buy These For Economy

These four accessories of the J & B line are bought because they are of dependable economy—in purchase price—in the saving which each affects in use—and in the assurance of long service.

The J & B Original Timer

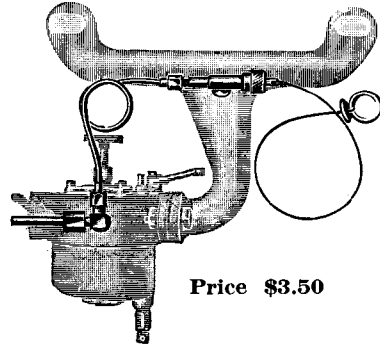


Price \$1.50

One of the many exclusive features of the J & B Timer is the arrangement for furnishing lubricating oil to the rotor. The oil hole in the Timer Housing is of ample size to enable you to completely enter the spout of the oil can in the Timer Housing. The oil hole is protected from dirt and dust by a spring hinged cover which is located on the upper forward side of the Timer Housing.

By examining the construction of this Timer closely you can readily see that we have overcome the timer difficulties which you have experienced in the past.

The J & B Gasoline Injector



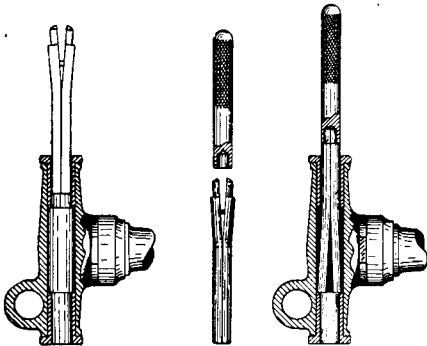
Price \$3.50

A simple device for priming the manifold of the Engine with gasoline vapor, and making easy the starting of the motor.

The Injector takes gasoline from the gas line, and delivers a rich mixture directly into the intake ports of the cylinders. Does not flood the carburetor and starts the motor without excessive cranking.

This is not a carburetor priming device, but a motor primer.

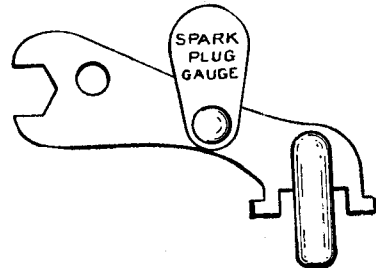
The J & B Bushing Remover



Driving out bushings is a simple and easy operation with this practical bushing remover. A substantial, necessary tool which sells for only

\$1.00

The J & B Switch Key



Here is a handy switch key and spark plug gauge, a well-made product. The price—

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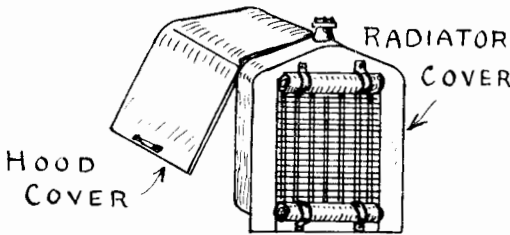
Mass.

radiator shutters can be partially closed, thus protecting the radiator against overcooling and freezing, when the car is driven against a strong head-wind. And, it is remarkable, how quickly a strong head-wind can freeze a radiator, on a cold day—even though there may be considerable anti-freeze, in the cooling solution.

This ability, to control the amount of covering of the radiator, is almost as great a help, in the efficient running of the car, as is the carburetor dash adjustment; which is not generally used nearly as much as it should be—except by clever and skillful drivers.

These radiator shutters do not require the driver to wade out in snow or slush to adjust them.

Just before stopping the car, these radiator shutters should be completely closed, thus bring-



Padded Hood Cover.

ing the radiator and engine to a high temperature. Then they will retain some of this heat for a long time, thus ensuring an easier start, even many hours later; especially if the hood and radiator are well covered over.

These radiator shutters are made of sheet metal, and are of the type used on The Hudson, Columbia, and other expensive cars.

Other Adjustable Covers.

Other types, of adjustable-from-the-seat radiator covers are made on the principle of window blinds, and have a cover rolled up on a shade roller. This cover can be pulled to cover as much of the radiator as desired, by means of a cord extending to the dash, and within reach of the driver.

Some of these shade covers drop down, in much the same manner that the curtain drops down in front of the stage of a theater. Others, pull up from the bottom. Just which type is better is a matter of individual preference.

Padded Hood and Radiator Covers.

One, much-used type of hood and radiator cover, consists of a patent-leather outside covering, with a felt, or quilted inside lining, or heat insulator. The outside covering gives neat appearance, and protection against snow and water; while the inside felting provides the essential heat insulating qualities.

Some of these covers are made for the radiator only, and have adjustable flaps, to be rolled either up or down, to expose enough of the radiator tubes to afford adequate cooling.

CHOOSING A RADIATOR COVER.

In selecting a radiator cover, one having a large opening should be selected. If the opening is too small, then the radiator will boil and the motor will over-heat, on those "middling" days, which occur now and then, in every winter. Also, when plowing through heavy snow, the engine has to work so hard that the full radiator surface is required, even on a fairly cold day.

Of course, one can remove the entire radiator cover but, if the flap opening is of adequate size, this will not be necessary. The securing of adequate cooling capacity is particularly necessary with the heavier, closed-car models, such as the Ford Sedan and Coupelet.

Some of these padded radiator covers are fitted with flaps which roll up, towards the top. Others, are fitted with flaps which roll down, towards the bottom.

When the Ford is not fitted with an electric starter; then it is better to select a radiator cover that rolls up, towards the top. For, if the flap rolls down, towards the bottom of the radiator, the rolled-up flap will interfere with the use of the starting crank.

However, if the Ford is fitted with an electric starting and lighting system, then it is preferable to have a cover with a flap rolling down, towards the bottom.

The reason for this is that the bottom of the radiator is always the coldest part, and most apt to freeze. So, in cold weather, when the radiator is only partially covered up, it is the bottom of the radiator which, preferably, should be protected against freezing.

If the Ford radiator freezes across the bottom, this shuts off the flow of water. Then the entire radiator soon freezes.

Steam, issuing from around the filler cap, or from the overflow pipe of the radiator, is usually one of the first indications of a frozen radiator. As soon as the water supply stops, the water, over the cylinder heads, begins to boil, and steaming results.

Hood Covers.

As the Ford hood has a number of slots, or louvres, to let the air circulate more rapidly and cool the motor; a hood cover, which closes these air-circulating slots, is of considerable advantage in retaining the heat for a longer period, and thus securing easier starting.

By retarding the radiation of heat from the inlet manifold, this also tends to make the engine start more readily.

Another advantage, of these radiator covers, is that then they tend to muffle the sound of the engine and so make it run more quietly.

These hood covers are usually made to fasten under the handles of the hood. They are fastened to the radiator cover by means of snap buttons, so that the hood can be easily detached from the radiator cover, and the hood lifted up, to permit access to the engine and adjustment of the carburetor.

Inside Hood Covers.

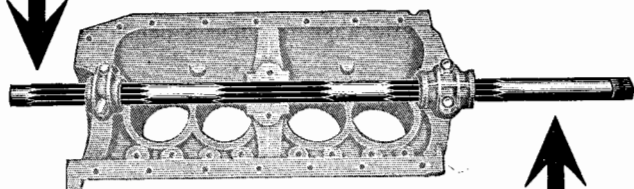
Another form of hood cover, which does not detract from the normal appearance of the car, is an inside hood cover, closing up the slots and so fastened on the inside of the hood that it does not interfere with access to the motor.

This reamer will pay for itself on the first five motors overhauled



At last a tool that will do accurate work in a minimum of time. The LEWIS Reamer is scientifically correct, it being positively the ONLY reamer that will ream connecting rods and main bearings in absolute alignment.

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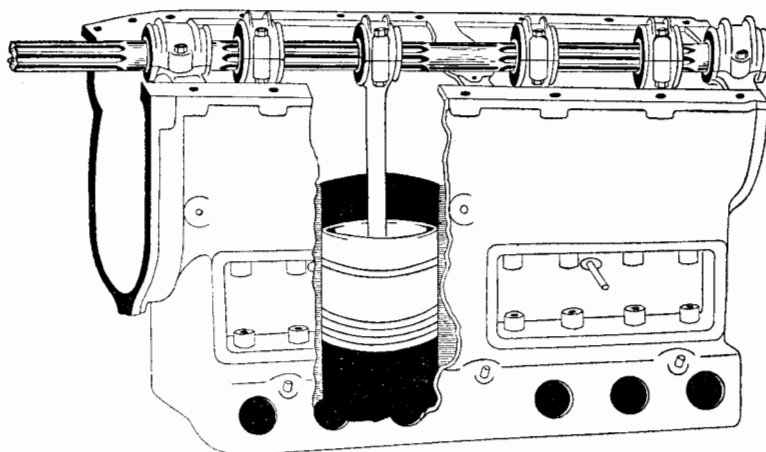


Position for Reaming Main Bearings.

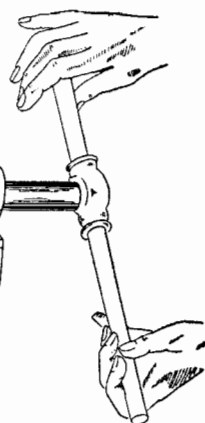
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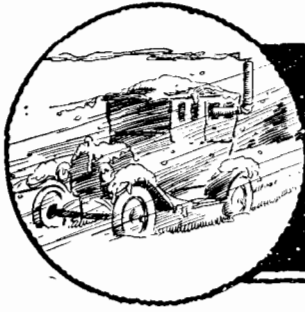
Position for Reaming Connecting Rods.



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Anti-Freeze Solutions

Many Varieties That Protect Both Radiator and Engine

The easiest solution, of the anti-freeze problem, is to drain the radiator, and put the car away for the winter. But, this is running away from life, and the car owner who does this, deprives himself of some of the best pleasures of owning a real automobile.

Other owners, of Ford cars, believe that they can drain the radiator, every time that the car is left standing long enough for the radiator to freeze. They can do it—if they have nothing else to do—or if they live in Florida, or Southern California.

But, we all know the fable of the pitcher that went to the well "just once too often." And the owner, who attempts to drain the radiator each time, usually forgets it "just once—too often." And then he has a nice bill for repairs and all the time and trouble is wasted.

Now a freeze-up may cost a radiator overhaul of \$7.50 for labor—plus the cost of the new parts installed. But, there is worse—and more of it! If the water freezes in the water jackets of the engine, and breaks the cylinder casting—then, Wowie! what a bill!

Of course, the freezing of the water, in the water jackets of the engine, does not always destroy the cylinder casting—it may just split open the water jacket, and such a leak can sometimes be soldered or welded. However, this makes necessary the taking of the engine out of the car—so a frozen water jacket may cost from \$10.00 up to \$50.00 or more, if it is necessary to replace the cylinder block.

COST OF ANTI-FREEZE.

Supposing that it does cost from \$2.00 to \$5.00, for enough anti-freezing solution for an entire season's use. Isn't it worth this much and more, to insure against such repair bills—and these repair bills may not only occur once, but many times, in the course of a single winter, if an adequate anti-freeze solution is not used.

Fortunately, the war is over, and anti-freeze is now cheaper than ever before! It is one of the few things beside the FORDOWNER magazine—that is.

While it is true, that the anti-freeze solutions, that formerly sold for \$1.50 a package, still sell for the same price of \$1.50, the dollar that buys them now, has much less purchasing power when it comes to buying other commodities. So the anti-freeze solution is relatively much cheaper, in the proportion that the buying power of the dollar has decreased.

Draining the water from the radiator is a messy job—at the best. At the worst—one gets

chapped hands and wet feet, and splattered with muddy water from the sediment hulk of the radiator. Also, the sediment bulb of the radiator is almost invariably clogged up, and one has to clean out the pet cock one or more times, whenever the radiator is drained.

In draining out the radiator, there is always the danger that one or more of the tubes may be clogged, or that the water may not drain completely from the water jacket of the engine, if the car is not standing on a perfectly level road.

Many a split-busted cylinder casting has resulted from trying to drain an engine, when the right-hand wheels were lower than the left, thus keeping some of the water in the cylinder block.

If one or more of the radiator tubes are clogged, then the water in them will freeze and burst the tubes, this leak revealing itself promptly, when the radiator is again filled.

Also, if one runs out of gasoline, has a puncture, or other trouble; it may be necessary to drain the radiator where once one cannot obtain the water to refill the cooling system—thus causing great trouble and delay.

PREVENTING LEAKS.

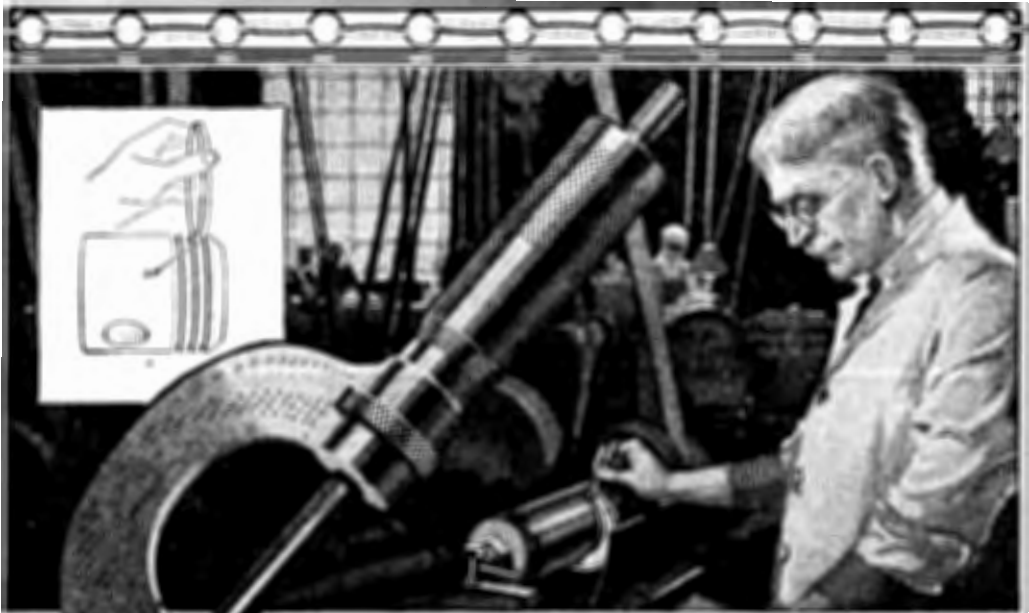
Since all anti-freeze solutions have one property in common—that of costing money, it stands to reason that, to use an anti-freezing solution economically, the anti-freeze that we put into the radiator must "stay put" and that leaks must be abolished.

While in summer the leakage of water from the radiator, or around the hose connections, may be only a darned nuisance in winter, this may cost considerable money.

Also, if the radiator is refilled with pure water, to replace the leakage, then the anti-freeze may be so diluted that it may fail to function adequately as a freeze-preventer, and damage may result.

A very small leak may sprinkle the roads with a lot of valuable anti-freeze, in the course of from 4 to 6 months of winter. Also, it should be remembered that the vibration of the car and engine, when the car is in motion, may cause more leakage than when the car is at rest.

It is a good plan to start one's preparations, for making the cooling system leak-proof, about a week before the anti-freezing solution is to be put in. Replace all hose connections that are in the "doubtful" class. Save the old ones for next summer's use—if you must be economical.



ACCURATE to .00025 of an inch by Micrometer Test

Every mechanic knows—that if the opening in a piston ring can be closed positively so that it cannot leak—and at the same time provision is made for the necessary contraction and expansion—the ideal piston ring would be obtained.

The simple Burd Automatic Coupler does just that. It closes the gap effectively against leaks, and as the opening increases — automatically adjusts itself to cylinder wear—insuring gas and oil tight, high compression. Burd Piston Rings

are easy to install—fit accurately to .00025 of an inch—and require no filing or fitting. They are guaranteed against flaws and breakage.

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for a copy of 1920 Burd Piston Ring Directory of Sizes, price list and information about our Sales Helps for Garages and Repair Shops. Your jobber carries a complete stock of all sizes—and oversizes—to fill rush orders quickly.

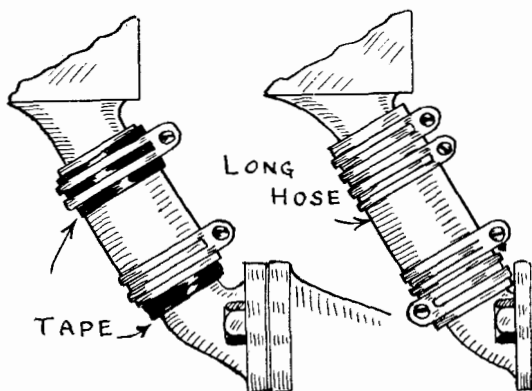
BURD HIGH COMPRESSION RING CO., Rockford, Illinois, U. S. A.

In replacing the top hose connection, between the radiator and the engine, be sure to have a piece of hose that is **long** enough. Often the hose is cut a little short and skimpy, and then one has endless trouble in keeping a tight joint at this place.

The difference in the vibration, between the radiator and the engine, tends to pull the top hose connection loose. Less trouble is usually experienced at the other two hose connections.

Sometimes the stunt of using two hose clamps at each end of the top hose connection, is used to advantage.

Other owners of Ford cars use double nuts on the screws of the top hose clamps. The second nuts are used as lock nuts, to keep the clamping screws from working loose, under the influence of engine vibration.



PREVENTS LEAKS.

But, these methods are bothersome, and are hardly ever necessary, if the hose itself is sufficiently long, and if the hose is properly clamped over the **ridges**, or ribs, which run around the top hose connection of the cylinder head and the water inlet of the radiator.

Some owners use shellac, ordinary shellac, to fasten the rubber hose to the cast iron hose connections. However, such special cements as Holdfast gasket cements, which are sufficiently **elastic** to maintain a tight joint, in spite of vibration, are preferable.

White lead is sometimes used between the rubber hose, and the cast iron hose connections, and usually makes an effective, stays-tight joint.

To remove a rubber hose from a hose connection to which it has been cemented by the use of white lead, it is usually necessary to cut off the rubber, or to remove the loose rubber from the outside, and then peel off the fabric of the hose, by unwrapping it.

MAKING GASKETS TIGHT.

Another place where leakage is apt to occur is at the gaskets between the top hose connection and the cylinder heads, and between the side hose connection and the cylinder block. Also between the cylinder block and the cylinder head.

Sometimes merely tightening the bolts, which hold the hose connections to the cylinder block and cylinder head, is sufficient. Be careful to tighten the bolts evenly, and equal-

ly on both sides, as pulling one bolt up tighter than the other is apt to cause leakage, and may break the cast iron parts.

Installing new gaskets may be necessary, if the gaskets have been bent out of shape, or if they have been pressed down so hard that they have lost their elasticity.

Careful cleaning, of the adjoining faces of the cylinder block and the hose connections, often makes it easy for even old gaskets to form a tight joint. The gaskets cannot make a tight joint, if dirt is allowed between the parts.

If the radiator leaks badly, it may be necessary to have the radiator overhauled, or repaired by a competent repairman. Soldering radiator tubes is no job for the amateur to tackle—and there are only too many so-called “auto mechanics” who make a botch job of it.

RADIATOR CEMENTS.

Sometimes the radiator has only small leaks, hardly worthy of the time and trouble involved in soldering them. In such cases, the use of one of the many radiator cements, now on the market, may prove an effective remedy for the trouble. By remaining in the solution, these radiator cements remain ready to seal any small leaks as they occur, and thus tend to eliminate trouble, and to conserve the anti-freeze solution.

Do not, except in cases of dire emergency, use flax-seed or other home-made radiator compounds. The flax-seed will only clog the tubes, preventing the water from circulating. Then, these clogged tubes will freeze and burst, making it necessary to completely dismantle the entire radiator, in order to clean it out and repair the damage.

As the Ford car is not equipped with a water-circulating pump, owners of Fords do not have trouble with the water leaking out around the shaft of the water circulating pump.

One of the peculiarities of some of the anti-freeze solutions, particularly those of the calcium chloride type, is that they tend to “find” leaks, by dissolving the dirt and grease which may have previously sealed these leaks.

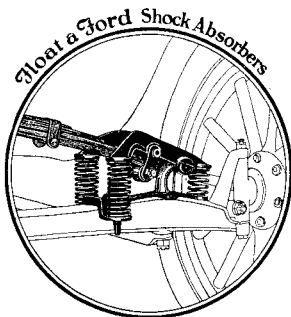
Tightening the cylinder head bolts **evenly** is an important factor in securing a tight joint between the cylinder head and the cylinder block—with either a new or an old gasket. Tightening cylinder head bolts is almost an art in itself.

One should begin with the bolts near the middle of the cylinder head, and then zig-zag around, tightening the bolts on each side and towards each end, alternately, until they have all been tightened.

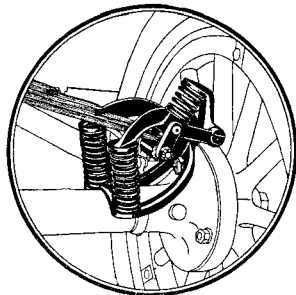
Do not tighten the bolts down **hard** at first, but only give them a general tightening, and then go over them again and again. Give the final tightening a half-turn or so at a time, until they are all equally tight. Use great care not to break off any of the cylinder head bolts, by the use of undue force.

Sometimes, if the rubber hose is of rather thin and skimpy material, the hose clamps will fit rather loosely on the hose. In such cases, it is well to wrap tire tape around the hose, and then tighten the clamp on over the tape.

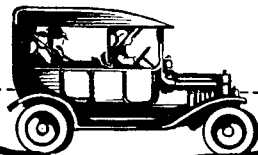
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The method, of wrapping the tape around the cast iron hose connection, and then forcing the hose on over the tape, is rather difficult and is not so apt to secure as satisfactory results.

CLEANING THE COOLING SYSTEM.

The muddy water, which comes out when the radiator is drained, should be sufficient evidence to anyone that the cooling system of the average Ford contains much mud and sediment. Often this rust and scale is clogging small leaks which should be fixed.

If this dirt is not cleaned out, the coating that it forms, in the water jackets of the cylinder block and inside of the radiator tubes, interferes with the radiation of the heat and cuts down the cooling efficiency of the radiator—resulting in boiling and loss of the anti-freeze solution.

To clean the radiator, dissolve a pound of ordinary washing soda in water, and pour into the radiator. Run the car a day, with this mixture in the radiator. Bring the cooling system up to the boiling point by retarding the spark, if necessary, or by using an over-rich mixture.

But, don't let the solution boil over, as it will injure the paint of the car, or one's clothes, if allowed to get on them. Then drain the solution, and flush out the cooling system thoroughly, using plenty of clear water.

RADIATOR CAP CONDENSER.

Where alcohol, or other volatile, anti-freeze is used, a steam condenser is sometimes fitted on the top of the radiator cap. This condenses the steam, and allows the condensed moisture to run back into the radiator rather than to pass out of the overflow pipe as steam, and be wasted.

Other condensers are fitted to the end of the overflow pipe, and condense and collect the liquid in a settling chamber.

REQUIREMENTS OF GOOD ANTI-FREEZE SOLUTIONS.

By deciding on the requirements of the perfect anti-freeze solutions, we can then decide which solution most nearly meets these requirements, in a practical manner.

1. The perfect anti-freeze should not be too expensive—either in first cost, or in the cost to maintain all winter at normal strength. That is, it should not be subject to too rapid change when in use.

2. The solution should not have a corrosive, or dissolving effect on the iron of the cylinder water jackets, on the copper, brass, and solder of the radiator, or on the rubber of the radiator hose. As the rubber hose is easily and cheaply replaced—destruction of the rubber does not necessarily rule out a compound, if this destruction is not too rapid.

3. The chemical used should not deposit dirt, scale, or sediment—to clog the radiator tubes. As a rule, a compound which does not cause corrosion, will not cause much sediment, as the sediment is really metal corroded from the parts of the cooling system.

4. The solution should be reasonably free from fire risk, so that any leak, in the cooling system, will not necessarily cause a fire if it

comes in contact with the hot exhaust pipe or electric wiring system. This objection is urged against the use of kerosene.

5. The anti-freeze should not waste away by evaporation too readily. Alcohol evaporates and boils away very easily, causing a constant expense all winter for replenishment. Preferably, it should have a higher boiling point than water.

6. The chemicals should be easily dissolved in water, or combined with it. Kerosene will not mix with water, and a combined solution cannot be used. Water and alcohol mix very nicely, and can be used together in any proportion.

7. Another requisite is good heat conductivity. Water is admirable in this respect, and so are the metallic salts. Oil is a very poor conductor of heat, and this is a serious objection to the use of kerosene.

PREPARED ANTI-FREEZE.

Prepared anti-freeze solutions have come into quite general use, as most car owners would rather purchase a solution that has the endorsement of a reputable manufacturer, rather than take chances by experimenting on their own cars.

A 6-pound package of one of these prepared anti-freeze compounds sells for about a dollar and a half. And a single package will protect the Ford cooling system to 5 degrees below Zero. For colder weather than this, more of the compound can be used.

These compounds do not evaporate, and it is only necessary to add water, to replace the loss due to evaporation. Of course, if the solution is allowed to boil, some of the solution will slop over and out of the overflow pipe of the radiator. This loss must be replaced by adding a small amount of fresh anti-freeze from time to time.

In order to test the strength of the anti-freeze solution, a Freeze-proof meter can be used. This instrument being a weighted glass tube, which sinks into the solution to an extent indicated by the scale, and so shows the density of the solution. The less anti-freeze in the solution the less dense the solution is, and the farther the glass bulb sinks down into the solution.

Another make of anti-freeze solution is called the Twelve-Twenty, because an ordinary storage battery hydrometer will indicate 1220 when the solution is of the correct strength to adequately protect the cooling system.

USING PREPARED SOLUTIONS.

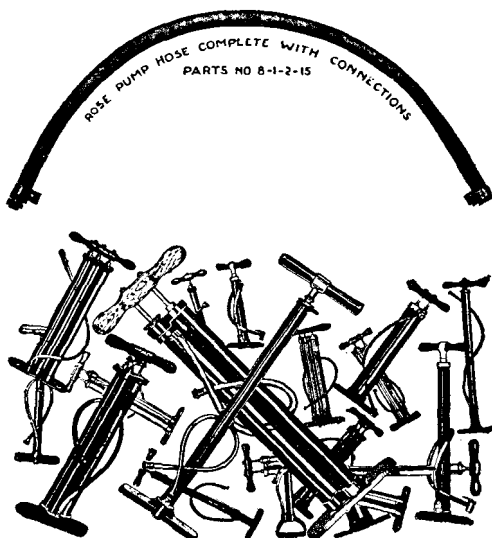
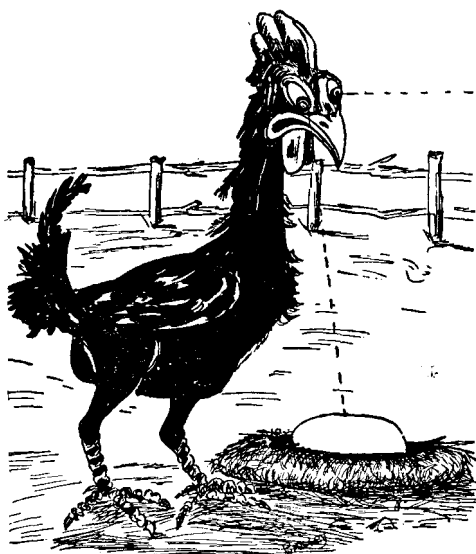
A few simple precautions are advisable when using these anti-freeze compounds. The radiator and cooling system should be well washed out, before adding the new anti-freeze. If the anti-freeze is added to water, which has been in the cooling system for a long time, the dirt and sediment in the water may tend to neutralize part of the anti-freeze, or combine with it, to form chemical reactions, which may have a deleterious chemical effect.

The anti-freeze should be thoroughly mixed with hot water, as hot water dissolves the chemicals much better. And not less than two gallons of hot water should be used for each 6-pound package of anti-freeze.

Just Why, We Can't Tell BUT THEY DO

THE
BLACK HEN LAYS A WHITE EGG

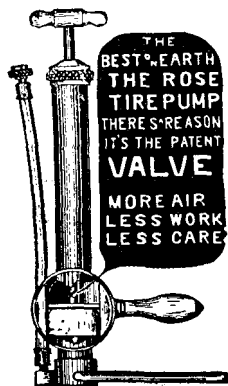
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ROSE TIRE PUMP HOSE FITS
MOST TIRE PUMPS



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The Rose Tire Pump Hose

is 24 inches long, 17-32 outside, 3-16 inches inside, with a wall of Pure Para Rubber. The fabric is 5 ply, rubber covered, made to withstand unusual weather conditions. Hose comes complete with connection and clamp, packed 6 in carton, 6 cartons to case. Fits most tire pumps and can be attached in from two to five minutes.



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1,500,000 in Use

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The Rose Tire Pump Needs No Introduction

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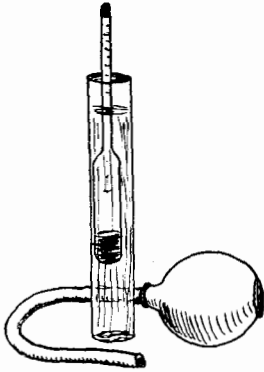
J. H. Haney & Co., Hastings, Nebr.

Ask Your Dealer

After the crystals have been completely dissolved, pour into the radiator and fill up with water, to within about 3 inches of the top. And always keep the water level in the radiator at about this point.

If the anti-freeze is not thoroughly dissolved, the crystals may settle in the lower hose connection, and interfere with the circulation of the water, and cause steaming, thus making the car owner think that the radiator is frozen, when the trouble is really only due to undissolved crystals.

After pouring in the anti-freeze solution run the motor immediately to thoroughly and evenly distribute the anti-freeze through the cooling system. This stirs up the cooling



FREEZE-PROOF METER.

system, and the heat of the motor tends to dissolve any particles of anti-freeze that have not been completely dissolved.

If any anti-freeze has gotten on the spark plug porcelains, or the wiring of the car, wash it off with hot water for this compound carries the electric current, and will cause short-circuits and misfiring, if allowed to remain on the wires or on the insulators of the spark plugs.

Most of these anti-freeze compounds are deliquescent—nice word that! We got it out of a book, and the dictionary told us that it means “gathers moisture from the air.”

Any overflow from the radiator or cooling system, leaving a deposit of this anti-freeze, will always look moist and will give the impression that there is a water leak. But, the anti-freeze should be washed off with hot water, and dried.

As the weather becomes colder, and one wishes to strengthen the anti-freeze solution, a gallon or two of the solution should be drained from the radiator. This should be heated, and the additional anti-freeze dissolved in it. Then poured back into the radiator.

If the solution seems to be dirty and contains sediment, it can be strained or filtered through a cotton cloth.

In very cold weather, when a strong anti-freeze solution is used, it is advisable to cover up the radiator and run the engine idle for a few minutes, to take the chill off the water, and be sure that it is circulating, before starting out on the road. This will dissolve any crystals of anti-freeze, which may exist,

due to the cold and the strength of the solution.

In bitterly cold weather, it is advisable to keep the bottom of the radiator covered up, to prevent crystallization of the anti-freeze at this point, and the over-cooling of the engine.

CALCIUM CHLORIDE.

Few car owners take the trouble to make their own anti-freeze solutions of calcium chloride, as care must be used to obtain the chemically pure chloride. And this costs about 25 cents a pound, or as much or more, than the ready-prepared compounds.

About 6 pounds of calcium chloride, mixed with 3½ gallons of water, will form enough anti-freeze solution to protect the Ford cooling system down to about Zero. Do not use chloride of lime.

To test for acid, in this home-made solution, use blue litmus paper. Add ammonia, to neutralize the acid, until the blue litmus paper no longer turns red, when immersed in the solution.

As to corrosive effect, on the iron of the water jackets of the cylinder head and cylinder block, this is not so apt to cause trouble. The metal at these points is made so heavy, for mechanical strength and for easy casting, that there is ample metal to withstand all the corrosion that is liable to occur.

The effect, on the soldered joints of the radiator, and on the steel hose connections of the radiator, should be watched. The electrolytic acid action, due to the copper of the radiator being in direct metallic connection with the iron or steel of the hose connections, makes electrolysis particularly apt to occur at these points.

ALCOHOL PREVENTS FREEZING.

Much of the utility of alcohol depends upon the price at which it can be purchased. And this price varies widely in different parts of the country. During the war, alcohol sold for \$1.50 and upwards. Now, the retail price seems to be around \$1.00, and the wholesale price is about 75 cents a gallon, when bought in 10-gallon lots.

During one “warm-and-cold” winter, the writer used over 10 gallons of alcohol, in one little Ford car. This is an unusual amount, but was made necessary by the fact that the patient Ford was left shivering outside the office all day long. During the comparatively warm days, the alcohol would evaporate rapidly—then it would be necessary to add a half gallon of alcohol or so to protect the radiator the next day when the weather changed to colder.

This “in-and-gone” process, with the alcohol, was repeated all winter, and the radiator froze twice—though without bursting, in spite of the \$15.00 worth of alcohol that was used.

While large cars, like the Packard and the Cadillac, can use alcohol successfully, this is due to the fact that these cars have a pump to keep the water in circulation. This keeps the water much cooler than the thermosyphon, or heat-circulating system of the



Champion

Dependable Spark Plugs

There Is No Substitute for Champion Dependability

The experience of thousands of users and the judgment of the ablest engineers is summed up in the Ford Motor Company's instruction book in referring to the use of Champion Spark Plugs.

"There is nothing to be gained by experimenting with different makes of plugs. The make of Plugs with which Ford Engines are equipped when they leave the factory are best adapted to the requirements of the motor."

Champion Spark Plugs are factory equipment on Ford Cars and have been since 1911.

When you buy a plug, be sure the name "Champion" is on the Insulator and the word trade mark is on the box. Don't experiment with substitutes.

Champion Spark Plug Company, Toledo, Ohio
Champion Spark Plug Co., of Canada, Limited, Windsor, Ontario

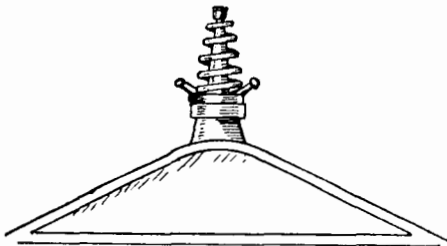


Ford, in which the water does not really begin to circulate effectively, until the boiling point is almost reached, in the water above the cylinder heads. That is why the Ford is so much more extravagant of alcohol as an anti-freeze, than the larger, pump-circulation cars.

About 5 quarts of alcohol will protect the cooling system down to about 5 degrees above Zero. And about a gallon and a half will protect the Ford engine in Zero weather. But, some owners feel serene in the knowledge that they have put so much alcohol in the radiator. But, it isn't what was in the radiator, it is rather what is in the radiator, that keeps the radiator from feeling frozen.

One of the reasons that alcohol is so costly in actual use is that there is no easy way of testing the strength of the unstable, ever-changing, alcohol-and-water mixture.

While it is true that the specific gravity of the mixture can be tested, by means of a special hydrometer—used for measuring liquids lighter than water—such hydrometers are not in general use. The storage battery hydrometers are for use with liquids heavier than



RADIATOR CAP CONDENSER.

water, and are hence not suitable for this purpose.

As a result of the difficulty of measuring the strength of the alcohol-water mixture, the cautious car owner usually keeps so much alcohol to the solution that the alcohol evaporates rather rapidly, and much of it is wasted.

If this is not done, then on some real cold day, when there is a "little too little" alcohol, the radiator will freeze. However, when some anti-freeze has been used in the water, the water seems to freeze in a sort of slush, and does not seem to have the hard, bursting effect of clear, cold water.

Among the advantages of alcohol is that it does not seem to have any corrosive effect on the metals, or the rubber of the cooling system any more than plain, clear water. Also, it does not have the dissolving and "leak-finding" ability of some solutions. As to fire risk, the fact that the alcohol is so thoroughly dissolved in several times its bulk of water, makes it practically fire-proof, though we would prefer not to hold a match over a steaming radiator, in the case of a strong, alcohol solution.

While wood alcohol has a lower freezing point, it costs more and evaporates more rapidly and so the use of denatured alcohol is generally preferable and more economical.

GLYCERINE.

Theoretically, glycerine is an admirable anti-freeze. In the same way, gold would be a good metal for stew pans—but they both cost too much.

The Ford Manual states that a solution of 60% water, 10% glycerine and 30% alcohol, is commonly used, and that its freezing point is about 8 degrees below Zero. But, as the glycerine would cost about \$5.00 and the alcohol about \$2.00, or a total of \$7.00, for filling the cooling system—no charge being made for the water—this solution is so uncommon that we have not seen it in a Ford radiator for several years.

At present prices, of about \$10.00 a gallon, the use of a mixture of glycerine and water alone is out of the question. Also, glycerine circulates rather sluggishly, which is a disadvantage in the Ford thermo-siphon cooling system. And the glycerine tends to attack and rot the rubber of the hose connections.

KEROSENE OIL.

In October, 1918, the writer filled the cooling system of a light Ford roadster with kerosene, using about 3½ gallons of oil, at 20 cents a gallon, or a total of 70 cents. This roadster had a light enclosed winter top attachment weighing only 10 pounds more than the regular Ford top.

No cover could be used over the hood or radiator, and every possible means had to be used to keep the engine cool, as the engine was constantly overheating. The first half-mile of every trip was all right. But, after a mile or two, the engine began to overheat and knock, causing unnecessary strains on the engine bearings and other parts, in spite of the fact that the engine was in first-class condition and free from carbon.

In March, when the kerosene was drained out, it looked more like engine oil, the lighter portion seeming to have been boiled away. Part of this heavy liquid was dumped into the gasoline of the fuel tank, but this made the engine run very rotten indeed, and the rest of the kerosene was used for cleaning the engine.

With sufficiently cold weather, there is no question that kerosene can be used as an anti-freeze—provided that the engine is humored in every possible way, and not worked hard, and not used for drives of more than a couple of miles at a time.

About 15 miles was the greatest distance we ever used the kerosene on a single drive—and the engine pounded like a trip-hammer, on that drive over fairly hilly roads.

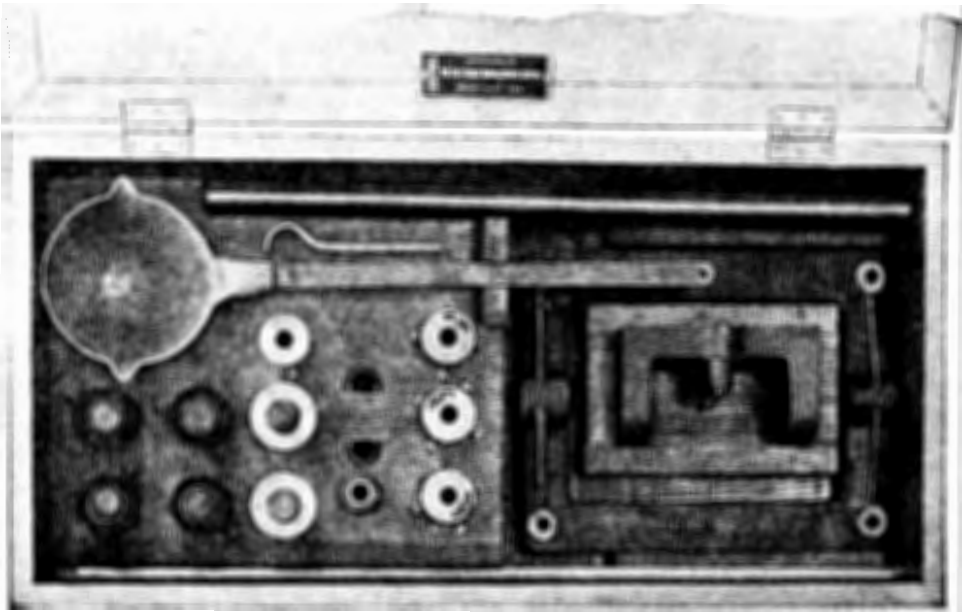
When first placed in the radiator, the kerosene boiled very easily. After using the car for about a week, the lighter products seemed to have boiled away, and the remaining kerosene did not boil nearly so easily.

The constant knocking of the engine was due to the low heat conductivity of the kerosene, which did not conduct the heat away from the cylinder walls with sufficient rapidity, even though the front of the radiator was comparatively cool.

**Rebabbitting and Reaming
the main bearings of a Ford in Two Hours!**
and with results comparable to a higher priced car

**Eliminates Handscraping—
Better than “Burning in”**

With the Ford Martell Reamer and the Ford Rebabbitting set, a mechanic can readily pour the bearings and ream them by the same method as is used by the large car manufacturers, the Government Aviation Camps and the most complete repair stations. Rebabbitting set, shown below, also includes fixture for re-lining connecting rods for Ford engines. Ask for Ford booklet R.



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When writing advertisers—Just say FORDOWNER

The writer is not going to use kerosene again this winter, as he believes that the constant knocking to be very injurious to the bearings and other parts, and might cause a broken crank shaft or other serious trouble. Also, the constantly overheated, had-to-be-humored engine took all the joy and pleasure out of driving.

After the lighter products had been boiled off, the remaining oil did not seem very inflammable, and the fire risk did not seem very serious. Though this fire risk was always present to a certain extent.

As to injuring the rubber hose connections, new ones were installed at the beginning of the winter, and were taken off at the end of the winter—no leakage troubles having developed. But perhaps these hose connections should really be replaced more often when kerosene is used, especially the top hose connection.

COMMON SALT SOLUTION.

The kind of salt, used in ice cream freezers, has been suggested for making an anti-freeze solution. But we do not consider this plan of any value. Even a saturated salt solution

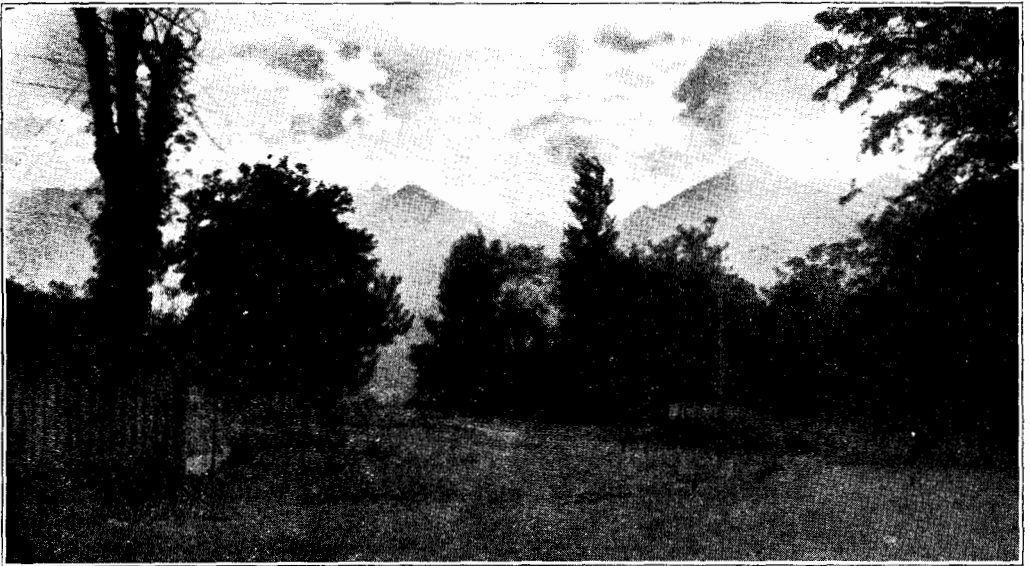
will not protect the radiator, in really cold weather, and a strong salt solution has an intensely corrosive action.

The reason that the strong salt solution is so corrosive is that the iron, of the cylinder block—together with the copper, and the zinc-containing brass of the radiator, form electric couples. The electrolytic action of these dissimilar metals, causes the rapid corrosion of the metals in the same way that the zinc of a door-bell battery is rapidly wasted away.

ARMY ANTI-FREEZE.

One of our readers, Mr. C. E. Lewis of Jackson, Michigan, has asked us about an anti-freeze, said to have been used in the Army trucks. This consisting of: water, 5 gallons; common salt, 10 pounds, and Arm & Hammer Soda, one pound. If convenient, boil for 20 minutes.

No doubt the soda is intended to prevent rusting, but we have no data available as to its effectiveness for this work. Soda is, however, quite frequently used for cleaning dirty radiators. Perhaps some of our readers have had experience with this solution, and can tell us about it.



EASIER COLD WEATHER STARTING

What has this caption to do with the picture above—or vice versa?

Why, friends, this is a psychic test. On cold, winter mornings when the 'bus stubbornly refuses to start out into the snow, just produce this picture. Show it to the car; let "Henry" dwell for a moment on this vision of sylvan, summer scenery. Or study it yourself for a while. Through the power of suggestion it should warm up both of you.

This picture is a reproduction from a photograph sent to us by Mr. Thomas F. Butler of San Francisco, who recently was fortunate enough to make an extensive Ford tour of

the great Southwest. Many such scenes were encountered and of this particular one Mr. Butler says:

"The view of the Sierra Nevada Mountains from this part of the Owens River Valley is grand beyond description. Nothing I have ever seen on the Western slope of these mountains can approach this view in wonderful grandeur and magnificance. In ceaseless wonderment I gaze, and, well, I simply gaze again."

You say you would like to make such a trip right now? Well, that makes it unanimous.

Atlas

Centrifugal Water Circulating Pump for Fords



Free your Ford from the freezing, boiling, steaming, leaky-radiator troubles of winter driving, and foot-toasting in summer. The nightly nuisance of radiator draining, or the gallons of anti-freezing solution boiled away, soon amount up in time and money to the small cost of an Atlas cooling system that saves this expense and annoyance.

Here's What the Dealer Can Do

In 15 to 20 minutes any dealer can put an Atlas Centrifugal Water Circulating Pump in your Ford. It fits naturally in the car, because it's a Ford edition of the pump we have made for 12 years for use by big car makers.

Send Coupon for Full Description

Get complete information about this money-saving Ford accessory and name of nearest dealer. We'll gladly send it. Write.

The Atlas Brass Foundry Co.

1001 S. Front St., Columbus, Ohio

Big Sales Chance for Dealers!

Take advantage of this pump's success—our handsome window hangers, folders, and direct-to-user advertising, make sales for you. Send coupon.

THE ATLAS BRASS FOUNDRY CO.
1001 S. Front St., Columbus, Ohio

Please send full information about your Atlas Centrifugal Water-Circulating Pump for Fords.

Name.....

Address.....

Improving The Ford Windshield

Increasing the Visibility for Winter and Spring

Lots of us know that a Ford can be driven with one hand—with the other hand “around somewhere.” And there be some such rascals who aver that this is the most comfortable of all ways to drive.

Other drivers close one eye—for the duration of a wink—when passing the beauties of nature. But, rash indeed are those who drive with both eyes closed, as this is what they really do, when the windshield is covered with rain or snow.

Even though we may feel that “nobody loves us” and we drive like Dare-Devil Dick

tort—“Why didn’t you buy one of the attachments for cleaning off the windshields—the owner of a car can surely afford one? If you can’t—you have no right to the use of the roads, until you can drive, with safety to others.”

MAKES RAIN DROPS SKID.

If the windshield were covered with a sheet of water, of uniform thickness, this water would be easy to see through. The trouble is, however, that the drops and streams of water running down, are of uncertain thickness. This twists, distorts, and blurs the vision; so that we get headaches, a wry face, and still are apt to have an accident.

One method of contending with the Rain-Imp, is to cover the glass with some preparation which will form a thin film, on the surface of the glass; so that the water will “smear” and skid lightly off.

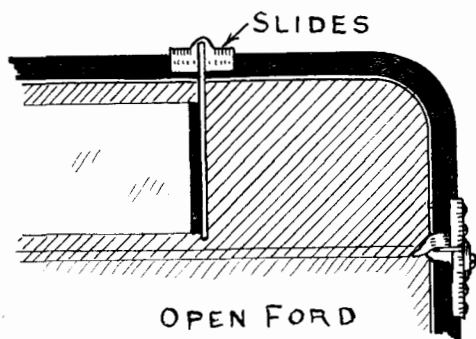
A little bottle, containing a half-and-half mixture of glycerine and alcohol, is a useful piece of equipment. Just before the rain starts, use a clean cloth to wipe over the surface of the windshield glass with this solution. It is not necessary to leave a lot of this solution on the glass, and the glass can be wiped quite clean, and still be slippery enough for “rain-skidding.”

COVERS PART OF GLASS.

Some car owners cover only a part of the windshield glass with this solution. Then, they can see through this part of the glass, while it is raining; and through the rest of the windshield when the rain is over. If the cloth is kept with the bottle, and the same cloth is always used; it will soon contain enough of the glycerine solution to do the work without frequent application of fresh solution.

PREPARED VISION SOLUTIONS.

Even better, than the glycerine-and-alcohol mixture, and not a bit more costly, are the soap-like preparations for rubbing on the windshield glass. These preparations have the advantage that they can be applied in the morning, and the windshield wiped clean. And yet there will still be a film on the glass that will dispose of rain occurring during the day. One application will sometimes be fairly effective for several days, but it is better to renew it every day, in very wet weather.



Scraper for Open Ford.

