The Ford Service Bulletin

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HANG THIS UP

A. H. HARKER, LIMITED

PRICE LIST

OF MACHINE OPERATIONS

"Satisfactory Ford Service"

CONFIDENTIAL PRICES TO SERVICE STATIONS, COVERING OPERATIONS ON FORD PARTS AND UNITS, BROUGHT IN, OR SHIPPED IN FOR REPAIRS

NOTE.—Express or Freight charges should be prepaid on out-of-town Orders. Please attach tag giving operation number and description, and name of shipper.

ALL ORDERS SHIPPED SAME DAY AS RECEIVED.

FRONT AXLE		
2691D	Front axle rethreaded by drilling out and bushing	$ 3.00
MOTOR ASSEMBLY		
3000F	Cylinder rebored only	6.00
3000G	Cylinders rebored, includes fitting pistons	8.00
3000H	Cylinders rebored, includes fitting pistons and valves	10.00
3000J	Cylinders rebored, includes fitting pistons, valves, push rods and straightening and fitting camshaft	10.50
3000L	Cylinder bearings renewed and crankshaft fitted only	5.00
3000M	Cylinders rebored, fitting pistons and connecting rods, main bearings rebabbitted, crankshaft fitted and run in	16.00
3000N	Crank Case lined up on special align machinery	3.00
TRANSMISSION		
3300A	Transmission only overhauled and rebuilt	6.00
3300C	Transmission drums rebushed (1)	.60
3300D	Transmission drums rebushed (all 3)	1.75
STARTING AND LIGHTING SYSTEM		
5099	Starting motor overhauled	2.50
5119	Generator Overhauled	2.50

The above is another splendid example of service advertising. It speaks for itself.

A Dependable Means of Cleaning Cylinder Bores

There are many times in motor work where considerable time can be saved with the use of special tools. One of these instances is in cleaning up cylinder walls when they become loaded with metal particles from the piston or slightly scored. Such motor troubles should be attended to immediately they occur or considerable damage may result which would run up a large repair bill. Such work is oftentime neglected because dealers have not the facilities for doing the work without tearing down a motor and reboring the cylinders, or spending laborious hours on the end of the lapping tool.

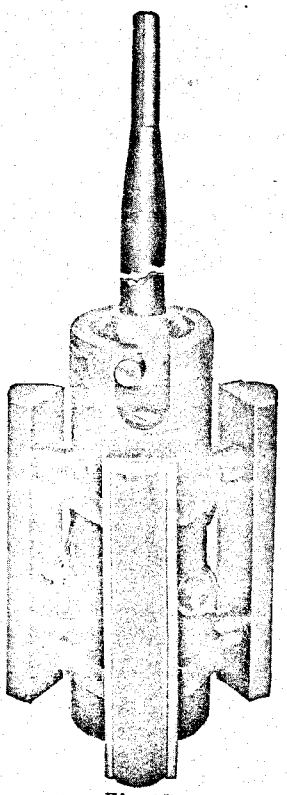


Fig. 47
HUTTO HONE

In this bulletin we are illustrating a tool for cleaning up cylinders where it is necessary to fit new pistons up to certain limits, and where the rest of the motor is in such mechanical condition as not to need re-building. Where a motor actually needs re-building the work of reconditioning the cylinders can not only be performed more quickly, but also with more accuracy in obtaining the proper clearance for any standard oversize piston. Where it is only necessary, however, to recondition one or two cylinders caused by conditions mentioned above, it can be performed much more quickly and more easily by using the tool shown in figure 47, without removing the motor from the chassis. This tool operates with an electric drill.

In this connection we have used a ½" special drill here for some time, and find it adequate for cleaning up cylinders from loads or small scores. However, if you actually wish to remove stock, you must use at least a ⅝" drill. However, where cylinder walls have become so badly worn from use that it is necessary to install oversize pistons, the rest of the motor will in most cases need re-building, and re-boring tools such as we have previously recommended should be used.

Carefully Read the Following Instructions:

Place a coarse stone in the grinder for the first cut, and finish with fine stone in order to get a polished surface. Before placing the tool in the cylinders be sure to cover all the bearings carefully with rags to prevent any possibility of grit getting into the bearings.

Place tool in cylinders and tighten adjusting screw at the top with screw driver. Care must be taken not to tighten this screw too much or the stones will be so tight in the cylinders that they cannot be turned. A little practice on the part of the operator will soon teach him just how tight this should be. A quarter of a turn of the screw will usually remove about .0025". Always work the tool up and down the cylinders, never allowing the stones to come into contact with the bearing below or there is danger of the stones being broken. The proper swing for the stones would be to raise it up and down so that the stones would not come out of the cylinders at top or bottom more than ½" or ⅜".

Use Plenty of Kerosene, as stones will cut much faster and not show a tendency to glaze nearly as quickly as when stones are used dry.

As soon as stones have relieved themselves again, tighten the adjusting screw and continue this until the job is completed.

Where cylinders are smaller at the bottom than at the top you can true them up by the feel of the stones in the cylinders. The stones are set parallel, and this will quickly indicate to the operator where the tight spots are. If the cylinders are true, the drill will maintain an even speed over the entire surface of the cylinders. Do not allow drill to operate if the stones are sloppy. Always keep them tight, as they will quickly glaze if allowed to operate loose.

When you feel that the cylinders are clean and true remove the tool and wash cylinders

well with kerosene and test with dial indicating gauge. If this does not show more than one half of one thousands variation and the piston fits with sufficient clearance, the job is completed. If not, continue as above until finished.

Do not throw stones away because they become cracked as they are still serviceable in that condition. Stones should be