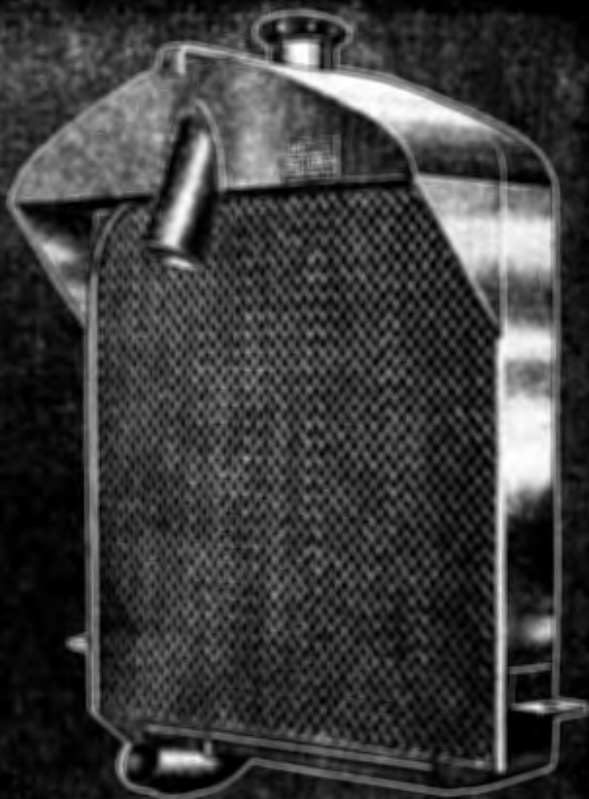
on the road, we have no right to cause any unnecessary risk to others—be they occupants of our car, of other cars, or merely human beings, walking along the road. For this safety reason, every owner of an “all-weather” Ford should use some devices for making it easier to see through the windshield in bad weather.

Even the most confirmed, “fair-weather” Fordist has to come home in the rain, sometimes; uness he is a more infallible weather prophet than the U. S. Weather Bureau.

When the windshield glass is covered with drops of water the headlights of an approaching car will convert each drop of water into a little lens; focussing a blinding array of light into the eyes of the driver, and making him apt to run into any pedestrian who may be walking along behind the approaching car.

In case of an accident, and lawsuits—to claim that one could not see on account of the windshield being covered with rain or snow, is only to bring forth the crushing re-

Greater
Cooling
Capacity
*than any
Other!*



G&O *for*
Radiators **Ford**
Cars

The Quality radiator with greater cooling capacity than any other radiator for FORD cars. Fits inside of standard shell. Tank and core, brass throughout.

Honeycomb and tubular cores for replacements. Orders for repairs filled and shipped on day of receipt.

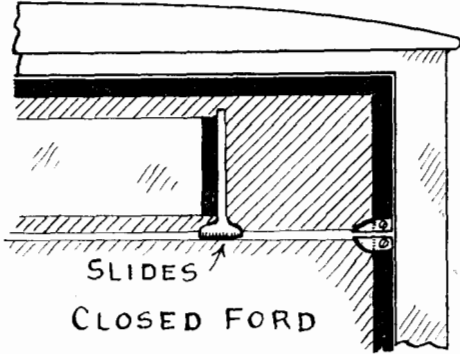
Dealers are stocking up now for Spring business.

The G&O Mfg. Co., New Haven, Conn.

USE ON ENCLOSED FORDS.

Owners of open Fords with enclosed top attachments, or of Ford Sedans and Coupelets, will find it advisable to carry a can of one of these prepared solutions, for wiping over the glass at the sides and back of the car.

This makes it possible for the driver to see traffic approaching at the sides, and makes for much greater safety and protection in wet weather, when the roads are dangerously slippery, and the "other fellow" may be driving with dangerous side curtains to obscure his vision.



Middle Sliding Scraper.

Even for the front of the windshield, even though a rubber scraper is used, the preparations are often useful. Many of the rubber scrapers clean only a part of the windshield. And there is no doubt that better vision can be had if one can see through it all. By smearing the preparation over those parts of the windshield, not reached by the rubber scraper, more comfort and safety in driving is secured.

As these preparations are comparatively inexpensive, one might as well pay the extra quarter, or so, for a can; and be prepared for all weather.

PREPARED PADS.

For greater convenience, these preparations are sometimes placed on felt pads and, in this form, the pad can be easily wiped over the windshield glass. Some of these pads are about the size of a black-board eraser, or perhaps a little smaller.

WINDSHIELD SCRAPERS.

Fortunately, there are many different kinds of windshield scrapers. This enables one to pick and choose that type of scraper that is best adapted to one's own Ford car. It must be remembered that a different type of scraper is required, for the enclosed Fords, from the type used on the open Fords.

As we all know, the upper glass of the windshield of the Ford open cars is placed about half an inch in front of the lower glass. The bottom edge of the upper glass is also about an inch lower than the upper edge of the lower glass. On the earlier Fords, this overhang of the glass is only about half an inch. But, on the latest Fords, this overhang is much more—"So be sure to try the

windshield cleaner on your own Ford before buying it."

On the Ford enclosed cars, the top and lower glass of the windshield are flush, or even, with each other, so a different type of cleaner can be used. The cleaners, which slide along the top of the windshield of the open Fords, cannot be used on the enclosed Fords. The wise dealer, in Ford accessories, stocks up with the different types of Ford windshield cleaners, in order to meet the varied requirements of the Ford trade.

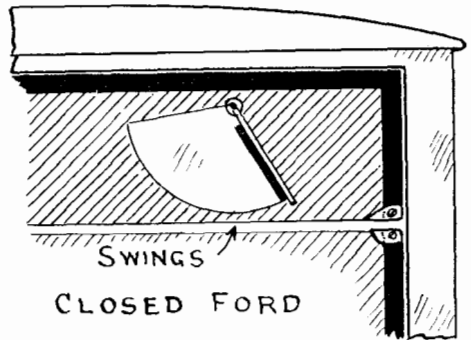
OPEN FORD SCRAPERS.

One convenient form of windshield scraper slips over the top of the windshield and slides along the top of the frame. This type can be easily slipped off at the end of the frame, and carried in the tool box, or under one of the seat cushions, when not in use. In this type of scraper one or more wide flat strips of rubber scrape the rain or snow off the windshield. Or, sometimes, a special shape of rubber scraper is used.

Among the advantages of this type of scraper is the fact that it cleans nearly all of the glass of the top of the windshield, thus affording a wider view.

As the driver of the Ford touring car or roadster sits so high, nearly all the driver's vision is through the top glass of the windshield—the hood and radiator, and the road close in front, being about all that is visible through the lower glass. As the time to see other cars is when they are at distance, seeing through the lower glass is of very little importance. Try this on your Ford.

Some of these scrapers have a rubber, or fiber, wheel, or other equivalent device, on the inside of the glass, to prevent scratching

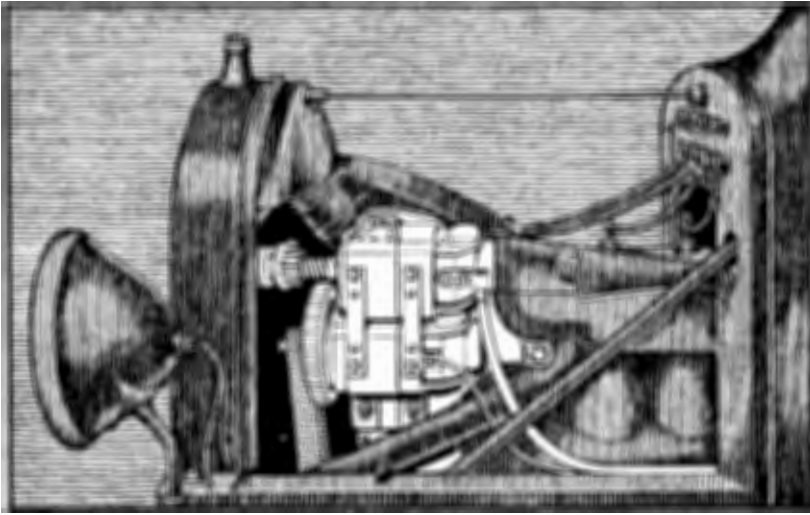


Swings From Glass.

the glass. Other cleaners have another cleaner, on the inside of the glass, to furnish the balance of pressure.

While, at first, a cleaner on the inside of the glass seems far-fetched, practical use often shows its value. In really cold weather the steaming breath of the driver, who has "rastled" with a "won't-start" Ford, is apt to condense on the inside of the glass.

The same thing sometimes occurs in foggy weather, especially with the more-tightly enclosed Ford Sedan and Coupelet. As the Weather Bureau would be apt to observe, the same conditions of "Fog, with increas-



GRAY & DAVIS

STARTER

for Every FORD

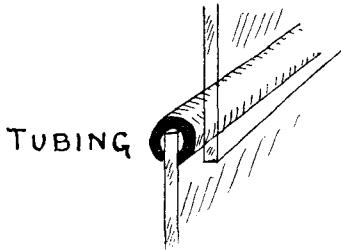
Add convenience and safety. You and your Ford deserve it. Always a quick start in any weather. Bright steady light standing or running. Specially designed and built to add Gray & Davis reliability to Ford service.

Booklet A 62 tells the story.

GRAY & DAVIS, Inc., BOSTON, MASS.

ing cloudiness" would be apt to occur after the ball is over, when the fervent devotees of the Jazz are about to discover that the "longest way round is the sweetest way home."

In selecting a windshield scraper, pick one which will not tend to scrape the enamel off the top frame bar of the windshield, thus causing it to become discolored with rust.



Tubing Strip.

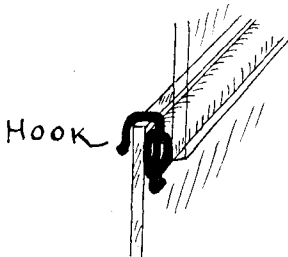
If one uses an anti-draft shield, fitted between the top of the windshield and the front edge of the top, then one should choose a type of windshield scraper that does not interfere with the anti-draft shield—particularly, if the car is to be much used in really cold weather. In merely wet weather, this is a minor detail.

TOP SWINGING SCRAPERS.

Another type of open Ford windshield scraper, clamps to the top of the windshield frame and has a swinging arm carrying the rubber scraper and cleaning a "piece-of-pie-shaped" space on the glass.

While this type does not clean as much of the glass as the other type, some drivers consider it more convenient to manipulate, as it is directly in front of the driver.

Another type, which can be used on the open Fords, is the swinging type in which a hole is drilled through the glass. This hole seems to weaken the glass, and many broken



Rubber Strip.

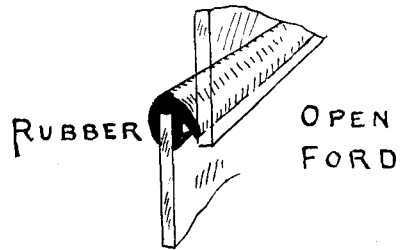
windshields have resulted from using this type of scraper on an open car windshield as it is really intended for the enclosed cars.

A vital point to watch is whether the scraper hits the lower glass, when the windshield is folded down. If it does, the scraper is apt to break the glass, when the windshield is folded down in a hurry, if the scraper is not first removed.

MIDDLE SLIDING SCRAPERS.

Some of the middle sliding scrapers can be used on the Ford open cars, in spite of the overhang of the top glass.

However, this type is more generally used on such enclosed Fords as the Sedan and the Coupelet. This type is very convenient as the cleaner can be slid all the way across the glass, and so cleans a wide surface. Also, the



Open Ford Strip.

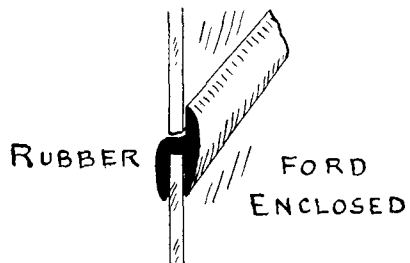
cleaner can be removed and carried under one of the seat cushions, in fair weather.

While this cleaner interferes with the use of the rubber strip, between the edges of the upper and lower glass panels, one can use about half the rubber strip, as it is not only necessary to slide the cleaner about half way across to give the driver clear vision—and half a strip is better than none.

Another type of middle sliding cleanser for enclosed Fords is so made that it cleans both the upper and lower glass panels at the same time. In the Ford enclosed cars, particularly the Ford coupelet, where the driver sits very low, this is a distinct advantage. The driver looks through the lower glass of the windshield much more on an enclosed Ford than on an open one.

SWINGING FROM GLASS.

The type of cleaner, which swings from a pivot, extending through a hole drilled through the top glass of the windshield, is quite frequently used on Ford Sedans and Coupelets. As the top glass panel of these



Closed Ford Strip.

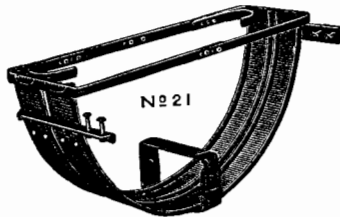
enclosed cars does not fold down like it does on the Ford open cars, there is not the same risk of the cleaner striking and breaking the glass as there is on the open cars.

WINDSHIELD STRIPS.

The strong head wind, due to the motion of the car, has a tendency to create a strong draught through the relatively small space

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Built to carry 1—30 x 3½
and 1—32 x 4½ **TIRE**



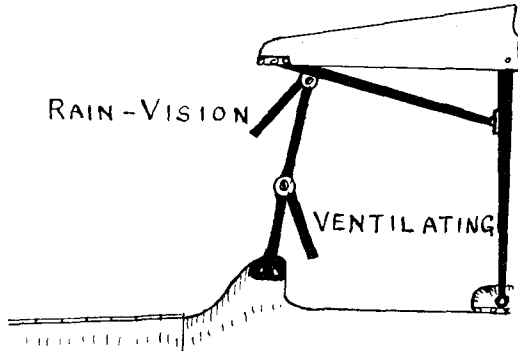
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between the edges of the upper and lower glass panels. But, several effective windshield strips have been devised to prevent this.

Some car owners simply split a piece of elastic, rubber tubing, along one side, and slip this split tube over the top edge of the lower glass of the windshield. If the tubing is of the correct size, and has heavy enough walls, this tubing will act effectively, if the space be not too great.



Special Windshield.

If the space is a little wider, it may be better to place the entire rubber tube between the two windshield glasses, and to hang this tubing in position by means of small wire hooks extending over the top edge of the lower windshield glass.

An even easier method is to purchase one of the special ready made rubber strips made for the Ford open car windshields by the specialty makers.

For the Ford Sedans and Coupelets, a slightly different style of rubber strip must be used, as the glass panels come together differently.

As the driver sits so low in the Ford enclosed cars that the division between the two panels of the glass comes right in the driver's line of sight, a less noticeable form of windshield strip is made of transparent celluloid. This is hardly noticeable when in use—but is not quite so elastic as the rubber.

These windshield strips prevent the rain blowing up on the inside of the top panel of the windshield, and make it much easier for the driver to keep warm and dry in bad weather.

The rubber strips can be easily removed and carried under the seat cushions when not in use, as it only takes a moment to slip them on. Some drivers, however, shellac these rubber strips to the glass, at the beginning of winter, and then feel that they will have no further bother from this source.

SPECIAL WINDSHIELDS.

The regular Ford windshield is a rather unobliging contraption. Either it is up—or it is down. While, theoretically, there are intermediate positions—these intermediate positions are not practical. One seldom sees the Ford windshield—save in one of the two standard positions—either all the way up, or all the way down.

The reason for this is the manner in which the upper glass of the Ford windshield is pivoted at the bottom. If the glass were pivoted at the middle, or nearer the top, then it would be possible to swing up the glass, so as to afford the driver a "rain-vision" view, between the two windshield glasses.

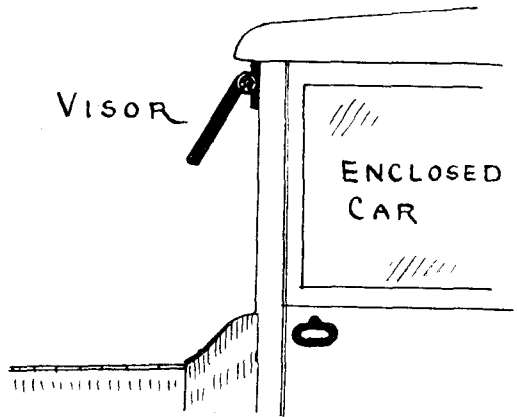
Now, some of the accessory makers supply special brackets, or attachments, by means of which the regular windshield can be changed to one of the rain-vision, ventilating type, such as is quite generally used in all high-class cars—except the Ford.

By making it easy to tilt the top glass at an angle, and by making the lower edge of this top glass project forward, the "rain-vision" can be secured. Also the glass can be tilted to afford varying degrees of coolness, in mild weather. The pivoting of the lower windshield glass makes it easy to direct a current of air into the front seat compartment. This is very desirable to remove the "fireless cooker" effect, for summer use.

Another advantage of some of these special windshields and windshield brackets is that they make the entire windshield slope towards the rear. This reduces the wind resistance of the car, and greatly adding to the up-to-date appearance of the Ford. Practically every car—save the self-centered Ford—now has the windshield sloping towards the rear.

THIRD-PIECE VISORS.

On the 1915 Ford Sedans, which had splendidly upholstered, all-aluminum bodies, a three-piece windshield was fitted. On later models, when the price was reduced, the third



Enclosed Ford Visor.

part of the windshield was omitted—the idea being that car owners could buy these windshields extra, if they wanted them.

But few owners of Ford Sedans and Coupelets are aware of these third-piece windshields, or know where they can be obtained.

On nearly all high-class electric automobiles and on many other enclosed cars of various makes, an extra top glass panel, or visor, will be noticed. These extra visors are not so generally used in the "fair-weather" open cars, as it is a little harder to find a place to fit the visor on an open car.

STORM REBORING MACHINES

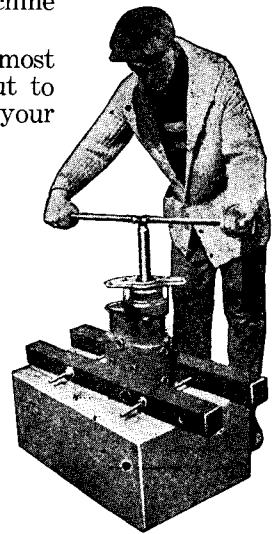
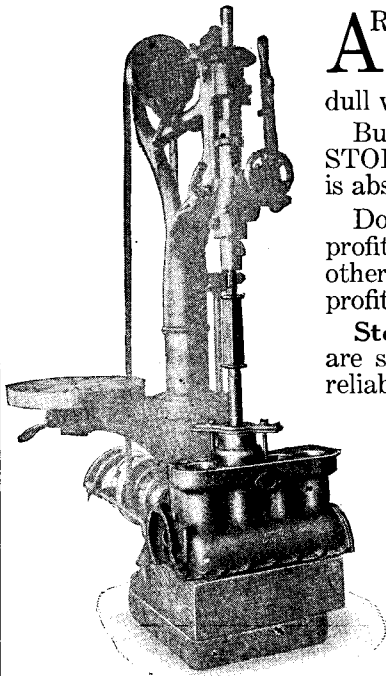
ARE making substantial profits for repair men everywhere. Now is the time to prepare for thorough overhauling and rebuilding and change the usually dull winter period into a busy, profitable season.

But you can't do this without proper tools and the STORM Cylinder Reboring Machine is absolutely essential.

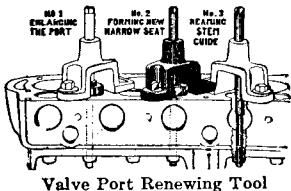
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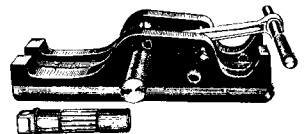


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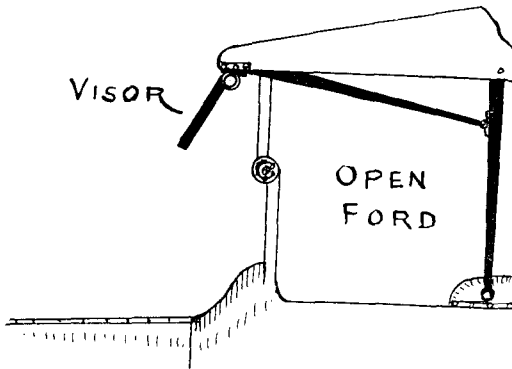
Connecting Rod Bearing Reamer, Jig and Gauge

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The use of a visor is an improvement over the use of a "rain-vision" windshield, in that it affords almost as clear a view, and still the car is **kept closed**. Thus, there is no torrent of rushing, rain-carrying air coming into the car.

When in use the visor is slanted down in front of the top glass. This keeps off most of the rain and snow, which would otherwise interfere with the vision of the driver.

In very bad weather these visors work most effectively if kept fairly well "down in front." For, if kept up, in a nearly horizontal position, the snow will sweep under, when the car is forging ahead.



Open Ford Visor.

In addition to their use on the Ford Coupelet and the Ford Sedan these windshield visors can also be used to advantage on many of the winter or enclosed top attachments for Fords.

Besides making these for the Ford enclosed cars, the visors are also made for attachment to the lower side of the front cross bow of the top of the Ford touring car and runabout. Another maker uses special brackets, fastening to the regular Ford open car windshield, to support the visor.

REAR-VIEW MIRRORS.

Our survey of windshield improvements would hardly be complete without the mention of those "eyes-in-the-back-of-your-head" rear-view mirrors, which are often attached to the Ford windshield.

Sometimes the mirror is made part-and-parcel with the back of the spotlight. This is a neat solution of the problem, if a spotlight be used.

More frequently, the rear-view mirror is attached to the side of the windshield frame, and extends out towards the side. The arm, holding the mirror, should be long enough

to hold the mirror fairly far out to the side, so that one can still get a good view to the rear, in spite of the interference with the view, of the Ford top when it is folded down.

Another thing to watch, in the purchase of a rear-view mirror, is that it shall be sufficiently rigid, not to vibrate too easily. The vibration may make it impossible to see much in the mirror, when the car is in motion. For this reason, flimsy brackets are taboo.

Another detail to watch is the fastening of the rear-view mirror to the windshield frame. Stupid friends are apt to use the rear-view mirror as a handle, when hanging onto the car, so make sure that—even if they do pull the mirror off, they will not cause damage by twisting the mirror bracket around into the windshield glass.

Some owners fasten the rear view mirror to the left front mud-guard, where it is out of the way. But some Ford front fenders vibrate so much that the driver has to almost stop the car—before he can see what is coming.

A more recent stunt—in rear-view mirror design—which is especially desirable for Ford Sedans, Coupelets, and winter top attachments, is to place the rear-view mirror inside of the car, and just over the middle of the top of the windshield.

This is not practical for the Ford open cars, as one cannot see back through the celluloid rear curtain light unless one has installed a real glass window in the rear curtain.

By pacing the rear-view mirror inside of the car, it is less liable to damage, it can be used by the lady passenger when powdering her nose, and, most important of all, the inside, rear-view mirror is still usable when most needed, in heavy rain or snow-storms. On some of the newest enclosed cars, of expensive makes, a narrow strip of mirror of this type is placed clear across the top of the windshield.

PREVENTS WATER LEAKAGE.

A heavy snow-storm, or a driving rain, is apt to cause the water to leak into the car and drip down onto the feet of the front seat passengers this water oozing in between the bottom of the windshield and the cowl dash.

This trouble can be easily eliminated by unbolting the windshield from the body, and placing several strips of tire tape, or possibly a thin strip of rubber, cut from an old inner tube, on top of the cowl. When the windshield is replaced and again bolted down against the rubber, the water will be effectively prevented from coming through, even from a driving rain, or melting snow.

THAT MORNING AUTO RIDE

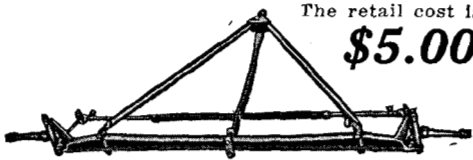
When the glory of the sunrise seems like
heavenly vision sweet,
And its touch of gold is heavy on the grasses
at your feet;
When each flower is heavy-laden with the
glory and the dew,
And the diamonds on its bosom seem to
sparkle just for you;

When all life seems new and tender in the
blush of early morn,
And you hear "Good morning," whispered by
the breezes in the corn,
O, 'tis then we joy in living, and the joy-
founts overflow
When we speed along the highway in the
morning's golden glow.

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Takes out the kink feature of Driving
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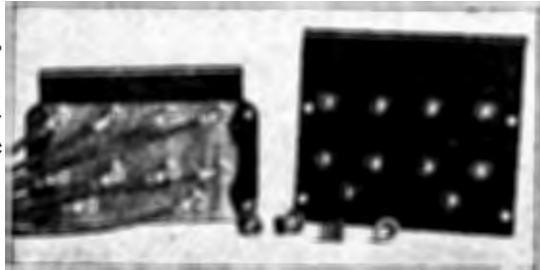
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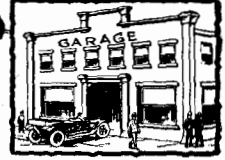
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Ford Service And Repairs



Reboring and Reaming Main Bearings of Cylinder Block After Rebabbiting

While rebabbiting is a "foundry" operation, which does not require much mechanical skill, or great accuracy, the reboring and finishing of these rebabbiting bearings is a "machine job," which requires great care and accuracy in order that the three main bearings may not only be in alignment with each other, but at the proper center-to-center distance from the Ford cam shaft as well.

If the crank shaft is not accurately aligned, with regard to the cam shaft, then the timing gears will be noisy, and the valve timing may not be quite as accurate as it should be, when the timing gears are installed.

In shops doing a great amount of reboring of the main bearings of the Ford cylinder block, the most accurate and economical results can be obtained from the use of expensive power driven, or specially built machine.

There are now on the market a great number of excellent types of the hand and power-driven reboring fixtures, which are readily and easily attached to the Ford cylinder block. These, if properly attached and adjusted, will produce a job of the same qual-

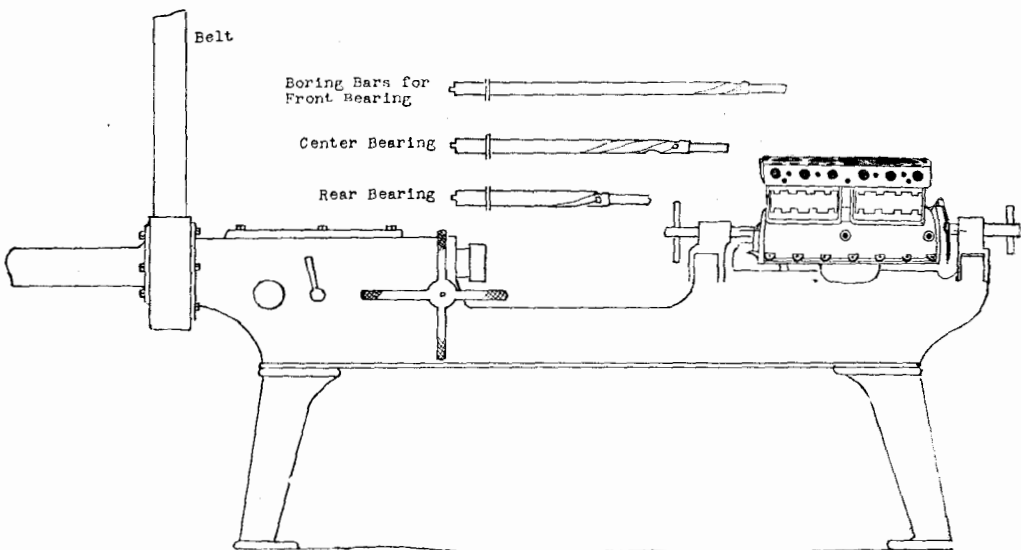
ity and accuracy as that obtainable through the use of the most elaborate and expensive machines

For these shops, in which reboring main bearings is only an occasional repair, the hand-operated type of reboring fixture is preferable, and will give excellent results.

Whenever the old crank shaft is to be replaced in new bearings then the cutting bar should be set to cut the bearings the correct size to fit that particular worn crank shaft. While all new Ford crank shafts are of practically the same size or diameter, this does not apply after the crank shaft has been in service for any length of time.

As a rule, the conditions which caused the cutting and wear of the babbitt bearings, are apt to have caused some wear of the steel of the crank shaft also. We have seen cases where the crank shaft had been reduced in diameter as much as .010 to .020 inch.

And if the cutting tool for reboring the bearings is set to the size for a new crank shaft the bearings will certainly be too large and too loose for a correct fit. This is one of the refinements of shop practice that makes for good work and prevents "come-backs."



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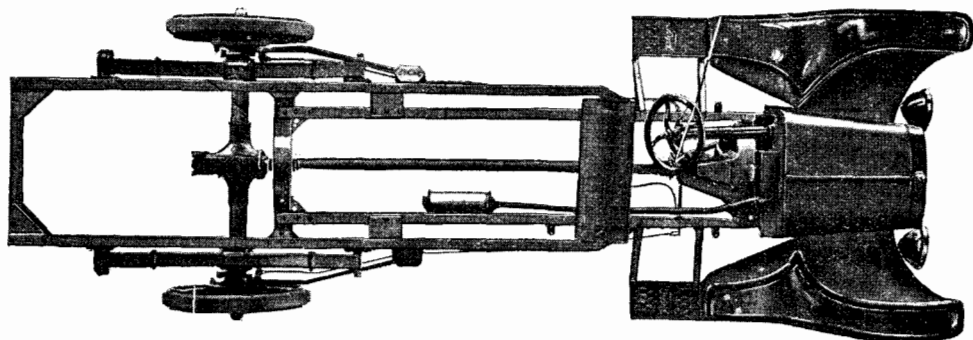
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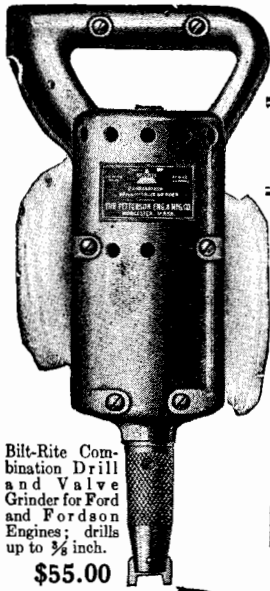
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Bilt-Rite *Electric Valve Grinder*

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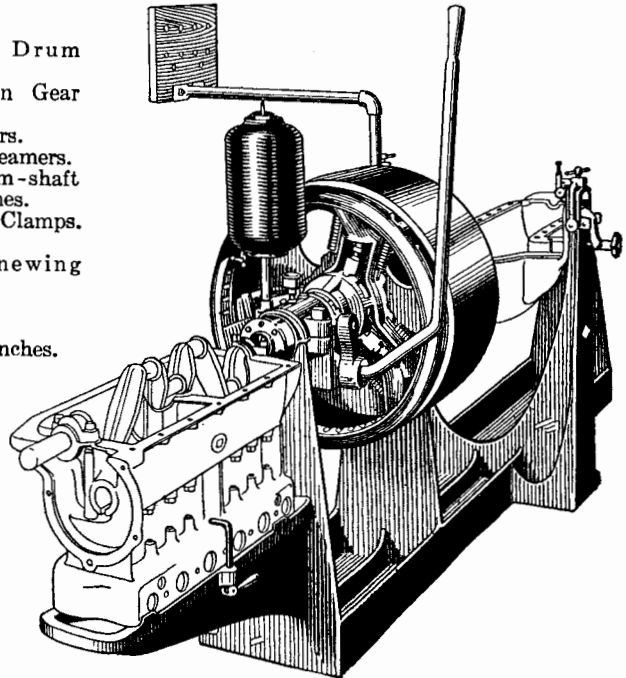
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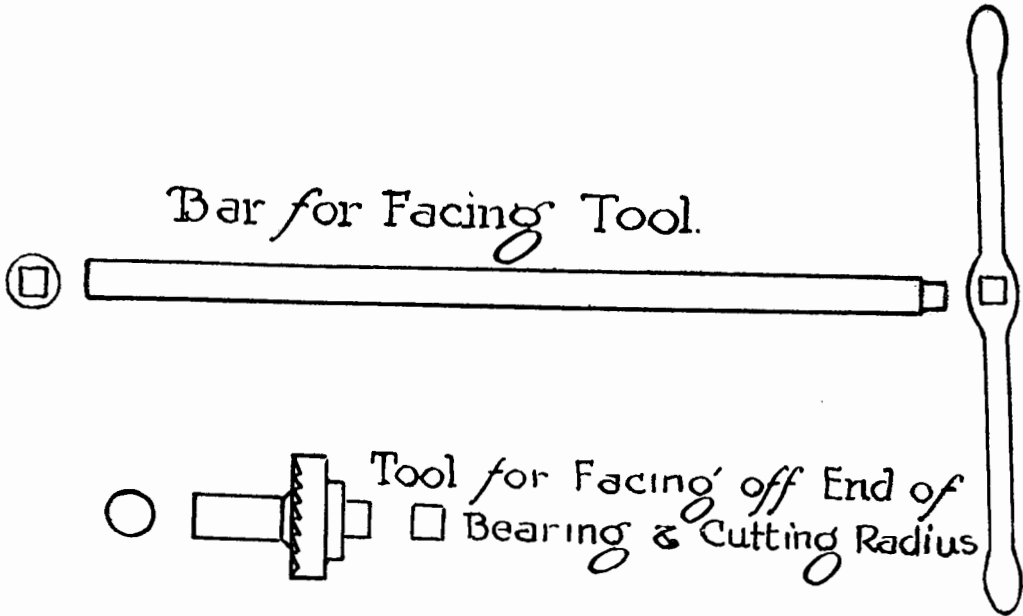
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There are now on the market various types of aligning reamers, or reamers made with inserted, adjustable blades. These blades can be readily adjusted to any desired diameter of cut.

Generally speaking, it is more important to have a clean, smooth surface on the cast babbitt metal, when a reamer is used, as the reamer has a wider cutting surface, and is not usually designed to take out as much metal as is the shorter blade of the cutting bar.

It is suggested that in any shop attempting to do much rebabbiting of main bearings that both the reboring bar and the aligning reamer be used. The reboring bar should be used to remove the stock, while the finished surface is obtained with the reamer.

Another advantage in the use of a reamer is that it is often desirable to overhaul a motor, when it is not really necessary to rebabbit the main bearings, as the bearings are sometimes somewhat out of shape. Also, in many cases, it is desired to install a new crank shaft, which, being larger in diameter than the old worn crank shaft, leaves enough metal for refinishing the main bearings, without the necessity of rebabbiting.

SETTING REBORING TOOLS.

Every manufacturer, making a portable babbitt boring fixture, furnishes directions applying to his own particular make of machine, but there are certain other directions which apply to all makes of machines.

With every reboring machine is furnished a small block, or gauge. These gauges vary in design, but all are intended to perform the function of adjusting the cutting tool to the proper diameter for making the bearing fit a standard, new crank shaft.

When one desires to set the cutter, to cut a diameter of say .008 inch diameter smaller than the standard, one can use a thickness or

"feeler" gauge that is one-half the desired change in the diameter; in this case being .004 inch.

In setting the tools for reboring, one should remember that a "running" fit requires about .002 inch clearance, to give room for the oil. Now, the Ford crank shaft is just $1\frac{1}{4}$ inches in diameter and, if we cut the babbitt about .001 inch smaller, or even of the same diameter, this will leave .002 or .003 inch of the babbitt metal, for the "burning-in" of the bearings.

In cutting such a soft material as babbitt metal, the cutters should have considerable "lip," or a sharp edge, like a plane, in order that the soft metal may not "crowd up" around the cutting edge and be pulled off, instead of being cut off, as it should be.

SEQUENCE OF OPERATIONS.

Assuming that the bearings have been properly babbitted, the face of the cylinder block should be trued up with a file, so as to eliminate any burrs, fins, gaskets, or other irregularities which are sometimes encountered.

It is suggested that three .002 inch shims be placed on each side of the front, center, and rear main bearings—between the cylinder block and the caps. Now the caps should be bolted down as securely, as if the crank shaft were permanently installed.

If the work is to be done on a specially designed machine, or if the work is to be done on one of the hand-operated fixtures, the fixture should be properly aligned with the cam shaft bearing holes, and properly clamped to the cylinder block, using the bolts provided for this purpose.

Care should be taken that the abutting faces, of the fixture and of the cylinder block, are free from grit and dirt, which might otherwise tend to cause inaccuracies in the alignment.



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Spark Plugs

Here's a Sterling Plug For Motor Car, Truck or Tractor

There is a new snap, a new power you will notice as soon as you install Sterling Tractor Spark Plugs in your engine.

These new, strongly-built plugs deliver a spark as sharp and swift as a flash of lightning.

You will note the quick, ready response of your motor with these plugs feeding current to the cylinders. Sterling Tractor Plugs were developed to meet the extreme demands imposed by the high-heat producing internal combustion motors of farm tractors.

Naturally, since they meet the rigorous requirements of tractor engines, they cannot but be all the better for passenger car or motor truck.

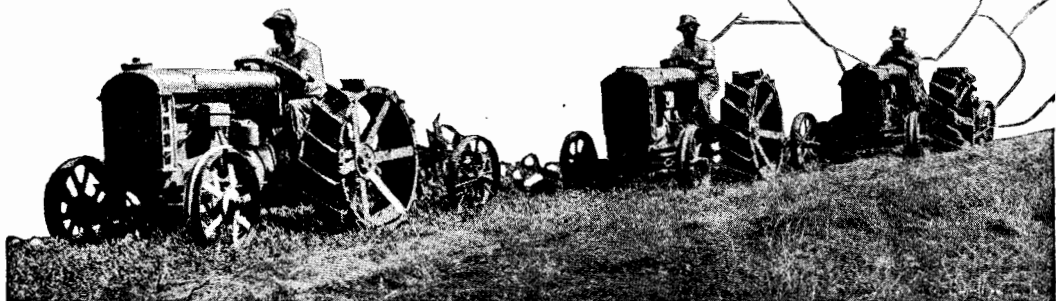
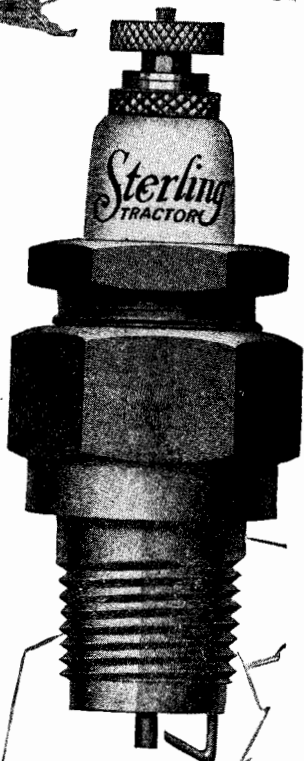
Sterling Tractor Plugs are built for heavy duty—for grueling, continuous work. The porcelain core is unusually heavy; the combustion chamber is extra deep, and the one-piece monel metal electrode will not warp.

Remember, Sterling plugs are separable and easily cleaned. Simply unscrew the gland nut, take out the porcelain core and wipe off the carbon. You can clean Sterling plugs clean.

Progressive garages and supply dealers everywhere sell and endorse Sterling Plugs.

The Lockwood-Ash Motor Company
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(86)



SEPARABLE



CLEANABLE

Special pins are provided to slip into the holes in the cylinder block, where the cam shaft bushings are placed. Then the fixture is aligned, with these pins, in order to get the correct center-to-center distance between the crank shaft and the cam shaft.

After clamping the fixture in place the bearings of the fixture itself should be well oiled so that no undue friction or excessive wear will occur in the reboring tool.

Assuming that all cutters have been set, to cut to the same diameter, the boring operation can now proceed.

In most of the reboring machines the main bearing caps have to be removed when the fixture is taken off.

FACING BEARINGS.

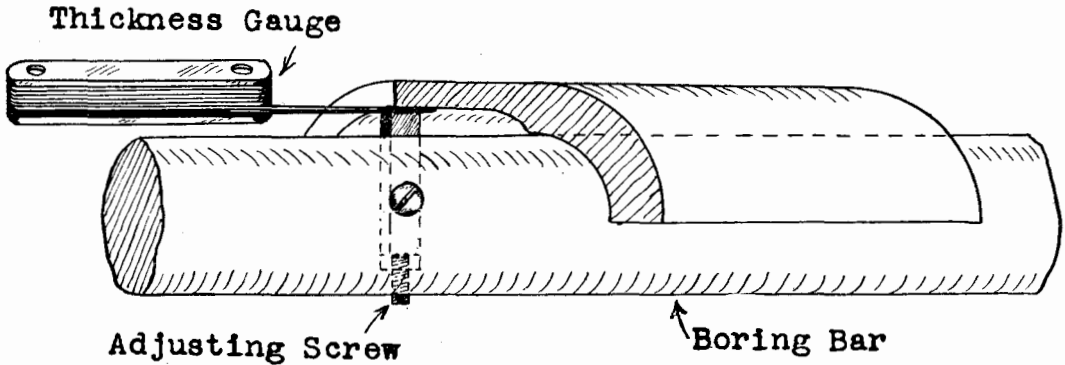
This being the case, the caps should be replaced on the cylinder block, and securely bolted down, as previously done for rebor-

of each side for a depth of $\frac{1}{8}$ to $\frac{3}{32}$ inch, and to a width of $\frac{3}{32}$ inch. The purpose of this relieving being to afford room for the metal to flow into, when the bearings are burned-in, and also to relieve the bearings of side friction, which is very prevalent when burning-in.

Another purpose of this relieving at the sides of the bearings is to provide oil channels for the circulation of the oil.

Several years ago it was customary to cut a spiral oil-groove, from one corner of the bearing diagonally across, and passing over the oil hole, to the opposite corner of the bearing. This practice has been discontinued, as being unnecessary. It is now believed that these oil grooves curtailed the available bearing area, and allowed the oil to get "out," as well as to get "in."

In some cases, where a new crank shaft is provided, and a main bearing burning-in machine is not available, it is suggested that the



Setting Boring Cutter.

ing. The facing tool should now be used to cut the radius in the ends of the bearings. This rounds off the inside of the ends of the babbitt, so that the babbitt fits properly against the fillets, or corners, of the crank shaft.

As there is no end thrust on the front and the center main bearings and, as all the end thrust of the crank shaft is taken up in the rear main bearing; it is necessary that the facing off of the rear main bearing be attended to with particular care.

As the rear main bearing caps are now made $\frac{3}{8}$ inch longer, it may be necessary to dress down the ends of these main bearing caps with a file, if a new crank shaft is used. Ordinarily, with a used crank shaft, which is a little worn, the wear of the crank shaft will make it unnecessary to remove much metal from the ends of the rear main bearing cap.

Now the main bearing caps should be removed, and the edges, or sides, of the babbitt of both the cylinder block and the bearing cap, should be "relieved" or cut away,

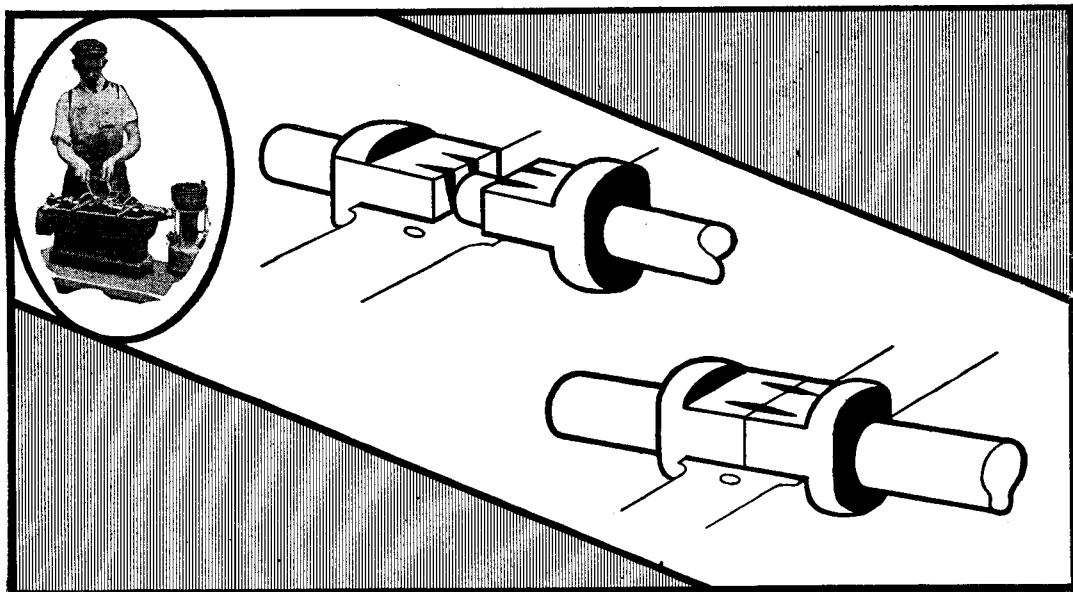
main bearing aligning reamer be used for the purpose of getting an accurate diameter and a smooth bearing surface.

If the bearings are to be burned in, it is advisable that a .002 inch shim be removed from each side of each main bearing cap. Then the caps can be bolted down tightly again, and the bearings burned in.

INDIVIDUAL TOOL KITS.

Most mechanics like to have some tools of their "very own," and the average mechanic will take better care of his tools, and keep them sharp and in better condition, if he knows that these tools are to be kept for his own, individual use. That is why it pays to have individual tool kits, in shops where more than one or two mechanics are employed.

In order that the tools may be readily accessible, wide, flat tool boxes are the best; as then less time is wasted digging through the several layers of tools to obtain the one tool needed—which is always at the bottom.



A Split Mould

One of the big features of the Universal Main Bearing Replacement Equipment for Fords and Fordsons is the Split Mould in the Babbitting Tool.

The mould is closed at the time you pour the babbitt metal into it. You pour through two gates in the top of the mould.

***There's No Possibility of the Metal
Over-flowing and Making a Mussy Job***

Then, to release the mould—just tap it with a hammer—it opens—and your bearing is clean and smooth, ready for boring.

The Split mould is an exclusive Universal feature.

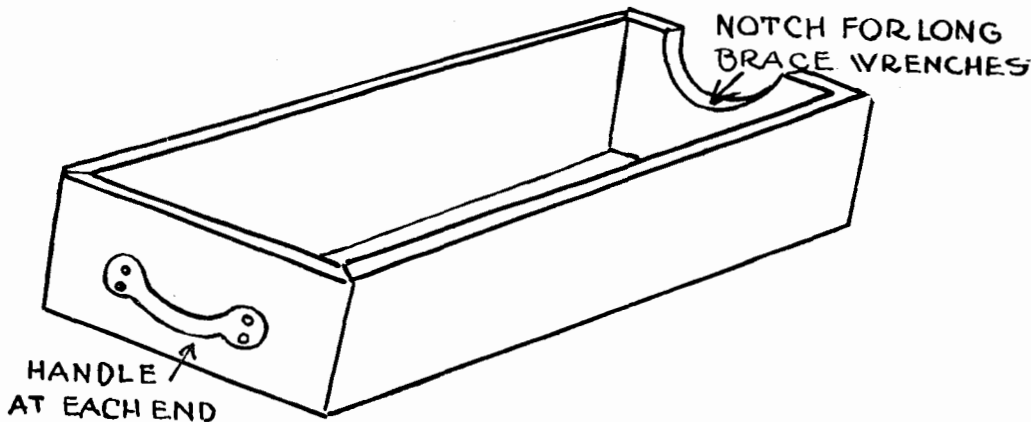
See current issue Auto Trade Directory and Chilton's Directory for list of jobbers carrying stock.

THE UNIVERSAL TOOL COMPANY, Inc.
435 Woodward Avenue Detroit, U. S. A.

*Manufacturers of Universal Cylinder Reboring Tools and
Main Bearing Replacement Equipment for Fords and Fordsons*

The UNIVERSAL Tool Co., Inc.

When writing advertise rs—Just say FORDOWNER



Individual Tool Kits.

As some of the brace wrenches, or speed wrenches, used in Ford car repairing are rather long, a notch should be cut in one end of the box for the shanks of these speed wrenches to extend through. If each mechanic has a number, this number, or the name of the mechanic, can be painted on each end of the box.

The ends of the box should be provided with handles, for easier handling and carrying. Some repairmen prefer a heavy strap, extending over the top of the box, and serving as a carrying handle.

When the whistle rings at "quitting time," these tool boxes can be piled up on each other very nicely, with the notched ends of the boxes outward, so that the boxes can be shoved clear back on a shelf.

Such boxes should be made of about $\frac{3}{8}$ inch planed lumber and should be about 24 inches long, 12 inches wide, and 6 inches deep.

Small compartments, or a little tray, can be placed across the un-notched end of the box, to carry the 6 sizes of cotter pins used on the Ford car.

MADE IN AMERICA

It isn't the cost of a car you know
That makes it a perfect prize.
And it isn't plate-glass, nor monograms,
Nor its length, nor its breadth, nor its
size.

And it isn't a name that is hyphenized,
Nor its solid silver mounts
That wins the race for an auto car,
But it's what it can do that counts.

The car that can take a muddy ditch
And climb up the sandy hill,
Or get stalled in the dark, where the
turf is soft,
And come back with ease, at will.

And go, if the going isn't good,
And pull, though the roads are bad;
And show to the world it is built for use,
And not for a rich man's fad.

Which never will kick at overwork;
Which never gets tired or bored.
O, this is the car the world clamors for
And the car that has come—the Ford!

Then let other cars hold medals gold,
And be owned by the ermined few.
The car we want, and the car we need,
Is the car that can always do.

—Anne Rogers.

JOHN'S ESSAY

A class of children was asked to write an essay of 150 words on some subject.

John chose a Ford car. His essay ran somewhat as follows:

"You call a Ford an automobile when you want to be polite.

"My uncle has one. It goes up hill. It

goes down hill. It also stops and then my uncle has to get out and fix it. He says he knows why you don't have to pay as much for a Ford as for other cars.

"That's about fifty words. The other hundred are what my uncle said when he had to get under the Ford to fix it."

Make Your Ford a \$3,000 Car

from the standpoint of motor service



Tony Bertoglio making record time at the Madison County Fair, Twin Bridges, Mont., where he won every automobile race for three successive days. His car has a speed of 75 miles per hour.

ROOF 16 OVERHEAD VALVE EQUIPMENT

Power Device Needed By Every Ford Owner.

One hundred per cent extra efficiency, with greater gasoline and oil economy, for either touring car or truck. Hill climbing for the touring car owner beyond his wildest dreams. Sand, mud, or the steepest grades have no terrors for the Ford owner with the Roof 16 valve cylinder head.

FORD RACING CARS

SPEED—Ford cars with our 16 valve cylinder head equipment have been rivals of the best racing cars on mile and half mile tracks, and have practically driven the high priced racing cars from competition, excepting on Speedways. Ben Lawell of the Fielding Auto Racing Team, Toledo, Ohio, who has attained a speed of 100 miles per hour; Joseph C. Hayes of San Francisco, with a record of 97 miles per hour, and hundreds of others with phenomenal speed records attest the wonderful power given to a Ford car, by the use of the Roof 16 overhead valve equipment.

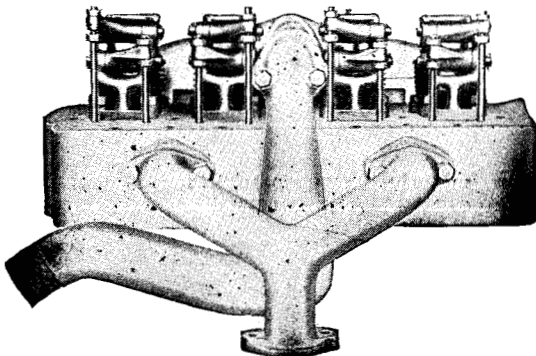
We are headquarters for everything necessary in Ford speed equipment, including polished nickel Roof 16 overhead valve equipment, Aluminite and Lynite pistons and rings, grey iron pistons and rings complete, Aluminite connecting rods, parts for undersliding chassis, nickel steel racing gears three to one ratio, racing carburetors, everything in ignition equipment, counter-balances for crank shaft, high speed cam shafts, wire wheels and steering gears.

Tell us what you want. We can supply it. Send for photographs of our beautiful racing bodies and racing radiators, which are our own special design.

GET OUR SPECIAL CIRCULAR ON LONG MILEAGE TIRES

DEALERS—GARAGEMEN—REPAIRMEN.

The ROOF-PEUGEUT TYPE CYLINDER HEAD FOR FORDS IS AN ALL-YEAR SELLER. THEY ARE QUICKLY AND EASILY INSTALLED—SET RIGHT IN PLACE OF THE OLD CYLINDER HEAD. ROCKER ARMS OPERATE FROM THE REGULAR CAM-SHAFT. Every Ford owner is a likely prospect, every Ford truck owner is a SURE SALE. If you want a steady stream of business throughout the year that pays, get our agency terms. Send for free illustrated literature of the greatest selling specialty for 1920. Place one equipment in your territory and it will bring every Ford owner to your door. WRITE TODAY.



Made in the "Puncture Proof" City.

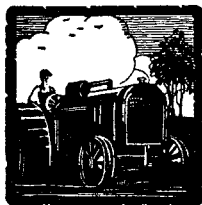
COMPLETE EQUIPMENT \$115.00

EXCISE TAX PAID

Laurel Motors Corporation

Union Building

Anderson :: Indiana



TRACTOR DIVISION



WINTER CARE OF THE TRACTOR

There is a wise saying to the effect that "The key that rests, rusts." And it is hardly to be doubted that the most effective way of keeping the Fordson tractor in good condition is to keep it in commission all year round.

While the condition of the ground and of the roads may make the use of the tractor—as a tractor—impracticable during the winter months; still the belt-pulley of the Fordson tractor makes it of special value as a portable power plant during the winter. Among such possible uses are to drive an electric dynamo, to charge storage batteries for furnishing light during the long winter evenings, for corn-shelling, feed-grinding, baling, wood-sawing, etc.

Other winter uses of the tractor are: stump-pulling, logging and hauling. For ice harvesting, for both cutting and hauling the ice, the tractor is of value. In some localities, where the state has made appropriations for keeping the roads open and free from snow during the winter months, the tractor can be hired out to the state highway department for pulling snow plows, etc.

EASIER STARTING.

When the Fordson tractor is used in winter it can be started much more easily if the commutator is kept clean, and free from dirt and heavy oil. Use a very light oil, such as 3-in-One, or light sewing machine oil. Or else use a 50-50 mixture of cylinder oil and kerosene for the lubrication of the commutator. A set of dry cells to furnish the current when starting, makes it possible to start the engine by simply pulling up on the starting crank, and without the necessity of spinning the motor, in order to get a hot, efficient spark. Do not, however, get the battery connected to the magneto, as this would tend to demagnetize the magnets of the tractor magneto.

PROTECTS RADIATOR.

When worked to the limit of its capacity, the Fordson tractor engine develops a lot of heat. So it does not always pay to use an alcohol anti-freeze solution. If the water boils this will evaporate the alcohol in jig time, requiring frequent and costly replenishment; if the solution is to be kept strong enough to afford adequate protection.

As a rule, it will be found more practical to fill up the radiator, and the air washer, with hot water, just before starting the engine, and then to drain them, after the work has been done.

A word of warning, as to draining the cooling system, may save the large expense of a cracked water jacket on the cylinder block. If the right-hand front wheel has been lowered into a hole, for the freer use of the belt pulley. Or if, for any reason, the right hand side of the tractor is lower than the left, then it is possible that some of the water will be pocketed, in the cylinder jacket, and may freeze.

For this reason, it is preferable to have the tractor standing approximately level, on all four wheels, when draining out the cooling system, by means of the pet-cock under the radiator.

As there are no rubber hose connections, on the cooling system of the Fordson tractor, there is no reason why kerosene cannot be used as a cheap and harmless anti-freeze—provided that the engine is only worked to about half of its normal power or capacity.

Kerosene has only about .47 the heat conducting capacity of water. But, if the weather is very cold and the load on the engine is light then the kerosene will answer the purpose very nicely. And there is no danger whatever that it will corrode or injure any parts of the cooling system. In fact, it will tend to clean out the cooling system.

If the tractor is worked so hard, that the kerosene anti-freeze in radiator boils; then there is fire risk from these fumes, and this should be watched.

WINTER STORAGE OF TRACTOR.

While, apparently, of rugged construction, the Fordson really has finer materials and workmanship in its mechanical details than many costly automobiles. Now hardly anyone would be so careless as to leave an automobile out in the storms all winter. Yet, tractors have been often left to just such a fate!

Answering the question, "Is my tractor adequately housed?" means more than a mere roof over it. The boards, of the side walls of the shed, or shack, should be sufficiently close together to keep the light, fluffy snow from sifting through, and from

START NOW FOR 1920 BUSINESS

Last year was a big sales year for **National Bodies**. 1920 will bring a still greater increase.

We are ready to meet the demand. Are **YOU** ready to get your share of the sure business?

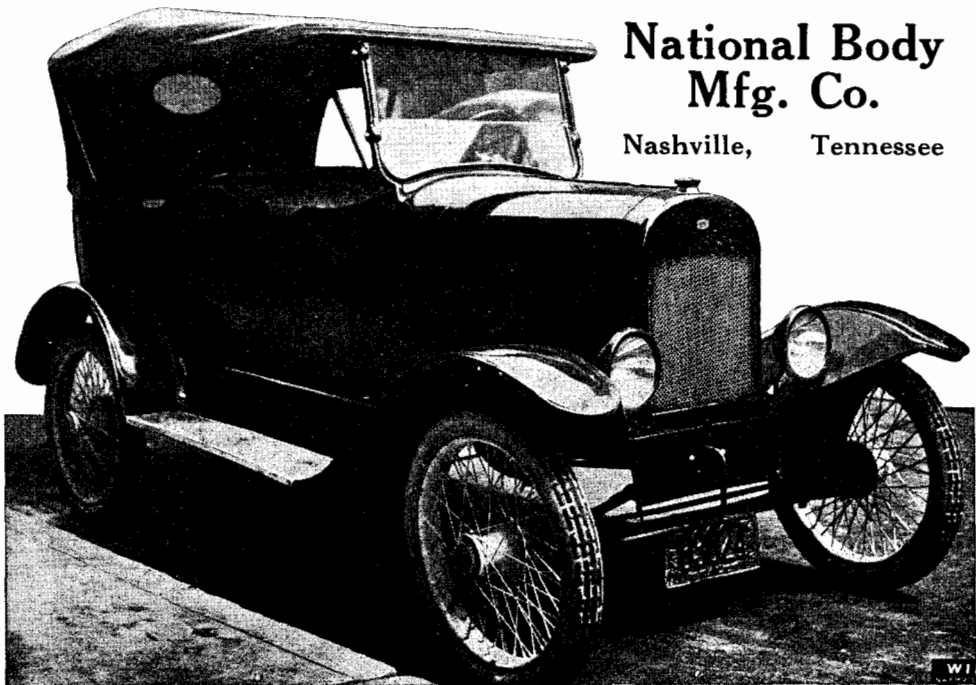
National
BODIES
for
Ford Cars

are eagerly bought by Ford owners because, at reasonable cost, **National Bodies** convert their cars into vehicles of elegance. Ford efficiency is retained but is clothed in the beautiful, streamline grace equal to cars costing \$2,000 and up.

This is what a **National Body** adds to the Ford: Large tonneau and added length to car body—large, roomy driver's compartment—double cowl with perfect curves—high radiator with shell resembling the Marmon, giving straight line back from radiator—20 gauge sheet steel over hardwood frame, with joints mortised, glued, screwed and solidly ironed by hand—one-man top and curtains—cowl fitting windshield—crown fenders with aluminum running boards—and several other exclusive **National** features. The upholstery is extra quality imitation leather and the springs are high grade cushion type. Handsomely painted in rich, glossy black—or other colors for small extra charge. The entire job is one of expert workmanship. The cost is only

\$260.00 F. O. B. Nashville

DEALERS: NOW is the time to prepare for the coming season. Be ready to gather early profits. Write us today.



**National Body
Mfg. Co.**

Nashville, Tennessee

collecting in little piles on the tractor only to melt and cause rust on the first warm day.

Such parts as the coil units, which are not improved by dampness, will be better protected, from both theft and dampness; if removed from the coil box, and carried into the house. The same can be said of the tools.

Answering the question, "Is the tractor protected against rust?" means more than a little oil. Oil evaporates and dries up in time, and it is best to smear over the bright metal, all working parts, and around all the bearings, with heavy grease, which hardens, and "stays put."

Also, a little paint, on exposed metal surfaces, where the paint has been worn off, is an excellent protection against rust and corrosion. The painter's saying "Save the surface—and you save all" is quite fundamentally true.

After draining the radiator thoroughly, and perhaps running the engine for a minute, to get rid of any water in the nooks and corners of the cooling system, one can allow the engine to cool. Then one can pour about a quart of alcohol into the cooling system, to protect from freezing, any water which may have remained.

However, the utility of alcohol, used in this manner, may well be questioned, as it seems unlikely that this small amount of alcohol, will find the small amount of water in the great big 11-gallon cooling system—save by the merest, one-in-a-thousand chance.

TRACTOR PREPAREDNESS.

Having, as it were, snugly tucked the Fordson tractor into bed, for its long winter's nap, we can take a long look ahead—for next spring and summer are sure to come. And, at that time, you will need the tractor for real use, and will have no time to fuss and fiddle with it.

The time for tractor overhauling is during the winter, and you should consult your nearest tractor agent as to when he can give your tractor a "look-over" to decide just what repairs and overhauling it needs to put it into first-class condition. After this examination there will probably be some repairs that you can make yourself, such as removing the carbon, grinding the valves, replacing the commutator, etc.

Other and more difficult repairs such as lapping-in new pistons, tightening main and connecting rod bearings, you may wish to have done by a competent repairman. And the time to make arrangements for his work is **right now**—before the spring rush begins.

By having the tractor overhauling done during the slack winter months, the mechanics will not be hurried, and much better work will be done. If the mechanic comes out to the farm to do the work, it is better to have the work done in the winter, when the tractor owner-driver is not so busy, as then he can watch-and-learn. The more one knows about such a mechanical device as the tractor, the better one will be able to drive it, and to make minor repairs when necessity arises.

Aside from removing the carbon, grinding

the valves, cleaning and adjusting the spark plugs, and fitting new pistons and rings, if necessary, and inspecting the bearings—the lubrication of the car can be overhauled.

LUBRICATION.

After a season of use, it will pay to drain out the oil from the crank case, clean out the case with kerosene, and replace with new oil. Also, all the wheel bearings, and the rear axle bearings, can be cleaned out, with kerosene. And the front wheel bearings filled with grease, and the rear axle filled up with heavy, fluid gear oil.

FINAL INSPECTION.

Before the final inspection, the tractor should be cleaned all over, as many loose parts will often be revealed—after a thorough cleaning. Tighten the cotter pin, all loose parts, nuts and bolts, before they have a chance to fall off and cause trouble in the field.

The contact points, of the coil units, should be smoothed off, with a fine file. If well worn, these contact points should be replaced, as a satisfactory adjustment cannot be obtained when the coil points are too badly worn.

WINTER STUDY.

With the tractor itself in A-1 mechanical condition, the next requirement for fine work is a super-intelligent tractor driver. Winter offers the chance for planning and study, as how to use the tractor to best advantage. Make a list of last summer's mistakes, and see what you can do to eliminate them for the coming year.

Consider your fields—have you decided just where to begin, and how to plow each field—in accordance with the suggestions that have been published in recent issues of the Fordowner—in order to do the most plowing with the least effort. Odd-shaped and unusual fields offer special opportunities for clever planning, as to plowing routes and methods.

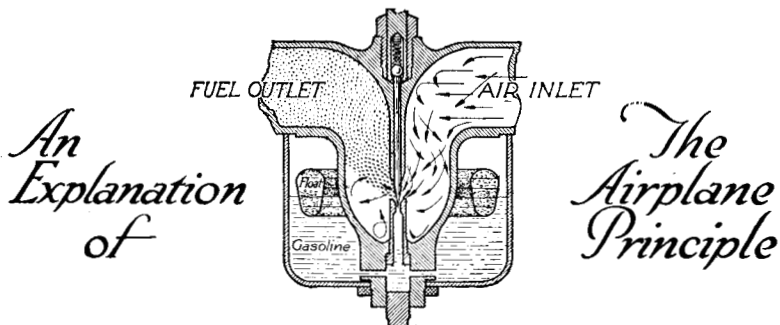
Many a battle is half won before a single shot is fired—because of clever planning and foresight.

TRY THIS ON YOUR PIANO.

By E. E. Robins.

"Wilt come with me, Elizabeth,
To yonder mountain side?
I'll let you climb to its very top
While I hold your hands and ride.
Sixty horsepower we will pass with a zip
and you'll throw him a smile from your
brass-bound lip
As an invitation—or sort of tip
To keep pace with your eager stride.

"Wilt dance with me, Elizabeth,
Where the Way is smooth and straight?
We'll waltz to the air the West Wind
plays
But we will not hesitate.
To the man who is out and under his car
We'll offer a tow, be it near or far.
And we'll prove that my little tin girl
is a Star
Who is never tired nor late."



An
Explanation
of

The
Airplane
Principle

VAN BRIGGLE CARBURETORS

A THOROUGH examination of the Van Briggles principle of Carburetion will show that it follows simple, natural laws in its functioning, and contains nothing mysterious or complex. To illustrate its simplicity, examine the cross-section above. Note the path of the inrushing air. You see that it strikes directly upon the lip of the nozzle on the inlet side.

Motor speed automatically controls fuel consumption

The velocity of this air has direct control over the amount of gasoline coming out of the nozzle. When speed is increased, the increased velocity of air, beating against the gasoline nozzle, retards the flow of gasoline. So the proportion of air and gasoline is instantly corrected to obtain the most power with economy, at any engine speed, under all variations of load, road or weather.

When the air strikes the top of the nozzle, it throws the gasoline in a fan-shaped spray toward the outlet side of the mixing chamber. Then the air which has passed on and turned up toward the outlet rushes up through this spray and reduces it to a swirling vapor, which enters the cylinders almost as evenly as natural gas.



Power, Economy, Dependability

The perfect mixing of air and gasoline, to a near-natural gas consistency — gives the power, the freedom from trouble, which Van Briggles owners praise.

The Van Briggles Airplane Principle Carburetor is simple, understandable. So much so that a Van Briggles user KNOWS, when his motor troubles or fails him, that his Van Briggles Carburetor is NOT at fault.

Ask your dealer or garageman today for a Van Briggles Airplane Principle Carburetor. For either cars or trucks, in the following models: Dodge, \$18; Maxwell, \$15; Ford, \$10. Complete, ready to install.

Shock Absorbers for Ford Cars

SAVES strain on motor and car-frame; reduces up-keep, makes riding more enjoyable. Adds to length of service; increases resale value. Makes easier driving.

Does not crimp or bind springs. The rebound is caught by the reverse movement of the shock absorber. Installed without removing wheels or changing anything. Price Complete Set, \$18 ready for installation:

Van Briggles Carburetors and Van Briggles Shock Absorbers are sold to dealers through bona fide automobile accessory jobbers.

VAN BRIGGLE MOTOR DEVICE CO., INDIANAPOLIS, U.S.A.

LAYING OUT FIELDS FOR TRACTOR PLOWING

ARTICLE V

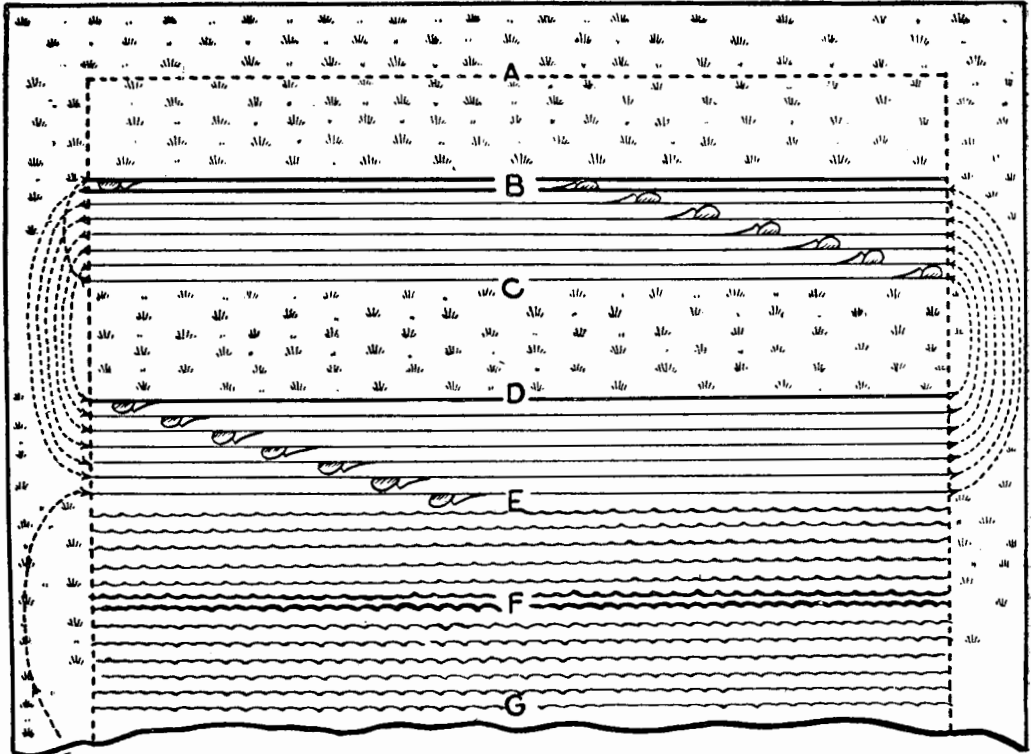


Fig. 9.—Method V, first stage: The first furrow is made through E, a long left-hand turn is made and a furrow plowed through B, continuing until the distance from C to D equals that from B to C. The finish is shown in figure 10.

METHOD V.

This scheme is very similar to that described under Method IV, and if it is used on a field which has previously been plowed according to that method, it can be arranged so that the back furrows come where the dead furrows came before, and vice versa.

To start plow along the line through E (see fig. 9), turn to the left and come back along the line through B, and continue to plow, always turning to the left, until the lines through C and D are reached. Turn to the right around the plowed strip between B and C, making a back furrow at B, and continue to plow as indicated in figure 10, always turning to the right, until the strip between C and D is plowed out to a dead furrow at D. In method IV there was a dead furrow

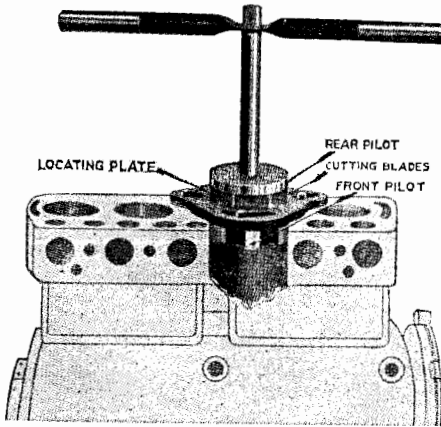
at B (see fig. 8) while in this method there is a back furrow at B (see fig. 10). In this method a dead furrow is left at D, while in the previous method there was a back furrow along this line.

In this method the plowing must be started on the side of the field opposite to that on which it was started in Method IV, so that an open furrow at E will be left at the finish of the preceding land, to be filled on the first trip across the field shown in figure 9.

The amount of idle travel will be the same in both methods if the widths of the lands are made the same. If the field has been previously plowed according to Method IV, and if the dead and back furrows are still visible, it may be possible to use them as guides in opening up the lands without measuring any distances at all.

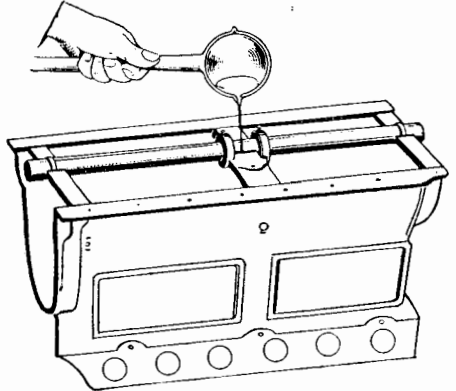
Time-Saving Tribune Tools for Every Shop

"Tribune" Cylinder Reamer



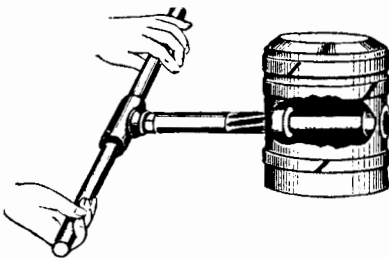
This is saving time and making money in many shops. Its use means rapid, accurate work. All working parts including pilots, are hardened and ground. Centered cutting blades, ground only at the forward ends, fit snugly into locating plate. Assured accuracy—and can not get out of order. Cost, for .031 over-size pistons, complete..... **\$20.00**

"Tribune" Babbitting Fixture



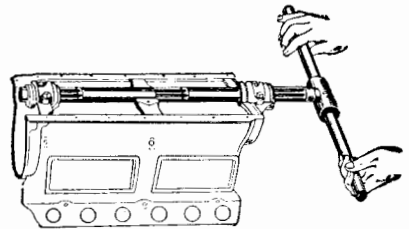
Three perfect bearings in one hour with this fixture. You can't cast a poor bearing. Its construction assures accuracy—automatically. Far quicker, far more sure and a satisfactory job always. The cost of this saver is only..... **\$10.00**

"Tribune" Piston Pin Bushing Reamer



Half the trouble encountered in reaming piston pin bushings is in getting the holes in both bushings exactly in line. That is because most tools for this work are made without pilots, and without them the average workmen allows the point of the tool to wander all over. Here is a tool that allows a novice to do an expert job—quickly. The cost..... **\$3.75**

"Tribune" Crank Shaft Bearing Aligning and Connecting Rod Bearing Reamer



Here is time saving. You can ream all *three* Ford crank case bearings and *four* connecting rod bearings in *one hour* with this "Tribune" Line Reamer. This tool is *simple, strong* and 100% efficient. It is a real and reliable money-maker. Price complete..... **\$12.00**

These are but a few of the "Tribune" savers. Send today for complete information on entire line

Time Saving
Tribune
 Tools for Ford Repairs

TRIBUNE ENGINEERING CO. Inc.
 Equipment Dept. Owego, New York

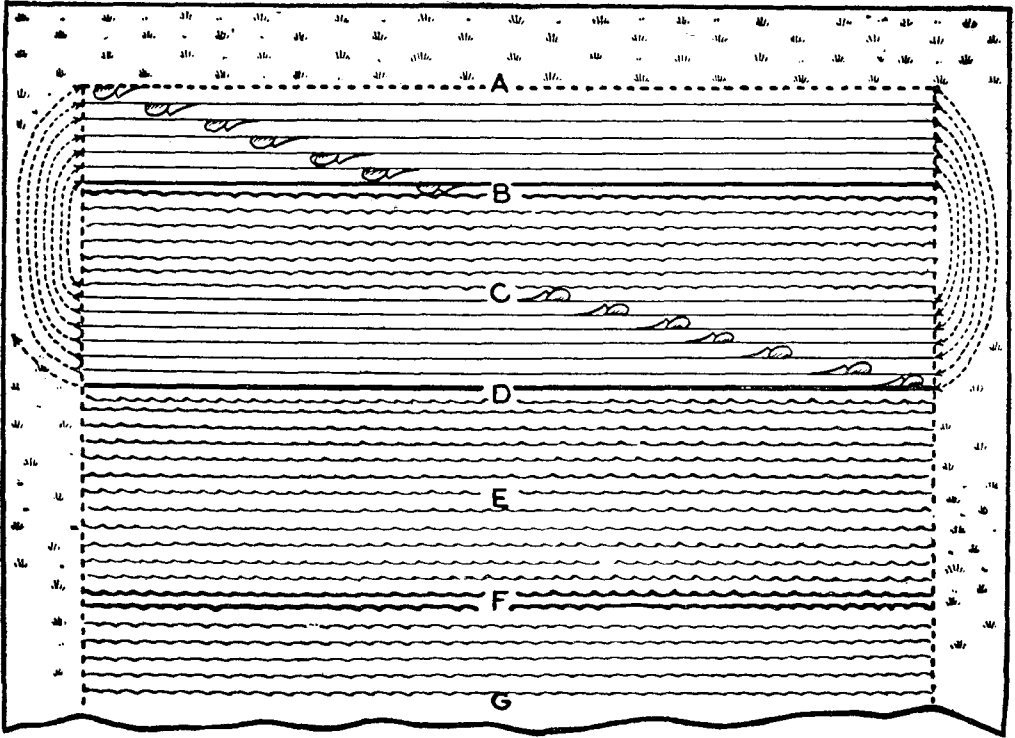


Fig. 10.—Method V, second stage: Right-hand turns are made around the plowed strip between B and C until D is reached, where there will be a dead furrow. There will be a back furrow at B and an open furrow at A.

Have You Any Old Fords?

Take a look around in your attic and see if you can find a real old Ford that you may have forgotten you owned. We mean one of those old-timers, an early model that, if you were to drive it now, would cause quite as much interest on the streets as it did when it first appeared.

Maurice W. Fox & Co., well-known Ford dealers at 2865 E. Grand Boulevard, Detroit, Mich., are anxious to secure some of these old models and have written the following letter to FORDOWNER:

Ford Owner,
Milwaukee, Wis.
Gentlemen:—

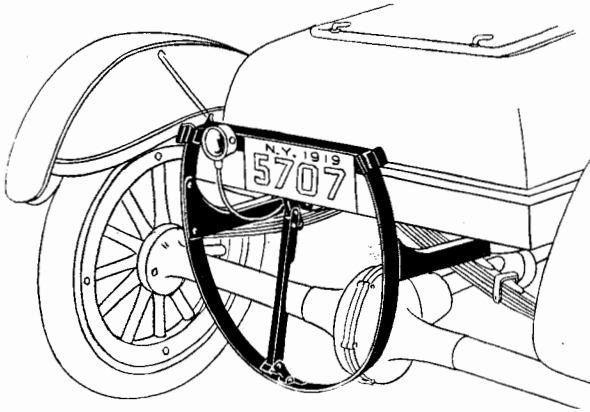
We recently had a Model C Ford car in our show window and this old model aroused a great deal of interest. The car has already been borrowed by five other local dealers, all of whom have had the car on display, and everywhere it went it was the center of attraction. It has occurred to us that one each of the various old models should be gathered together for historical purposes.

We would appreciate your publishing this letter in order that we may be able to obtain good specimens of such models as R, S, N and K; also the earlier types if possible. We would like to get one each of these cars at once.

Very truly yours,

MAURICE W. FOX & CO.,
Per Maurice W. Fox, Pres.

Anyone owning one of these models is asked to communicate with Mr. Fox. The idea is a good one—a complete exhibit of all Ford models would be interesting.



IT'S ALL IN THE TOGGLE

The EMCO is the Tire Carrier you have been waiting for.

No bolts, straps or chains to fuss with. A slight pull on the Toggle releases the spare tire or rim—an easy push locks it tight. A child can operate it.

The EMCO is made substantially of steel for all types of Ford cars. It is inexpensive and easy to install. Once on it requires no further attention.

Every outfit is guaranteed for the life of the car.

*If your Dealer is out of stock write us direct
for full information*

DEALERS:

Get your share of these sure-enough profits. Write for Dealer Proposition at once.

PRICES:

Clincher Type	Single Demountable	Double Demountable
\$5.00	\$5.50	\$6.00

Emco Manufacturing Company-Inc.

Makers of Dependable Products for the Automobile

79 Leroy Street

Binghamton, N.Y.



A Clever Fordson Display

"Human interest" is a quality that is a mighty beneficial factor in advertising and selling. Talk to people about the things of which they are accustomed to talk; show your product in such a way that it is skillfully represented in connection with other things of general interest and you will get attention.

This is rather a difficult thing to do when the article to be sold is such a prosaic, mechanical thing as the Fordson tractor; but that it can be done is proven by the picture above.

This is a reproduction of a photograph of a window display arranged by the Barnett Motor Agency, Ford and Fordson dealers of Carrollton, Illinois, during County Fair week. The effectiveness of this display is so apparent that it needs no comment. Such clever methods should bring business—and probably did.

A NEW USE FOR THE "MAKIN'S."

Do you "roll your own" cigarettes? If you do, and if you use "good old Bull" Durham as makin's, you are sitting pretty in preparation for the next rain storm which dims the windshield. Here is a new tip from John H. Olsen, 1218 74th St., Brooklyn, N. Y., which, we will admit, is a new one on us:

"A bag of ordinary "Bull Durham" rubbed over the windshield will keep it clear. The rain-drops, instead of staying, flatten out im-

mediately when they hit the windshield. Other tobaccos won't do the trick. I have tried. Try it yourself if it sounds ridiculous. You will be surprised."

Here is an opportunity for the tobacco company. It could advertise its product for a double purpose: "Keep your head and windshield clear with a bag of Bull," or words to that effect.

We are so anxious to try out Mr. Olsen's suggestion that we hope it will rain today. We live and learn.

When Springs Break, put on

VULCAN
QUALITY
The Replacement Spring



This is the VULCAN spring rack

The Automatic Salesman

The VULCAN Spring Rack is an efficient salesman successfully employed by over 7000 dealers. The VULCAN Spring Rack is always on the job.

During every hour of daylight, and when your store is illuminated at night, it carries this message to every motorist.

“When your springs break, put on VULCAN, the Replacement Spring.”

The VULCAN Spring Rack is sent free with your first order for VULCAN Springs. Write for particulars today; you will find it worth your while.

Jenkins VULCAN Spring Company

Factory, RICHMOND, IND.

Branches

Atlanta, Ga. Dallas, Tex. Minneapolis, Minn. St. Louis, Mo.
Boston, Mass. Kansas City, Mo. Reading, Pa.

Fording The Desert

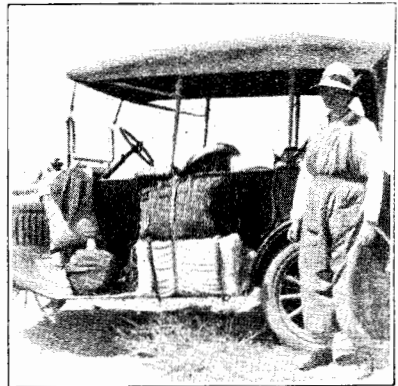
By Julia F. Atkinson.

"The camel is the ship of the ocean of sand; the reindeer is the camel of the desert of snow," but the Ford—the Ford is camel, reindeer, Arabian steed, fast express, tank, airplane, and verily is even called "automobile" by that ubiquitous person who chiefly associates with Fords, the average American. The most striking characteristic of the Ford owner is that he who has a Ford uses it—Fords were made to use. Even the average American has more artistic insight than to buy a Ford for the beauty of its silhouette or to rouse envy in the breasts of his pedestrian friends. Fords, I repeat, are made for use—for climbing mountains and for crossing plains, for blazing trails through virgin forests; for plowing through stretches of bottomless sand, and for swimming modest rivers. Being Ford owners, average Americans, and having a desert to cross, what more obvious plot to make of this promising triangle of facts than for the average Americans to Ford the desert? Only one touch of the unusual could be claimed for our plot—the fact that we two average Americans belong to the sex which always in song and story, and in the movies, is supposed to cry for help at every Ford; and we proposed to Ford the desert unaided by a masculine Forder and also unhampered by a second trailing car.

Of course our friends were pessimistic. They had to grant that our team-work in changing tires was reasonably efficient, but even so, we were women and suppose we had engine trouble; suppose we lost our way in the Mojave desert; suppose we got stuck in sand and no one came along to help before the desert thirst reduced us to the extremity of drinking crank-case oil as two men lost on the desert had been driven to do not long before; suppose an axle should break; suppose the radiator should spring a leak; suppose, suppose, suppose—

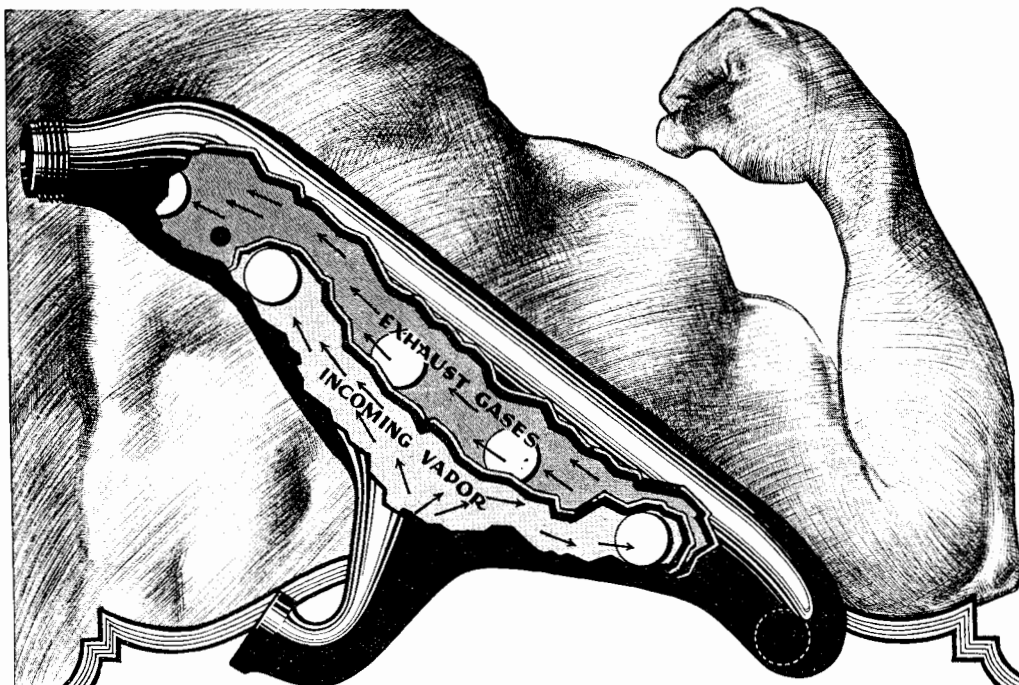
We refused to suppose; instead, we sat down and took stock of ourselves. We had been Ford owners for eight months, could drive fairly well over desert roads, had dared one hard mountain trip of a hundred miles and "got by" with it, and we were not afraid of Henry the Ford. Early in our ownership we decided our car had too much individuality to be merely "the Henry," to be classified with such soulless objects as the lawnmower or the carpet-sweeper. From our first introduction to Henry he impressed us,

all unused to machinery as we were, as possessing almost human intelligence. One week's acquaintance convinced us that his traits were decidedly masculine; witness his perverseness when denied regular meals of his favorite brand of gasoline; his love of liquid refreshment for his radiator; the deep, bass tones of his cylinders; his egotistic refusal to adapt his pace to that of slow-moving traffic and his sulkiness when forced to a four-mile gait; his endearing habit of suddenly exploding his muffler with awful swearings, spitting it aside in an outburst of wrath at some fancied wrong! Yes, he was



Ready for the Big Trip.

masculine, not to be coerced by petticoats but to be led gently and tactfully to do our pleasure. So much we knew of Henry's traits. We could give him the valet service of changing tires and offering food and drink; we knew something of his temperament and fancied an affinity between our auras and his, but could we really administer effective first aid in some hour of his dire need? We knew the where of a spark-plug, a carburetor, and a commutator, but did we know much of their whys and whens? We had to admit that we didn't, but perhaps we could learn, so we read up on electricity and internal combustion engines in long-forgotten physics texts after which we spent a summer morning in a garage watching a mechanic overhaul Henry's ignition system the while he talked of coils, sticking

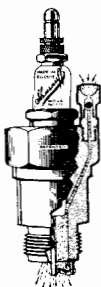


More Power Less Gasoline

To get most power from present day, low grade gasoline, high priced cars are equipped to *heat* the gasoline before it reaches the cylinders. You can do exactly the same thing with your Ford by installing a



SHURNUFF HEATER puts joy into winter driving. Installed in floor board of front seat, utilizes heat from exhaust pipe and engine. In Touring Cars, Sedans and Limousines, a second heater may be installed in tonneau to take heat from the muffler. Opened and closed with foot. Easily installed. For all autos and trucks, \$1.50 each.



SHURNUFF SPARK PLUG admits air directly to firing point with down stroke of piston, producing better combustion, more pep and power on less gasoline. Great for oil pumping motors because incoming air keeps plug entirely free of unburned oil and gas, which soon

foul ordinary plugs. Price \$1.50 each. For best results, install a complete set.

Shurnuff
TRADE MARK
REG. U. S.
PAT. OFF.

Combination Manifold

In this simple device, the exhaust gas heats the incoming gas from the carburetor, more completely vaporizing it and producing more perfect combustion.

This gives more power from less gasoline, less carbon, smoother running, easier starting.

Prices, \$9.00: West of Rockies, \$10.00: In Canada, \$12.50. If your dealer can't supply you, we will fill your order direct.

Shurnuff Mfg. Co., Dept. A, St. Louis, Mo.

C307A

vibrators, cracked spark-plugs, and the importance of keeping the storage battery of that extra appurtenance, the electric starter, full of both water and juice. This was the sum total of our knowledge of Henry.

As to ourselves—it is a wise woman who knows herself, but we firmly believed we had developed more than the usual feminine muscle by having to crank Henry when his starter refused to work on cool mornings, and by changing his tires and cleaning his countenance. Also, we were sure we could endure almost any degree of dry desert heat and that our digestions would stand the strain of living off the country we traveled through, provided that country offered anything a shade less prickly than cacti and horned toads.

For fear, however, that in the heart of the Mojave, the time, the place, and the desire for dinner might not always coincide, we carried a few supplies of small bulk but of approved caloric or thirst-asuaging value. The tale of the cylinder oil drunk by the lost automobilists made a deep impression on us and we registered vows to carry ten gallons of water and to keep this supply absolutely at par by replenishing it at every possible source. We carried the water in one five-gallon desert water bag and two canteens, each holding two and a half gallons. Our personal belongings were carried in suit cases clamped to the running board; besides, we had a roll of bedding for camping out when we pleased.

For ordinary travel we elected to wear khaki Norfolk suits (coat and skirt) and white galatea middies. For wear in the very hottest, most desert part of the desert, one of us chose tan peggy-jeans (a feminized form of overalls) and the other, bloomers. Peggy-jeans wore a small round sport hat with enough soothing green-lined brim to turn down all around, while Bloomers took to a boy's cap with a good stiff visor. A most important addition to the head gear was the large amber goggles with amber side to keep out the terrible white glare of the sand as well as the wind. The costumes would not be complete without honorable mention of the little Colt automatic twenty-five, which were to protect us from a long string of menaces from highwaymen to rattlesnakes and coyotes.

Henry's own luggage was light—two new casings in a tire carrier on the rear and four inner tubes, besides some extra parts such as spark-plugs, fan-belt, brake band, and radiator hose—but he liked his new outfit and hummed happily as we set out from Tucson on the morning of June 4th on a familiar and almost perfect desert road.

We Start the Trip.

We were soon in a stretch of typical Arizona desert, the greenest desert in the world, so we Arizonians claim, and the most varied; not flecked as an opal is variegated, but banded like jasper. First, we ran through a belt of greasewood, for greasewood is less town-shy than most of the desert growth; then came a zone of palo verdes, yellow as Scotch broom with late blossoms, but almost

out-rivalled in gorgeousness by the scarlet tips of many tall green ocotillos; a climb next through a miniature mountain pass and beyond, a bit of country covered with yuccas and silver-gray chollas; again a climb up a little divide and down to a plain broken by many washes traced in by lacy-leaved mesquite trees and palo verdes, leafless, but vividly green; finally, a wide, flat strip of greasewood brought us to the little town of Florence on the Gila river. In the sixty-seven miles covered, there were only two ranch houses but the road was livened by desert birds and dozens of scurrying little gophers.



Well Garbed and Armed.

We had lunched from a parting-gift lunch box in a fairy spot on the way, ringed in by mesquites and palo verdes, where Palmer thrashers called out "pretty quick, pretty quick" to us; a pair of cactus wrens scolded us roundly for approaching their nest tunneled far into a thorny cholla; a shiny black phainopepla flew over us displaying the white feather lining of his wings as he opened and closed them fan-wise. An Arizona cardinal—largest of all the cardinals, added the supreme touch of charm by posing for us a moment on a mesquite bough.

An early start, you say, puzzled, and yet lunch before sixty-seven miles were run? Well, Fords go at varying rates of speed. We once heard of a Ford that made forty-five miles an hour; we've seen one go catapulting along at thirty-five, scorning the earth-bound vehicles which keep all four wheels on the road at once, but if our Henry takes a desert road at more than fifteen miles an hour, we begin to feel like candidates for the flying squad under the dizzy test for the birdman's sixth sense. So we lunched before reaching the Gila, which had recently divorced itself from its handsome concrete bridge in a fit of bad spring humor; the bridge was left standing forlornly on dry land while the faithless river sulked along a hundred yards away, so low in spirits that Henry pulled through the sandy bed and forded the scattered rivulets under his own power. Once across the Gila we traveled a good road

Try this
test with
Oro

Filtered Air



TAKE a sheet of clean white paper and hold it before the nozzle of a No. 7 Filtered Air Outfit. Turn on the air and watch the paper. You won't see a particle of oil, dust or dirt collect on the paper! The reason is very simple. The air has been washed thoroughly and is free of oil, dust, dirt and all foreign matter that might possibly injure a tire.

And because motorists appreciate the value of using such air in their tires, the Filtered Air Outfit is a wonderfully profitable investment for you. You attract trade—you hold it. You make it worth while for all classes of motorists to come to your place of business and they will gladly buy from you the things you can supply for their cars.

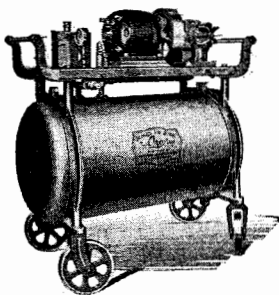
A Remarkable Outfit

The "Filtered Air" outfit is complete—ready to run. You simply connect it with your electric wiring and it will immediately fill the tank with perfectly clean air, and keep the tank full—day and night. Sufficient pressure for pneumatic truck tires up to 150 lbs. Only 3 moving parts to compressor mechanism, in addition to valves. ½ horse power motor.

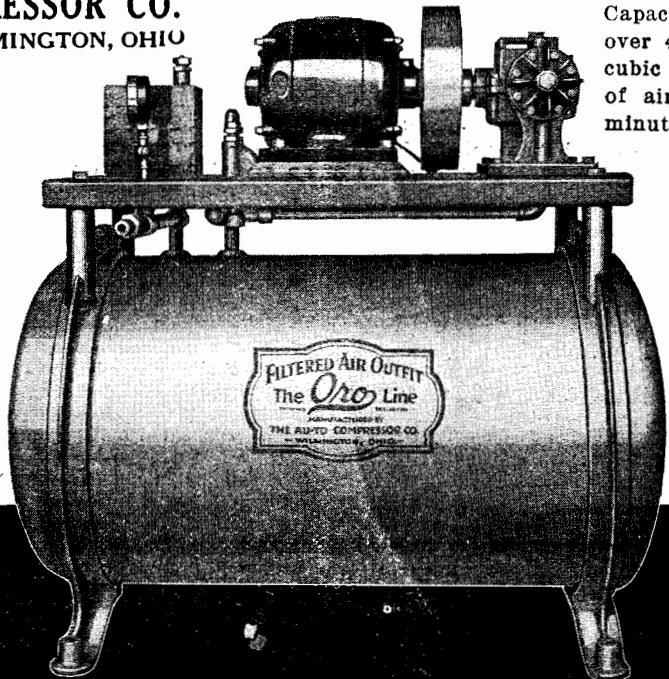
Get this splendid machine and watch your business increase! Ask your jobber, or send us his name and we will see that you are supplied quickly.

THE AU-TO COMPRESSOR CO.

301 S. Mulberry St. WILMINGTON, OHIO



Model No. 8 Au-To Air Compressor—same as No. 7, excepting that it has large wheel casters, which make it easy to move from place to place in the shop or garage.



Capacity over 4 cubic feet of air a minute.

a sign like this



brings business.

through the same green desert—always the green of the creosote bushes and always the weirdly white chollas; while frequent clumps of cacti with lovely red rose-like blossoms, which we are pleased to call desert roses, did for trimming. Here and there bristled small forests of sahuaros, the giant cacti so often reminiscent of the seven-branched candlestick, and again did our road cross countless washes edged with mesquites, palo verdes, and, rarely, with graceful desert willows hung with unbelievably delicate lavender blossoms. Later, near Higley, a real town of two houses and a post-



Giant Cacti.

office, we struck a stretch of mean road with deep holes full of fine sand most upsetting to Henry's equilibrium.

However, this bit of hard going only divided the desert from the sown, for we soon entered the Salt River Valley—the wonderful oasis made by that colossal reclamation project, the building of the Roosevelt Dam. The Arizona desert, criss-crossed with roads and washes of gleaming creamy sand, is green with the soft green of an age-dimmed turquoise, yet, despite the greenness, one never doubts that it is a desert. In contrast with the desert green, this amazing Salt River Valley, with its alfalfa and cotton fields and fruit orchards, outlined by cotton woods shading huge irrigation ditches, sparkles like an emerald set in brilliants—green turquoise of the desert, emerald of the valley with deepest of blue turquoise Arizona sky above, and to complete our joy, long lanes of arching cotton woods animated with hundreds of red-winged blackbirds—handsome, saucy fellows warbling their loudest and elevating their red epaulets as if bursting with pride at these military decorations. Vast dairy farms showed why Arizona has the best butter, good enough even for mending the mad Hatter's watch. But, you of the middle western fields and meadows, don't imagine that this is a familiar scene! You have no brilliant Arizona sun to put sparkling facets on your emerald fields. Your green meadows are only uncut emeralds. You have no jagged mountains always in the background changing

with every sunset from glowing pink through all gradations of amethyst and purple to shade away at last in cold steely blues into the dusk. Your pastures have as sleek cattle and horses and hogs but never do ostriches graze among them, adding as effective a touch to the landscape as swans give to a park lake.

We dined that night at Mesa, a thriving town in the midst of the dairy region, and after dinner we sped on through the silky night over the sixteen miles of boulevard to Phoenix, the capital, where Henry fell asleep in a garage, well content with his day's work of a hundred and thirty-two miles.

Well Under Way.

Late the next afternoon we left Phoenix and continued our drive between the shaded waterways; still the flocks of Sonora redwings warbled lustily in the cottonwoods, and startled little groups of kildeer flew across our path calling "kildee, kildee" in most abused tones. For the first time we felt like real travelers exploring the unknown, as we were now steering our course by strip maps provided by Bush's Ferry at Parker; for, after days of discussion, we had finally decided to go to Los Angeles via the Parker cut-off, though fully aware of the appalling fifteen miles of sand to be attacked before reaching the Colorado River at Parker. Thrifty miniature villages scattered along the way, with names conspicuously displayed on church or schoolhouse, assured us we were following the map, as did also the Agua Fria, which spread sandy and dry in our path, daring us to cross.

Arizona rivers are like nothing on earth but Arizona rivers. Nine-tenths of the year they are wide stretches of deep loose sand, usually with a lovely, strong, but most inadequately short, bridge adorning the foreground of the near bank or the middle distance of the farther bank—this because in that other tenth of the year the river went on the rampage and tore away the bridge approaches. But we are young here in Arizona and we'll learn, in time, as California has already learned, to span a hundred-foot river with a mile long bridge so that unwary travelers will not have to gaze resentfully at the splendid architecture of the bridge while they painfully plow through the treacherous sandy bed below.

We plunged into the Agua Fria and we got stuck fast in the sand, but we learned a lesson—learned never to leave the foot-deep ruts in a sandy road—absolutely never! Dare anything, even a head-on collision, but dare not to turn out for passing vehicles unless you are sure you have reached a turn-out on firm ground. We innocently and courteously turned out to let a Chevrolet pass, and the word Chevrolet is still anathema to us, for it passed, saw us sticking hopelessly in the sand for courtesy's sweet sake, yet it Chevroleted along leaving us to our fate—a kinder fate than at first appeared; for it soon provided a linen-dustered Samaritan who stopped and helped us stuff brush under the jacked-up rear whels, until a wiser and less polite Henry could pull his way back into the road the while we pushed with all our



—ONE PACE AHEAD—

THE average Ford passes unnoticed. Equipped with a National Zig-Zag Radiator it creates keen interest. Such distinction is a source of much personal satisfaction to every owner.

Besides this, however, the more practical kind of satisfaction that comes from owning something which gives results, is yours with National Zig-Zag Radiator equipment.

It clearly writes its achievements by actual accomplishment—which speaks louder than mere words.

You too, can benefit by such an installation.

“Let us put you in touch with our nearest dealer.”

NATIONAL CAN COMPANY

DETROIT

RADIATOR
DIVISION

MICHIGAN

\$28.00

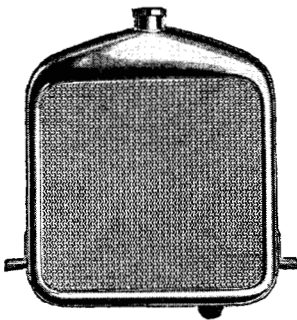
F. O. B. Detroit.

Finished in either nickel or black enamel.
Shipping weight complete 35 lbs.

NATIONAL *ZigZag* RADIATOR

DEALERS

We are now in position to offer you an attractive agency proposition. Full information upon request.



might behind. In all our trip that Chevrolet was the only Levite who ever passed by on the other side, unmindful of the ethics of the road.

Sunset found us at Buckeye, thirty-three miles from Phoenix, and after dining there we decided to go on to Winter's Well, twenty-one miles farther. Since our afternoon's experience with the Agua Fria we were a bit timid about crossing the Hassayampa by dam, but a native at Palo Verde assured us that the "Hassayamp" crossing was packed as hard as the famous butter of that name when it leaves its refrigerator car—and so we found it; but it would take all the words of execration of a dozen languages to describe the road on the other side. The ancient conception of a river as the dividing line between purgatory and paradise must surely have been suggested by the "Hassayamp"; on one side the green Salt River Valley teeming with life, on the other, low lava-covered hills. A climb of two miles over this black lava only delivered us to a worse inferno of a road. Picture a track made of a series of parallel, foot-deep ruts, each rut worse than all its fellows, widening and deepening every few yards into what are called "chuck-holes" in the vernacular of Winter's Well. Desert roads were the commonplaces of Henry's experience, but never before had he been asked to negotiate such as this. He hated life and ground his gears with rage, jerking the driver's arms in agonized efforts to leap from the ruts and blaze a virgin trail through the desert expanse on either side. How his axles survived will ever be a mystery. We climbed out of one series of chasms only to fall into another, but at last, late at night, with aching hands and shoulders, we hailed with relief the ghostly big tank of the vast ranch called Winter's Well. Water, at least, was forthcoming here as a friendly sign informed us, and in lieu of lodging we stopped, heavy with fatigue, under a lacy mesquite on the bank of a small wash, a placid Henry on guard beside us. Only one Colt defended our trenches, for the other had been hopelessly jammed in target practice earlier in the day, but, after this our first taste of hard going, nothing on earth could have brought us to life till the desert thrushes woke us next morning.

We breakfasted frugally from our supplies, and on breaking camp devised a scheme for packing the bedding which added much to our comfort. Instead of carrying it rolled on the fender, we stacked it, canvas and all on the floor in the rear.

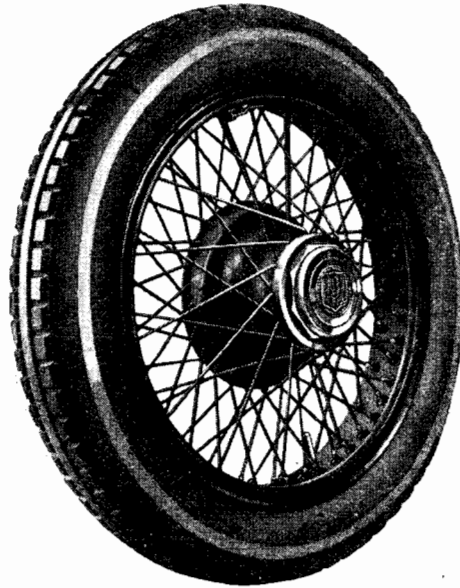
We were still in a green and lovely desert with low rocky hills breaking its flatness all around. The road through the greasewood, unknown and mysterious, beckoned alluringly. We felt our stiff shoulders and suspected that road, so took to peggy-jeans and bloomers as more suited to a road of dust-filled chuck-holes than skirts. We had breakfasted lightly, but the name of Harrisburg loomed in big letters on the map only forty-three miles away; surely a handsome lunch awaited us there. Alas and alack! each of those long miles was beset with

sandy washes, chuck-holes and deep ruts arranged in series parallel to increase both their voltage and amperage, and Harrisburg!—it took all the suggestion of our mannish attire to work up the courage to face the fact that it was a has-been, a few deserted houses, only two inhabited, and no refreshments but water.

However, seven more miles brought us to Salome and again to the Santa Fe Railroad which we had left at Buckeye; and at 2 p. m. two starved women fell upon great pitchers of ice tea, platters of ham and eggs, and bread—breakfast, lunch, and possibly dinner compressed into one, for the desert traveler eats when and where he finds food, eats all that is set before him, lest the remembrance of a wasted crumb goad him to madness in some future hungry hour when restaurants and hotels seem distant and unattainable as the planet Mars. Henry, too, had gas and oil. Salome-on-the-Sand seemed most fair to all three of us but we had to leave her, for Parker, with its sandy approach, was that day's goal.

We Encounter Experiences.

A fair road, paralleling close the Santa Fe track took us to Bouse where we stopped at a garage for advice on the best road to Parker. We knew there was a new road, not shown on our map, in fact we had been warned against it, but already we had learned not to believe every report on a road; it was our experience that no two opinions of the same road ever agreed. We had learned that by inquiring at a garage we could usually get first-hand reports from drivers who had been over the road in question and we could compare the reports and make our own choice. The Bouse garage proffered a gruesome tale of two men who had taken the old road to Parker, had lost their canteen just before the radiator sprang a leak, and though Parker is only thirty-nine miles from Bouse by that road, some one passing the crippled car thirty hours later found one of the men unconscious and the other too weak to start for help. All advised the new and shorter road, characterizing it as "twelve miles of boulevard and fifteen of sand." This we found true telling, and, the twelve miles of boulevard ended, Henry started to crawl tank-like through the sand—loose, white, shifty stuff that slid back in the ruts filling them almost to the top. Henry floundered in these as one wading in a muddy stream feels blindly for the bottom; he groaned in his mighty efforts and we let him run in low until he boiled frantically from such strenuousness on a hot afternoon. In pity we stopped to water and cool the engine, but when we were ready to go Henry refused to take up the burden. Neither starter nor cranking would arouse him to action. We started at him and felt his pulse, trying to remember all we had heard about ignition that far-away morning in Tucson. Nothing seemed to fit the case. We sat on the sand and read the Ford Manual; it gave us no gleam to follow. We watched the sun set—never had sunset seemed so stupid. We remembered it was nearly dinner-time, and ate an orange. Then



Beauty as a Sales Aid

Of course you have noticed the increasingly large number of motorists who are equipping their cars with National Wire Wheels.

Careful investigation by us bears out what you have doubtless observed—that car owners are directly influenced in this selection by the grace and beauty of National Wire Wheels; the added distinction they confer upon any car.

This information is of interest to you, in that it points the way to increased sales and continued patronage.

National Wire Wheels are twice sold—first by their beauty, then by their admirable performance. Their initial sale will bring you profit, their performance friends.

Our "Pasco Type" wire wheels will prove a strong seller to your customers who drive Overland 4's, Chevrolet 490's or Fords.

National Wire Wheels will be on exhibit at: New York Show, Jan. 3 to 10, Space 19-20. Chicago Show (Coliseum), Jan. 24 to 31, Space 62-63-64

NATIONAL WIRE WHEEL WORKS, Inc.
 General Sales Office: 416-417 Book Building, Detroit

Plant No. 1—Geneva

Plant No. 2—Hagerstown, Md.

Northern Electric Company, Ltd., Montreal, Canada, and Branches

(2)

National

we just sat, but luckily not for very long. A little touring car, stripped to its spider-like skeleton raced lightly toward us over the sand on its extra broad tires, and true to the ethics of the road, stopped to help. The two men of the spider were not mechanics but knew something about a Ford and one of them diagnosed Henry's fit as congestion from a flooded carburetor. We vowed that an impossibility; we had pulled the primer slightly only once. He examined it, nevertheless, and found that a little spring by which that unreasonable primer worked, had caught at the first tug subjecting him to a kind of forcible feeding at which he struck. This impressed on us the fact that the very first, first aid to a balky car is careful regulation of its food supply, for, as with real men, too much food is as disastrous as too little.

Soon we were plowing through the sand again—queer going it was, too, but Henry, with more sympathetic management decided to take much of it on high. Part of the fifteen miles was a series of short steep hills, often with vicious stretches of deep sand between them, but Henry stopped no more and 10 o'clock found us dining, belated but ecstatic, at a "doggie" wagon in Parker where we found ample lodgings though restaurants seemed scarce. We spent the night in this tiny brave town that the Colorado River and the Santa Fe R. R. have conjured up out of the bottomless sand, and next morning, seeing the lovely green belt of cottonwoods and willows which outlined the river—tender, spring-like, almost flower-like, against the waste of sand, we paid tribute anew to the mighty magic of water.

Down at the river, Henry, daringly balancing himself on two planks, boarded one of the huge launches of Bush's Ferry, that much-advertised institution that had encouraged us for more than a hundred miles by map and sign-boards, to struggle on until it could help us over the river. When we produced our purse at the opposite bank, the pilot waved it aside, stoutly declaring that passage was free to "ladies in Red Cross work." We looked at each other wildly, but light was vouchsafed when our bronzed giant pointed to the rear of the car where Henry still flaunted one of the big banners bearing the device "Red Cross Relief Week," with which all but the most unpatriotic cars had been tagged the week before in a big drive in Tucson. The mistake was natural for a sudden shower had camouflaged the ee's in "week" until this looked much like "work." The desert heat had not quite seared our consciences, so the purse was lightened by two dollars and a half, but we had made the discovery that the Red Cross banner harmonized well with our khaki suits and gave us prestige, so it adorned our car to our journey's end.

We Reach the Desert.

We had decided, after weighing much advice on the subject, that the Parker cut-off had done its best work for us when it got us across the Colorado River, so on the California side we deserted this route for the

National Old Trails Road, whose sign boards, posted by the Automobile Club of Southern California, were our cloud by day and our pillar of fire by night to guide us from Needles to Los Angeles. The convenient little strip maps of this road, issued by the same club, were the incarnation of all the law and the prophets for us on the entire journey. We had no map for the sixty-two miles from Parker to Needles, but the road was so well defined and signed that only a blind man could stray from it; almost due north it ran and with every mile we read unmistakably the signs of the real desert. The green Arizona desert, the near-desert, had ended at the Colorado, and the vast Mojave Desert, lifeless, soundless, merely threatened here and there by civilization, but for the most part unconquered and defiant, had begun. Our road was a natural desert road that soon lost us the green outline of the Colorado and led up and down, up and down, another series of short steep hills. There had been no recent rains and even the ocotillos, those strange near-cacti which put out myriads of small green leaves after every rain, refused to add any high color note to this brown country; the sand was reddish brown, the loose rocks were deep brown, and the low range of the Mojave Mountains was the same color. Our amber glasses toned the rocks and hills into a warm cinnamon and transmuted the dazzling white sunlight to lustreless gold. About twenty miles from Parker is a toy canyon some three miles long that seems as a maze especially planned to lead to some Japanese garden. It turns and twists and winds through baby hills one can almost see over, making the most breathless hair-pin turns, and the roadway is so narrow that the car seems barely to escape the low steep canyon walls. It is called Rattlesnake Canyon, whether from its many vicious coils and sidewindings or from an abundance of reptiles there, we never knew—probably from the former as we did not see a sign of a rattler.

Our first chance to play the good Samaritan came some time after we emerged from the canyon for we came upon two cars, one of which had broken down in an effort to act as a prairie schooner for a whole family. At a semaphore signal from the head of the family we stopped and listened to his tale of woe. His car had a broken axle and he would have to go twenty miles to Needles to buy a new one, return with it and repair the car before he could travel on; meanwhile his party had food but no water, as a slightly leaky radiator had emptied their canteen. We gave them five of our ten gallons and four thirsty children fell upon the water at once; we left them filling a pan with water for half a dozen fuzzy yellow chicks which had been resting forlornly in the shadow of the car—the only bit of shade for many miles.

Our northward road led us to the Colorado again at Needles where we made a short stop for lunch for ourselves and Henry before turning west. We were guided now by the admirable strip maps which not only



Pat. applied for

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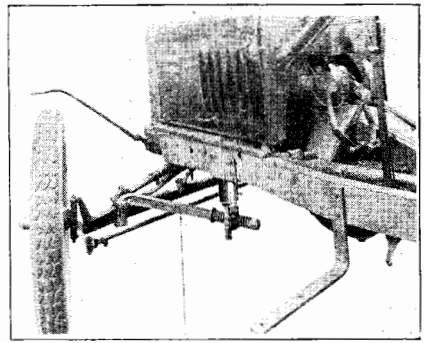
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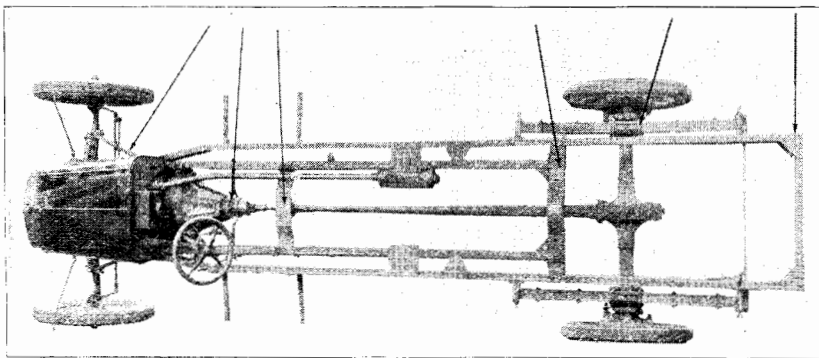
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pointed plain the way for us but also foretold our joy or sorrow by little arrows scattered along the map pointing to such captions as "sand wash, but good," "good gravel road," "drift sand, very hard pulling," "heavy sand," "15% grade," etc.; similar arrows acted as a Cook's guide to point out the most interesting bits of scenery such as "crater and lava beds," "dry lake," "alkali marsh"; they indicated such comforting promises as "fine flowing water," "railroad water tank," "fine spring," "deep well." Greek crosses showed where Henry might refresh himself on oil and gas while other and more cabalistic symbols indicated the presence of meals and lodgings, and of garages. Our close traveling companion, the Santa Fe Railroad, was always pictured, and at every station, both the distances from some already passed important town and to the next station, were given.

Hot Weather En Route.

The afternoon of this fourth day of our trip was so hot that an ordinary thermometer must have burst trying to express its feelings. We were glad enough to drop our superfluous skirts which we had assumed in deference to the size of Needles, as we did before disembarking in any sizable town; bloomers and peggy-jeans were much more suitable for enduring a June afternoon on the Mojave. We had made a compact before starting that each should drive the same number of miles, and we easily kept the records straight by taking alternate tricks at the wheel—twenty miles to the trick if the driving was hard, thirty or more if it was easy. This afternoon a twenty-mile trick was quite enough, for Henry boiled so in the scorching sun and from occasional pulls through sand that the driver's feet were always slowly cooking; she could stand the rare and medium degrees of roasting, but when the well-done stage set in, which happened about every tenth mile, she was compelled to stop for water all 'round. Canteen water was good enough for the radiator, while we drank from the cooler water bag, adding lemon juice to make it still more refreshing. The front seat was not a choice place to ride with the engine heating it like a furnace, so while Bloomers was taking her trick at the wheel, Peggy-jeans would stretch luxuriously on the improvised couch in the rear, both pillows under her shoulders at one corner and moccasin-clad feet waving to the cooling breeze at the corner diagonally opposite. This was the very ecstasy of relaxation, only tempered by the thought that as the odometer clicked off the last fraction of the twentieth mile, she must return to renewed roasting at the wheel while Bloomers retired to the couch to cool her parched soles in turn.

The road was oiled in stretches but even the unoiled pieces did not seem bad to us, still aching a little from those unspeakable miles between the "Hassayamp" and Parker, though the native Californians, spoiled by the paved highways of their state, complained biterly when we met them. We passed not more than three or four east-bound cars that afternoon, and it seemed to be the etiquette of the road to stop and tell

each other, out of our fresh experience, what sort of road each had just traveled. We were usually appalled at the graphic pictures of the vicious road that lay before us, while we gave most cheerful reports on the road we had just covered to the east. As we gradually found out that the terrible roads never materialized, we began to wonder what comments those east-bound Californians might be making about the general veracity of Arizona women—and yet, it was only in the point of view.

Late that afternoon we met a large high-power car with its radiator boiling furiously. Two men with bloodshot eyes looked thirstily at our water bags and one of them asked if we had any water to spare; so, for the second time that day, we were glad we carried ten gallons of water. They drank and drank and gladly accepted some proffered lemons as well as water enough to fill their radiator. They had lost their canteen, had been stopped by engine trouble, and had had to work in the sun over the engine for two or three hours before they could locate the trouble and get started again.



A Welcome Oasis.

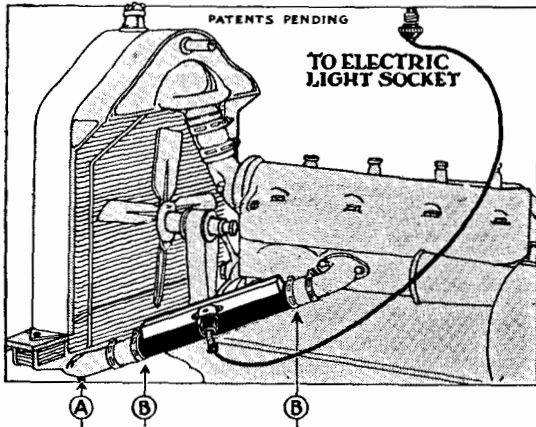
Dusk, the cool evening breeze of the desert, and a good stretch of road came all together. They were not to be resisted; besides, we were not yet hungry after our late lunch at Needles, so we drove on until we had skirted the Providence Mountains, had come suddenly upon a low shadowy pass and had emerged from it just as unexpectedly; even though it was dark, we had the feeling that we were in a big amphitheatre, and a morning survey of a map showed it to be a large dry lake, Bristol lake. We stopped, about 10 o'clock, not far from the little station of Amboy, decided it was too late to try to get any dinner there, so fell back upon our stores; 10:30 found us seated in front of Henry's lights on the pebbliest imaginable ground, dining on sardines, crackers, plum jam in lieu of butter, with a can of pineapple for dessert. The pebbly ground was unthinkable to lie on, so we each took one of Henry's abbreviated cushions, pieced out its length with our feather pillows, and slept—small matter whether we were comfortable or not—we slept!

(To be concluded in the February issue.)

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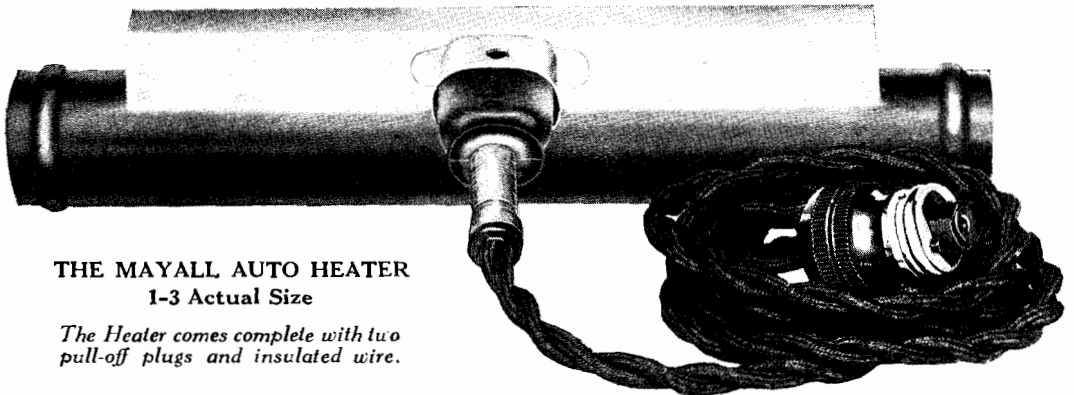
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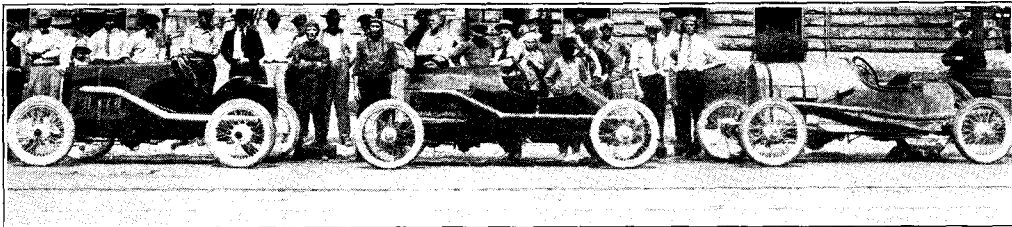
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THREE RACING FORDS

Three Ford racers, fitted with Roof 16-valve cylinder heads, are here shown, to give an idea of practical, Ford racing body designs. The car to the left is capable of attaining 75 miles an hour, with the standard Ford gear ratio in the rear axle. To produce an engine that will turn up to 3150 revolutions, while delivering power, takes patience, time and study. And, to produce this powerful engine, with its tiny radiator and cooling system so perfect that it does not over-heat, even without the use of a fan or pump, as shown by the radiator thermometer, requires everything to be just right.

The car is equipped with wire wheels, front wheel roller bearings, DeLuxe radiator and body, with Ballot type gasoline and oil tank combination, aluminite pistons and aluminite connecting rods, high-tension magneto, and $1\frac{1}{4}$ inch, special carburetor.

The car, in the middle of the picture, is being shipped to Athens, Greece; to carry the fame of Ford speedsters to the land of the Marathon race. Socrates, Pericles, and Alexander the Great—please sit up and take notice.

The car, at the right, is the one that finished second in the Cincinnati race in 1917, and still has splendid speed.

A great many Ford speedsters have been built this year—by men who returned from the war—but, most of them were finished too late to do much racing this year. But, next year should be a splendid one for Ford racing. And we would appreciate our readers sending us notice of Ford races which are to occur in the future. Then we can publish the notices and help in securing a larger number of entries, and more interesting competition.



ON THE WINGS OF THE MORNING

A glance at these three Ford Speedsters, all set to "GO;" reveals some interesting mechanical features, to those interested in specialized speed car design.

The car, at the left, is the one owned by Robt. M. Roof, Chief Engineer, of the Laurel Motors Corporation, of Anderson, Indiana. This car has been underslung by the use of the Laurel underslinging brackets, giving it a compact, clean cut appearance. The pointed, wind-splitting radiator is of interest. And the large gasoline tank is readily accessible, and contains a compartment for oil. The sloping windshield, and the large exhaust pipe, add to the racy appearance of the car.

The middle car is called "Ja-Da" by its owner, Herman Nelson, of Anderson, Indiana. This car has a very short wheel-base, making it more effective for racing on half-mile dirt tracks. The high, narrow radiator adds to the classy appearance of this car, and gives effective cooling.

This car also uses the Laurel underslinging brackets. The position of the driver, sitting directly over the rear axle, is not so comfortable for general road use; but these close-coupled Fords can certainly "Zizz" around a half-mile track.

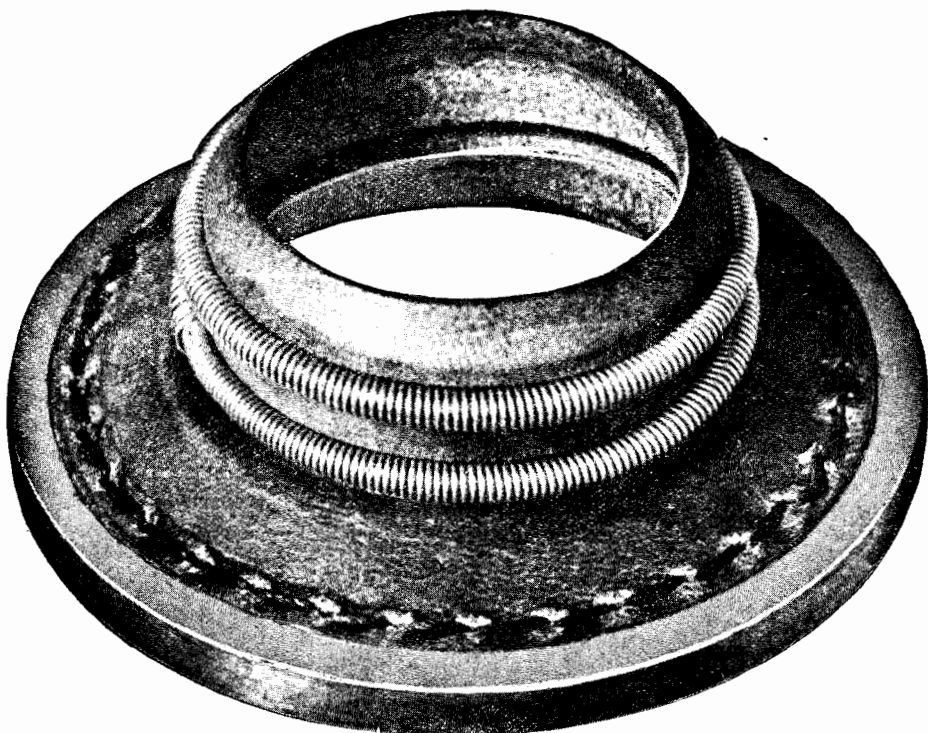
Looking closely at the end of the exhaust pipe, of the car owned by Mr. Goltrie, of Wabash, Indiana, shown on the right; we notice that a muffling arrangement has been fitted on the end of the exhaust pipe, for use in city driving.

This consists of an ordinary stove damper which, when closed, has a couple of small holes through it, to allow the gases to escape. When the damper is open, the Shelby steel tubing exhaust pipe acts as a pipe organ and gives an aeroplane exhaust, which makes the welkin ring.

To protect ourselves against inquiries, the shock absorbers are real old Hasslers, which are still giving splendid service on a darn-the-expense Ford speedster.

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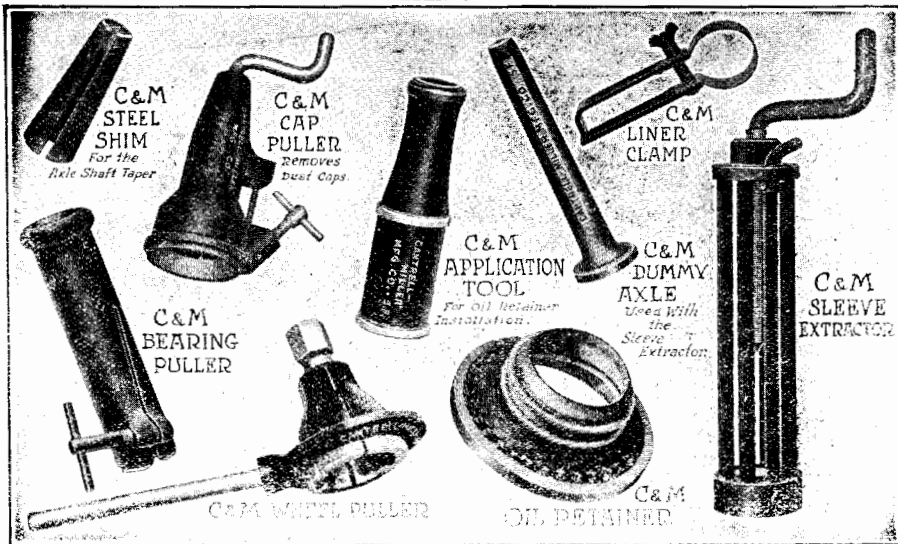
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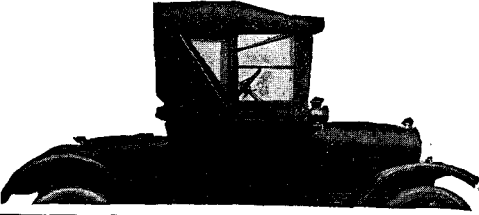
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Law for the Motorist

"A Tip in Time May Save a Fine"

YOUR CRIMINAL LIABILITY FOR NEGLIGENCE OF ANOTHER DRIVING YOUR CAR IN WHICH YOU ARE RIDING

By Leslie Childs.

The law of criminal liability, for the taking of human life, through negligence or carelessness, applies to the motorist operating his machine in about the same manner as where any other agency is used. Generally speaking, if one carelessly, or negligently, drives an automobile, upon the public highway, and thereby kills another he may be guilty of manslaughter. This appears to be just and we say, "well and good," of course a person should be criminally liable under circumstances of this kind.

But, suppose you are riding in your car, accompanied by a friend or chauffeur, who is driving, and through the friend's or chauffeur's carelessness an accident occurs in which another is killed. To what extent, if any, will you, as the car owner be criminally liable? Under what conditions may you be indicted, possibly sent to a penitentiary? A nice question, and not at all impossible, as witness the following case which occurred in New York a few years ago, the facts being substantially as follows:

A Mr. Albo was riding upon a public highway in his automobile, accompanied by one Scanlon, his chauffeur, who was at the wheel. They were going at a twenty-five mile rate and in passing a horse and buggy collided with same, thereby causing the death of a boy who was riding in the buggy.

Albo and his chauffeur, Scanlon were both indicted under a charge of manslaughter, tried in the county court, and convicted. The case was taken up on appeal, and in reviewing the evidence the following facts were pointed out and commented upon.

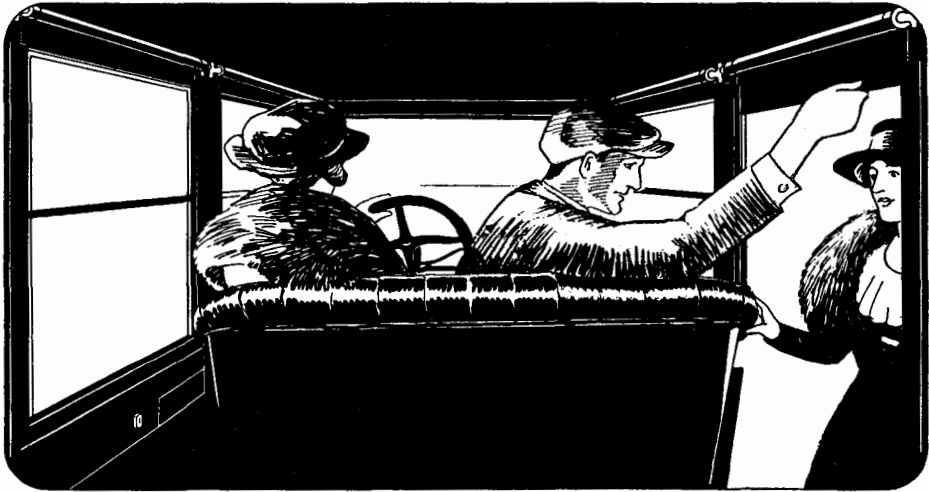
That Scanlon was driving, and that he had been previously instructed by Albo to always give full leeway to any passing vehicle; that

there was no evidence to show that Scanlon was an habitual careless driver; that the accident was one that happened quickly and could only have been averted by instantaneous action on the part of Scanlon if at all.

In commenting on the conviction of Albo the court said: "He had not the wheel in hand. It is true that the chauffeur was under the control of the owner, but that means the general control. He might give general directions. It would be impossible, however, to give specific directions as to the manner of driving upon each separate piece of road over which they were passing. If it were the chauffeur's habit to run so close to other cars as to cause danger and Albo knew of it without correcting it, he might be held liable for this negligence, but there is not one word of evidence to the effect that this was the habit of the chauffeur * * * It seems clear, therefore, that the conviction of the defendant Albo was unjustified, and that conviction must be reversed." (People vs. Scanlon, 132 N. Y. Supp. 628.) The conviction of the chauffeur being affirmed.

A fairly close shave for the owner; looks as though if there had been the least bit of evidence showing lack of proper instructions, or knowledge that the chauffeur was inclined to be careless, the owner would have gone the way of his driver.

In the light of this case, if you permit another who accompanies you to drive your car, and if you should meet with an accident, as described above, you may be called upon to shoulder some real liability. Much would, of course, depend upon the circumstances, but before turning your wheel over to every "good fellow," it might be a good plan to think it over.



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TU-BE OR NOT TU-BE

By Dr. S. J. Fort.

The Ford owner who is driving a car, say of the 1916 vintage, equipped with demountable rims, has no doubt, like the writer dropped sundry small sums for repairing slow leaks in tubes, especially those nasty little ones which let one down when least expected.

Repairs, due to accidental punctures and blow-outs, are to be expected in the day's work. But, many of the more insidious ones can be prevented by a little watchfulness and care upon the part of the driver.

A demountable rim, like everything made of iron, is subject to the ravages of rust, especially that part in closest relation to the interior of the tire and exterior of the tube. Drive with what care you may, water will obtain entrance between the tire and rim, the accumulated moisture bringing out a rich crop of flaky rust, particles of which may, and frequently do, cut a minute hole in the tube.

Driving through mud or deep sand, sharp, gritty particles, entering at the same place, are another source of small but effective abrasions. The rear wheels are apt to accumulate grease from the hubs, some of which, in time, works its way into the rims, and remains long enough to exert its fell action upon the rubber of both tire and tube.

All this may occur in a reasonably new car, but it is in the older cars, driven by careless owners, that slow leaks are most apt to occur. Most of us who are driving "used cars," from motives of economy, have known the difficulty experienced in removing a tire from the rim of a recent purchase, finding it almost cemented to the rim by accumulation of rust—to say nothing of rust debris in the interior of the tire.

The remarkable resistance of rubber, to these destructive agents, occasions little thought or consideration, until a series of leaks call attention to the causes. Then we wonder why in thunder we did not find it out sooner and apply the remedies.

Returning a tire to a well-rusted rim, without attempting to get rid of present rust, and preventing it in the future, is simply storing up trouble. A good wire brush will remove most of that present and this treatment, supplemented by coarse sandpaper, gives a fairly smooth surface upon which to apply one or two coats of graphite paint as a protective. Before painting it may be well to go over the edges of the rim to remove sharp points created by dents.

One of the vulnerable places, through which water, sand and grit obtain entrance, is the valve stem hole. In new cars this hole is fairly protected by the valve cap and its base. But, in older cars, constant unscrewing and screwing back into place gradually wears the wood, leaving considerable space through which extraneous matter may obtain entrance.

Or in other cases, the valve stem of a new tube is not of the same length as that of the old one, and the old cap will not fit the new stem. Then away goes the driver, without any protection over the stem, except the

little dingus screwed over the top which, turned end for end, is used to remove the valve from the stem.

Another money saver is to take good care of spare tubes, carried in the car as a reserve. Jostling it around in the rear seat compartment, along with chains and miscellaneous junk, or throwing it carelessly in the tool box, is bad business. Carefully deflated and neatly rolled, placed in a strong cloth bag and well dusted with talcum, it can be carried in its original box with safety almost anywhere about the car.

Before placing a new tube in an old tire, the interior surface of the tire requires some overlooking. Generally there is more or less accumulation of dust, which requires a bit of bouncing and juggling to remove. Quite recently I had small leaks develop in two new tubes and discovered the cause in the point of a tack which protruded through the tire just far enough to cut the tube and was hardly visible, so it is a good plan to feel all over the interior of the tire for such possibilities.

Talcum, dusted into the tire, is good, but all surplus requires removal, for fear it will harden and prove an abrasive.

The valve stem must set straight in its hole or there is constant strain on it which will eventually break the rubber around its base. Any kinks in the tube must be straightened out before inflating.

Under-inflation is perhaps worse than over-inflation. I mean by that if you drive with say 60 pounds pressure as a maximum, a loss of from 10 to 15 pounds, which is hardly noticeable to a casual observer, may produce a weakening or cracking of the tube or tire or both.

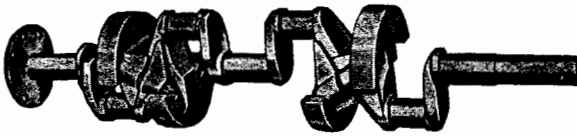
Over-inflation is not apt to occur when one uses the average tire pump, but in any case the air-gauge is a necessity in every driver's equipment. Inflating the tires, by guess or by gosh, is bad business. Speaking of over-inflation, be careful when using a compressed air outfit. Notice its pressure and, if around 100 pounds, remove the valve frequently and use the gauge, or you stand a chance of bursting the tube. Blessed be the man who invents a tire pump which will stand up to its work and not wear blisters on the hands or make one get his air by the sweat of his brow.

The catechism of Fordowner's "don'ts" is long enough without a recapitulation here of the necessity for trued-up wheels or the effects of sudden stops and starts, skidding, ruts, car tracks, loose stones, etc., on the life of tire and tube.

The special points mentioned are offered more for the beginner than the expert, those being the ones most frequently in trouble from small things which are avoidable. Whether the aforesaid beginner can save time and money by making his own tube repairs, I cannot state from experience, but I have it in mind that it is safer to have a spare tube or two at hand rather than to attempt road repairs.

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Realizing that practically all high-priced cars are "counterbalanced," Ford owners were quick to see the practicability of



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They bought. They found satisfaction. And sales for Dunn Counterbalances increased by thousands. The name of Dunn came to mean reliability.

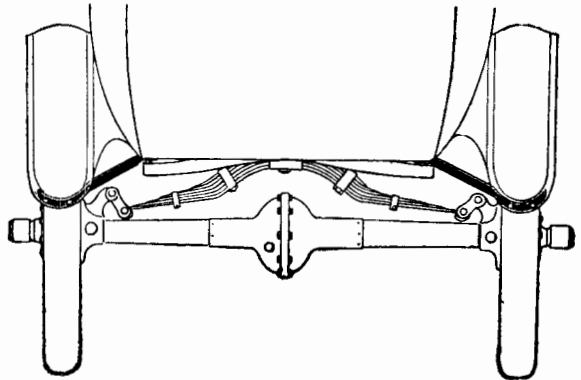
Dunford Rear Fender Brace

Prevents whipping and vibrating of Ford fenders—eliminates the need of fender replacement—stops rattles, squeaks and fender troubles in general. Again Ford owners bought. The cost was small—\$1.00 per pair—the saving great. And again they were satisfied.

The sales now on both of these worthy products are increasing by leaps and bounds.

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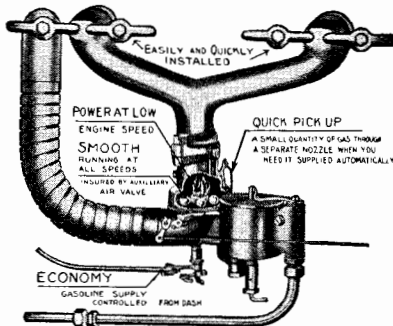
Dunn Manufacturing Company
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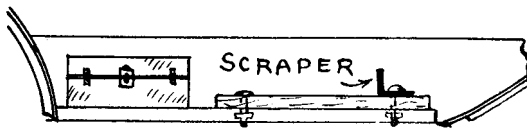
Send us rough sketch and description of any repair hint that would be of assistance to Ford owners. If acceptable, we will pay \$1 for same. Here's a chance for easy money.



RUNNING BOARD SCRAPER.

As the sheet steel running board of the Ford is apt to be very slippery, when wet or icy, I made an anti-skid running board by fastening a piece of $\frac{3}{4}$ inch pine board on top of the regular running board, with $\frac{3}{8}$ inch carriage bolts.

At the front end of the wooden board, a foot scraper is fitted, which is made from a



piece of $\frac{1}{8}$ inch sheet metal, bent at right angles. The side that fits on the wood board is $\frac{3}{4}$ inch wide, and the upright side is $\frac{1}{2}$ inch high. This scraper can be fastened in place by the two forward bolts which hold the wooden running board in position.

G. F. Morris, Somerville, N. J.

CASTOR OIL IN TIMER.

Much of the cold weather timer trouble of the Ford is due to the gumming of the congealed oil. This can be largely avoided by the use of a super quality of lubricant.

Usually, the Ford timer is oiled with ordinary engine oil, because a liberal supply of this kind of oil is always at hand. However, these mineral, cylinder oils have a tendency to partially dissolve the fiber insulation, in which the timer segments are imbedded.

Then this putty-like paste gets on the roller path, and prevents good contact, thus causing hard starting and misfiring.

As a vegetable oil, such as castor oil, does not tend to disintegrate the fiber so readily, it is a good plan to use a little of this good, but expensive, lubricant in the timer.

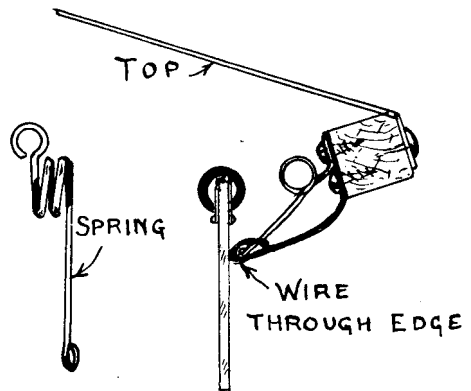
G. A. Luers, Washington, D. C.

AUTOMATIC STORM FLAP.

An anti-draught shield, or storm flap, between the top of the windshield, and the front edge of the top, is a useful winter fitment. Many of these manufactured shields are very

good, but often they can be bettered by making tension springs, to hold the lower edge of the flap tightly against the windshield glass.

The lower edge of the fabric is doubled over and sewed, leaving enough room to run a fairly stiff wire through the seam. Springs



are made, from steel or brass wire, with a couple of coils. The ends are looped, so that they can be fastened in place with round-head wood screws and washers.

When the top part of the windshield is lowered, the springs pull the flap up against the top and out of the way automatically. The loops, on the longer ends of the springs, are for the wire which extends along the bottom of the curtain, to pass through. About 4 of these coiled spring tensions should be used.

Leslie E. Dingman, Johnson City, N. J.

HOLDS SIDE CURTAINS.

In order to hold the side curtains more closely to the bottom edge of the Ford top, a strip of wood can be fastened to the inside of the top, between the top and the side curtains.

This piece of wood should be about 3 inches wide by $\frac{3}{8}$ inch thick, and can be

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One Piece —Ford Special

*The Ring With
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A new motor, equipped with most any make of piston ring, runs smoothly and has maximum power. After being run a few hundred miles, it begins to lose power, pump up oil and carbonize. What is the trouble?

The cylinder walls have warped or shrunk and the piston rings cannot conform to the depressions or warped places. The explosion and other forces destroy the seal of oil between the ring and cylinder wall as it passes over these spots, the gas escapes and oil passes up.

"NO-LEAK-O" is the only piston ring that has a groove full of oil between the ring and cylinder wall WHICH MAINTAINS THE OIL SEAL. This is the reason why "NO-LEAK-O" gives results no other ring can.

This is also the reason why "NO-LEAK-O" restores power in old motors when other rings fail.

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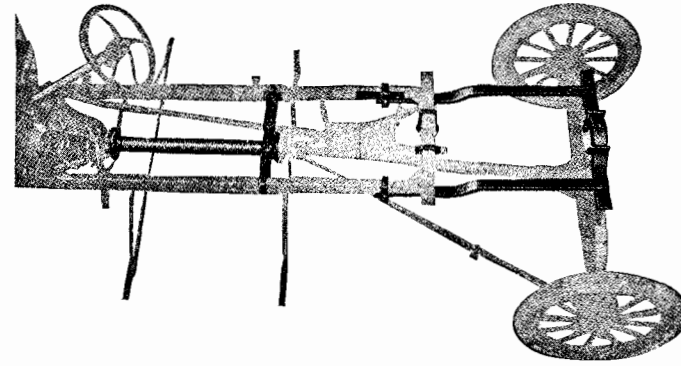
With the Hay-Dee, a hammer and wrench is all you need to convert your Ford into a practical delivery car chassis with 96 or 108 inches loading space back of the driver's seat.

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15 inch—\$55—Making a 115 inch wheel base
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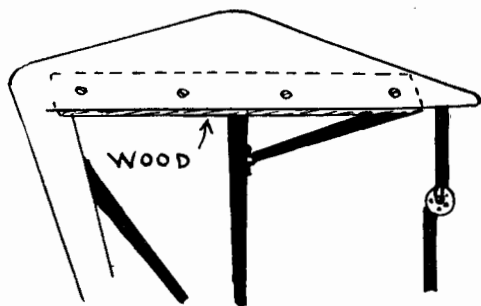
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1872 Broadway, New York City

More than 5000 in use



Dealers—
Write for data

screwed or tacked to the inside of the top fabric. And the Murphy fasteners placed on the strip of wood. This method is only ap-



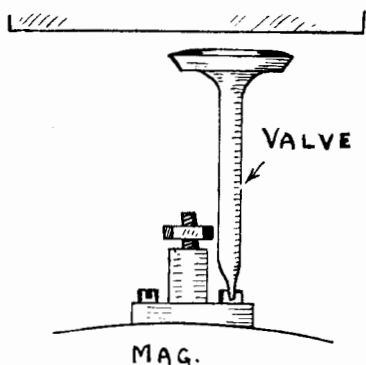
the gauge may indicate a normal clearance while, actually, the clearance is so great that there is a valve tappet knock, when the engine is running.

plicable in winter, when the top is never folded down, and makes a tight, neat closure, which keeps out much wintry weather.

Sam Roave, Monticello, Ill.

SHORT SCREWDRIVER.

A short screwdriver, for use on the three screws which hold the magneto contact terminal in place, can be made from a discarded Ford valve.

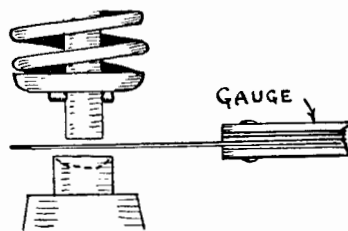


Heat the end of the valve stem, and pound down the end of the stem to a flattened, screw-driver blade. Finish with a file, or by grinding, and then temper. The head of the valve can be rounded off, to form a better handle. This screw-driver can be made short enough so that it can be easily used under the coil box, and in other inaccessible places.

P. F. REMPEL, Meade, Kans.

VALVE TAPPET CLEARANCE.

After the Ford engine has been in use for some time, the ends of the valve tappets often become slightly cupped from wear, due to impact against the ends of the valve stems. In such cases, if one attempts to measure the clearance, between the ends of the valve stems and the tappets, with an ordinary thickness, or "feeler" gauge, misleading results are apt to be obtained. And



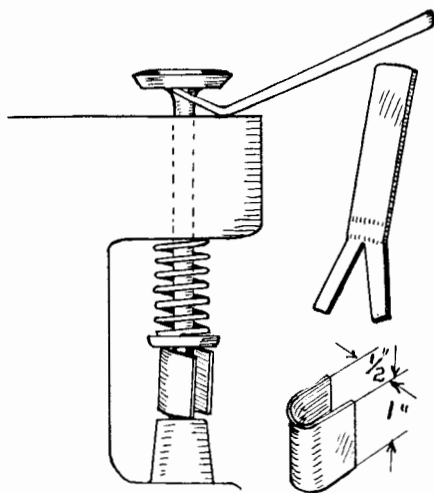
By leveling off the ends of the valve tappets, after the valves have been removed for grinding, much better and more permanent adjustments can be secured. This can be done by a file while the tappets are still in in the cylinder block, although it can be done better by grinding or filing, after the parts have been removed from the block.

P. B. NEWKIRK, Otisville, N. Y.

VALVE SPRING HOLDER.

Take a piece of band iron, one inch wide, and 1/8-inch thick and bend it to a U-shaped form. Turn the starting crank, until the valve is raised, and then use a pry-bar, made from another piece of band iron, to lift the valve.

A tire tool can be used for the same purpose, by placing a piece of wood or iron, be-



tween the top of the cylinder block and the prying tool. By having the pry-bar split and surrounding the valve, the tool can be made to lift straight up, so that there will be less danger of bending the valve stem.

Now turn starting crank, so that the tappet drops down. Then the valve cotter can be pulled out. The holder will hold up the valve spring—which can be left in position while the valve is being ground, or other adjustments made.

AUTO BODY WORKS

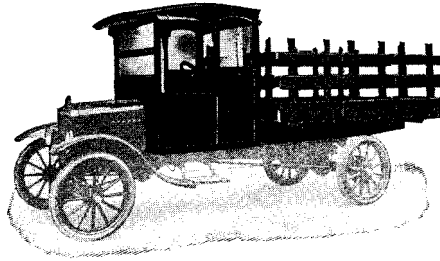
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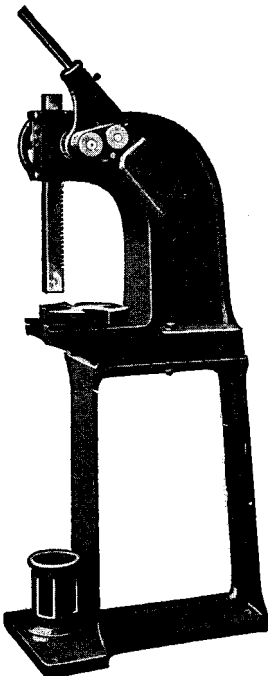


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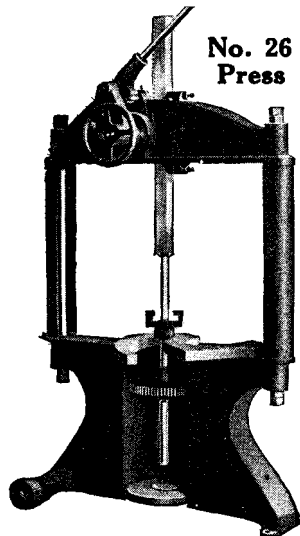
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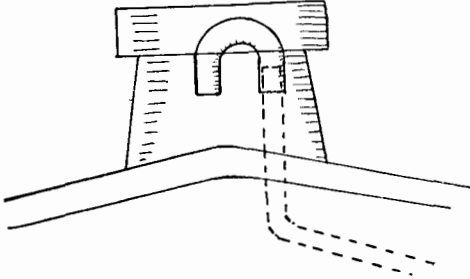
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By using two of these metal valve holders, two valves can be handled at one time, as the cam shafts lifts and lowers two valves at a time, when the starting crank is turned.

E. E. BOCK, Walkerton, Ontario.

TOP ON OVERFLOW PIPE.

When filling the overflow pipe of the radiator, car owners are often bothered by having part of the water enter the overflow pipe and run to the ground, spattering mud and water on the shoes and clothing.



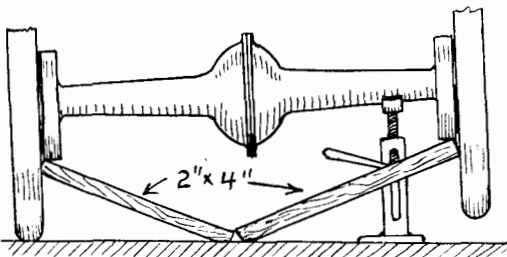
An easy method, of avoiding this, is to take a three-inch piece of copper tubing, of a size just large enough to fit snugly over the end of the overflow pipe, and to bend this tube into the shape of an inverted U. Then, when this piece is fitted onto the end of the overflow pipe, the opening will point downwards—instead of up.

The water can now be poured into the radiator as rapidly as desired. This arrangement will not interfere, in any way, with the usual functioning of the overflow pipe.

Y. K. STODDARD, San Diego, Cal.

REMOVES REAR WHEEL.

In order to remove a stuck rear wheel, in case the breakage of a brake shoe, or other trouble, should make this necessary on the road, and one doesn't happen to have a wheel puller in the car, two pieces of lumber of, say the 2 by 4 inch size, and a jack, can be used.



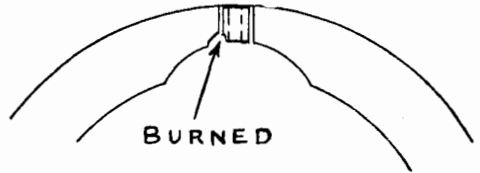
The axle, on the side that the wheel is to be removed, is jacked up, and then the wood props are braced between the two wheels, and resting on the ground. Then, when the jack is lowered, the pressure of the ground acting against the ends of the boards, acts as a powerful toggle-joint, and tends to press the wheel off the axle.

If the wheel is on the axle rather tightly, one should lower the jack carefully. Then, in order not to damage the wheel, or bend the axle shaft, one should strike the end of the axle shaft a good, husky blow with a lead, or brass hammer. Or, hold a piece of wood on the end of the axle shaft, and strike the wood block with a hammer, to avoid injuring the threads on the ends of the axle shaft.

R. G. SNAPP, Caledonia, N. Y.

COMMUTATOR SHORT.

Trouble was experienced, on a 1915 Ford, with the fourth coil unit buzzing continually, when the motor was running. A new wire loom was tried, but did not remedy the trouble.

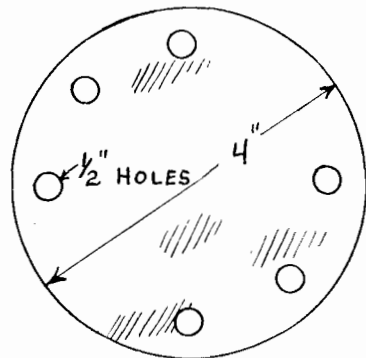


The fourth contact removed—first being marked so that it could be replaced the same way—in order to give a smooth surface. At the bottom of the contact, a small steel shaving was found. This had caused a hole to be burned, in both the contact insulator and in the roller race-way. After revolving the insulator a half turn, the engine ran all right.

CHARLES J. TUGGEY, Detroit Mich.

NEW MAGNETO COIL ASSEMBLY.

When installing a new-type magneto coil assembly, in one of the older Fords, it will be found that the new coil sometimes projects farther than the older type. By cutting a piece of tin, or other sheet metal, about .010 inch thick, and placing this shim between

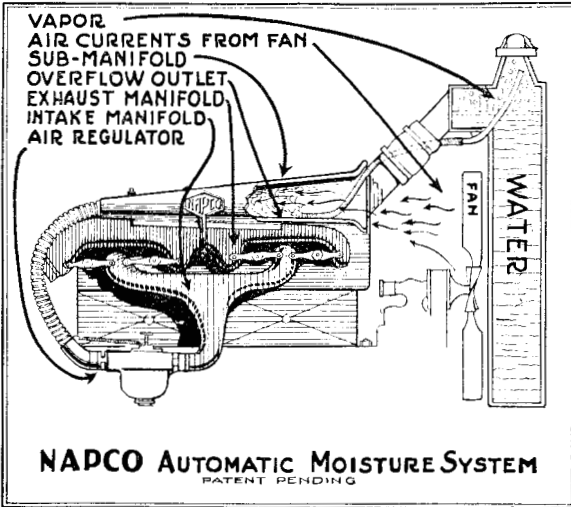


the end flange of the crankshaft, and the transmission shaft flange, the proper clearance will be obtained. In some cases, a shim 1/64 inch thick will be needed. Half-inch holes are cut for the bolts to pass through.

BERT DOBBERTIN, Rochester, N. Y.

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Eliminate Carbon Troubles and Save Gasoline



Moist air automatically mixed with gasoline vapor creates perfect combustion, even with the present day low grade of gasoline.

The "Napco" Automatic Moisture System operates perfectly at all speeds. No moving parts. Attaches to the motor without drilling and fastens in place with a set screw. Absolutely automatic in operation and guaranteed for the life of the car.

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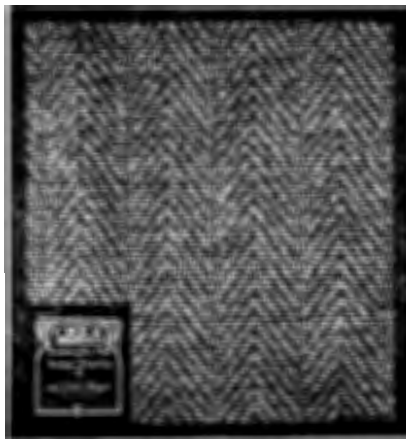
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Independent of your starting and lighting system.

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You can install it yourself—no expert mechanical knowledge required.

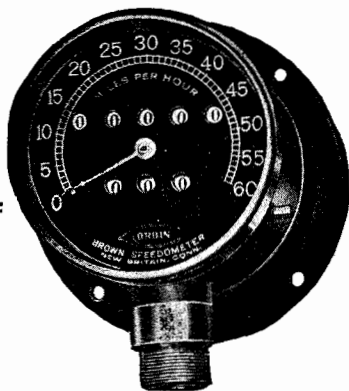
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GRINDING ADJUSTABLE VALVES.

Many Ford car owners fit the valves of the Ford engine with lock-nut valve adjusters, so that the valves can be quickly and easily adjusted to the best clearance, between the ends of the valve stems and the tappets. When grinding the valves, it is the usual custom to remove these nuts, and then replace and adjust them, after the valves have been ground.

This can be avoided, and time gained over that usually required for grinding the non-adjustable valves, by lifting the valves about half an inch, and placing a piece of flat metal between the end of the valve stem and the tappet. Place a small pocket mirror under the valve and, by rotating the valve, it is easy to determine if the valve really requires regrinding. (Quite frequently, the inlet valves do not need it.)

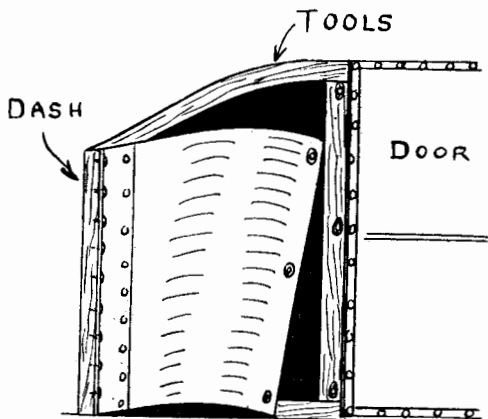
Now put the valve grinding compound on the face of the valve—in the regular manner—and lower the valve against the seat and grind. The mirror can be used again, to determine when the valve is sufficiently ground. Valves can be cleaned of the valve grinding compound by running gasoline over them, and cleaning the face of the valve and its seat with the end of a screw-driver and rags.

BERT DOBBERTIN, Rochester, N. Y.

HANDY TOOL HOLDER.

On Cadillacs, and other large cars, the tools are carried in compartments in the door, and in the sides of the body. So, why not in the Ford?

The space, between the forward side of the front door and the dash, is a convenient and accessible place for carrying the tools.



Remove the imitation leather covering, and the card-board backing, and sew or rivet, a leather hinge to the front, or short side. At the rear side, fasten the eyelets of two Murphy fasteners—such as are used to fasten the side curtains to the body.

Line the recess with carpet, or padding, to prevent the tools from rattling, when in place. By using a few hooks, and some leather loops, all the tools can be kept separate, and nicely in place.

W. E. YOCUM, Canosera, N. Y.

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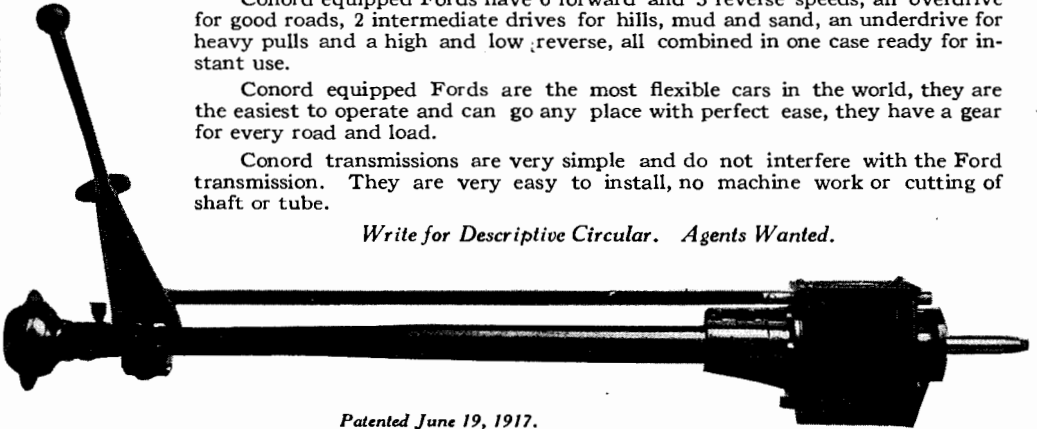
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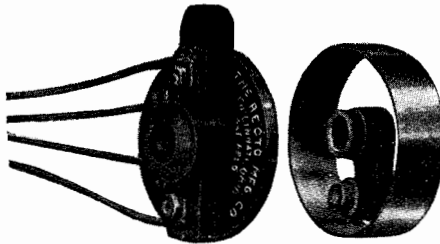
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A department wherein the Fordist in Mechanical Trouble may find a Cure. All questions answered cheerfully, and as correctly as experience guides us.

By
MURRAY FAHNESTOCK



Editor Fordowner: What are the numbers on the pistons, in regard to the cylinder block being rebored?

How often does the Ford Motor Company recommend reboring the Ford cylinder block without injury?

The Ford Motor Company only rebores the cylinder block once—to the .03125 inch oversize.

If the numbers, on the top of the piston, are .03125, or .033, then the cylinder block has been rebored. If the numbers are .0025, then the block has not been rebored.

On present Ford pistons, the size is stamped on with a rubber stamp, and soon rubs off with the carbon. But, on earlier Ford pistons the size numbers were stamped into the metal with steel stamps.

Editor Fordowner: I understand that the Ford starter, which they are using on all the late cars, has given the owners considerable trouble. Would like your opinion on the Ford starter.

While the salesmen, of other cars, will quite naturally start rumors that the Ford electric starter is not giving satisfaction—this being about the only part of the Ford that is not of proven utility—it has been our experience, from Ford users in general; that the Ford electric starter has given splendid satisfaction. It is not perfect, of course, but it is well designed and well made, and has given surprisingly little trouble, considering that both users and repairmen do not understand it now as well as they will later.

Editor Fordowner: While holding down the coil points, I got a shock! I tried it again—Just as soon as my arm would touch the car, and my fingers the coil vibrator springs, I would get a shock!

Is the coil box supposed to do that? Or is there a short-circuit? The wires are all good, and the wrapping isn't off, and there is no miss in the car. If there is a short, how shall I find it? I have looked all the wires over good.

It is quite the proper thing that one should get a shock, when touching the vibrators of the coil units. One side of the Ford magneto is grounded on the frame work of the car, so that the Ford wiring system is always "grounded," when in good order.

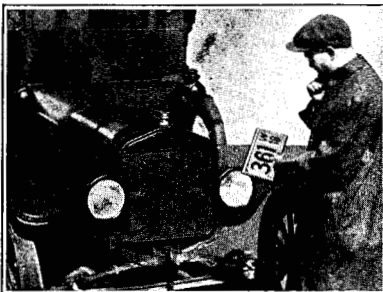
The shock that you get is due to the "self-inductance" of the primary windings of the coil unit. When the vibrator breaks the circuit, the sudden change, in the RATE OF FLOW of the current in the turns of wire, causes each turn of wire to INDUCE a flow of current in the ADJACENT coils of wires. This causes a MOMENTARY flow of high-voltage current which shocks you so. The condenser absorbs part, but not all, of this current.

Editor Fordowner: Could any one get a Ford piston wrong?

Is there any mark on the piston ring to distinguish the bottom from the top?

In spite of the fact that 3,000 years ago Moses and other sane, clear-thinking men laid down clear and concise rules for "Be good and you'll be happy" and these plain facts have been hammered into us by every-day life ever since—a few of us are "as the good Lord made us—but most of us are a darn sight worse!

In spite of the fact that for 3 long, war-weary years, the FORDOWNER magazine has been mentioning, in almost every issue or so, the fact that the Ford Motor Company has been making tapered piston rings, and that these piston rings must be installed "right-side-up-with-care"; there are only too many "know-it-all" repairmen who still do not know anything about these rings, and install them up-side down, just as often as not.



The DOTTL License Bracket DOES IT

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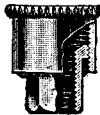


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No. 5675
Hub Cap.

The type R oil cup is used on the later models of Ford cars, to lubricate the spindles, furnished in rough steel finish only. The No. 70 oiler is used for the same purpose on the earlier models, furnished in nickel plated or dull brass finish. The No. 207 grease cup is used on the fan shaft; rough steel finish.

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The No. 5675 Hub Cap is more rugged and durable than the usual cap. Rough steel, nickel plated steel, or black enamel steel finish.

The No. 249 Grease Cup, No. 1 size, rough steel, nickel plated steel, or black enamel. Used on the universal joint housing of Ford cars.

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Ford piston rings are now stamped with the word "Ford" on the piston ring, and these rings should be installed on the piston with the edge bearing the word "Ford" towards the top.

Earlier Ford piston rings had a punch mark on the inside of the ring, about opposite the gap between the ends of the rings. The punch mark should be placed upward.

Editor Fordowner: Have a 1915 engine in one of my Fords which I would like to exchange for a new one. Please advise what to do, and how much difference I shall have to pay.

You can exchange your 1915 Ford engine and transmission complete, for a new Ford engine and transmission at an exchange price of \$175. As a rule, unless the car has been in a fire or a collision, or something of that sort, it is generally more economical to have the engine and transmission repaired. From \$75 to \$100 will cover the replacement of practically all WEARING parts of the engine and transmission.

With the WEARING parts replaced, then the engine and transmission are almost as good as new. The exception being that such non-wearing parts, as the crank case, may have become weakened through the fatigue of the metal in use, and may fail. Also, there is the possibility that these time-tried and time-tested parts may last as long, or longer, than the same parts of a new, untried engine.

If one is considering the installation of an electric starting and lighting system, then it will probably be desirable to make the exchange.

Much depends on the condition of the cylinder walls, as to whether or not a new engine should be purchased. If the cylinder block has NOT been rebored, we think it probable that an overhauling will be more profitable to you.

Editor Fordowner: Where a 1916 Ford starts unusually hard, would you advise installing a high-tension magneto?

If the hard starting is due to a weak Ford magneto, or other defect of the Ford ignition system, then the installation of a high-tension magneto will eliminate the trouble and give easier starting.

However, easy starting depends on the carburetor as well as on the ignition. And if the carburetor is not properly adjusted, even a high-tension magneto cannot give perfect—even though it may give better—results.

Try opening the carburetor dash adjustment for two or three FULL TURNS in cool weather, and then readjust the carburetor to normal running position, after the engine has been started.

The high-tension magneto is well worth considering for the greater smoothness, power and speed secured from the engine, and the greater freedom from adjustment troubles.

Editor Fordowner: Wish to build a trailer, to carry a yacht from one lake to another. This trailer to be of the four-wheel type, with regular Ford front axles and wheels, both front and back.

How much weight will these axles sustain?

One make of four-wheeled trailer, fitted with 30 by 3 inch Ford front wheels and tires, is of 1,000 pounds capacity.

Another make of four-wheeled trailer, fitted with 30 by 3½ inch tires, and Ford wheels and bearings and axles, is rated at 2,000 pounds carry capacity.

The Ford Sedan, electric starter type, fitted with 30 by 3½ inch tires, weighs 1,900 pounds, or about 2,700 pounds with passenger load. This gives an idea of how much load these wheels are supposed to carry.

The tire makers state that a 30 by 3 inch tire, inflated to 60 pounds, will carry a front wheel load of 500 pounds maximum. And that 30 by 3½ inch tires, inflated to 65 pounds, will carry a maximum load of 700 pounds. We believe that the Ford front axle, especially if fitted with the Timken roller bearings, which are now factory equipment on the Ford enclosed models and Ford Ton-Trucks, will carry all the load that the tires will carry. So you can count on a 2,000 pound yacht, on 30 by 3 inch tires, or a 3,000 pound yacht on 30 by 3½ inch tires—if you drive at a reasonable speed, on reasonable roads.

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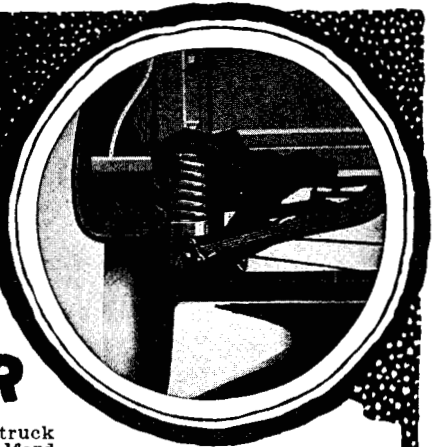
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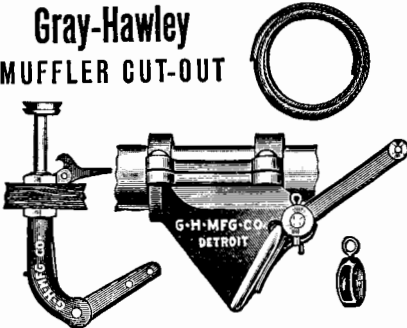


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Editor **Fordowner**: There are lots of your readers interested in aviation, and as they are of the class that do their own "tinkering," they would probably build their own aeroplanes and use Ford engines.

One Kansas man has constructed a pusher-type bi-plane, using a rebuilt Ford engine, and has flown over 2,200 hours. (At 60 miles an hour, this would equal 132,000 miles!)

There is a California company making a monoplane, flown with either a motorcycle, Ford or Chevrolet engine. I don't know any "dope" on this plane, as flown with a Ford engine, but it has been doing fine with a motorcycle engine.

We quite agree with you that the subject of Ford-engined aeroplanes would probably find more response among our readers than among the readers of any other publication. If any of our readers will send us information along these lines, we shall be glad to publish it, as being of general interest to our readers.

Editor **Fordowner**: Have a 1914 Ford, which makes a grinding sound, when placed in reverse gear or in low gear.

Much of the grinding noise, when in low gear or reverse, is due to worn bushings in the triple gears, Ford Part No. 3313. However, in the case of a 1914 Ford, other parts, such as the bushings of the transmission drums, will also be worn. We think it will be advisable to have the transmission overhauled also, the next time your engine needs an overhauling. The grinding noise is disagreeable, but does not necessarily indicate anything radically wrong.

Overhauling and rebushing a Ford transmission requires special tools and expensive reamers, and is not a feasible repair for the home mechanic, but the work should be done at a well-equipped Ford service station.

Editor **Fordowner**: The radius rods of my car are slack. I wish to know how to get them to the proper tension.

If too tight, I imagine that these rods would strain the rear axle. If too loose, it seems probable that the drive shaft housing might break.

Start the castle nuts, on the forward ends of the radius rods, and draw them down, until they begin to bear on the shoulders of the universal ball.

One can determine when they have been drawn down evenly, by the feel of the wrench. Line up the slots in the nuts with the cotter pin holes in the rods, and cotter pin the nuts in place. These are the front nuts.

Next, tighten the nuts, on the back of the shoulders, making sure that the lock washers are in place.

The drive shaft should then be turned, with the wheels off and the outer roller bearings removed. This will show whether the axle shafts turn true, with the hole in the housings. There should be an equal space all around, between the axle shaft and the sleeve.

Editor **Fordowner**: What amount of gasoline is required for a single explosion, considering conditions normal?

Just one drop of gasoline is required for each explosion.

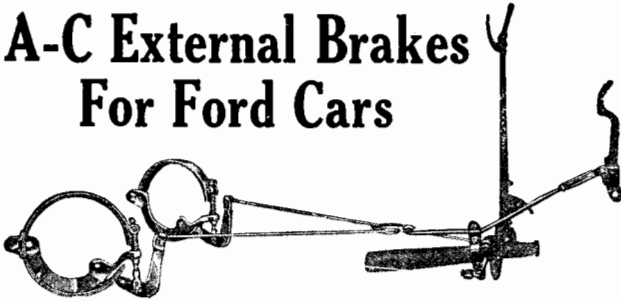
If gasoline ekeps going up in price, there is no doubt that we can "feed the Ford with a medicine dropper," thus dispensing with the carburetor, the gasoline tank and other superfluties.

Of course, drops are all sizes. We've seen Mother drop a stitch—and we've read of men who dropped ten stories. The Perimeter, circumference, and the periphery of the drop of gasoline vary—according to the size of the drop.

If the "Ask Me" Department were allowed to ask questions, we would exclaim, "Why in the deuce do you want to know?" If you just want to "show us up" why that's been done long ago, and we're still gathering up the remains.

Perhaps some of the carburetor manufacturers, who advertise in our magazine, will place a drop of standard-size gasoline on the end of a pin, and send it to us—so that we can see the point.

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With A-C Brakes, the braking power is delivered direct to the rear wheels, and there is no strain on the car. They stop the car without slipping, grinding or chattering. They incorporate the proper braking principle of larger cars and will double the life of your Ford. They are easy to install. The savings of A-C Brakes are big—the cost small.

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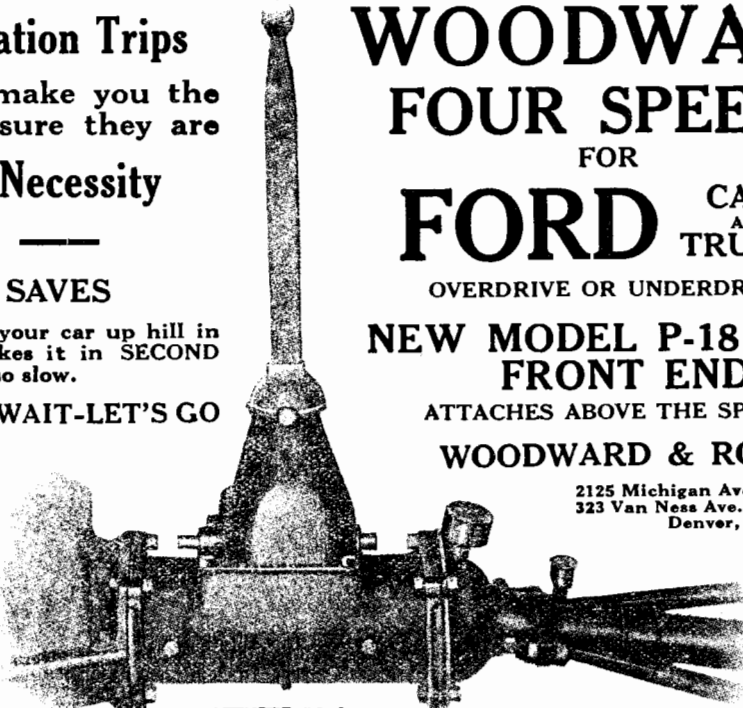
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Editor Fordowner: I can get a generator, such as is put out by a company making a lighting system for Fords. Can I run the lights direct from this—without using a battery? This would save me the trouble of taking care of a battery in the winter time.

If the generator, which you expect to purchase, was designed to be used in connection with a storage battery, it is quite probable that it will burn out the lights, if the storage battery is not used.

To charge a storage battery, a generator has to be wound to supply a considerably higher voltage than the rated voltage of the battery—and when the storage battery is connected, the battery absorbs this excess voltage very nirely and acts as an effective regulator.

Without the storage battery, the brilliancy of the headlights will vary, much as they do on the Ford magneto. Without the battery the lights cannot be used when the engine is stopped.

While there are some generators which include regulating devices, enabling the generator to be used without a storage battery, these are not in such general use.

Editor Fordowner: Is it necessary to use a new cylinder head gasket, every time that the carbon is removed?

How many times can a gasket be used, on the average, when it is removed without being injured, new grease being put on the gasket each time.

What makes the gasket play out—the heat, or the screwing down of the bolts?

As only the narrow edge of the cylinder head gasket is exposed to the heat of the cylinders, and as the rest of the gasket is adequately cooled by being in intimate contact with the water-cooled cylinder block and cylinder head, we can safely assert that neither the copper or brass or the asbestos of the basket is affected by the moderate heat to which the gasket is subjected.

Now, this proves that it is the "squeezing-down" and the "hardening" of gaskets that eventually makes them worthless. If, when the gasket is new, the gaskets are not squeezed down too hard—but just enough to prevent leakage, then these gaskets should last for a long time, before necessitating replacement.

While we have known of the same gaskets to give good service for three years or more in the hands of skillful repairmen; we would say that about one year, is a fair average life for a cylinder head gasket. This will probably mean about 4 to 6 replacements of the cylinder head, for one cause or another—mostly carbon renewal.

Some Ford repairshops install a new cylinder head gasket every time the cylinder head is replaced. From their point of view, they have two good reasons—one is that they make their own 25 per cent profit, on the sale of the new gasket installed.

The other reason is that, when the old gasket is replaced, it is necessary to tighten the bolts more carefully and evenly, than if a new gasket is used. Also, it is necessary to clean off the old gasket, and this takes a few minutes, while a new gasket is already cleaned.

There are also some bungling repairmen who have not the skill to put on an old gasket and get it leak-proof—without unduly tightening the cylinder head bolts.

This gasket replacing shows up an important defect, from the customer's point of view, of the Ford plan of Flat Rate Charges for Repairs. There is always the inducement to the repairman to install the extra new parts, on which he makes a profit; and to save time, at the expense of the customer. So it pays to go to an honest, intelligent repairman—who has the customer's, as well as his own, interests at heart.

Editor Fordowner: In the November Fordowner it is stated that Dodge valves could be used in the Ford by reaming out the ports, with a Ford valve reamer, and then using a Dodge reseating tool. Is this practical for a roadster and touring car? So that they will throttle down slowly, and pull well?

Will the regular manifold and carburetor work well, when the Dodge valves are used. Or

does it take a larger carburetor to take care of the larger valve opening.

The stunt of enlarging the valve ports, always involves the risk of cutting through the cylinder block into the water jackets, and ruining the cylinder block. We do not recommend this practice, for the regular Ford roadster or touring cars. Speedsters are different, and those who build them are usually willing to "take a chance" on the risk of spilling parts, in order to secure more power and speed.

Changing the valve sizes will have practically no effect on the ability to throttle down well to a low speed—provided that the larger valves fit equally well and there are no air leaks.

Changing the valves only, helps some; but the full results are only obtained by the use of a larger manifold and larger carburetor also.

Editor Fordowner: Have a 1914 Ford, which has a bad piston slap, in the third cylinder. When I short-circuit the third spark plug, no slap is heard. Would it be cheaper and more satisfactory to have the block rebored, or to get a new cylinder block?

I installed .0025 inch oversize piston, but this did very good. This was the largest piston that I could put in.

We have a sneaking suspicion that the "piston slap" of the third cylinder is, in reality, due to a sprung connecting rod. The fact that a .0025 inch oversize piston was the largest that you could get in, and that this only effected a partial cure, is strong confirmation of this idea.

Pistons often have from .008 to .010 inch clearance, yet without piston slaps—when the connecting rods are perfectly true.

Instead of the expense of a new cylinder block, or of reboring, we suggest that you first try lapping in a .005 inch oversize piston, and, have the connecting rod tested and straightened, in a connecting rod alignment jig, at some Ford agency.

Instead of purchasing a new block, have the old one rebored—there is no use throwing money away.

Editor Fordowner: Want a speedster, with a maintained speed of 35 to 45 miles an hour, with bursts of speed up to 65 miles an hour.

Will use 16-valve head.

Have my choice of using light-weight pistons and aluminum connecting rods—Without counter balances. Or of light-weight pistons, factory-trimmed connecting rods—and counter balances.

Would a five-inch drop in the chassis be sufficient?

What gear ratio should be used in this case?

As the aluminum connecting rods are more bulky than the steel connecting rods used in the Ford; counter balances cannot be used with the aluminum connecting rods. As the steel Ford connecting rods are well designed, and are strong and reliable, not nearly as much is gained by attempting to lighten the Ford connecting rods, as by the use of light-weight pistons.

A five-inch drop in the chassis is about right for general road use, as a larger drop hardly affords sufficient clearance for anything except board tracks or boulevards.

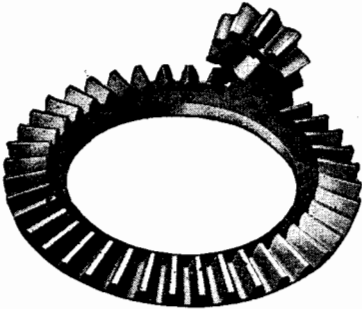
Use either a 3-to-1, or else the standard Ford gear ratio. The 16-valve heads will give such high engine revolutions that you will get plenty of road speed, with the standard ratio gears. . . .

Editor Fordowner: As a close student of your answers and as a mechanic of 30 years' experience and old enough to be your dad as well, I am going to call on you for a lecture on what I consider the weak point of the Ford motor, namely, the ignition system.

Why does the Ford Motor Company continue to use a four-coil, vibrating system, with a timer that would make a preacher swear, when other cars are equipped with non-vibrating coils, and a high-tension distributor?

Why is it that a Ford owner is unable to buy an alternating current volt-meter, at a reasonable price, that will register from zero to 30 volts, so that the magneto can be tested at

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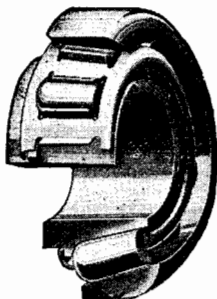
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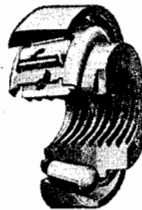
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CHICAGO

cranking speeds, at which we have the most trouble"

If you had asked me something easy like "Why Women Sin" or "Why Men Fall in Love," I might have been able to give an answer as sensible as the question. But, to explain why a great big company, like the Ford Motor Company, does so-and-so, is rather extremely difficult. As a matter of fact, I often have the very Dickens of a time—explaining to friends and enemies—why I do so, myself. And that's only me.

In puzzle-guessing why the Ford Motor Company does this-and-that, it is necessary to assume what the writer guesses to be the underlying motives of the Ford Motor Company. The greatest good to the greatest number, is the big ideal.

But, common sense tells us that a poor idealist cannot do much good, in a matter-of-fact world. And the Ford Motor Company is as practical as a dollar. Therefore, the Ford Motor Company desires to make money—incidentally, and as the reward of service.

The greatest good of the greatest number decides that "reliability" is a fundamental necessity. If one coil unit goes wrong, the other three will function, and the car will proceed on three cylinders. When the Ford ignition system was designed; high-tension distributors, as then known, were unreliable, and the Ford ignition system was the cheapest and most reliable then known.

When one considers that the Ford magneto supplies currents to the ignition, headlights, and horn it is still the cheapest, as compared to the cost of a high-tension magneto, direct current generator, and storage battery, which would otherwise be necessary—even though the use of these details of equipment might produce a somewhat more luxurious car.

Editor **Fordowner**: Have a 1915 Ford with piston slap. Have put in .0025 inch oversize pistons and rings, about a year ago. Now they are noisy again. It has good power. I don't like the noise. No. 2 piston is most worn.

What is the next size piston that I must use?

How are pistons lapped in?

After installing .0025 inch oversize pistons, the next size to install is the .005 inch oversize. These .005 inch oversize pistons are no longer supplied by the Ford Motor Company, as there was not so much demand for them; but you can obtain them from one of the piston manufacturers, who advertise in the *Fordowner* magazine.

When installing these new pistons, we think that you might find it worth while to lap-in a set of light-weight pistons; instead of using the regular, heavy ones.

To lap in the new pistons, use the OLD pistons as the lapping tool, smearing FINE valve grinding compound over the old piston, and rubbing the old piston up-and-down, and round-and-round, at the same time.

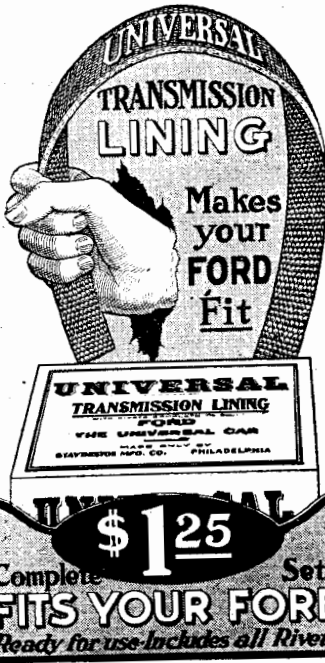
Place the cylinder block on the floor, or on a low box. Turn the piston upside down, and grasp the piston pin with your fist. Or if your fist is too big, leave the connecting rod on, and use that as an extension handle. Shove the piston down through the bottom, so that there is no shoulder at the bottom of the cylinder walls. Finish lightly with the new piston.

Editor **Fordowner**: Am having trouble with the rear axle of 1917 Ford. The left wheel, when tight on the axle shaft, fits too closely to the housing. And the brake shoe and the bolt and perch bolt, grind against the heads of the bolts holding the brake drum to the wheel.

Had housing straightened, and the differential overhauled, by a Ford mechanic, but the trouble still persists.

If, at any time, the rear wheel has been a wee bit loose on the axle shaft; this may have caused wear, on either, or on both, the end of the axle shaft, or the hub of the wheel.

Wear, on the end of the axle shaft or in the hub of the wheel, will allow the rear wheel to slide so far onto the tapered end of the axle shaft, that the bolts holding the brake drum



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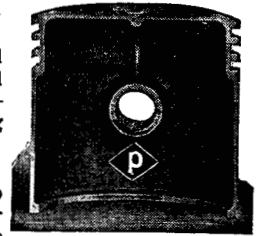
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Designed to Fill Your Want for a Strictly Quality Piston

Made from highest quality semi-steel castings. Each weighs 1¼ pounds less than the regular piston. Accurately machined and ground—balanced within ¼ ounce—fitted with three rings and hardened and ground piston pin—the best and most practical piston for Ford that automobile engineering knowledge has ever produced.



Higher Speed—Quicker Acceleration—No Engine Vibration—Less Wear on Motor Bearings—Lower Operation and Upkeep Cost.

\$14.00 Less Rings **SET OF FOUR** Complete **\$16.00**

Sizes: Standard, +.0025, +.005, +.031, +.033, +.062

The Perfection Auto Parts Company

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CLEVELAND, OHIO

When writing advertisers—Just say FORDOWNER



Your tire is all right. All it needs is air! Get a Schrader Gauge and when it tells you that your tires are too soft — use your pump!

Å. Schrader's Son.

Brooklyn, N.Y.

will grind against the spring perch bolt and the hub brake bolt.

But there is a steel shim for the rear axle shaft taper, that is just exactly what you need. This will hold the wheel farther out, and will prevent the striking and the interference of the parts.

Of course, if you will replace the axle shaft, and the wheel hub, this will restore conditions to normal, and eliminate the trouble. But, you can obtain practically the same result, at a small fraction of the cost of materials and time and trouble, by using the steel shim.

Worn thrust washers, by allowing the axle shafts to shift back and forth in the axle housings, sometimes contribute to this trouble. But, no doubt, these thrust washers were replaced, when the rear axle was overhauled.

Editor Fordowner: Most of us "old birds" never ask that question, "Why Women Sin" or "Why Men Fall in Love." We know; but never mind that, son, it will all be clear to you when you have reached my age. (Why do I have to wait?) Ed. Note.

How nice it would be if, when the engine had refused to start, one could hook a volt-meter to the magneto and coil terminal, crank the engine and, if it would show say 6 volts, we could say "There, darn you, we don't have to look for trouble in the magneto."

We know what the voltage should be, when running at a moderate speed, because the testing instrument tells us. But, ask any service station man what the voltage should be at cranking speeds, and see how few can answer that question. Have tried it many times, without securing the desired information. I now have a low-reading, alternating-current volt-meter, and hold up every Ford that passes my house.

It is the use of the 4 vibrating coils, the miserable timer, and the location of the timer, that I do not like. There are 4 vibrators to watch so that the spark will be uniform and the timer to be kept clean and smooth. "Take it from me" — it is no small job to keep the engine purring on all four, all of the time.

The distributor, that I have made, has been in use for 6,000 miles and the coil point has been adjusted but once. Am averaging 23 miles per gallon for the season, and do not have carbon trouble or dirty spark plugs. To determine if it is running all right, if it will run at the rate of 6 or 7 miles an hour I am satisfied. Am using a special manifold, and take moist air from the overflow pipe of the radiator, and am not troubled with overheating.

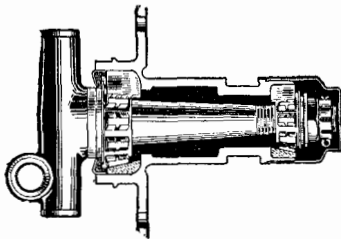
If I can secure a non-vibrating coil, I can make an ignition system that will sell for less than the Ford.

I take it, from your letter, that you are a fisherman (most good fellows are). So some day, when we can forget work, I will meet you half way, say Lauderdale, and after a day of good sport, we will light our old pipes and chew it over, around the old camp fire.

"Cranking speeds" depend upon the stiffness of the engine, and the strength of the "Armstrong" starter, but about 75 revolutions per minute is a fair average. At such speeds, a voltage of from 6 to 8 volts should be available. But, the voltage is not a certain or positive way of making the test, as there might be dirt under the magneto contact terminal, or a loose connection in the windings of the magneto coil assembly. This might allow the voltage to pass, and yet offer resistance to the free flow of sufficient current to operate the coil units satisfactorily.

As to the Ford timer, these are made in many varieties, and some give splendid results in actual use. As to the timer location, special brackets are made for elevating the timer, where it can be much more easily kept clean and smooth.

On account of the alternating current, furnished by the Ford magneto, you cannot easily use a non-vibrator coil. At the instant of REVERSAL of current flow, which occurs sixteen times for every revolution of the Ford engine, there is no current at all, and the non-vibrating coil would miss fire. If the interruption of the circuit occurred at such a time,



TROJAN Roller Bearings

The Best for

Ford Front Wheels

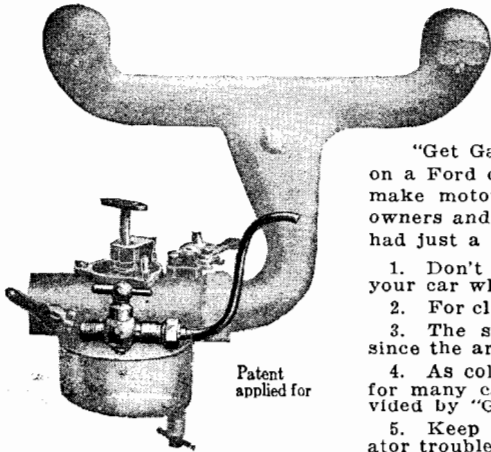
The Trojan Roller Bearing for front wheels will eliminate all bearing trouble.

Gives easier steering and longer life to tires by holding wheels in proper alignment.

Write us for particulars.

Ahlberg Bearing Company

317 E. 29th St., Chicago, Ill.



GET GAS!

"Get Gas" is an absolute luxury and not a necessity on a Ford car, but it is one of the things which help to make motoring a comfort and a pleasure. How many owners and drivers of a Ford car have wished that they had just a little gasoline?

1. Don't spoil clothes and temper crawling beneath your car when a small amount of gasoline is needed.
2. For cleaning the hands after working on the engine.
3. The sooty spark plugs can be cleaned in a jiffy since the arrival of "Get Gas."
4. As cold weather makes priming almost a necessity for many car owners, an easy and quick means is provided by "Get Gas" for filling the squirt can.
5. Keep the fan belt dry and clean. Half your radiator troubles arise from a slipping fan belt. A few drops

of gasoline easily obtained may save a lot of trouble. Keep the oil pan clean—"Get Gas" Gets The Habit.

6. For Patching the inner tube or repairing the casing.
7. A positive insurance against leaking carburetors. Lessens risks from fires, etc.
8. Any Ford car owner using the Holly carburetor can, without special tools of any kind, install this appliance in five minutes. A never failing convenience which you would not be without for ten times what it costs.

The price is \$1.50 post paid to any part of the United States.

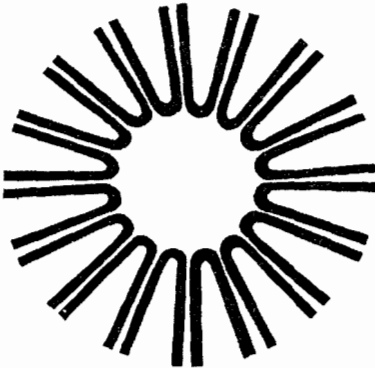
AGENTS WANTED

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Sold by MONTGOMERY & CO., Inc. Tools, Files
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The Simmons Super Magnet FOR FORD CARS



Too little importance is placed upon the functioning of the Magnets in your magneto, and yet upon those little Magnets depend the energy that you must expend in cranking your car.

The present type of Ford Magnet after being magnetized, will lift a piece of metal from five to six pounds. The Simmons Super Magnet, made of special analysis Magnet Steel, and magnetized by our own process, will lift, and continue to lift, a piece of metal weighing at least 12½ pounds.

In general, the stronger the magnet the greater will be the resulting electrical out put, but this ratio is not a direct one. What actually occurs is that the pull exerted by a magnet will vary as the square of its flux. Consequently when the pull is increased in the ratio of 2 to 1, which is the case in the ratio of the pull exerted by the Simmons Super Magnet to the pull exerted by the ordinary Ford Magnet, the necessary flux increase will be in the ratio of 1.414 to 1., or approximately a 40% increase. This 40% increase in effective power of spark will make your car approximately 40% easier to crank.

The amount of energy or heat in a spark, will produce a much more noticeable effect in case a poor grade of oil or gas is used. It is generally known that the quality of gasoline which is being sold to the consumer today, is of very inferior quality to that sold to them a few years back. This therefore, makes it all the more necessary that your car be equipped with a set of Simmons Super Magnets.

These Magnets are identical in design and size with Ford Magnets and are guaranteed to be absolutely interchangeable.

A real addition to your car.

List Price \$9.00

Per Set of 16 Magnets

Manufactured by

The Simmons Manufacturing Co. 3405-11 PERKINS AVE.
CLEVELAND, OHIO



--- tested, tried, STANDARD.

Every set is sold with the distinct understanding that a *power increase of 25 to 65% be effected or money back.*

If you are thinking about "trading in" your old car because it has lost its original power, write for our proposition.

Keys Piston Ring Co.
3014 Olive St. St. Louis, Mo.

Lightford



Like the regular Ford but **ONE POUND LIGHTER**

Every Measurement and Detail **GUARANTEED CORRECT**

Three 1/4 in. lap joint rings.
Bronze pin bushings.

Lightfords increase speed and acceleration decrease vibration and wear **25%**

List **\$3.50 each**
Standard and Oversize

THE G. H. DYER CO., Cambridge, Mass.

Editor **Fordowner**: Am thinking of drilling 3 or 4 small holes at equal distance apart, around the piston, and tapping these holes for small set screws, with lock nut. These screws to set up against the piston ring. Would this stop "piston slap."

Will it cause the scoring of the cylinders, or breakage of the piston rings?

With wide open throttle the pressure, on the top of the piston, may rise as high as 400 or 500 pounds per square inch. The 3 3/4 inch diameter Ford piston has an area of about 12 1/2 square inches, giving a maximum pressure of possibly 3 TONS on the piston.

Supposing the angularity of the connecting rod to make the side thrust on the cylinder walls 1/2 that of the pressure on the top of the piston. This gives a TON pressure, which is a whole lot for a little set-screw to sustain.

The limited area, of pressure, of the piston ring against the cylinder wall would, in all probability, cause the scoring of the cylinder walls and the rapid wear and breakage of the piston ring. The only feasible remedy we know of, for piston slap, is to replace with oversize pistons, which fit correctly.

Editor **Fordowner**: Will the so-called, piston ring expanders be all right to use on my Fordson Tractor?

Will they keep their strength?

Will they harm the tractor, by being too stiff, at first?

Piston ring expanders chiefly tend to equalize the pressure of the piston rings against the cylinder walls, making the pressure of the ends of the rings more nearly equal to that at the sides. So that all the pressure they can add will probably have no appreciable effect on the wear of the piston rings or cylinder walls.

Of course, if these expanders are so poorly designed that they fill up all the space, between the inside of the piston ring, and the bottom of the groove in the piston, then the ring may be jammed against the cylinder walls, and may cut and score the cylinder walls. But this can be easily tested, by pressing down the ring, when the piston is out of the cylinders. If the ring can be pressed down, below the surface of the piston at all points on its circumference, no damage is apt to result.

As these piston ring expanders have put a limited motion, there is no reason why they should not retain the same strength almost indefinitely.

Editor **Fordowner**: I came across your magazine in an accessory store in Melbourne, Australia and purchased the copy—3 months old—for 2-6, equal to 60 cents! Some profiteering Your magazine is splendid, and being an enthusiastic Ford owner. I enjoyed reading even the advertisements. There are several accessories that I would like to secure at double the price—if they were only procurable.

My Ford is painted black, with a local-made body, inferior to the Ford make, which cost me 250 pounds, or, roughly, \$1,250.00. Petrol (our name for gasoline) of very poor quality, costs \$4 cents a gallon.

What is the Canadian price of a double-seater Ford, standard model?

Are the Canadian Ford chassis, that we get in Australia, made wholly in Canada?

The engine number on my car is C134445. Can you tell me when it was made?

We are glad that we have been able to put enough value into our magazine to make both you and the accessory dealer value it at 60 cents, and we hope to put even more value into future issues.

The Canadian price of the Ford touring car, f. o. b. Ford, Ontario, is \$600, plus \$56.93 war tax. Touring car, equipped with starter, is \$700, plus \$65.18 war tax, f. o. b. Ford, Ontario, Dominion of Canada. These prices prevail all over Canada.

The Canadian Ford is manufactured at the Ford Plant at Ford, Ontario, Canada, and is not merely assembled there.

Motor number C134445 was manufactured at the Canadian Ford Plant on November 7, 1917, and shipped for export to Australia on November 9, 1917.

SUNDERMAN

Vacuum Carburetor

ECONOMY FIRST—that's what the Sunderman Carburetor gives—a sure saving of 30 to 50 percent of the gasoline it takes to run your car.

In addition, the Sunderman Carburetor gives a roaring burst of **power** that is worth many times its purchase price in satisfaction to the man who owns the car.

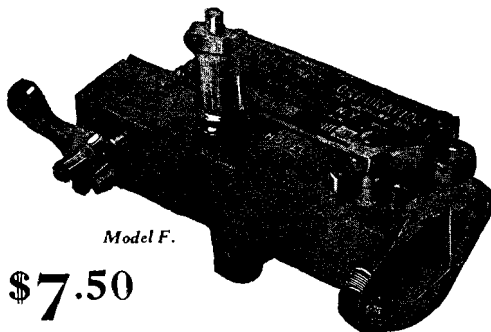
Speed, if you want it: acceleration, flexibility, rapid pick-up, economical idling, low throttling, great hill-climbing ability—Model F (illustrated) gives all these things as good measure.

The owner of a Ford equipped with a Sunderman Carburetor need never cloye on anyone's dust. It saves your gasoline, gives you more **power** and **speed** at the same time, and the **flexibility** it imparts to the Ford motor places it far in front of all competition.

Ford owners will be wise in trying out this carburetor immediately. Order one today.

Dealers, here's a tremendous market for you. Write us now and begin to get the profits.

The dealer who makes the most money is the one who serves his trade best.



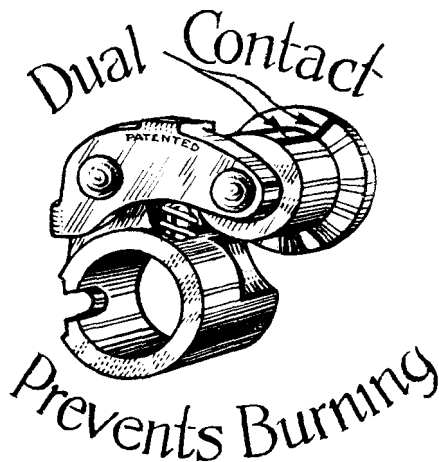
Model F.

\$7.50

Sunderman Corporation, Newburgh, N. Y.

FORD TIMER PROBLEM SOLVED

Eliminate the Greatest Source of FORD Trouble by Installing a
RUSH DUAL CONTACT TIMER ROLLER



POSITIVELY GUARANTEED TO

1. Keep the track in a new timer case smooth.
2. Smooth the track in a rough discarded timer case.
3. Work perfectly in a timer case so badly worn as to be worthless with any other roller.
4. Facilitate starting.
5. Produce accurate firing.
6. Prevent gum forming on the roller or the track.
7. Increase gasoline mileage.
8. Prevent engine skipping.
9. Run in cup grease and eliminate oiling.
10. Give from five to ten times as much service as any other Roller and save nine-tenths of the trouble.
11. To work equally well on Ford pleasure cars, Trucks, and Fordson Tractors.

The RUSH Timer Roller is scientifically constructed of the best materials obtainable, and will give satisfactory service indefinitely.

SOLD UNDER A GUARANTEE OF EFFICIENCY AND SATISFACTION SO ABSOLUTE THAT WE WILL REFUND THE PURCHASE PRICE AFTER 5,000 MILES OF USE, IF DESIRED

If your dealer cannot supply you, send us his name, and \$1.50, and we will forward direct.

W. S. RUSH & CO.

108 North Daly Street
LOS ANGELES, CAL.

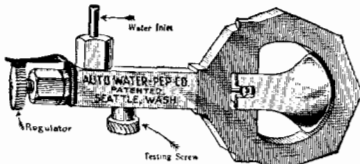
DEALERS:—A worth-while proposition will be sent to responsible dealers upon request.

It's the Water

The *Automatic Water Vaporizer*, automatically, accurately and positively supplies moisture to your engine in just the desired amount to give it the highest efficiency. This moisture eliminates all carbon deposits and keeps your engine clean, aids lubrication and saves 20% to 30% gasoline. Thousands in use. Sold only on money back guarantee. Easily installed. Made for all makes of autos, trucks, tractors and launches. Send for literature. Agents wanted.

FORD SPECIAL \$12.00

Sent prepaid on receipt of price, accompanied by our money back guarantee.



AutoWater-Pep Co.
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Don't Let Your Radiator Freeze Use "Anti-Freeze"

A chemical preparation affording protection against freezing of automobile radiators.

Will protect automobile radiators from freezing at a temperature as low as fifty degrees below zero.

Contains no strong alkalis, acids or oils. Will not injure the radiator, engine or hose couplings and connections.

Boiling point 240 degrees Fahrenheit. Specific gravity 26 Baume.

Will last an entire season provided you have no leaky connections, such as hose couplings, etc. "Anti Freeze" is non-inflammable and will not ignite or explode.

COMPLETE FORMULA FOR \$1.00.

Purchase chemicals at your drug store at small cost. Used by U. S. Government in their automobiles and trucks. Satisfaction guaranteed or money refunded.

Don't delay, it's freezing now.

NEW WAY LABORATORIES,
Box 223, Wapakoneta, Ohio.

Editor **Fordowner**: I live 20 miles from the city. Suppose that:

First: I got to town today in my Ford, and take 2 hours for the trip, or at the rate of 10 miles per hour.

Second: Suppose I go to town tomorrow in one hour, or at the rate of 20 miles an hour.

Now, which trip, if either, would consume the most gasoline?

I contend that as the piston, of the cylinder be no difference. How about it? ?

Every **INDIVIDUAL** Ford has its own most "economical" speed, at which it will run most-miles-per-gallon. This speed depends on many factors, including carburetor adjustment, mechanical and electrical condition of the engine, the skill of the driver, the adjustment of the transmission bands, and so on—almost indefinitely. This "economical" speed can only be determined by making a number of careful tests.

We should "guess" the "economical" most-miles-per-gallon speed of the average Ford to be around 20 miles an hour. Though this may vary for each and every individual Ford car in America. This is about the "happy-medium" for an "all-day-long" speed, at which the Ford excels.

It takes gasoline to make energy, and it is energy that propels the Ford. The less energy, for a given distance, the greater the fuel efficiency.

There is also an "economical" speed for foot-traveling. The writer gets "tired-out" if compelled to mosey along for 2 miles, at the rate of one-mile-an-hour. Also, **RUNNING** for 2 miles is terrible exhausting—and I wouldn't do it for anyone but a great, big policeman. But, there is a "happy-medium" of walking speed of say 3 or 4 miles an hour, at which I can walk 2 miles very easily, and with great conservation of energy.

Editor **Fordowner**: Do you advise the use of kerosene in the radiator, to prevent freezing? If so, in what proportions?

As kerosene and water will not mix—the kerosene simply floating on top of the water—it must be an "all-or-none" solution, when kerosene is used.

As kerosene only conducts the heat half as well as water, the engine is apt to overheat and knock, unless the weather is very cold; say at an average of 20 degrees above zero, or lower.

At temperatures above 20 degrees, the kerosene boils and gives off inflammable, smelly fumes, and the engine knocks—and this causes extra wear of the engine bearings.

Also, one should not use a radiator or hood cover, when kerosene is used, and the engine must always be kept as cold as possible. This tends to make it more difficult to start the engine.

If the weather is very cold, kerosene is a cheap anti-freeze, but it makes starting more difficult. When alcohol does not cost more than a dollar a gallon, many car owners prefer it.

Editor **Fordowner**: Have a 1916 Ford, in Parcel Post service. Have made some 32,000 miles, with possibly some 220,000 stops and starts.

On a cold morning, I cannot turn the motor over. When I pull real hard on the starting crank, the car has a tendency to move ahead. I jack up the rear wheel, and the engine spins easily, and starts right off.

But, when I put on the emergency brake, to stop the spinning rear wheel; it kills the motor, as if the clutch were engaged. After several trials, I usually get the car going. I tried hot oil, to warm the motor, poured in a half gallon, with the same success.

Evidently, the high-speed clutch is not disengaging as freely as it should. This may be due to the drag, due to cold, congealed oil; between the discs of the high-speed clutch.

We think that the use of a different kind of oil, during the winter, will do much to eliminate this trouble. You need an oil that flows freely at low temperature, and that does not gum and thicken when cold.

The 25 discs, of the high-speed clutch, only separate a few thousands of an inch, between discs, when the clutch is disengaged. And the

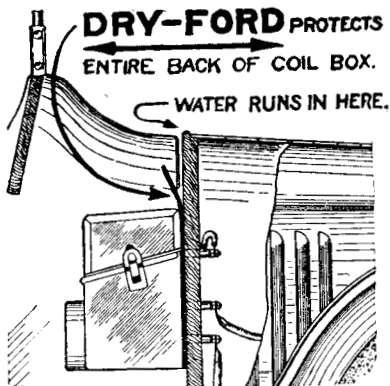
DRY-FORD

TRADE MARK

PAT. APPL'D FOR

A RUBBER PROTECTOR

Makes Fords Waterproof. Is Never Taken Off And Ends All Water Troubles Forever. Price 75c.

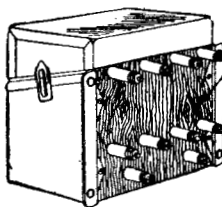


DRY-FORD PROTECTS
ENTIRE BACK OF COIL BOX.

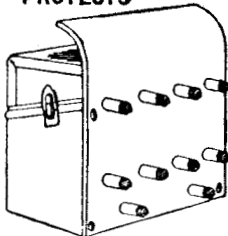
WATER RUNS IN HERE.

Small, efficient, easily attached, it is never taken off and is not in sight.

WOOD GETTING WET
PREVENTS SPARK



DRY-FORD PROTECTS



JOBBERS-DEALERS-FORDAGENTS

Here is a live one. Thousands have been sold. Liberal discounts. Sent prepaid to car owners for 85c.

Peter Gray & Sons, Inc.

Sole Manufacturers

287 Third St.

East Cambridge, Mass.

THE SIMMONS TAPER ROLLER THRUST

FOR FORD AND CHEVROLET CARS

PREVENTS REAR AXLE TROUBLES AND EXPENSE

A pair of Simmons Taper Roller Thrust plates makes the rear axle entirely roller bearing—roller thrusts on both sides of differential—thereby eliminating practically all rear axle trouble—a radical improvement over the regular Ford type of plain flat brass-to-steel bearing.



(Patent Applied for)

The present Ford type of brass-to-steel bearing wears rapidly, even under favorable conditions, causing "misalignment" and rapid wear of gears.

The Simmons Taper Roller thrust has one hundred times more real bearing surface than any BALL thrust now on the market, and is used on both sides of the differential case. The entire differential is thereby protected from gear and end thrusts.

The construction of the Simmons Taper Roller Thrust is such that if the differential case sags or drops down, bearing contact is still maintained, because of the special construction of the retainer plate. Protection must be given to gears from both sides of the differential case, which is subjected to extremely heavy strain when the car makes a sharp turn.

Your dealer or repair man recognizes this as the only proper type of thrust bearing. If your dealer or jobber cannot supply you, write us.

Price \$3.50 per set of two \$5 in Canada

Sold in Complete Sets Only

Mr. Jobber—Dealer—Repairman: NOW is the time to place an order for a stock of Simmons Taper Roller Thrusts.

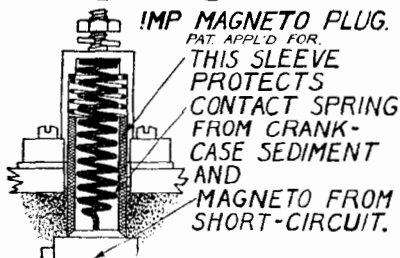
Ready for immediate delivery.

Manufactured by

THE SIMMONS MANUFACTURING COMPANY
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Stop Magneto Troubles on Your Ford Forever With An Imp Magneto Plug



Money returned if you are not satisfied after 30 days' use.

Price 65c — In Canada \$1.00

The above cut shows the vital point of the Ford ignition system absolutely protected against all lint and sediment by the safety sleeve of the "IMP."

The "IMP" eliminates short-circuits; insures perfect ignition; makes cranking easy and prevents a dead magneto.

If your jobber or dealer can't supply you, write us.

Manufactured by

The Improved Motor Accessories Co.

3405-11 Perkins Ave., Cleveland, Ohio.

oil can easily cause a heavy drag—enough to stall the engine, when it is first starting.

It is also possible that the end of the clutch lever screw, which rests on the speed lever quadrant, has become worn, and so does not fully disengage the high-speed clutch, when the emergency brake lever is pulled back. Try tightening this screw a little, so as to disengage the high-speed clutch more completely.

Editor Fordowner: On page 50 of the May, 1919 Fordowner, you suggested the possibility of devising a rear main bearing cap, made adjustable to take up end play. This article stated that, to adjust the rear main bearing cap, the bolts would have to be loosened, and the article seemed to infer that to loosen the rear main bearing bolts was not possible, and dropped the matter right there.

I do not claim to be a mechanic, but only a "bug" on automobiles, as it is a hobby with me to tinker with them (that's what my neighbors call it). But, I have taken the rear main bearing cap off, dressed it down with a file, and replaced the main bearing cap, though the lower crank case cover door. It is about a three-hour job, to tighten the rear main bearing of a Ford. I have read many auto magazines, but they all say that to tighten the rear main bearing it is necessary to take the engine out of the car. If the two bolts, which hold the front bearing, had nuts on both ends, then that bearing could also be removed very easily, and taken up.

As you state, every auto magazine states that it is necessary to remove the engine and transmission from the car, in order to adjust the rear main bearing.

ALSO! The OFFICIAL statement of the Ford Motor Company is as follows: "It is necessary to remove the motor to do any work on the rear line bearing." Now! Don't you feel squelched!

In spite of the thunders—of all this heavy artillery—you have spilled-the-beans. And, though the vast majority of Ford repairmen do not know it, **THE REAR MAIN BEARING CAN BE TIGHTENED WITHOUT REMOVING THE ENGINE.**

However, it is a mean, difficult job. And, when the writer has it to do—he is always so busy that he lets George-do-it.

Now, we know one way of doing it—but you may know another. And, for the good of the sport, we suggest that you write and tell us how you do the work; telling, in a general way, the method of procedure, and which bolts you remove, and what tools you use. Rough sketches will help. Let's hear from you soon.

WIRE WHEELS

HOUSE
QUICK CHANGE

FOR FORDS

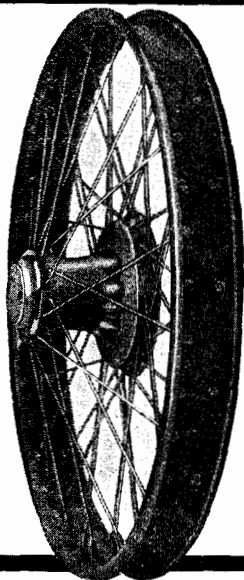
List price for set of 5 wire wheels, 4 inner hubs, 4 hub caps, hub cap wrench, spoke nipple wrench, one hub dust cover for spare wheel. White, black, red. Colors optional.

\$70

WIRE WHEEL CORP.
OF AMERICA

(Successor to Houk Mfg. Co.)

1700 Elmwood Ave.
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Direct Factory Branches and Service Stations:
New York, 835 11th Ave., at 57th St. Detroit, 11 Leland St.
Philadelphia, 328 N. Broad St. Los Angeles, 1216 S. Grand Ave.
Chicago, 23rd St. and Indiana Ave. San Francisco, 1690 Pine St.

Exclusive Canadian Representatives:

DUNLOP TIRE & RUBBER GOODS CO., Toronto

A LAY TO THE FORDSON TRACTOR.

The Fordson on the farm arose
Before the dawn, at four,
It drove the cows, it washed the clothes
And finished all the chores.
Then forth it went into the field
Just at the break of day.
It reaped and threshed the golden yield
And hauled it all away.

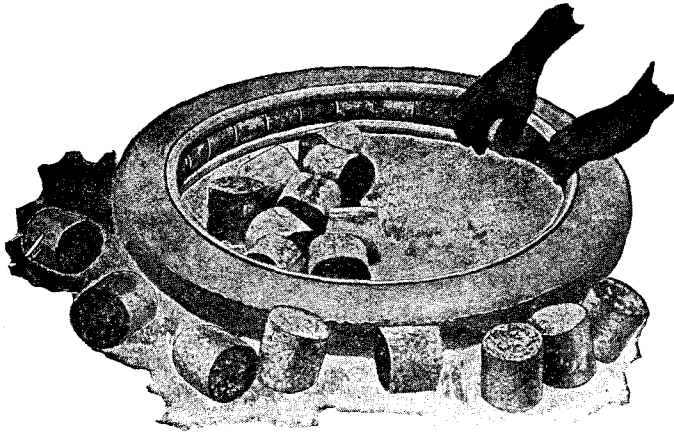
It plowed the field that forenoon
And, when the job was through
Hummed a pleasant little tune
While it churned the butter, too.
Then it pumped the water for the stock
And ground a crib of corn
And hauled the baby round the block
To still its cries forlorn.

Thus ran the busy hours away
By many a labor blest,
And yet, when fell the twilight grey,
Our "Hero" had not rest
For while the farmer, peaceful-eyed
Read by the tungsten's glow
The patient Fordson stood outside
And ran the dynamo.

—Darlington, Wis., Journal.

When writing advertisers—Just say FORDOWNER

ENDS YOUR TIRE TROUBLE FOREVER



It brings new happiness and releases you from the horrors of expected tire trouble. Think of the joy of riding along without the eternal fear of a puncture or blow-out. Think of getting from 10,000 to 20,000 miles out of every tire—no vulcanizing, no patching, no repairing of any kind—just real good old pleasure riding. Do away with your inner tube and the many troubles caused by its use forever by installing in your tires this wonderful and economical

National Rubber Tirefiller

National Rubber Tirefiller is made of the best grade of rubber, cut in small particles, treated, molded and vulcanized by our special steam process, in sizes to fit all standard makes of tires. It is laid in your tires and not melted and poured in. It gives the same pressure as the well inflated air-filled tire and has all of its good riding qualities with none of its faults. Can be transferred from one tire to another. Will not freeze, melt or harden—fully guaranteed against deterioration in any form.

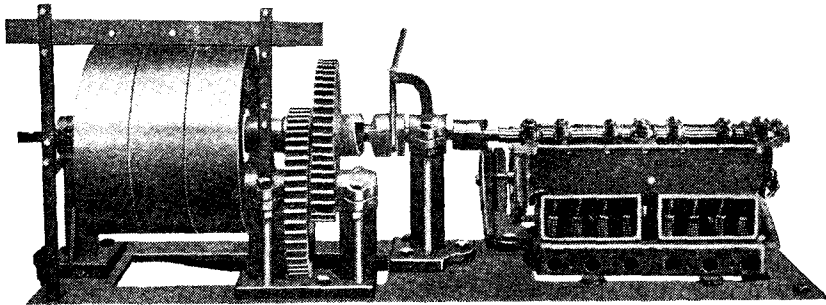
It is a wonderful big success. We have been selling it for more than seven years. We sold over 35,000 sets last year. Don't let prejudice stand in your way. Good business judgement demands that you at least make a careful investigation. Let us send you full information, sample and prices.

DEALERS—We have a fine proposition for you.

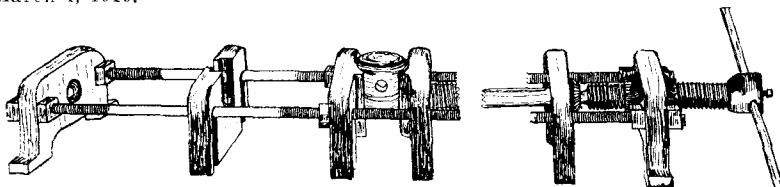
NATIONAL RUBBER FILLER CO.

222 COLLEGE STREET

MIDLOTHIAN, TEXAS



Goodale Motor Stand. Reams all bearings at one time, gives perfect alignment and 100% bearing surface. Combines work table, testing machine and burning in stand. Three motors may be worked on at one time. Machine has two speeds and idler; easily operated on 10 to 20 h. p. motor or gas engine. Weight approximately 620 pounds. Price \$225. Patented March 4, 1919.



Adjustable vise or press. Has removable and reversible jaws; takes shaft of any length; does not injure gear or shaft; has special jaw for pulling Ford transmission gear. Weight 170 pounds. \$50.00. Patented September 30, 1919.

THE MOTOR MACHINE CORPORATION

Reliance Building, Kansas City, Mo.

(All prices f. o. b. factory, Joplin, Mo. 25% must accompany orders, balance sight draft attached to bill lading.)

Equipment Review

A monthly department in which manufacturers are given an opportunity to furnish news and views concerning accessories, equipment and ideas for the Ford car.

AN INTERESTING EXHIBIT.

One of the most interesting exhibits at the recent show conducted by the Automotive Equipment Association, was that of The Northwestern Chemical Co., of Marietta, Ohio, which showed the application of Norwesco Products.

A 1914 Model Maxwell Automobile, which from all appearances had evidently seen its best days, a car that had never been repainted, was used by Norwesco, showing just half of the car re-finished from stem to stern, which produced a wonderful contrast, showing how an old car

ers on one side of the car were painted with Utility Black, as well as the cushions, the top and the body, showing Leather Dressing, Mohair Dressing, and Black color Varnish, respectively.


JOINS AMBU FACULTY.

President C. J. Buckwalter, of the Ambu Engineering Institute has announced the appointment of Hugh Campbell, B. A. Sc. to the faculty of the Chicago Institute which is the only one in America devoted exclusively to teaching au-



can be made new-looking again, by Norwesco Products. The radiator was badly smashed, breaking several tubes, which were repaired by Se-Ment-Ol. The head of the motor was off and showed two cylinders which had been cleaned by Carbonox, Carbon Remover. The two remaining cylinders were dirty, showing the actual work of this Carbon Remover. Two valves were ground, using Norwesco Valve Grinding Compound, in contrast with two valves that were not touched. Half of the engine was painted with Gray and Black Never-Burn, the other half remaining in its natural condition. The Fend-

tomotive electricity. Mr. Campbell is the fifth member of the Ambu faculty of automotive specialists and will devote his time to teaching fundamental electricity which comprises the first two weeks of the eight week course. The second period of two weeks is devoted to starting and lighting under W. N. Littlewood, formerly of the University of Wisconsin; the third period to ignition under James G. Zimmerman, formerly of the Splittdorf and Jefferson Electric Companies and the final two weeks to batteries under Henry E. Peers, author and inventor. David P. Moreton is dean of the Ambu Institute.



-WHEEL PULLERS-


FOR

FORD CARS - FORD TRUCKS - CHEVROLETS

DEALERS—Send us your inquiry. JOBBERS—Write for our proposition.

Manufactured by

Baltimore Hub-Wheel & Mfg. Co., Baltimore, Md.
U. S. A.



When writing advertisers—Just say FORDOWNER

The E-T-AUTO LOCK

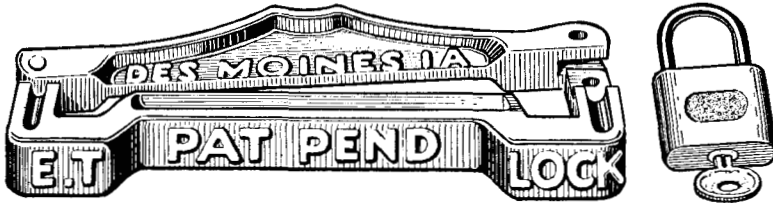


THIS device locks your car in gear. Engages the high gear and reverse at the same time, making it impossible to tow the car either forward or backward or start the motor. We do not change any part of your car. It is easy to put on, without getting out of the seat.

EXCLUSIVE TERRITORY

Write for information on exclusive territory proposition—State, County, etc.

Ask your dealer to order one for you or mail us draft or money order for \$6.50, for which we will send you one lock complete, by mail.

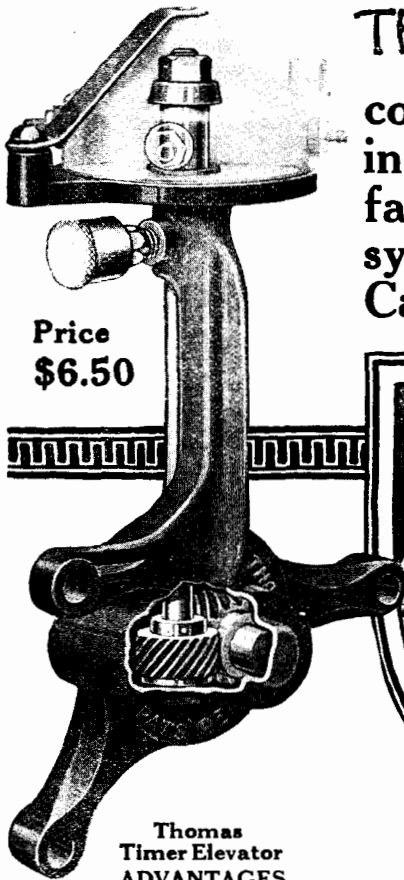


Made of Brass

THE E-T-AUTO LOCK CO.

1015 West Grand Ave.

Des Moines, Iowa

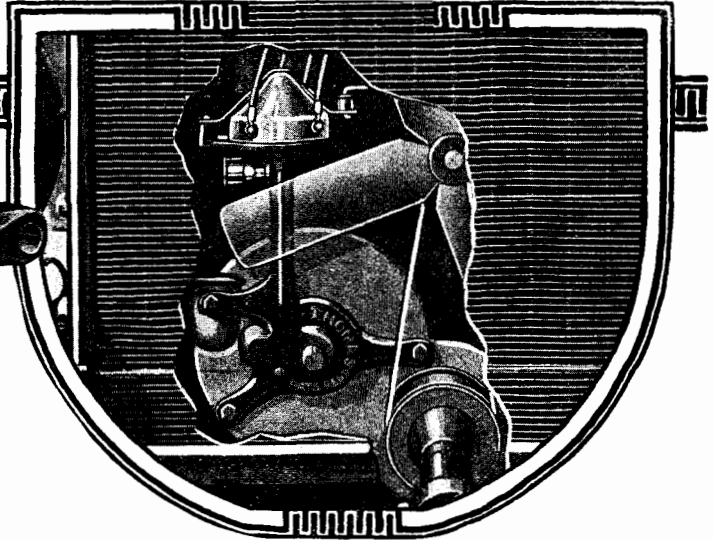


Price
\$6.50

**Thomas
Timer Elevator
ADVANTAGES**

- 1 Ease of installation—in 20 minutes.
- 2 Simple in construction—fits any timer.
- 3 Protects against oil, dirt, grease and water.
- 4 Allows overhead wiring.
- 5 Machine-cut, hardened spiral steel gears.

THOMAS Timer Elevator
corrects all ignition trouble arising from the Timer. Compares favorably with the best ignition systems on the highest price cars. Can be installed in 20 minutes.



DEALERS All Ford Owners Are Thoroughly Sold on This Elevator at Sight

The Thomas Timer Elevator

Over One Hundred Thousand Now In Use

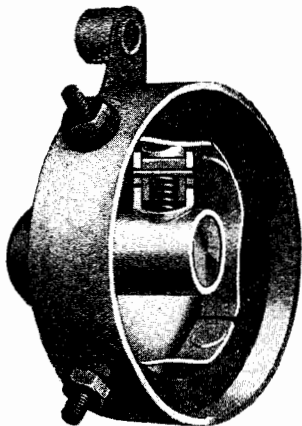
The Thomas Timer Elevator corrects ignition troubles by lifting the Timer up where it remains clean and is easy to get at.

By employing the Thomas Elevator, the wiring is overhead—where it belongs—and compares favorably with the most expensive ignition systems. The Thomas Timer Elevator can be installed in 20 minutes without any special tools. It is not necessary to remove the radiator. Any Timer made to fit a Ford will fit the Thomas Timer Elevator without making any changes.

THE THOMAS TIMER

The Thomas Timer employs the wipe contact principle which is recognized in the electrical field as being the most satisfactory. Contact is always made at exactly the right time, thereby assuring perfectly balanced explosions. An outstanding feature of the Thomas Timer is the fact that worn parts can be replaced in a few minutes for a few cents, which is not practical with a roller type Timer.

The Thomas Timer is guaranteed for one year from date of purchase.



**Thomas
Timer
\$1.50**

Thomas Products Are Sold Through Jobbers

Thomas Andrews Corporation, Chicago

Department of Sales 624 Michigan Ave., Chicago
Factory Waukegan, Illinois

What Shall I Do With My Old Dependable Ford ?

EVEN if the body is shot to pieces—that good dependable engine is still there. It is good for thousands and thousands of miles of reliable service.

When you get the new Ford with the electric starter don't trade in your old, willing stand-by. Use it. Get all the worth of that wonderful engine. It is still the best power plant for its size in the world—bar none. It's a crime not to use this power when it's so easy to have a one or two-ton truck.

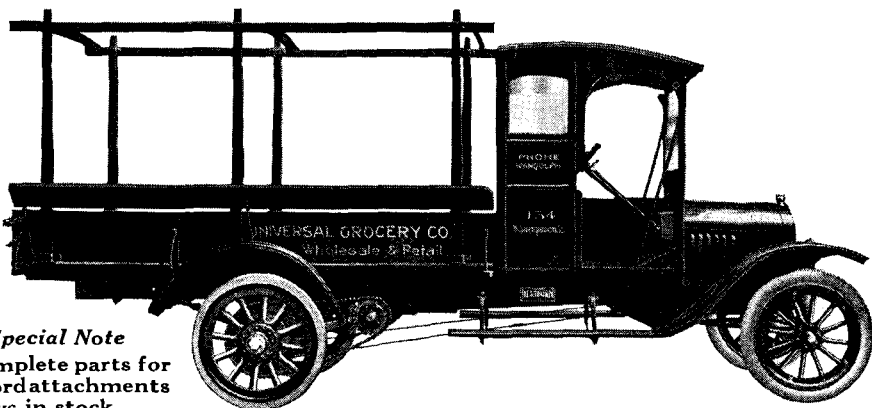
DEARBORN FORM-A-TRUCK

will make a truck that will serve you as well as any truck of equal capacity. And it will run at less cost per mile than any of the heavy trucks. You can't beat the Ford engine for economy—power—dependability. If you need a one or two-ton truck, you can't beat this converted Ford.

If you don't need a truck, fit your old Ford with this Dearborn attachment, and sell at a handsome profit over what you would have received on a "trade in."

If you don't know the Dearborn dealer, write us for full PARTICULARS. We will send them to you without any obligation. DO IT NOW. It will pay you.

Dearborn Truck Company
Dept. A., 2015 S. Michigan Ave., Chicago



Special Note
Complete parts for
all Ford attachments
always in stock.

STANDEX



"Accurate to the dot"

METERS fuel unerringly. Saves gasoline overcharge. Shows exact gasoline mileage. Tells at a glance how much gas you have to run on. To install, screw in filling hole. Never in the way, never need be removed from gasoline tank. Made for sedan or regular model. Price, \$1.75.

Standex Mfg. Cor'n
341 E. Ohio Street
Chicago, Ill.

A NEW WINDSHIELD CLEANER

An entirely new type of Windshield Cleaner is being made by The Presto-Felt Manufacturing Company of Toledo, Ohio, and is called "The Presto-Felt Windshield Cleaner." It is made with two chemically-treated felt pads which are pressed against either side of the windshield by means of oil tempered, spring steel holders. These spring holders insure uniform tension, prevent rattling and keep the Cleaner from dropping down in the line of vision.



As the windshield becomes thoroughly wet in a rain, the Cleaner, with its chemically treated pads, is swung back and forth across the glass three or four times until the action of the water causes the chemical to flow. Then, as the felt pads wipe the water off the glass, they also deposit a very thin film of the chemical on the face of the glass, as a result of which the water does not stick to the glass and form in "beads," as it ordinarily does. Instead, as soon as the rain strikes a "Presto-Felted" windshield, the drops of water flatten out, leaving a clean, "flat," transparent surface through which the driver can distinctly see the road and clearly distinguish objects ahead of the car. This result is in marked contrast to that of having the windshield constantly covered with "shimmering beads" of water through which it is almost impossible to see. One cleaning with a Presto-Windshield Cleaner is quite sufficient during any storm. Another important point is that the Presto-Felt Cleaner cleans both sides of the glass at the same time, thus preventing dust or steam from gathering on the inside of the windshield, particularly as with a closed car.

The Presto-Felt Windshield Cleaner is made in one model only, yet is so designed that it fits any and all types of windshields. It can be attached in either of three ways—clamping over the top of the windshield frame, bolted through the frame or bolted directly through the glass. All necessary parts are furnished with each cleaner for attaching in any of the three ways. Price complete, \$2.00 each.

NEW ADVERTISING COMPANY.

Harry S. Buzby, who for twelve years was connected with the staff of the Chilton Co., and W. Cortez Raughley, former automobile manager of The Philadelphia Public Ledger and for the past five years connected with The Fletcher Co., have formed a partnership under the name of The Buzby-Raughley Co., Advertising and Merchandising.

On account of this long experience in national automotive advertising, their efforts will be confined chiefly to this industry.

NEW TIMER PLANT.

What is believed to be one of the largest buildings devoted exclusively to the manufacture of timers for Ford cars, has been recently put up by the McCulloch Manufacturing Co., at Sandwich, Mass. The new plant which has over 15,000 square feet of floor space is located on the Cape Cod Canal, and will be devoted entirely to the manufacture of the patented McCulloch Timer for Fords.

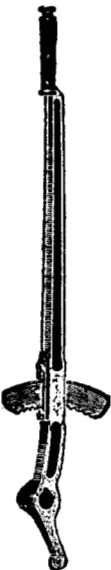
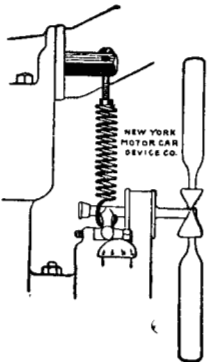
The McCulloch Timer is practically a new

A LONG FELT NEED SUPPLIED.

PREMO SPECIALTIES

ARE
MISSING LINKS

for
Ford Cars

↓

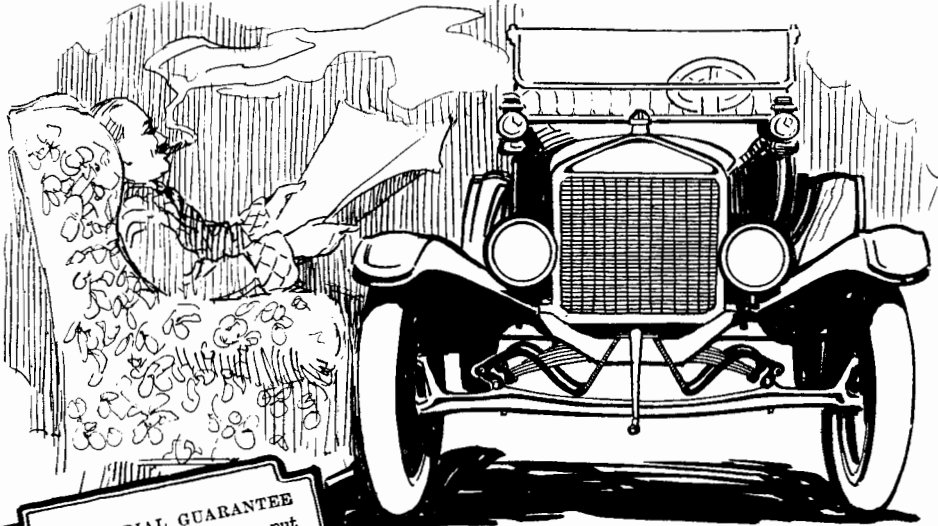
Fan Belt Tightener...	\$1.00
Emergency Lever....	5.00
Gas & Spark Control..	1.50
Oil Filler & Breather..	1.00
Transmission Flange..	1.00
Transmission Clamp..	1.00

For Bands
Brake Rod Springs... .25
Stop the rattle.

WRITE FOR CIRCULAR

N. Y. Motor Car Device Co.
800 Broad St., Newark, N. J.

When writing advertisers—Just say FORDOWNER



30 DAYS TRIAL GUARANTEE
 Dealers are authorized to put H & D's on any Ford. Should the owner decide to have them removed after the 30 days trial, we give a new set for every one so removed and our draft for \$3.00 to pay you for your time and trouble.
THE H & D COMPANY

24 HOUR PARTS SERVICE

H & D distributors are located conveniently to all dealers in the United States and Canada. They carry a complete stock of parts for 24 hour service. Parts broken or giving unsatisfactory wear are replaced free.
THE H & D COMPANY

Ride on H & D's 30 Days

—Convince Yourself of the Arm Chair Comfort

Travel the roughest roads—hit the hills, hollows, crossings and rutty stretches at any speed and feel them melt into smooth, gentle riding roads.

You'll experience less arm strain at the wheel—the car guides easier—vibration is almost eliminated—tire and gas mileage increased.

With H & D's, the wheels follow the natural contour of the road—shocks, jars and bounding become things of the past—you ride in solid comfort.

Have your dealer put on a set of H & D's and experience this riding comfort for 30 days.

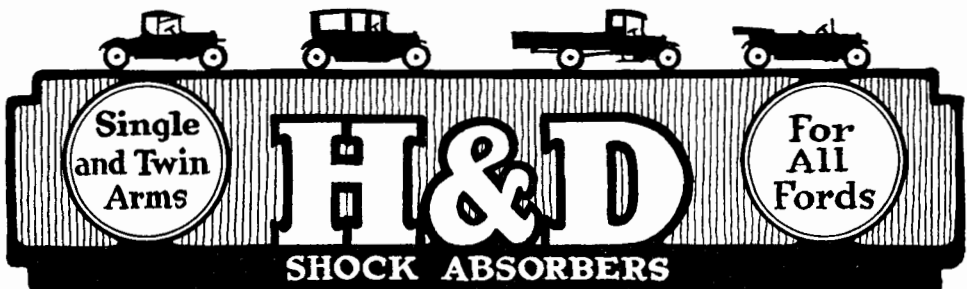
\$10.00 For complete set of four.

The H & D Company
 Goodland Indiana

In Canada

Richards-Wilcox Canadian Co., Ltd., London, Ontario.

DEALERS—Write your jobber or us for particulars and profit.
THE H & D COMPANY



Did This Ever Happen To You?



Of course it has—10 miles from the nearest garage—with a broken Fan Belt—is an everyday occurrence. The result is an overheated motor which decreases its efficiency and increases repair bills, to say nothing of the annoyance and loss of time.



THE ONE ANSWER

"CROWE" Mechanical Fan Belts eliminate these difficulties. Steel links prevent stretching or breaking. Sole leather blocks provide noiseless friction and eliminate slippage.

Guaranteed 15,000 Miles

Standard Ford Sizes..... Each \$1.25
 Other Cars—any width flat type. Per foot .60
 Other Cars—any width U type..... 1.20

LIBERAL DISCOUNTS TO DEALERS

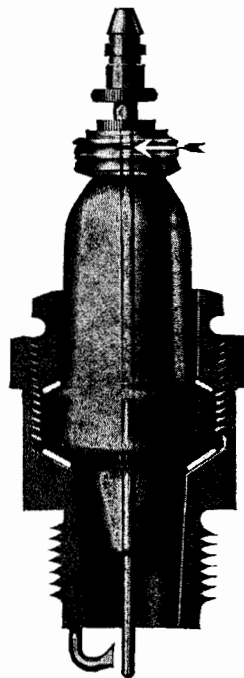
PREMIER ELECTRIC CO.

3801 Ravenswood Ave., CHICAGO, ILLS.

product in the automobile accessory field, but in this comparatively short time, it has made so large a following of friends, that the plant at 216 High St., Boston, became too small, and the new building was the necessary outcome. W. L. Ross, Vice President of the Company, is to have charge of the building at Sandwich. The executive offices of the concern will be located in Boston, where A. P. McCulloch, President and General Manager will supervise the manufacturing of the other McCulloch products. The McCulloch Manufacturing Company are specialists in Ford ignition, and besides manufacturing their Timer, are the patentees and makers of the McCulloch Timer Grinder and Wipe Contact.

AN INTERESTING SPARK PLUG

The same principle applied in increasing the intensity of waves in wireless telegraphy is used in the construction of the Vacuum-Fire spark plug, a new product of the Penn Manufacturing Company, 319 West Ninth Street, Kansas City, Mo. By producing a jump-gap spark in a vacuum chamber built into the head of the Vacuum-Fire plug, the intensity of the flame delivered at the firing points is heightened from ten to



twelve times. This intensified flame will fire through oil or grease. It also will burn carbon deposits from the firing points, virtually eliminating missing and skipping. An added feature of the Vacuum-Fire plug is its wide point, which delivers a ribbon-like flame that increases the efficiency of the fire many fold. A distinctive design has been adopted for the Vacuum-Fire plug, setting it out attractively in external appearance from the usual type of plug. The Vacuum-Fire plug sells for \$1.25 Porcelains, which include the intensifying chamber, sell for 40 cents each.

SPECIAL WENRCH FOR CONNECTING ROD NUTS.

A special designed geared offset wrench for removing the 4th connecting rod nut of a Ford motor has recently been placed on the market by the Sawyer Sales Company.

The Universal offset speed wrench for Ford motor is made of steel having three cut spur gears, machined, hand forged sockets and heavy brace.

The offset is 4 3/4 inches long having 3 inches distance between the socket and brace rod. This allows ample distance to place the wrench in

DIXON'S GRAPHITE Automobile LUBRICANTS

You don't tire yourself all out—and you don't tire your Ford all out, if you lubricate it with Dixon's Lubricants. Write for booklet 45-G.

Also ask your dealer about
 Dixon's Famous Cup Grease

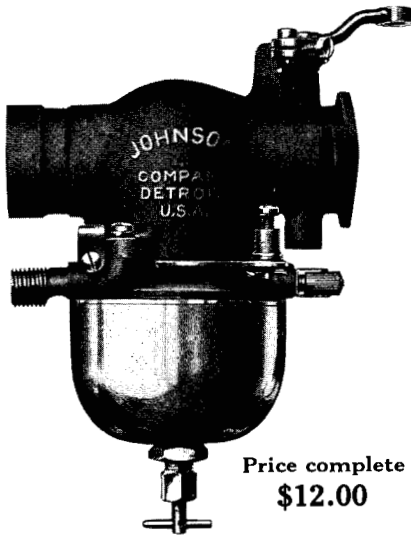
JOSEPH DIXON CRUCIBLE COMPANY

Jersey City, New Jersey

Established 1827



Johnson Carburetor for Fords



Price complete
\$12.00

Counts Every Drop of Gasoline.
Makes Every Drop Count.

Ford Gasoline Strainer

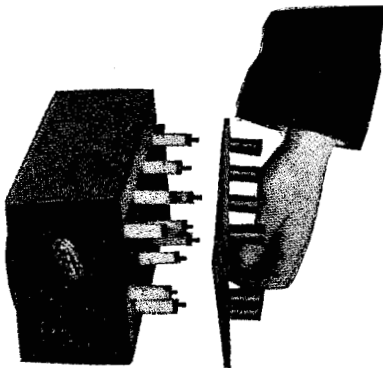


Traps the Dirt. Fits Any Ford.
Price **\$1.25**

JOHNSON COMPANY, 515 Forest Ave. E., Detroit, Mich.

The Device You Have Often Wanted

The B. & H. Coil Insulator For All Ford Cars



Guarantees Dryness of Coils in Wet Weather and Freedom From Ignition and Starting Troubles Due to Wet, Fouled or Improperly Insulated Coil Connections.

This is a device which is needed on every Ford Car and one which is indispensable on Fords which are used in damp, wet or rainy weather. It protects the coil box and connections from the rain and water which otherwise runs down the dash, short-circuiting the wiring system and causing serious ignition and starting trouble which usually requires that the coil-box be removed and dried out before the car can be started. In addition to this, the B. & H. Coil Insulator assures proper insulation of all coil connections, thereby eliminating all ignition troubles from faulty insulation of coil connections.

Every Ford Owner Can Try a B. & H. Coil Insulator Under Our Liberal Guarantee

Purchase a B & H Coil Insulator from your dealer or direct from the manufacturers, install it on your own car and drive it 10 days in any weather, under any conditions. Drive it in the mud, turn the hose on it, drown it with a tub or bucket of water. Subject it to the most severe test that you can think of and if it does not prove thoroughly effective and satisfactory in every respect take it off and return it to the factory or dealer from whom it was purchased and the purchase price will be refunded in full.

AT DEALERS AND JOBBERS OR SENT POST PAID ON RECEIPT OF PRICE

\$1.75 EAST OF ROCKY MOUNTAINS

BROWN & HADFIELD

:

LOUISVILLE, KY.



**S & P Brand Makes
Valve Grinding a Pleasure**

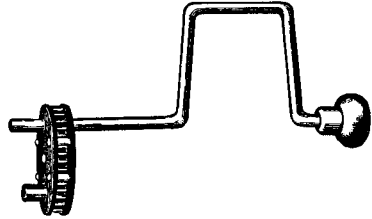
An average increase in sales of over 70 percent per month for the past five months is downright evidence that S & P Valve Grinding Compound DOES DELIVER THE GOODS.

Remember S & P Brand is packed in the Yellow Can. We Guarantee that it gives the quickest and most practical results with hand or power driven tool.

Send for your Free Sample—Mention your Dealer's or Jobber's name.

S & P Manufacturing Company
163 Columbus Ave. New York

the crank case and have the socket fit up directly on the nut of the forth connecting rod. The upper projection of the brace serves as a bearing on the crank shaft and the lower part of the brace takes bearing against the crank case. The brace is of one-half inch steel rod made with a



ten inch swing thereby giving sufficient leverage to remove the tightest nuts. The socket is of special design and removable.

The wrench is 17 inches over all, and weighs 4 pounds. For trade price list and information write to The Sawyer Sales Co., 582 Terminal Bldg., Lincoln, Nebr.

A PRACTICAL RADIATOR SHUTTER.

The UNIVERSAL Radiator Shutter which is now being extensively advertised is meeting with instantaneous success where ever introduced. It opens and closes from the seat. Any garage man can install one of these shutters within thirty minutes. This shutter enables positive regulation of the flow of air through the radiator, winter and summer, which makes it a year round necessity.

It is claimed that from the seat, a car owner can regulate it as easily as turning on his lights or ignition switch. He can regulate the flow of air so that just enough strikes the motor to keep it operating at the correct, scientific temperature of 185 degrees—the highest point of automobile efficiency as attested to by engineers—the point where all the fuel vaporizes and makes power in the cylinders instead of kerosene in the lubricating oil and carbon in the motor. With it you can keep the water in your radiator always approaching the boiling point but never reaching it. With your motor in this condition you are enabled to secure maximum efficiency from your car, says a noted professor of Mechanical Engineering.

The UNIVERSAL Shutter is made for Ford, Overland, Maxwell, Chevrolet, Dodge, Buick, Oakland, Saxon "6," Reo, Studebaker, Chalmers, Chandler, Hupmobile, and Nash Cars. It is manufactured by the Auto Metal Parts Company, Des Moines, Iowa. General Sales Offices, 624 Michigan Avenue, Chicago, Illinois.

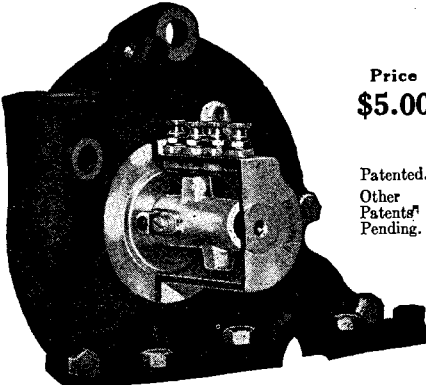
THE FOX-PROOF LOCK FOR FORDS.

The Fox-Proof steering wheel lock for Fords, made by the A. H. Fox Gun Co., Philadelphia, actually locks the front wheels and steering wheels of the car at the same time—doesn't merely free the steering wheel as most steering wheel locks do. It does not change or weaken the steering column.

The lock is simply constructed, having few parts to get out of order or wear. It consists of an internal gear case cap that is surmounted by a cylindrical piece about 1½ inches high, and having about the same diameter. Both are cast in one piece. There are ¾ inch diameter, round holes ½ inch deep on three sides of this cylindrical piece.

The other part consists of a steering wheel spider and lock-housing cast integral. A ¾ inch cylinder-holt taking a Yale type key is fitted into the housing. The key operates a plunger on the side of the ¾ inch cylinder-bolt. When plunger is outstanding (its position always when the key has been withdrawn) it locks the ¾ inch cylinder-bolt in one of the three holes in the cylinder piece surmounting the internal gear case cap by catching on the inner side of lock-housing or when the Ford is being operated it catches in a hole in the lock-housing and holds the cylinder-bolt from going into any one of these three holes.

THE JACK RABBIT
An Easy Starting, Sure Hitting Timer.
It Certainly Makes a Difference.



Price
\$5.00

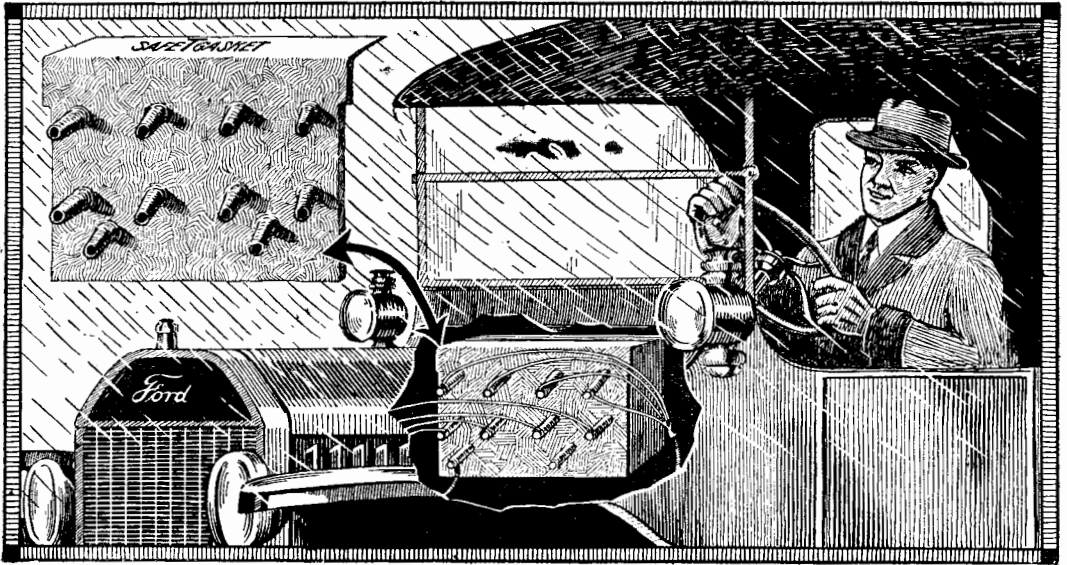
Patented.
Other
Patents
Pending.

The Jack Rabbit unquestionably is the short cut to quick satisfaction. Briefly, this timer ends the old familiar trouble on the Ford. It does not Constantly roll, Continually drag or peck itself to pieces. And as each brush unit simply takes care of the labor of one cylinder, durability is certain. There is absolutely no wear on insulation. Its wiring is accessible out of oil and free from shorts. And the clean location of its contacts assures positive ignition, and a fat, hot spark on the turn of the crank, for easy starting. A pair of pliers attaches the rabbit.

Dealers, Write. This rabbit alive and moves on sight.

JACK RABBIT IGNITION CO.
1062 PALMER AVE. EAST DETROIT, MICH.

Safe T First Rubber Coil Box Protector ^{for} Ford Cars



Price, Complete, \$2.00. West of Rockies or Canada, \$2.50

Rain, Snow or Dampness never reaches the Coil Box on your Ford car if equipped with a Safe T First Rubber Coil Box Protector, made of scientifically treated Para rubber. If your dealer or garage cannot supply you, send us \$2.00, money order or currency; \$2.50 west of Rockies, or Canada, and we will mail the Safe T First Rubber Coil Box Protector postpaid. For sale by all Jobbers and Dealers. Manufactured Exclusively by the

SAFE T FIRST GASKET CO., 316 West 134th St., New York City.

The Quick, Easy and Profitable Way to Grind a Crankshaft

JUST one job pays the cost of an Atlas Abrasive Tool.

No experience required. The Atlas simplifies crankshaft grinding.

No lathe or other equipment required. Use a vise if you like, but remember that the crankshaft need not be removed from the crankcase.

One hour completes the work on any crankshaft.

No machine shop guarantees greater than two-thousandths of an inch accuracy. With the Atlas you get one-thousandth.

If you need an Atlas but once a year, it accommodates your customer, puts a good profit in your pocket and gives you a reputation for service.

Another hand tool would cost from five to ten times the price of an Atlas—you would not get Atlas convenience—nor

simplicity of its one cutter principle—nor the saving of time in making adjustments.

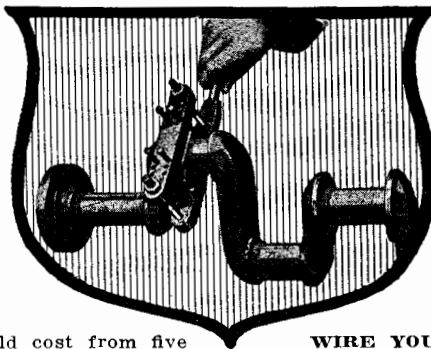
Adjustable to crank pins and bearings up to 2½ inches diameter for all passengers and trucks.

Hundreds of garages and repair shops are enthusiastic users of the Atlas Abrasive Tool—it's selling like hot cakes.

A good mechanic would rather part with a \$50 bill than with his Atlas, if he could not buy another.

Price, complete, with cutter, \$10, postpaid. Extra cutters, (including bronze bearing tracks) good for from 10 to 20 pins or bearings, 30 cents each.

Patented Nov. 11, 1919.



WIRE YOUR ORDER TODAY
ATLAS MANUFACTURING CO.
 North Canal St. PITTSBURGH, PA.



FOR A QUICK START ON COLDEST DAYS

Don't wear yourself out—lose time and temper—trying to get a start on a cold morning. Use the easy and the sure way. Install a

HOT-SPOT Generator (Patent Pending.)

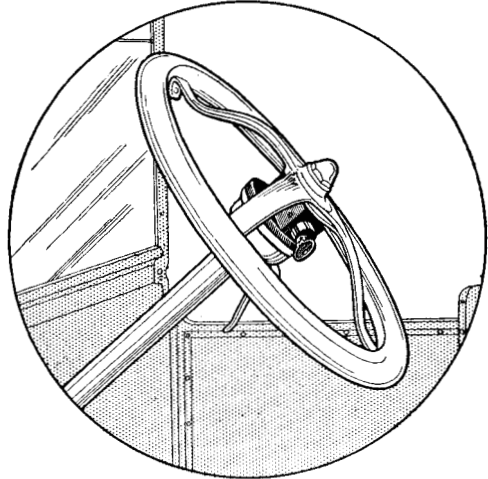
Attaches in one minute. Positively starts the motor on the coldest day. Can be operated 100 times for one cent and is a wonderful time and trouble saver. Ready for immediate use. No electricity required.

The cost of the Hot Spot Generator complete is
\$1.00 POSTPAID

AGENTS—Write today for territory.
It's a big seller.

THE HOT SPOT GENERATOR COMPANY
1325 Walnut Street Kansas City, Mo.

In attaching the FOX-PROOF STEERING WHEEL LOCK the original internal gear case cap is removed, also the steering wheel. The gear-pinion is re-inserted into the head of the steering column. Then the "Fox-Proof" internal gear case cap is put on and screwed up tight. There is a 1/4 inch diameter hole in the gear case cap. Another hole is drilled directly under this one and tapped. A long screw supplied with the



"Fox-Proof" is tightened into the hole. The original spider is unscrewed from the rim and the "Fox-Proof" spider and lock combined substituted. This is put on and keyways of gear-pinion and steering wheel spider are brought together and key inserted. Top nut is then tightened.

The steering wheel and front wheels can then be locked in three positions corresponding to the three holes in the cylindrical piece on top of internal gear case lap. The action is simply pushing the 3/8 inch cylinder-bolt into one of these holes and withdrawing the key. Neither steering wheel or front wheels can then be moved and the lock cannot be picked or broken. "It's the lock that can't be beat."

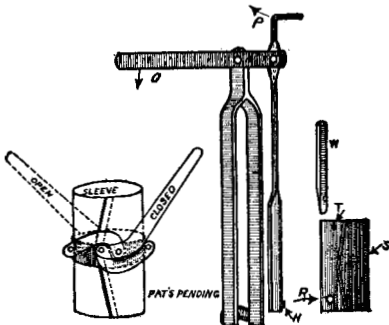
LIBERTY TIRE RACK.

The Liberty Tire Rack for Fords, made by the A. H. Fox Gun Company, Philadelphia, holds two tires—clinchers or demountable, and locks them in with steel bands and 6 lever locks.

The Liberty Tire Rack is made throughout of iron and steel and consists of 2 angle irons that are bolted between the chassis frame and body sills. These angles have a semi-circular metal piece wide enough to carry two tires and about 1/4 inch thick riveted to their ends which protrude about 9 inches beyond the rear of the chassis. This extends around the lower half of the tires and supports them. A piece of steel 1/4 inch thick and 3 inches wide spans this semi-circular piece near the top and is riveted at the ends to the semi-circular piece. Two steel bars 1/2 inch thick, 1 1/2 inches wide and 9 inches long are hinged to the top of this spanning piece by means of rivets. These bars fit closely across the edges of the tires.

Another steel piece with a slotted end is hinged to each of these bars by rivets made especially hard to resist a file. These pieces fit across the sides of the tires. The other ends slip over projecting pieces of steel riveted to the outside upper part of the semi-circular piece supporting the tires.

There is a lever arrangement riveted to the free ends of the hinged pieces and used to pull these tight across the inner edges and sides of the tires. When this has been done holes in the ends of the levers are directly over holes in projecting pieces riveted to the semi-circular tire supporter. A 6 lever lock goes through both these holes on each side. The tire is now securely locked in on the outside by the tire supporter, on the inside by the 1/2 inch by 1 1/2 inch bar on



REPAIR SHOPS, "THINK OF IT" IN TEN SECONDS

The Jiffy Roller Bearing Sleeve Puller will:

1. Pull out roller-bearing sleeve from rear axle housing.
2. Work as well with axle in housing as out.
3. Work in either end of housing without change or adjustment.
4. Lasts for years in severe shop use. Made of the best steel forging, with oil-tempered steel hook H which will not break or wear out. Tested to double working pressure at factory.

IN THREE SECONDS

The Jiffy Roller Bearing Sleeve Clamp will clamp sleeve together so it is easy to put in housing.

Prices: F. O. B. Los Angeles, Cal.

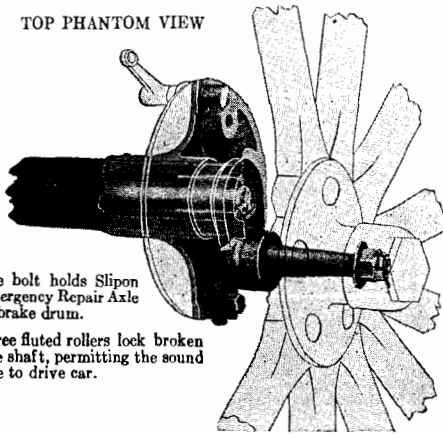
Ford Sleeve Puller.....\$6.00.....Clamp \$3.00
Ford Truck Sleeve Puller.. 8.00.....Clamp 3.50

Sold on Money Back Guarantee.
Jobbers and Agents write

NICHOLAS E. KOCH
3741 S. Vermont Ave. Los Angeles, Cal

"We Will Equip Our Entire Fleet of Fords"—

TOP PHANTOM VIEW



One bolt holds Slipon Emergency Repair Axle to brake drum.

Three fluted rollers lock broken axle shaft, permitting the sound axle to drive car.

"We have tried out the Slipon and it surely works. We are ready to talk business."

That's what one of Chicago's big stores wrote after thoroughly testing the

SLIPON Emergency Axle for Fords

Everyone else who sees or tests the Slipon—buys.

Slips on. Anyone can apply it with a monkey wrench.

In seven minutes, after axle breaks, you can drive your car. Repair the broken axle at your leisure—the SLIPON EMERGENCY AXLE gives the same service as before the break.

Simple, strong and absolutely guaranteed against breakage.

COST, COMPLETE, \$6.00 F. O. B. MILWAUKEE

State Distributors and County Agents! Others are gathering rapid profits. If you have reasonable financial and selling qualifications to swing state or local territory, write or wire immediately for details.

THE SLIPON COMPANY, 155 Knapp St., MILWAUKEE, WISCONSIN

Simpson Crank Case Support For Fords



Price, \$2.00

Protects Crank Case Arm—Repairs if broken.

Jobbers and Dealers: Write for full particulars and trade prices.

WALTER ECKHOUSE & CO.
616-622 So. Michigan Blvd. Chicago, Ill.

Sales Department for
The Simpson Garage & Machine Co., Newark, O.

Double Your Ford's Carrying Capacity

The Dottl Spring and Frame Support is easily and quickly attached to the rear spring of the Ford car or converted Ford truck, midway of the spring. The two heavy coil springs furnish two extra points of support and permit the Ford to be safely loaded to double its normal carrying capacity.

DOTTL
Spring & L
Frame Support

Made in two models for old and new style Ford Rear Springs. Price, \$8 per set. In Canada, \$10.

Dottl Mfg. Co.
Dept. R. Madison, Wis.

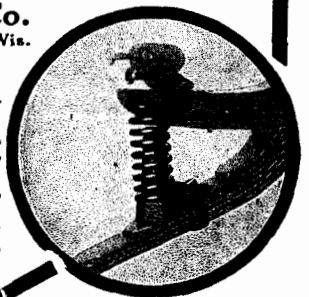
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The Thiele & Baker Mfg. Co., Marion, Ohio.

The Wales-Adamson Co., 1402 S. Michigan Ave., Chicago, Ill.

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“Better Spring Bumpers Stand the Bumps Better”

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These popular priced Spring Bumpers clamp on to Ford frame securely and require neither cutting or drilling.

Arms exchangeable so as to make front Bumper attachable to other cars as well as rears of Fords.

No Dead Bumper Stock.

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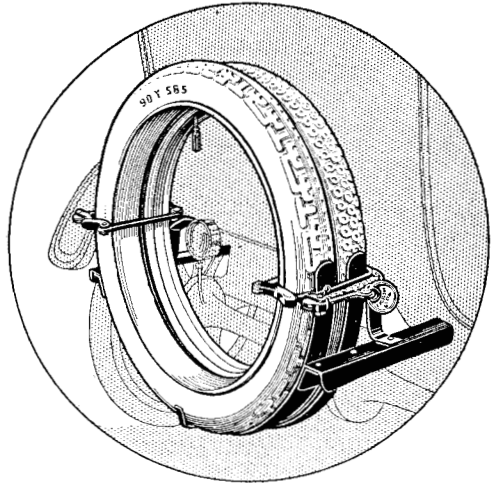
New Era Spring & Specialty Co.

1172 Hamilton Ave. Grand Rapids, Mich.



NEW ERA "BETTER" SPRING BUMPER

the other sides by the spanning piece and slotted end bar. As an additional safe guard against the tires rattling they are held apart by projecting pieces on the bars that fit across the inside of the tires. These projectors fit snugly between the tires.



The license tag and lamp are attached to the band that spans the semi-circular tire supporter. An upright piece about 2 inches high is riveted to the bottom of this supporter and keeps the tire from moving.

A NEW SAFETY DEVICE.

Among the latest and most worthy inventions along the lines of attachments for Ford cars comes the Porter Neutral Stop. Mr. Geo. G. Porter, its inventor, of the Porter Engineering and Mfg. Co., manufacturers, has brought forth a number of useful Patents during his twenty years as a mechanical engineer and factory owner manufacturer.

The Porter Neutral Stop consists of a steel plate which is fastened to the floor board of the car and an attachment which is fastened



to the clutch pedal lever. It is provided with a stop lever of correct length to hold the clutch positively in neutral position when pushed against the obstruction on the floor plate. This makes a positive locking device and must be released by pressing the toe against the releasing latch before the clutch can be thrown over into low gear. With this device installed on his Ford car the driver simply pushes both feet forward when making a stop and the clutch is automatically held in the neutral position.

The operation of the Porter Neutral Stop is as follows:

STOPPING:—The right and left pedals are pushed forward as far as they will go. This

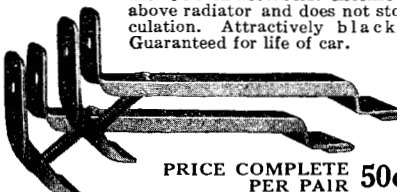


“JOFER”

FRONT
LICENSE
PLATE
HOLDER

HOLDS LICENSE PLATE RIGID

“JOFERS” stop rattling of front license plate. Eliminate danger of cutting your hand while cranking. Don't interfere with use of shock absorbers. License plate held above radiator and does not stop air circulation. Attractively black finished. Guaranteed for life of car.



PRICE COMPLETE PER PAIR 50c

If your dealer can't supply you, order direct.

Dealers: Every Ford owner is a prospect for “JOFERS.” Write today for Dealer's Proposition.

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SPECIAL OFFER

To Ford Owners

TO INTRODUCE For-do Long Life Spark Plugs

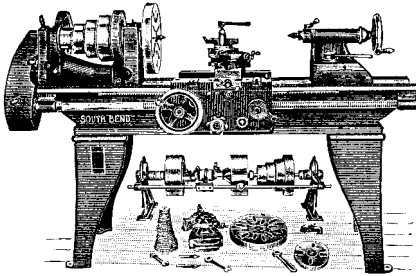
Weather cold—engine cold—starts hard. Now is the time you need new plugs. Get a set of hot-spark For-do Plugs on this special offer and your car will start easier and run better all winter. Here is our special short time offer.

4 PLUGS FOR THE PRICE OF 3

Send only \$2.25 (regular price of 3 plugs) and we will include another For-do Plug **Free**—all four sent postpaid. For-do plugs are first quality with highest test government standard porcelain—extra durable and easily cleaned. Every plug guaranteed. **Send for three—GET ONE FREE.** Order direct from this advertisement. Money back if not pleased. Agents wanted.

G. E. COLBY CO., Dept. 60, Maywood, Illinois

Also Makers of Ford-do Spark Intensifiers.



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For the Machine and Repair Shops

13" Lathe	\$385.00	18" Lathe	\$ 735.00
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Made with straight or gap bed. Price includes equipment as shown in illustration. **South Bend Lathes have been on the market thirteen years. Over 22,000 in use. Est. 1906.**

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How to Run a Lathe An 80-page book, postpaid to any address for ten cents, silver or stamps accepted.

RE-COVER YOUR FORD TOP

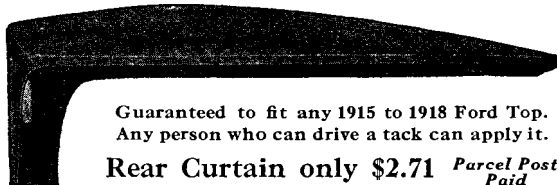
Complete outfit consists of Roof and Quarters, made of best Ford rubber, sewed together, and Rear Curtain as shown below. With tacks, binding, fasteners and printed instructions for applying. All packed in a box and marked.

ROADSTER

With Rear Curtain

\$7.22

Parcel Post Paid



Guaranteed to fit any 1915 to 1918 Ford Top. Any person who can drive a tack can apply it.

Rear Curtain only **\$2.71** Parcel Post Paid

TOURING

With Rear Curtain

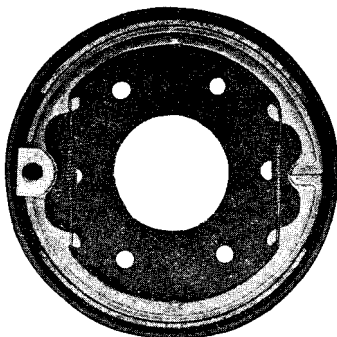
\$9.36

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LIBERTY TOP & TIRE CO.

Dept. X

Cincinnati, Ohio



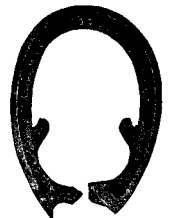
CLAMERT MALLEABLE IRON EMERGENCY BRAKES

For FORD cars

We guarantee CLAMERT BRAKES to last as long as the car in which they are installed if occasionally relined. We will absolutely replace free any CLAMERT BRAKES which have broken in service.

Manufactured exclusively by

The Clamert Mfg. Company
Pittsburgh, Pa.



This is one of our malleable iron castings bent double by sledge hammer blows.



One Way to Kill Rattle

is to plug up the ears and pretend the old bus is a summer breeze. But the best way is to plug up the racket with

FERNALD (Steer-Aids Little B-R-A-T-S Anti Rattles)

STEER-AIDS end steering rod rattles and wobbly wheels—save bushings—reduce skidding and front tire wear. Retail at 50c a pair.

LITTLE B-R-A-T-S slip over brake-rod and levers and clinch 'em in a rattle-proof grip. 50c a set.

AUTO DOOR ANTI-RATTLERS put an end to loose-door noises. Big sellers at a quarter a pair.

DEALERS: Here's where you can make small sales total big profits. Get in touch with your jobber on the Fernald Line.

Fernald Mfg. Co., Inc., North East Pa.

Little BRATS



AUTO-DOOR ANTI-RATTLER



Jiffy Crank Holder



throws out the clutch, holds the clutch pedal in its neutral position and puts on the brake.

STARTING:—The clutch pedal is moved forward by the left foot until it reaches the stop and held there while the emergency brake is released. The pedal is then released slightly to free the end of the stop lever from its abutment, the foot rocked upward and forward so that the toe engages the latch and moves it forward sufficiently to raise the end of the stop lever from its abutment which then allows the clutch lever to be pushed forward into low gear.

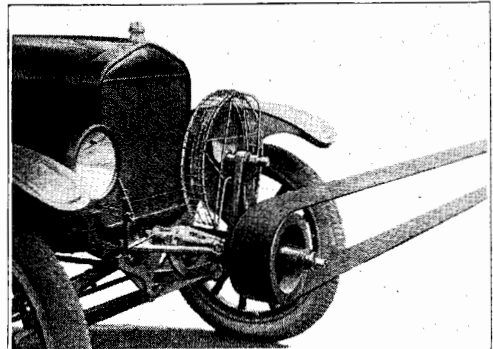
REVERSING:—When reversing it will usually be found very convenient to hold the clutch pedal against the Neutral Stop with the left foot, throw the emergency brake clear forward and operate the reverse and brake levers with the right foot, quickly passing the foot from the reverse to the brake pedal when it is desired to stop.

THE MCGILL AUTOPOWER.

The McGill Autopower for Ford cars is a portable powerplant delivering from 5 to 14 H. P. as required.

For the dealer in farm implements, one of the most interesting features about the McGill Autopower is the fact that it can be sold to the average farmer, who, having thus secured a power plant capable of operating a great many belt-driven machines, is then a likely prospect for the dealer's entire line.

The McGill Autopower has been manufactured since 1915, but the war prevented the market-



ing of it generally. Now, however, this product is being pushed actively and is meeting with exceptional success.

Autopower takes power direct from the crankshaft. The engine is started by cranking in the ordinary way and the clutch thrown in. An automatic governor maintains constant speed by increasing or decreasing the fuel supply. An auxiliary fan prevents overheating by sending a rush of air against the radiator, just as is the case when the car is in motion. Fuel consumption is claimed to be the same as when running on the road at between 15 and 30 miles per hour. Among the machines autopower will operate are the following: ensilage cutter, feed grinder, hay press, wood saw, cotton gin, concrete mixer, sprayer, pumps (all kinds) well drills, cider press, fanning mill, corn shellers, washing machine, cream separator, churn, lighting plant.

After the first installation the Autopower can be taken off or attached in three minutes. A friction clutch permits the motor being cranked before throwing in the load.

The component parts of Autopower are made of the best materials obtainable, and the plant is fully guaranteed for one year against material and mechanical defects. The drive pulley is 10 inches in diameter, with 5/4 inch crowned face. Speed of the engine is approximately the same as when running on the road at 15 to 30 miles an hour—according to the horsepower required. Shipping weight is about 100 pounds. The price of the McGill Autopower to the consumer is \$87.50, west of the Rockies \$92.50. It is manufactured by the Knight Metal Products Company, Detroit, Mich.

The "MASTER"
WORLD'S BEST
Ford Timer
Starts Motor First Turn
in Zero Weather
Price 75c

Wanted—Distributor with Ford.
Sample postpaid on receipt of price.

The "MASTER"
Ford Governor
Complies With Laws of
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Price \$3.75

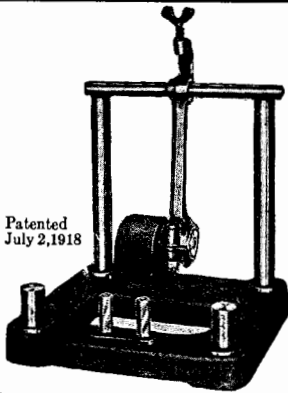
The MASTER GOVERNOR for commercially used Ford Cars, Trucks and Tractors, insures positive, unflinching control of Ford motor speed without impairing or altering the motor's efficiency.

Your Speed Limit when Master equipped, is:

Standard FORD	23 Miles Per Hour
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MASTER PRODUCTS CO., Detroit, U. S. A.

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That is what they all say when they come in for repairs. Satisfy your customers by being prepared. Our

PATENTED PAGEL JIG

for straightening and aligning Ford connecting rods saves its cost in labor in a short time and does PERFECT WORK. Piston Clamp, Motor Block Clamp and Three Wheel Dolly Jack are other SPECIALTIES we manufacture. Write your Jobber or direct to

GARAGE EQUIPMENT CO., 241 4th Ave. S. Minneapolis, Minn.

Langbein 4 speed auxiliary

For all Ford Cars.
For Ford Worm-drive Trucks.

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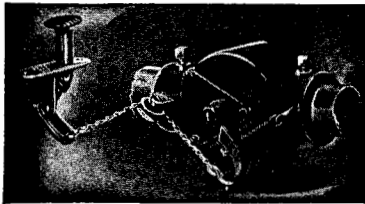
Gears Always In Mesh.

Furnished in Overdrive and Underdrive Types.

The Transmission With Hess Bright Ball Bearings

Write for detailed literature. Dealers, get our proposition

American Gear & Transmission Co. 1146 S. Los Angeles St. Los Angeles, Cal.



The Petry Cut-Out For Fords

and the Ford car itself, have made good on the same basis—the ability to give efficient, dependable, and consistent service under all motoring conditions.

The last word in muffler Cut-Outs because of its efficiency, its ease of application and its meritorious features. Expels the full exhaust to the rear, not down. Does not spatter mud and stir up dust. Has adjustable lever, making attaching easy, positive cut-off from the muffler. Spring away from heat, and easily adjustable, compound lever action and spring makes action smooth and easy on pedal. Valve seat and valve machined to prevent leakage. A scientifically designed mechanical job. Neat in appearance, strong in construction, thoroughly serviceable. Size plainly cast on each size. Invaluable for "tuning up" the motor.

Sold complete with pedal and chain for \$4.50. At your dealer's—or direct.

N. A. PETRY Co., Inc., 1317 Race St., Philadelphia

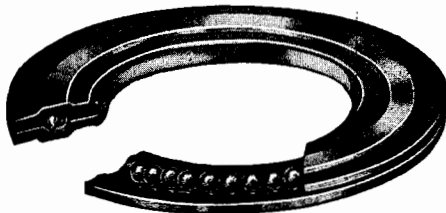
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- NORMAN COWAN CO. 445-451 Rialto Building, San Francisco, Cal.
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TO JOBBERS AND DEALERS:

Write or wire to us at once. Hand-some working counter display sent with order for twelve assorted sizes.

Graham Socket Wrenches
THE UNIVERSAL WRENCH
Convenient—Compact—Clean
Contained in Case
Solid Steel Hardened



Attractive Discounts to Jobbers and Dealers

GRAHAM THRUST BEARING

For Ford and Chevrolet No. 490 Cars
Full Type The One That Has Made Good
Micro Chrome Balls—Special Alloy Steel

Manufactured only by
THE GRAHAM ROLLER BEARING CO.
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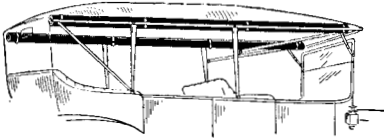
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We have an unusually attractive proposition to offer you on

NO-FAULT

POCKETS for FORD SIDE CURTAINS



Patent Applied For

The 20th century way to carry your side curtains. Used with top up or down. Made of Double-Texture Leatheroid. Will last as long as the car.

Touring Size, \$4.50. Roadster, \$3.50. Descriptive Circular on Request.

TO CAR OWNERS!!!!

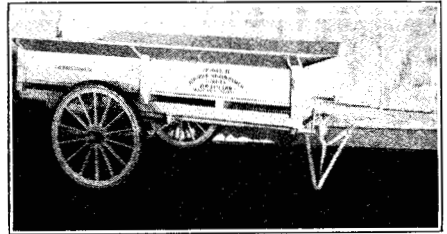
If your dealer cannot supply you, write direct to the

NO-FAULT SPECIALTY CO.
P. O. Box 17 F STONEHAM, MASS.

THE BOWER ADJUSTABLE TRAILER.

If you had happened along the road between Fowler and Lafayette, Indiana, about a year ago you might have seen a sight that would have given you a little amusement, but, probably not the idea that it gave the man who was the subject of the "sight." This is the story of how Frank W. Bower, a prominent Benton County farmer got an idea from two accidents that resulted in the manufacture of a light automobile trailer with a very promising future.

Mr. Bower possessed a two-wheel auto trailer which he used almost continually hitched to a Ford car. He got along well on the level roads over the Prairie around Fowler, and all was well, until when he started to Lafayette, some 30 miles away with a big cow in the trailer. Three miles out of Lafayette he came to a steep little hill. About half way up the Ford came to a stand still. The motor was racing. He looked behind, and was puzzled. The rear wheels were



spinning, then it dawned on him. The up grade caused the cow to crowd to the rear of the trailer. The weight of the cow in the rear of the trailer caused enough leverage over the axle in the center of the trailer to raise rear of the Ford until the wheels had no traction. Mr. Bower sat down and waited for help. He stopped passing car and three men got in the rear of his car. This gave him traction enough to get up the grade.

Mr. Bower figured out that by changing the wheel to the rear of the trailer he would overcome this trouble. He went home and rebolted the axle back and got along pretty well until he started to haul sack cement. This being a dead weight the full length of the body, it threw too much weight on the front of the trailer. Result—The first hard bump—the tongue broke.

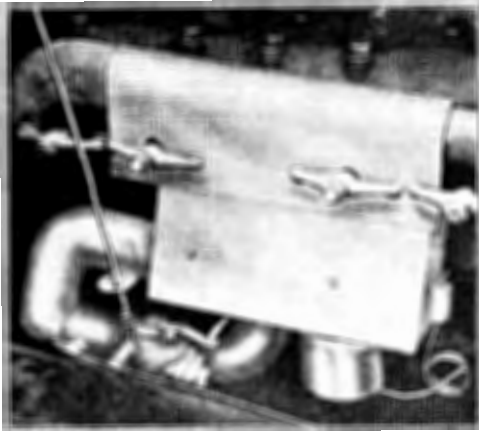
Then Mr. Bower saw the light. What he needed was to be able to shift the axle at all times under the trailer so as to adjust the load. He immediately started to build such a device. And after much labor and experiment and also with the help of an engineer the Bower adjustable trailer was perfected.

This shifting or adjusting device consists of two screws, one on each side of the trailer, made of cold rolled steel one inch in diameter and 40 inches in length, with four square threads to the inch. They run in plain bearings of malleable castng secured to cross steel beam at front of trailer. The threads on screws runs in a casting which is secured to a draw bar.

The screws are surrounded by steel tubing which is packed in hard grease, thus keeping this lubricated and free from dust. The screws are rotated by a crank on right screw and a steel chain and sprockets just back of front steel beam.

The front of springs are connected to draw bar at same point as screws, giving an equal draw on both sides of trailer. The rear end of spring is secured to sill of main frame by a rolling shackle which works on a steel bar fastened to under side of sill on main frame. This shackle consists of two roller bearings, one at each end, and makes the spring action very elastic and eliminates all possibilities of breaking spring, also eliminates any friction on the shifting device.

The Trailer is equipped with a steel stand in front for a support when trailer is not in use and folds up when not needed. The tongue is supported in pockets and runs the full length of trailer. By removing one bolt it will pull out,



A Sure Start and Saves Gas

You can start your car in zero weather with the same ease as in midsummer with the

EVER-READY MANIFOLD HEATER

No fuss or trouble in starting. No need of a choker or heavy gas adjustment for cold motor. Saves a large percentage of gas and assures "summer running." A practical device that really does the work. Every claim has been proven by many users.

Price \$10.00

DEALERS AND CAR OWNERS: If unable to procure—send cash direct for 5 day trial.

MORGAN AUTO NOVELTY CO., Iowa City, Iowa

giving an extension of forty-five inches. The tongue is also equipped with a Brice Automatic Ball and Socket Hitch.

This trailer has a at bottom, 46x90 inches and two beds. These are supported on flat bottom by pressed steel stake pockets. Stake pockets are secured to cross sills. This gives end pull on sills, in place of on the main sills, which would have a tendency to twist them out of shape.

The axle is made of 1½ inch round cold drawn, chrome nickle steel, heat treated, with a tensile strength of 130,000 pounds to the square inch.

The wheels are 32x2 with 14 spokes to the wheel and equipped with the Swinehart 32x2 solid clincher tire. A new type of Hub and Bearing are used, the inside and outside bearings are both the same size and both bearings interchangeable with the inside bearings of the Ford wheel.

The trailer is built throughout of oak, red gum, and the best grades of steel, and has many superior features. It can be adjusted at any time so that a part of the load rests on rear of Auto.

The Bower Manufacturing Company at Fowler, Indiana, has been in operation several months. They have shipped trailers all over the United States and Canada and the demand is growing rapidly.

NEW FORDSON FENDER.

The Corcoran Manufacturing Company has made a Fordson fender especially to meet a big demand, which they list as their No. 8 "Peerless" Fordson Tractor Fenders, which are illustrated herewith.

These "Peerless" Fordson Tractor Fenders are made of very heavy gauge steel, finished in two coats of black enamel baked on, and furnished with the necessary irons and bolts to hold them rigid to the tractor, and they are essential for the protection of both driver and engine, and add greatly to the appearance of the tractor. They are the latest addition to the "Peerless" line of Commercial Fenders, and followed closely upon the heels of the No. 5 "Peerless" Commercial Fender especially for the new Ford truck equipped with 32x4½ pneumatic tires.

JAMES ABELES JOINS BOYCE-VEEDER.

James A. Abeles, well-known in the automotive field as former Vice-President and General Manager of the Motor Car Equipment Company, and more recently organizer of an eastern house for the Beckley-Ralston Company of Chicago, has recently joined forces with the Boyce-Veeder Corporation, who will manufacture and market the new Boyce Fire Extinguisher. Mr. Abeles' long experience in the marketing of automobile accessories and equipment, combined with Mr. Boyce's experience as a manufacturer, should form a strong combination.

The new company has already opened offices and is now equipping a modern factory in Long Island City.

BOYCE FORMS NEW COMPANY.

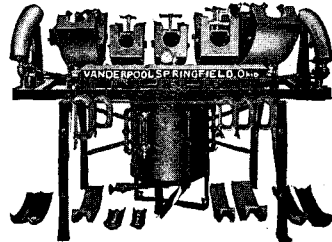
Harrison H. Boyce of the Moto-Meter Company, Inc., Long Island City, N. Y., has formed a new company the name of which will be the "Boyce-Veeder Corporation," having its factory and office in Long Island City, for the marketing of an automatic and hand operating fire extinguisher especially applicable to motor cars, trucks, tractors, aeroplanes, and other automotive vehicles. The new company will operate under the "Erwin" patents, and the device is said to be of a very novel and most meritorious nature.

Associated with Mr. Boyce will be Paul L. Veeder, an attorney well known in both New York and Chicago. Offices have already been opened in the Queens Subway Building, Long Island City. It is stated that production will be in full swing January 1st.

Mr. Boyce plans to divide his time between the new organization and the Moto-Meter Company, Inc.

**Open a Tire Repairing Shop!
Business Good and Fast Growing**

Vanderpool Vulcanizer (5 cavity), has capacity of \$100 worth of work a day. We are the pioneers in the manufacture of the Dry Cure Vulcanizer.



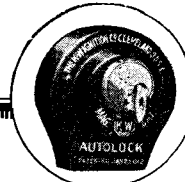
With the Vanderpool Vulcanizer no experience is necessary. We give you free instructions.

Write today for **Free Tire Repairing Manual** and full particulars. If others can be successful, so can you be. Write today.

In answering address Dept. A20

WM. VANDERPOOL CO., Springfield, Ohio

You Can't Forget to Lock It



You Can't Forget to Unlock It!

\$3.50

\$3.50

Equip Your Ford Now
With a



Leave your car anywhere, free from the possibility of theft.

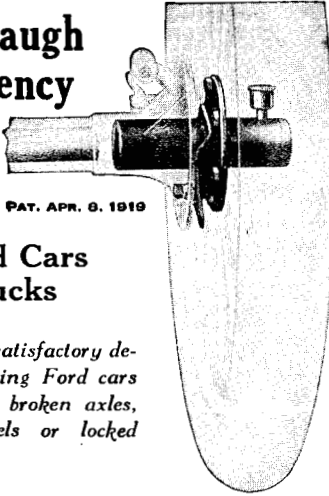
The K-W AUTOLOCK—

- Locks thru the ignition control. Can't be wired around.
- Has no master key or unsightly levers or contraptions.
- Locks units in coil box.
- Saves as high as 15% on insurance premiums.
- Prevents theft and unauthorized use.
- Complies with all local ordinances.
- Permits towing from restricted zones.

Order from your dealer today. If he cannot supply you with an original K-W, write to us direct.



Shambaugh Emergency Hub



PAT. APR. 8, 1919

for Ford Cars
and Trucks

The only satisfactory device for towing Ford cars with bent or broken axles, broken wheels or locked gearing.

Car will have same height and tread as under normal conditions.

No shock absorber or other accessory can interfere with installing.

There is no wear on housing—Hub is oiled. Applied in few minutes.

Tows at any speed.

Car Type, \$6.50. Truck Type, \$15
If your Jobber cannot supply you, order direct

SHAMBAUGH MFG. CO., LaFayette, Ind.

THE WRIGHT TRAFFIC AND DANGER SIGNAL.

Most everyone has heard in the traffic the resounding crash which indicates that some motorist has failed to understand the signal of the driver in front of him. Very frequently it is difficult for even the most experienced driver to translate the wig-wagging of other car drivers. There has always been a need for a satisfactory signal and this seems to be offered in the Wright Traffic and Danger Signal. This is a positive direction indicator which is distinctly visible to cars behind you at a distance of 150 to 200 feet, night or day in any kind of weather. At night, your tail light, shining through the white translucent glass of the Signal, onto the red arrow brilliantly, making it

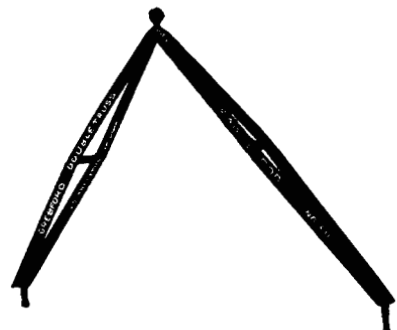


possible for the man behind you to clearly see its every movement.

The advantage of the Wright Traffic and Danger Signal lies in the fact that it lets the driver following you know, well in advance, of any change in the direction of your car. You can get it half way down the block. Secondly, it signals all five movements of the car—Forward, Right Turn, Left Turn, Stop and Back Up. Thirdly, no expense involved in its operation. You have to burn your tail light anyhow and this light illuminates the Wright Signal at night. You do not draw on the power of your batteries. You do not need electric wiring. By day, the Signal requires no illumination. For more complete information regarding this signal write the manufacturers, The Wright Traffic Signal Co., Cincinnati, Ohio.

A NEW GREB PRODUCT.

The prestige which attaches to the products of the Greb Co., 199 State St., Boston, Mass., is being upheld by their new Grebford Double Truss Radius Rod. This strengthens the Ford front axle and holds it rigidly in position. It



cannot buckle, lessens vibration, prevents accidents and makes steering much easier and safer. It can easily be attached in a few minutes without the aid of a mechanic. The cost is \$5.00. Complete information regarding this new product and other items of the Grebford line may be had by writing the manufacturer. congested traffic.



A SMOKING MOTOR IS WASTING OIL AND GAS

—accumulating carbon-fouling spark plugs and piling up present and future trouble and expense for the owner.



Pat. Mar. 2, 1915, Feb. 27, 1916

PRESSURE PROOF RINGS will stop this

The Expander—an important feature of Pressure Proof Rings—forces an even, constant pressure against one side of the groove and outward against the cylinder wall.

All wear, even the slightest, is thus automatically taken up and groove clearance through which oil may be sucked into the cylinder above the piston ring (where it would ignite and form carbon or pass out as smoke through the exhaust) becomes impossible.

Pressure Proof Rings insure permanent, full power and greatest operating economy.

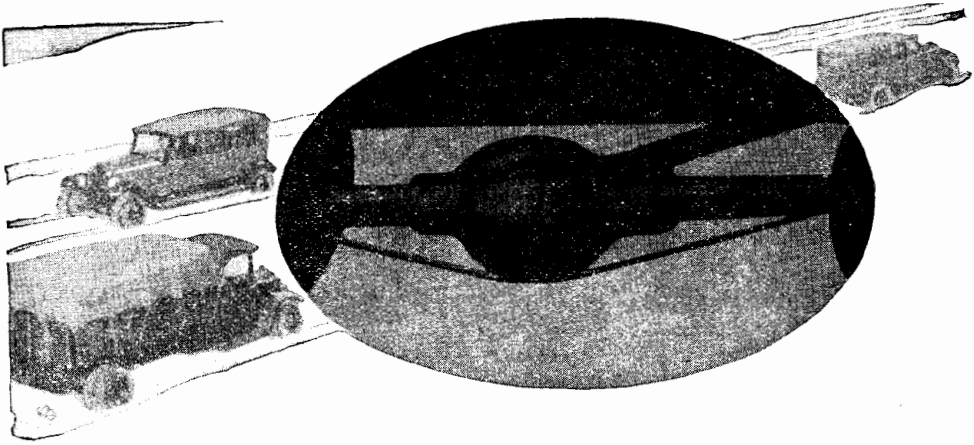
ONE PRESSURE PROOF THREE-PART OR TWO PRESSURE PROOF JR. TWO-PART RINGS make a full piston equipment.

The full equipment of a piston including the necessary Pressure Proof Rings is less in first cost than an equipment of any other special rings.



PRESSURE PROOF PISTON RING CO.
107 MASSACHUSETTS AVE. BOSTON MASS.

When writing advertise rs—Just say FORDOWNER



Powrlok in Here Prevents Skidding and Stops Stalling

AFTER five years of actual service in thousands of trucks, passenger cars, tractors and industrial trucks under every conceivable sort of service, Powrlok is today admitted by practically all the leading axle manufacturers to be the most perfect form of differential construction yet devised.

It is particularly adapted for Ford cars, now being used in thousands of Fords in all parts of the country.

The Powrlok differential, besides performing the same functions as the ordinary differential, has the marked advantage of reversing the action of the ordinary differential when the traction on the rear wheels is unequal.

Powrlok automatically transmits the power to the rear wheels in *direct* proportion to the traction or hold, which the wheels have on the road, thus applying the power where it is needed to pull the load instead of wasting it in useless wheel-spinning and tire wear. This proper apportioning of the power to the rear wheels, stops skidding almost entirely.

Fifty leading manufacturers of the four classes of automotive vehicles use it now. All will eventually. It will pay you to investigate now.

Our new book, "More Than a Differential," explains it in detail. It's yours for the asking. Our special proposition to dealers and distributors will be sent on request.



**We shall exhibit at
the New York and
Chicago Shows.**

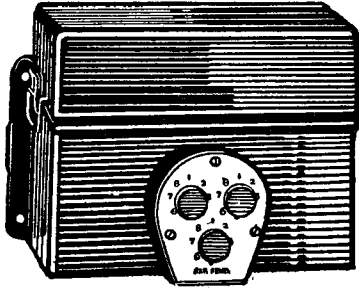
THE POWRLOK COMPANY
1107 East 152nd Street CLEVELAND, OHIO
THE CANADIAN POWRLOK COMPANY, WALKERVILLE, ONTARIO

POWRLOK

More than a Differential

When writing advertisers—Just say FORDOWNER

100,000 FORDS STOLEN LAST YEAR



A CHRISTIE LOCK

WOULD PREVENT THESE THEFTS

DISTINCTIVE FEATURES

1. No key required.
2. Cannot be wired around.
3. Same operation which stops your motor automatically locks your car.
4. Approved by the Underwriters' Laboratories.

Ask your nearest dealer. Price \$6.00

Christie Auto Lock Co. ⁶⁶⁰⁷ *Dorchester Ave.* **Chicago, Ill.**

A NEW IDEA.

Mann & MacNeille, architects and construction engineers, have added to their organization an automotive department with headquarters in the Book Building, Detroit. This department is designed to render expert building service to automobile dealers, garagemen, repairmen and others engaged in retailing automotive merchandise, and is prepared to carry out work at any point in the country.

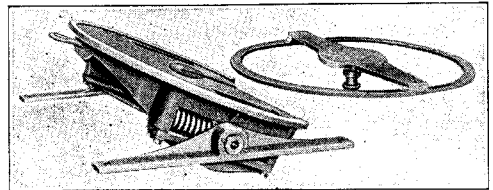
The aim of this new department, the first of its kind, is to cut the cost of construction and to increase the operating efficiency and sales pulling power of automotive buildings by improved design resulting from concentrated effort in this field.

Its advent is due to recognition of the fact that a garage, showroom or service station building is a specialized form of construction similar to a hotel or theater and that detailed knowledge

of the automobile business is primarily necessary if efficient buildings are to be developed for the trade.

MARTIN ROCKING FIFTH WHEEL.

A new Automatic Fifth Wheel, which renders unnecessary the use of jacks for lifting the front end of the semi-trailer in order to connect to and disconnect from the truck and combines in one unit an automatic coupling device and cam



whereby the front end of the semi-trailer may be automatically raised, has been invented by C. H. Martin and will soon be placed on the market by the Martin Rocking Fifth Wheel Co., Springfield, Mass.



HILLMETER

registers ROAD GRADES and accurately determines an ENGINE'S—(1) Performance; (2) Efficiency; (3) and a CAR'S "free rolling;"— The THREE determining factors of ECONOMY and SAFETY.

Write for "The Hillmeter Reasons" to the Manufacturers.

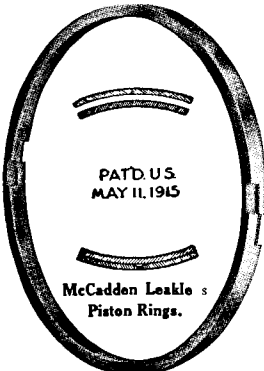
THE METEOR CORP.
140 West 68th St., New York City.

NEW MOTOR DRIVEN KLAXON.

Responding to a demand that has grown to large proportions among the owners of Ford cars for a motor-driven horn, the Klaxon Company now announces its new KLAXON "5," Ford Type. Shipments already have been made to dealers and jobbers in the various parts of the country.

The new horn is equipped with a bracket that fits readily onto the Ford engine, under the hood. Installation on Ford cars, which are now

Ford Owners, Racing People and Aeronauts



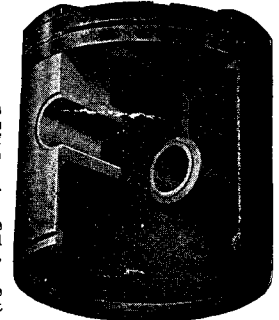
In our light grey iron piston weighing under 1 1/4 pounds each, equipped with McCadden leakless rings, bronze bushings and pins at \$18.00 a set, we offer a permanent source of satisfaction. For racing people and Aeronauts our Adjustable piston, can be adjusted within limits of .025, very light.

In our McCadden Ford aeroplane motor we offer an exceptionally high powered motor at an unusually low price.

Our special fast cam shaft to make the Ford into the racing type we guarantee a gain of efficiency both as to speed and to power of 25 to 30 per cent from this source alone, furnished with adjustable push rods. Write for price.

Ford cylinders rebored and reground and fitted with the light grey iron pistons, leakless rings and bronze bushings at \$23.00, send head with cylinder. The shop of quality.

McCADDEN MACHINE WORKS, Inc.
St. Cloud, Minn.



Sectional Light Grey Iron
Piston 1 1/4 pounds.

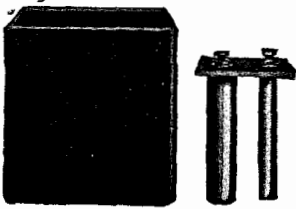
When writing advertisers—Just say FORDOWNER

FORD OWNERS

Safety! Convenience! Economy!

A constant supply of current stored for your lighting, starting, or ignition when you want it—regardless of whether your engine is running or not.

“FORDREKTAFIER”



will do this for you. Simple, durable, effective, no moving parts—nothing to get out of order. While your engine is running, current taken from your Ford magneto and transformed by FORDREKTAFIER charges any battery; this gives you at low installation cost, positive insurance against hard starting and a dead lighting line. Eliminates dangerous driving in the dark.

Exclusive Points of Superiority

1. No drag on engine power.
2. No moving parts to adjust or wear out.
3. No slipping belts.
4. No bearings to wear out.
5. No brushes to clean.
6. No switches or cutouts to operate.
7. No parts to lubricate.
8. Never needs expensive overhauls.
9. FORDREKTAFIER charges any battery and protects coil points and magneto.
10. Absolutely fool proof.

FORDREKTAFIER is an electro-chemical device that positively permits you to forget the lighting, starting, and ignition troubles constantly experienced. Thousands in use—satisfaction guaranteed or money refunded.

Install FORDREKTAFIER at once—banish electrical troubles. You'll never know what satisfactory car service is until you have FORDREKTAFIER. Installations quickly and easily made. **PRICE \$10.00 f. o. b. factory**, shipping weight 6 lbs.

For further details including complete installation instructions, etc., inquire of your garage or battery service station. If they cannot supply you, write.

The Warnerlite Co., Inc.

8 Ritzman Ave.

Pasadena, California

Garages and Battery Service Stations Attention!

FORDREKTAFIER is a profitable, snappy sales proposition—a sure business builder for you. Investigate our national sales and advertising campaign. 3,500,000 “prospects” to date and more every minute.

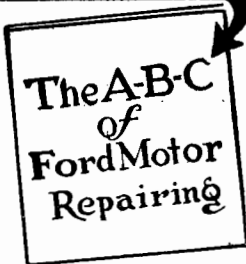
“Warnerlite Products Are Universal and Dependable”

FREE Repair Book

Fully illustrates and explains how to grind your own Ford valves as good as an expert with the "Little Sioux" Ford Tool Set. You can keep your Ford engine full of pep and hitting on all four. Saves gas and garage bills. Write for it.

Complete tool set with instruction book, \$7.25. Saves its cost on one job.

ALBERTSON & COMPANY Manufacturers and Patentees
150 Jennings St. Sioux City, Iowa



"coming through" equipped with self-starters, is a simple matter, and can be done by any Ford owner himself.

The need for a motor-driven signal for Fords has been sensed for some time, but the Klaxon Company has been considerably oversold during the past year on its standard lines; and it has been only recently with an enlarged capacity that it has been possible to turn out the new Klaxon "5" in quantity production.

THE RECTO TIMER.

A new timer which seems to be meeting with considerable success is the "Recto" Timer a product of the Recto Mfg. Co., 23 West Third street, Cincinnati. This timer has been designed to prevent the timer wires from coming in contact with the fan belt or any metal—preventing grounding. It is said that the Recto Timer eliminates hard starting and jerky, uneven motor action while it puts more life and pep generally into the igni-

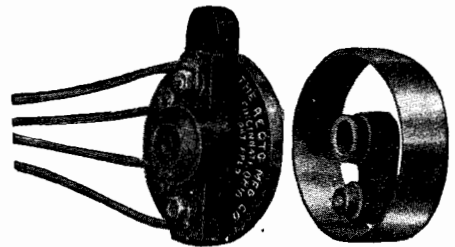
Get This

Practical License Holder

The sensible, secure, quick way to attach license plate is with the **LITTLE GIANT LICENSE HOLDER**

The most perfect and practical holder to be found. Holds any size license plate at the bottom of the left hand headlight bracket. Holds tag secure. Cannot swing around. Made from heavy cold rolled steel, well finished. Easily attached—no alteration of car.

Dealers: Ford owners buy this practical license holder on sight. Easy profits. Write **C. C. BOYD, Pulaski, Pa.**



tion. It functions the same as the brush on an electric generator or motor. A sliding carbon metal brush pushes the grease and dirt before it with a high resistance carbon to wipe away the spark. This timer needs no oiling and the flat inside surface can be cleaned and smoothed off with sandpaper. Water and oil from other parts of the engine will have no effect on the timer. Brushes can be renewed for 30 cents each. The timer is marked with numbers and designed with colors for wires so there cannot be any mistake in installing.

HOLDS LICENSE PLATE.

We have seen license plates attached to the Ford in various ways. Sometimes a piece of string attaches the plate in some unlikely place on the car. One way to have the license tag properly attached is through the use of the Little Giant Ford License Holder, manufactured by C. C. Boyd of Pulaski, Pa. This bracket is especially designed for attaching the front license numbers to the Ford cars at the bottom of the left hand head light bracket. The bracket holds any size license number. It holds the plate securely and cannot possibly swing, rattle or mar the car. The license tag is readily attached and held rigidly in position; is neat and conforms to the law as required.

It is not a light, stamped affair but made from heavy cold rolled steel, nicely finished and will last as long as the car. It is not an experiment but has been in use quite a long time. It is easily attached and requires no alteration of the car.

STARTS FORD QUICKLY.

An accessory which users claim to be safe, sane, and satisfactory, and a decided aid in securing a start on cold mornings is the Hot Spot Generator. This consists of a burner which can be attached to the Ford car in one minute. Fitting under the manifold, its heat warms up the manifold quickly and assures vaporization. The burner is easily removable and can be dipped in gasoline or alcohol without the danger which would be present if it were required to pour fuel over it while attached. It is said that the Hot Spot can be operated one hundred times for one cent and the initial cost is only \$1.00. It is a product of the Hot Spot Generator Co., 1325 Walnut St., Kansas City, Mo.

YANKEE TIRE PUMP

Most powerful—convenient—easiest operating Tire Pump ever produced. Infallible. Never loses compression. Actually gives 90 lbs. of air before you know it. No back-breaking bending—stand erect. Few sweeps of handy handle—job's done. Clamps to running board of car. Folds to fit tool box. Lasts life-time. \$5.00 East of Rockies.

Order from ad—or write for descriptive folder.

APEX ELECTRIC MFG. CO.
1410 W. 59th St. CHICAGO, ILL
Pacific Coast Representatives
HUGHSON & MERTON, Inc.
77 O'Farrell St. San Francisco, Calif.

DOUBLE TIRE MILEAGE USE INSURT TIRES

A tire reinforcement preventing punctures and blowouts, also doubling tire mileage.

Cheaper than retreading; installed by yourself in any tire without the use of tools.

Becomes part of tire, yet can be used over again.

Fully guaranteed. Save money by writing at once.

AUTOCESSORY SALES CO.
108 N. Dearborn St. Chicago, Ill.

Make Winter Starting Easy

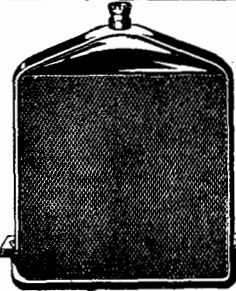
with a starter that spins your Ford motor in any weather. No battery or wiring to cause trouble, no generator to sap engine power. The

Rockway Automatic Starter

operates with a strong coil spring. Just pull the lever. When engine starts it automatically rewinds spring. Easily installed. A convenience to you and increases re-sale value of your Ford.

Dealers: Order early to insure deliveries. Write for terms.

The Rockway Starter Co., Waukesha, Wis.



With the Arrival of
Superford
HONEYCOMB
RADIATORS

For Ford cars, the dealer is now assured of a high-class radiator, carefully constructed, for service and efficiency.

"Superford" Radiator Units are made entirely of brass.

Model No. 16F for 1909 to 1916 Ford cars. Price each, \$30.00.

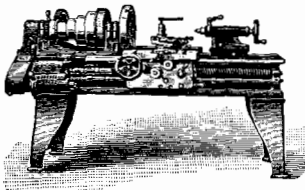
Model No. 18F for 1917-1918 Ford cars. Price each, \$35.00.

Catalog No. 6 now ready—Write for proposition. We shall exhibit in the New York Show, Grand Central Palace, January 3 to 10, 1920.

SUPERIOR LAMP MFG. CO., 150 W. 52nd St., New York

A Garage Owner in Colorado

writes in this strain:



"I am using a 14 inch Champion lathe in my shop. This machine is equipped with Milling and Gear Cutting Attachment and is a complete machine shop in itself. There is hardly a job I cannot do on this machine. It is some lathe."

Some lathe is right, and we can convince you if given the opportunity. Catalog?

12-14-16 and 18 inch sizes.

Champion Tool Works, Winton Place, Cincinnati, Ohio

BURGESS

"TRIPLE DUTY"
REBOUND CHECK AND SHOCK
ABSORBER

Saves Real Money on Tires, Gas
and Repairs

The only "Triple Duty" Shock Absorber on the market. Checks all rebound. Makes your car glide over the roughest roads. Saves your money.

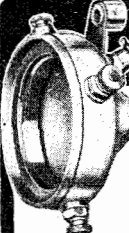
Full Details Upon Request.

Manufactured and Guaranteed by

W. S. BURGESS MFG. CO., St. Joseph, Mich.

Sales Department

THE ZINKE CO., 1321 Michigan Ave., Chicago, Ill.

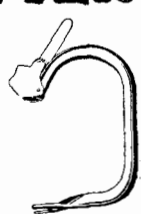


Over 500,000
Sold Last Year!

Every Ford owner knows the superiority of the Milwaukee Timer. It is the recognized standard of replacement timers for Fords. The most durable timer made—assures a fat, perfectly-timed spark and is a sure cure for most ignition troubles.

Retail price, \$2.25. Write for attractive dealer proposition.

MILWAUKEE AUTO ENGINE & SUPPLY CO.
Dept. 110 Milwaukee, Wis.



BEARDSLEY
NEVER-SLIP
VALVE LIFTER

Three popular priced types— for Ford cars, for Dodge cars and Fordson tractors, and a Universal which fits 90% of all cars.

Literature and Dealer's proposition sent on request.

The Loomis-Beardsley Mfg. Co.
1118 Mt. Vernon Ave., Columbus, Ohio.

CRANE PULLER

The Original Pulling Tool

Quickly, Safely and Easily Removes Automobile and Truck Wheels, Flywheels, Gears, Couplings and Cams. Straightens Bent Shafting.

BUILT FOR SERVICE

Write for latest catalog.
Order from your Jobber.

CRANE PULLER CO.

54 LAKE ST.

ARLINGTON, MASS.



RONSON
TRADE MARK REGISTERED


12 COMPLETE TOOLS IN ONE
COMPACT UNIT

You Need Every One Every Day

6" long— $\frac{1}{2}$ " thick—weighs only 8 oz. Your dealer can supply you. Otherwise remit direct to

THE ART METAL WORKS, 7-15 Mulberry St., Newark, N. J.

\$1.00



DON'T
ENVY THE
MAN WHO
DRIVES A
LAMCO
EQUIPPED
FORD

THE CAR FOR PALS

SPORTING—TOURING—RACING

DEALERS: Write for the late fall edition of the "LAMCO," showing the complete "Lamcoline" of Bodies, Tops, Seat Covers, Spark Plugs, Tires and Accessories.

Lehman Mfg. Co. 511 Fourth Street, CANNELTON, IND.
Drive One YOURSELF

SUPERIOR LAMP HAS NEW BRANCH.
 The Superior Lamp Mfg. Co., 150 West 52nd St., New York City, has leased a building on a long term at 313 Halsey St., Newark, N. J., wherein they expect to operate a direct branch to give service to the trade throughout New Jersey and Pennsylvania. An exclusive wholesale motor car accessory jobbing business will be carried on at this address. The Company will occupy this branch on January 1st.

THE "MASTER" TIMER.

Those motorists who have some difficulty in starting the motor in zero weather—and this includes not more than 100% of them—will be interested in the claims made for The "Master" Ford Timer, of which the manufacturers say that it will start the motor on the first turn in zero weather. This Timer has many points in



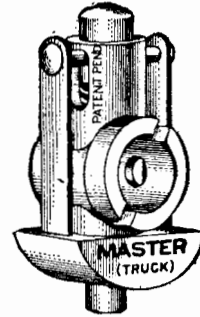
Auto Scope
Windshield Wiper

Fits any windshield
Three popular models.

Prices \$1, \$1.50 \$2

Wipes both front and back of windshield. Fits the cars that other wipers don't. Gives dealers complete line. Better made, easier attached, longer lasting.

WHITE PRODUCTS CO., 106 W. 55th St., Chicago



its favor yet sells for the small price of 75c. It is a product of the Master Products Co., Detroit, Mich. This Company is also meeting with considerable success in marketing the "Master" Ford Governor, which limits the speed and expense of Ford cars and trucks. The speed limit of the Ford car equipped with this device is 23 miles per hour; of the Ford truck, 16 miles per hour.

AM-PE-CO CYLINDER GAUGE.

The American Machine Products Co., Marshalltown, Iowa, have placed on the market the Am-Pe-Co Direct Reading Cylinder Gauge. The purpose of this gauge is to take the place of the expensive and delicate internal micrometers now used to determine cylinder diameter. By the selection of the proper blade a quick and correct "reading" of the oversize is made. The Gauge is made of hardened and polished steel. Each blade is ground true to its designated length by revolving on centers, so that the whole arc of the blade can be used in measuring. The simplicity of this Cylinder Gauge appeals to all garage mechanics because it eliminates the possible uncertainty in micrometer reading, and for the fact that it quickly gives, plainly indicated, and correct measurement.



B-W
COIL TESTER

A Quick, Easy and Infallible Test for the Coils of Ford Cars.

Every garage should be provided with this time-saver. It makes a testing job a matter of a few seconds. Pays for itself in one day's use. Ask for folder and terms.

Ballman-Whitten Mfg. Co.
 4060 Forest Park Blvd.,
 ST. LOUIS, MO.,
 Manufacturers of
 B-W Ammeters.



THE AF-FORD-ABLE "JUNIOR" TRUCK UNIT.

The way to get the most economy out of the Ford which already is recognized as the economical car is pointed out by the Affordable Motor Truck Corp., 1154-6-8 North 16th St., Omaha, Nebr. It is claimed that the capacity of the Ford can be doubled without increasing the operating cost through the use of the Af-Ford-Able "Junior" Truck Unit manufactured by this company. Further claims made for this truck unit are that it is stronger, safer, more economical and does not change regular Ford engine speed; with upkeep less than one-half that of units where gear ratio is changed. It eliminates vibration by keeping the rear-axle bearings and the differential gears in line making a free running gear. Lower gasoline bills, greater tire mileage, longer life for the car and the lowest possible hauling cost, are claimed. The Affordable Unit is very well made, is easily attached to a new or old Ford and sells for only \$97.50.

PHILBRIN
High Frequency Ignition
for Ford Cars

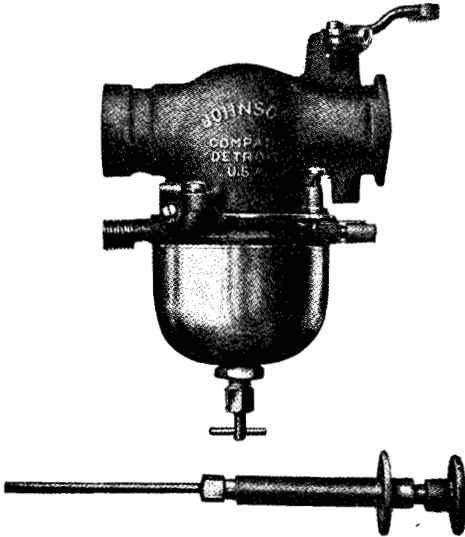
Develops More Power, Increases Speed,
Adds to Flexibility, Utilizes Current
of Ford Magneto.

Philips-Brinton Company
 511 S. Broad St. Kennett Square, Pa.

When writing advertisers—Just say FORDOWNER

TWO INTERESTING PRODUCTS.

The Johnson Co., 515 Forest Ave. East, Detroit, Mich., offer two interesting products which are attracting considerable attention in the trade field. The first is the Johnson Carburetor, Model A. This carburetor has many unique features and is said to be a decided economy for the Ford owner. The Johnson Gasoline Strainer is a unique means of assuring gasoline which is



free from foreign matter. It traps dirt and sediment before it can lodge on the inlet needle seat. It is a means of preventing leaky carburetors and can be installed in a few minutes. The Johnson Carburetor sells for \$12.00 while the cost of the gasoline strainer is \$1.25. An inquiry to the manufacturer will bring more complete information.

CONVERTING THE OPEN CAR INTO A LIMOUSINE.

Here is one of the very latest acquisitions in the auto top line. The open car can be easily converted into a practical closed "Tour Sedan" or Limousine, without the necessity of changing the style of the top or adding to the weight of the car.

We refer to the new "Limo Weather-Proof Top," manufactured by Buob & Scheu, 216-26 Webster St., Cincinnati, O. This top is so constructed that it can be detached at any time, or replaced, within a few minutes. The curtains



open with the doors, as shown in illustration. It is simple, practical and very reasonable in price. All curtains are made up in sections, so that any one or more sections can be detached to meet the weather conditions. The outfit can be applied to any make or model of car. However, it is made principally for the Ford car. The top is very attractive in appearance and affords all the comforts of a high-priced closed car.

A letter to Desk 12-D of the above company will bring complete information and prices.

SECURITY AUTO LOCK
 The original loose wheel lock for Fords. Approved by underwriters. Insurance reduced 15%. Made of solid brass. Nickel plated. Easily installed in 10 minutes. No drilling. No filing. No Sawing. No chiseling. Price \$6.50 Subject to advance. Distributors wanted.

The image shows a cylindrical brass lock with a Yale logo and the text 'SECURITY AUTO LOCK CO. PAT. NOV. 14, 1916'.

Security Auto Lock Co.
 410 N. Paulina St.
 Chicago, Ill.

COMMON SENSE
 AUTO POLISH
THE GREASELESS CLEANSER

COMMON SENSE MANUFACTURING COMPANY
 508 N. Whittier, St. Louis, U. S. A.

For all *Ford's* \$25.
BARRETT
 SELF STARTER AND PRIMER
 5 YEARS GUARANTEE

IF YOUR DEALER DOES NOT HANDLE THEM
 WRITE US - 1777 BROADWAY NEW YORK

Barrett Motor Starter Mfg. Co.
 1777 Broadway, New York, N. Y.

SOMETIME

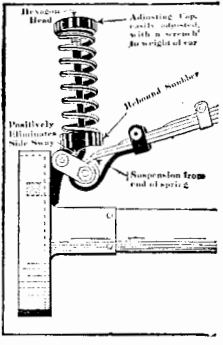
You have been reading that "SOMETIME" a Successful way of Carbureting KEROSENE would be found.

We are here to tell you that "SOMETIME" is NOW.

LET US PROVE IT

A principle utterly foreign to that employed in all other Kerosene Carburetors heretofore designed.

HOCKETT KEROSENE CARBURETOR CO.
 Wabash, Indiana



LANSHIELD SHOCK ABSORBERS
For FORD CARS
INSURES RIDING IN COMFORT
Price \$12.50
West of Rockies \$13.00
AT ALL DEALERS
Lanshield Mfg. Co.
West Haven, Conn.

SAVES TIME AND MONEY.

The very latest device for saving time and labor in the Ford Service Station is the Steere Servistock Parts System. More valuable time goes to waste through improper stock room facilities than from any other operation in the modern service station.

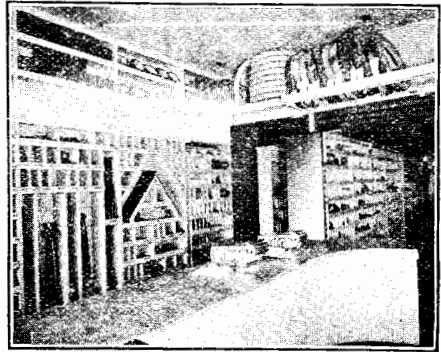
The Steere idea is to have all the parts stored in units numerically arranged following the Ford parts list—each number having a bin by itself. The bins in turn are built in proportion to the size of the part and quantity of parts required for a month's business. With the Steere Servistock System in use, cheap labor may be employed in the stock room, because a stock clerk need not know the difference between a stud and a bolt, yet if he can read numbers, he can fill a stock order. The Units are also arranged to minimize the walking distance in filling an order. For instance, take the filling of a parts order on a rear axle job, which is one of

T STEEL

FORGED Steel Emergency Brake Shoe for Fords

An adjustable, reinforced, forged steel brake shoe giving the maximum of braking area obtainable with the Ford drum. The T construction makes buckling and breaking impossible. Lined with the highest grade wire inserted asbestos brake lining. Will last the life of the car if occasionally relined. A brake equal in efficiency to that of high priced cars. Thousands in use. Fully guaranteed. Price \$3.00 per set. Electrotypes furnished jobbers on request.

SAFETY FIRST BRAKE SHOE CO.
SEATTLE, WASH.
Sales Department
THE ZINKE COMPANY, Chicago, Ills.



FORD SPRINGS

We are fully equipped for manufacturing Automobile and Truck Springs of superior quality. We solicit the inquiries of Automobile and Truck Manufacturers. We carry a large stock of Ford front springs. We also manufacture a One Piece Angle Auxiliary Radius Rod for the Ford car. Send for particulars.

SHUNK MFG. CO., Bucyrus, Ohio

9959 FORD DEALERS

List United States and Canada, corrected up to July 1, 1919. Typewritten and Rated, the only complete and up-to-date list to be had. Price \$35.00 or \$5.00 per thousand by states. 2,600,000 Ford Owners every state and all other Automobile Owners, and all Auto Dealers, Garages, Supplies and Repairs. Write for General Price List No. 97.

A. F. WILLIAMS, Mgr.
Desk 8. List Department,
Phone Franklin 1182 166 W. Adams St.
Established 1880. Chicago, Ill.

the most common jobs, these parts would come in adjacent units which carry the complete rear axle assembly, and would be located near the shop service window. The Units carrying parts for less common jobs are placed correspondingly further away.

When installing the Steere Servistock System the number of Units is determined by the volume of stock required. Standard systems are 11 Units, 28 Units and 42 Units. The Units are substantially constructed of a good quality of material; tight joints are a feature. The finish is Dado Grey with numbers stenciled in black, unless otherwise specified.

The Fairbanks Company—Administrative Office, New York, N. Y., are merchandizing the Steere Servistock Parts System. Orders taken with a definite date for delivery. All shipments are made F. O. B. Detroit.

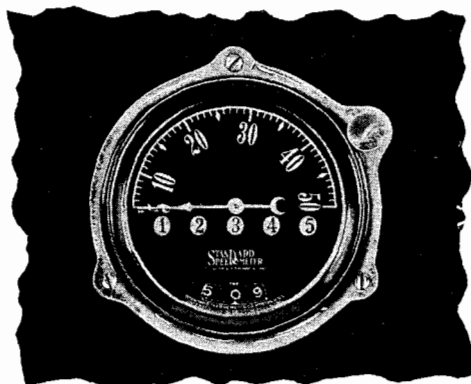
SOMETHING NEW AND INTERESTING.

The Sunday morning clinic had gathered in Gasoline Alley for the purpose of determining what was wrong with the Ford belonging to Brother Jones. The diagnosis revealed that it was suffering from badly scored cylinders and the treatment prescribed was an expensive re-boring job. It happened that there was a radical in the crowd who pointed out that re-boring must of necessity thin the cylinder walls and that there was always the probability of encountering a sand-hole with the chance that another cylinder block would bite the dust of the junk pile.

Unlike most critics, this radical had a solution and suggested the use of Transco Fluxoid, a new product manufactured by the Transmuted Metal Co., 3334 Chicago Ave., Chicago, Ill. This Fluxoid is said to be an absolutely sure means of perfectly repairing scored cylinders, by means of a very simple operation which avoids re-boring and replacement of new pistons and rings. A smooth and lasting cylinder surface is assured. Furthermore, it is claimed that Transco Fluxoid is not affected by the heat of the motor.

Naturally enough this revelation created considerable interest. The radical proved to be a willing informer and told the group of motorists

STANDARD SPEEDOMETER FOR 1920 FORDS



MODEL F505
\$18.00

CUT METAL BOARD *and* INSTALL IN HALF HOUR

Our special tools cut metal board neatly and quickly. Not over five minutes required. Sprocket attached without drilling hub-flange and our 18 Pitch Helical Gear Joint attaches in front of axle with only one bracket. A simple, solid installation without excessive cost to you.

Mr. Dealer: Do you know we have manufactured instruments of precision for at least thirty-five years; that the knowledge acquired in that time has been used in developing the **New Standard Speedometer** and we can now offer you a speedometer that is *perfected* from indicator to driving joint?

Not Built to a Price

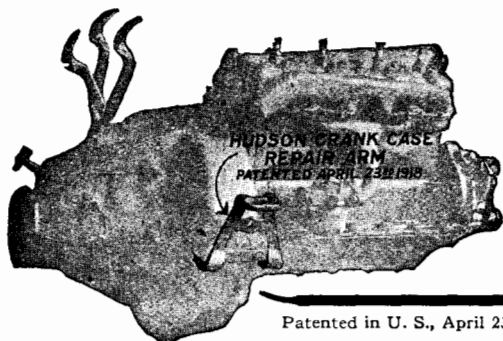
The dollar has been ignored in this work of art. Every unit is designed to give the maximum of service, and the best of workmanship and material obtainable has been used to make it the

“STANDARD” of All Speedometers

You can't go wrong in selling this speedometer if you want an outfit of highest merit. It is built to satisfy the most exacting.

Our Sales Proposition is as good as the speedometer and we guarantee prompt delivery. Efficient sales and service stations in all large cities. Name of nearest distributor sent on request.

Standard Thermometer Co.
65 Shirley Street, Boston, Mass.



\$150
LIST PRICE
Liberal Trade
Discounts



Patented in U. S., April 23, 1919. In Canada, May 13, 1919

The Original Patented Nationally Advertised Hudson Crank Case Repair Arm for the Ford

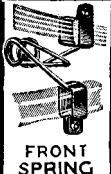
This device in two years has saved \$4,000,000 in repair bills for Ford Owners. Saves a day in making the repair when the Ford Motor Arms break. *Time of repair, old way, One Day. Hudson Crank Case Repair Arm Way, 20 minutes.* Simply loosen four bolts, tighten the nuts, slip Hudson Arm in place. No tearing down of motor.

Stocked by More Than 20,000 Retailers and Wholesalers.

JOBBER: Let us send you our Distributors' Proposition.
DEALER: Are you carrying this big seller?

MAY WE SEND CATALOGUE OF COMPLETE LINE OF HUDSON SPECIALTIES FOR THE FORD?

HUDSON MOTOR SPECIALTIES COMPANY 1932-34 Arch Street
Philadelphia, U. S. A.

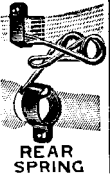


FRONT SPRING

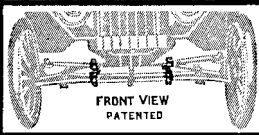
NABOB SHOCK REMEDY
For Ford Cars
A Shock Absorber and Rebound Check In One

A set of 4 springs which anyone can attach without drilling any holes or changing anything on car. Break force of down plunge, check rebound making Ford smoothest riding car. Saves 1-5 gasoline. Stops jarring and sideway. Makes driving easy. Increases tire mileage. Try springs 10 days; if \$6.50 not satisfied return and receive money. Dealers write us.

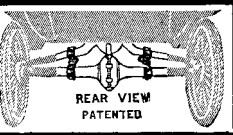
SHAUGHNESSY & CO. 333 So. Dearborn St. Chicago, Ill.



REAR SPRING



FRONT VIEW
PATENTED



REAR VIEW
PATENTED

FYRAC

SPARK PLUGS


*One inch firing surface—*one inch jumping fire—explodes every particle of gasoline, so *gasoline-formed carbon* is prevented. Ask your dealer for Fyracs, or write to the factory.

FYRAC MANUFACTURING CO., Rockford, Illinois
Export Department, Werner & Butts, 336 Whitehall Building, New York, U. S. A. Canadian Department, Campbell Agencies, 350 Kinnon Building, Toronto, Canada

MR. DEALER

?

Can You Supply The Trade?
December Issue, Page 89



**“Special”
Cut-Out**

*“Feels the Pulse
of the Car.”*

**Correctly Designed. Quality
Guaranteed. Easily Installed. Fits Any Car.**

SIZE	Valve Only	Valve With No. 3 Pedal	Valve With No. 4 Pedal
1½ in.	2.50	3.00	3.50
1½, 1¾, 1¾ in.	3.00	3.50	4.00
2, 2½ in.	3.50	4.00	4.50
2¼, 2¾, 2¾ in.	4.00	4.50	5.00
2¾, 2¾, 3 in.	5.50	6.00	6.00

THE COOPER MFG. COMPANY, Dept. F, Marshalltown, Ia.
Sales Mgrs. THE FULTON CO., Milwaukee, Wis.

of other discoveries made by the Transmuted Metal Co., which included among many solders one which is positively guaranteed to solder together any known metals permanently. This applies to aluminum, which heretofore has been a problem for the best of metallurgists. Extensive tests made by this Company have proven the thorough practicability of this aluminum solder.

The assembled group considered this information as the most interesting announcement which they had heard in a long time, and one which was filled with immense possibilities. We believe that readers of the above will view the matter in the same light and will want to know more about these products. Full information may be had by writing direct to the manufacturer.

A NEW TOW CHAIN.

Of the new auto accessories that have come to the attention of this department, one of the handiest is an 18 foot heavy link tow chain recently introduced by the Chain Products Co., of Cleveland, Ohio.

To the motor car owner who has luckily escaped the need for a tow chain, any such a product apparently will serve the purpose, but to the initiated the following items will be of more than ordinary interest.

First, the links are unusually heavy and strong and the hook at each end is drop forged. What is more exasperating than to start your tow only to have a link give way or one of the hooks straighten out or break clear off?

Second, both ends are covered so that the enamel of neither the car towing nor the car being towed are scratched by the links while coupling or uncoupling.

Third, each chain is packed in an individual bag making it easy to handle and keeping any mud picked up off the other tools of your tool box.

The Bulldog tow chain is made of 10-0 Bulldog chain, 5-6 inch material with a tensile strength of 4400 lbs. It is 18 feet in length with drop forged hook on each end and the links on each end are covered to protect the enamel of both cars. Dealers will find this tow chain a product with a world of sales opportunity.

UNIVERSAL RADIATOR SHUTTER.

The Ford owner can now equip his radiator for efficient control of the heat of the motor the same as several of the higher priced cars. The Universal Radiator Shutter, made by the Auto Metal Parts Company, factory, Des Moines, Sales Office, Chicago, has been put on thousands of Ford cars since October, and its use is becoming universal.

This shutter is built so that it can be opened or closed from the driving seat and the operator of the car can regulate the flow of air through the radiator so as to maintain a correct operating temperature. Many Ford dealers over the country are successfully selling the Universal Shutter with new cars, including it as a part of the original sale.

ATLASTA SAFETY DEVICE.

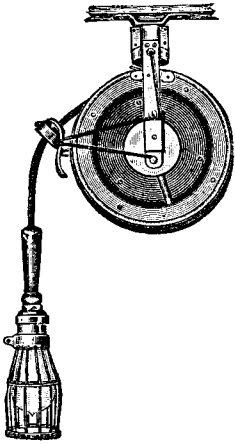
This device is a Ford accessory pure and simple, an attachment which fits over the crank to make it impossible for the crank to kick back. The principle is the simplest in the world. By means of a ratchet and pawl of durable construction, the Atlasta Auto Safety Device automatically disengages the crank from the crank-shaft whenever the engine back-fires.

It is said that cold weather and an advanced spark make no difference. This ingenious contrivance will always do its work—can always be depended upon to protect the good right arm of him who cranks his Ford. Quite naturally the Atlasta Auto Safety Device found a ready demand. The first advertisements placed in carefully selected trade papers brought inquiries from dealers and Ford-owners throughout the country and resulted in thousands of sales. The advertising appropriation was increased with equally profitable results. And today this practical device is in use in every section of the country. It is a product of the Atlasta Specialty Mfg. Co., St. Louis, Mo.

When writing advertisers—Just say FORDOWNER

AUTOMATIC EXTENSION REEL

For ELECTRIC LAMPS

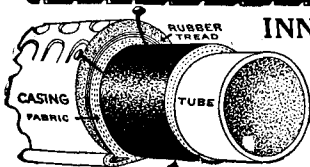


For use in Garages, Machine Shops, etc. Equipped with 25 ft. reinforced cord, lamp socket and guard. Attached to ceiling, beam or conduit. A swivel jointing enables lamp to be carried in any direction from Reel, returning it automatically when not in use. An automatic lock holds the lamp at any desired distance from the reel.

Approved by the Underwriters. Full particulars and prices on request. Pat. Jan. 30, 1917.

THE CINCINNATI SPECIALTY MFG. CO.
1901 Powers St., Cincinnati, Ohio

INSYDE TYRES



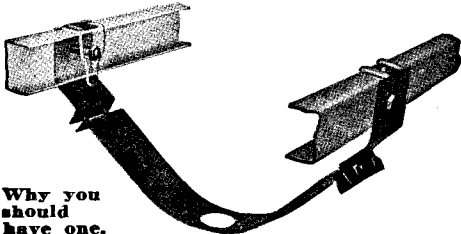
INNER ARMOR FOR AUTO TIRES

Double tire mileage, prevent punctures and blowouts. Easily

applied in any tire without tools. Used over and over in several tires. Will not separate, heat or pinch the tube. Cheaper and better than double treads, etc. Thousands sold. Guaranteed. Details free. Distributors, dealers and agents wanted. Act quick.

American Accessories Co., Dept. 831, Cincinnati, O.

FORD CAR CRANK CASE SUPPORT



Why you should have one.

Prolongs the life of your car. Reduces your repair bills. Prevents the crank case bracket supports from breaking or tearing off. Anybody can attach it in place. Pat. applied for. Made and Sold by Bayley Structural Iron Co., 705 So. Pierce St., Milwaukee, Wis. Write for dealer's proposition. Price on application.

GARDNER THERMOSTAT CARBURETOR

Starts Easily in Cold Weather

Our Thermostat automatically gives the proper mixture without adjustment. It is controlled automatically by the temperature of the motor.

In zero weather when you crank your Ford the Thermostat increases the gasoline and cuts down the air and the motor receives a rich mixture very finely vaporized by our double mixing process.

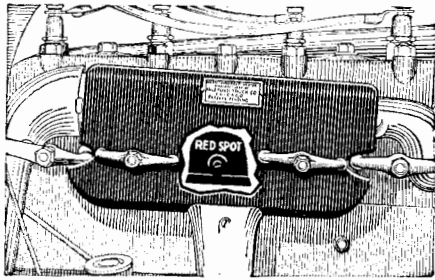
After an easy start, the Thermostat automatically changes the mixture to suit the temperature of the motor, using at all times the smallest amount of gasoline necessary for smooth running.

The Gardner gives you a smoother running motor at all temperatures and in addition:

We GUARANTEE you 25 to 50% more mileage with a Gardner than you are getting with your present carburetor, or we will refund your purchase price any time within 30 days.

Gardner Carburetor & Brass Works

23 Hancock West DETROIT, MICH.



Put a Hot Spot on your Ford

GIVE your Ford the easy handling, smooth pick-up, and the power on hills or in sand of the latest, up-to-the-minute, high priced car. A Red Spot—the Hot Spot for Fords, will be a never ending delight to you. Your Ford will be an entirely different car the minute you put a Red Spot on the engine. Never growl, spit back or stall, when you want to start, or clatter and fuss when you want to stop. But will go along quietly and noiselessly in the heavy, crowded traffic and jump ahead when you give it just a notch on the throttle.

Get one-quarter more miles from your gasoline and eliminate carbon. Sold with a money-back guarantee. Ten day trial. Price \$5.00, delivered anywhere. State year of motor, when ordering. Send for one, or write for details.

Makes Starting Easy

AXLEFORD TRUCK COMPANY
Dept. 2251 7311 Crandon Avenue, Chicago

Ford Owners

who read this magazine each month, simply can't do without it. Do you wonder at it?

Sign and send in now.

Subscription Blank

THE FORDOWNER,
Montgomery Bldg.,
Milwaukee, Wis.

Gentlemen:

Enclosed please find \$1.00 (or \$2.00 if you pay for three years), for which please enter my subscription to THE FORDOWNER, beginning with the next issue. (Canada and other foreign countries, 50c extra per year.)

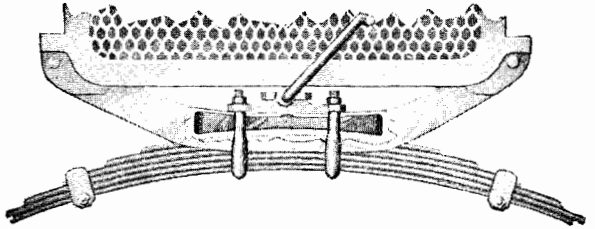
Name

Street Address

City and State

THE WILBUR SPRING SUPPORT.

Of what use is a spring when there is no more spring to it? Very little, we will say. As a means of retaining life in the front springs of the car comes the Wilbur Spring Support, a product of the Boel Mfg. Co., Temple Court Bldg.,



Minneapolis, Minn. This device is said to eliminate all breaking of springs and provides lubrication to the springs, which makes riding easy. It is guaranteed to put new life into dead and flat springs and strengthen the springs to withstand any rebound. The cost of the Wilbur Spring Support is \$3.50. More complete information may be had from the company named above.

NEW COMPANY MAKES HIGH CLASS BODIES FOR FORDS.

The Dayton Metal Body Company has been organized at Dayton, Ohio by Robert Dutch and H. J. Oakes, both of whom have been manufacturers of automobile bodies for more than fourteen years.

An up-to-date, thoroughly new-in-every-respect factory has been erected just north of Dayton and the new firm is featuring at the moment their "Classiford" Bodies—a high class job in every respect and one which is meeting with ready response on the part of the trade as well as the consumer. Three models are featured—one that converts a Ford chassis into a five passenger Touring Car; a Roadster; and also a Speedster model. The manufacturers claim that from parts to painting their Classiford Bodies represent class and quality.

The spacious new factory and equipment makes it possible fully to meet a big demand with ease in the C. F. Body Department of the plant and this demand at present is very brisk from dealers everywhere who are seeking the agency for these bodies. The reputations of Messrs. Dutch and Oakes, secured through fourteen years of experience in Automobile Body manufacture, are sufficient guarantee that in their new venture of adding the Classiford Body Department to their business they will enjoy continued success and substantial growth.

A NEW PUNCTURE PROOF TUBE.

A new company, the United States Puncture Proof Tube Corporation has recently been organized to manufacture a puncture and blow out proof tube invented by C. D. McGiehan. There have been a number of so called puncture proof tubes on the market before, but so far all have been to impractical to attract much attention. In this tube however the inventor seems to have overridden all the, heretofore insurmountable difficulties, and to have produced a really puncture proof tube worthy of the name.

The company claims that it is impossible to have a blowout due to the cord construction which will withstand a 300 lb. bursting strain when in the shoe. The tube is filled with no liquids, gums and etc., but is strictly pneumatic, containing nothing but air. When penetrated the puncture proof composition automatically closes and heals the wound permanently.

The company realizes that their claims are more or less startling, but are willing to prove them with a one year guarantee of money back or a new tube and a 10 per cent rebate of purchase price.

The tube is being exhibited at the Manufacturers and Merchants Exchange, Grand Central Palace, 46th and Lexington Ave., 8th floor, New York City. The company invites those who are interested to write or call at that address for information about the tube.

FORD OWNERS—

Why be Crabs
Lengthen your ARMS

A notched stick will turn an oil cock but it takes a
CLEANING PIN



Pacific Coast, 60c.

to prove if the crank case is empty or merely stopped up.
Our Patented wrench with cleaning pin is the only tool with this feature.

27 Warren St. **J. H. FAW, Inc.** New York
918 Hearst Bldg., San Francisco



**A Saver—
A Seller!**

Increased Power—longer motor life—better running—and an end of Piston troubles are assured through

**Special Light Weight
BRODRIB PISTONS**

A sure fit. Absolutely round. Threelap joint rings. Hardened and ground wrist pin. Square with crankshaft. Best grey iron.

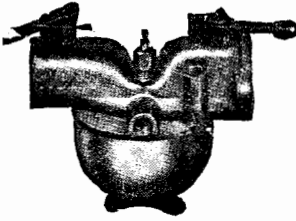
Price \$3.00 each. Special Dealer Discounts.
BRODRIB BROS. AUTO CO.
61 Congress St. HARTFORD, CONN.

STOKES DUAL CARBURETOR

Undreamed of Power and Economy.

FORD CARS, \$15.00

DODGE, \$16.00



**Simplest and
Most Effective
Carburetor in
the World.**

Made for all cars up to and including 1 1/2" vertical manifolds.

Dealers—Write for official service station proposition.

STOKES CARBURETOR CO., Inc.

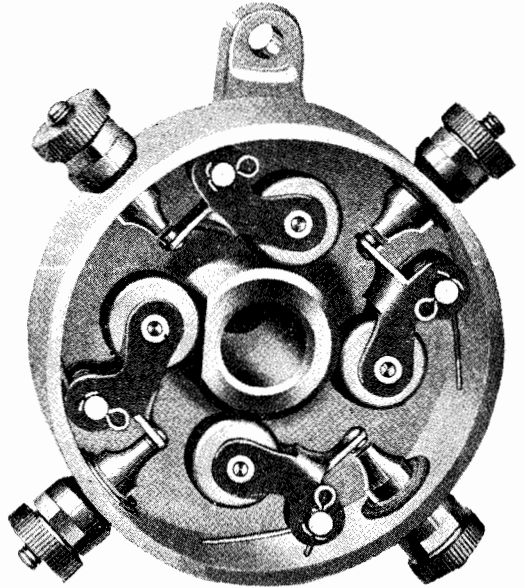
384 E. 133rd St.

NEW YORK CITY

A REAL FORD STORY.

Rolling sedately along the streets of historical old Boston one day early in spring was an automobile whose occupants were a happy family of four, the father, mother and two young children. The boy and girl were wide awake seeing and hearing most that was to be observed. Soon they passed a greenhouse wherein a car had been stored for the winter. Little Miss B., who was at that age of observation when question follows quickly upon sight, looked up at her father, saying, "Daddy, do you think if that Ford stays there long enough it will grow to be a real big car?"

**BUILT FOR
COLD WEATHER
STARTING**



**DUNTLEY
MAGNETO BREAK
TIMER**

The positive make and break contact of the Duntley Magneto Break Timer furnishes a strong, hot spark to each cylinder. This starts the motor with a spin.

The Duntley is the last word in Timer Manufacture. It has no sliding or whirling contacts to wear out quickly. It requires no lubrication. Equipped with genuine Tungsten Points.

Guaranteed for 50,000 miles—more than 10 times the life of the ordinary timer.

The tremendous sales record it has made is proof of the wonderful efficiency and economy of the Duntley Magneto Break Timer.

J. W. DUNTLEY

1007 S. Michigan Ave.
CHICAGO, U. S. A.

When writing advertisers—Just say FORDOWNER



TRAVEL WITH A CRUISER OUTFIT

With a Cruiser Outfit on your Ford Roadster you can make a camp wherever you please—sleep high and dry on a real mattress with a good tent over you and do your own cooking. Not a TRAILER.

- Set A—Body attachment only \$60.00
- Set B—Body with tent, folding table, mattress and fender irons 150.00
- Set C—Complete Cruiser outfit including stove, cooking utensils, furniture, bucket and axe 200.00

DEALERS—Write for discounts.

CRUISER MOTOR CAR COMPANY

2010 E. JOHNSON ST.

MADISON, WIS.



FORDOWNER

For Ford Dealers and Owners

Sends the Best of
Good Holiday Wishes
and a
Sincere Hope
for
All Good Things
for
the Year 1920
to its
Many Friends
throughout
the world.

Goodrich

AUTOMOTIVE EQUIPMENT

GOODRICH products are everywhere recognized for their Quality.

Write for prices and descriptive literature.

GOODRICH-LENHART MFG. CO.
44 Pine Street Hamburg, Pa.

JUSTRITE

A REAL CARBURETOR

Eventually you will use a Justrite on your Ford—today, next week, next year—just as soon as you realize its sterling merit—faultless carburetion without adjustments, day after day, any old weather.

Big firms with Ford fleets have found \$15.75 is returned to them each 3 months in gas consumption alone—the longer you delay, the more you pay. *If you get less than 25 miles to the gallon of gas, you can afford a Justrite.*

Absolutely guaranteed. Year's free service.

WILCKE-ARMSTRONG CO.

879 Monroe Ave., Detroit

WUNDR CARBON REMOVER

Most efficient on market.
Cleans engine in 15 minutes
without scoring.

Costs 25 cents a cylinder.

Ask your dealer or write

MUNGER PRODUCTS COMPANY

220 Fifth Avenue New York City

Dealers: Write for special discount.

CLASSIFIED ADVERTISEMENTS

WANTED MEN

Everywhere With

FORD CARS

To Work at Home or Travel

\$10. to \$25. Per Day
From Start

Write for Particulars

ROBERT H. HASSLER, Inc.

MANUFACTURERS

DEPT. 11-A, INDIANAPOLIS, INDIANA

EVERYTHING FOR THE MOTOR CAR

IF IT'S MADE, WE CAN FURNISH IT.

Ford electric lighted head to tail \$1.50 to \$35.00. Streamline Hoods, Speedster Bodies, No-Kick Device. Carefully selected line Accessories for the Ford. Write today. **Victor Auto Supply Co., 2004 Locust St., St. Louis, Mo.**

Why didn't I think of it? Best vest pocket tool ever invented for deflating inner tubes. Six for 25c; mail stamps or coin. **W. D. Cross, Geneva, Ind.**

CYLINDER REBORING TOOL, \$20.

Does perfect work. Lasts a lifetime. Guaranteed. Garagemen everywhere are grasping this opportunity.

Get busy and do this cylinder reboring yourself. **BIG MONEY.** A growing business. Order now. Be up-to-date. Circulars sent on request to dept. F., **National Products Co., Elmira, N. Y.**

Wanted: Agents everywhere to handle the most complete line of automobile accessories manufactured. Live easy sellers. Write for circular descriptive and proposition, advising territory wanted. **Milton Moto Company, Adrian, Michigan.**

Insyde Tyres inner armour for old or new automobile tires. Double mileage prevent punctures and blowouts. Big saving. Details free. Agents wanted. **American Accessories Co., Dept. FO, Cincinnati, O.**

CLASSIFIED ADVERTISEMENTS

FORD AUTO PARTS BIN MARKERS, Haddco P & S Auto Bin Cards, Sheet Metal Card Holders, Price Cards, Stock Record Cards, Transparent Celluloid Card Covers. Send for samples and prices. **Haddon Specialty Co., Haddon Heights, N. J.**

HELP! A BROKEN AXLE!

No need of getting excited. If your axle breaks you simply slip on an emergency axle and drive on safe and secure in seven minutes. Absolutely guaranteed against breakage. Write for complete information. A swell proposition for state distributors and county agents. Address **FORDOWNER, Dept. L, Milwaukee, Wis.**

FORDOWNERS—Going to overhaul your car this month? Don't fail to get our Bargain list of new standard parts. Write for circular on 20th Century Spark Intensifiers, the best on the market. Agents wanted. Manley Auto Devices Co., 1123 Chestnut St., St. Louis, Mo.

MANUFACTURER wants dealers, county and state representatives for greatest auto accessory ever invented; patented August, 1919. Territory destined to be as valuable as the Ford agencies. N. E. C. Co., 129 S. Green St., Chicago, Ill.

BRAINS ARE WHAT I WANT—MEN WITH A thorough knowledge of Ford motor, particularly ignition, valves, carburetion—can you qualify? If you can, will show you how your spare time will pay at least \$3.75 per hour and lead to a business worth thousands yearly. **Wilcke-Armstrong Co., 879 Monroe Ave., Detroit, Dept. N.**

FORD SHOP SUPERINTENDENTS NOTICE. Wanted ideas pertaining to shop equipment. Send sketches or photographs at our expense, and if accepted by ourselves we will pay from \$5.00 to \$100.00 in cash for each idea. **Dearborn Engineering & Equip. Co., 1704 Tower Bldg., Chicago.**

BARGAIN SALE, 48 Oxford Ton Truck Attachments for Fords. Early bird gets the worm. Write, **Oxford Truck Co., Oxford, Penn.**

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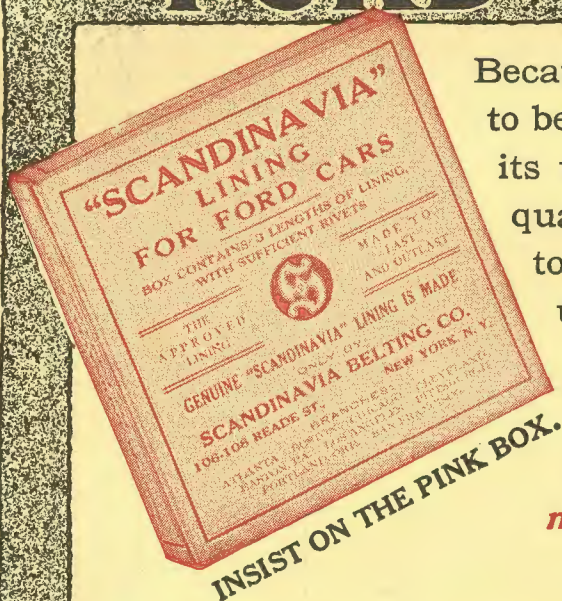
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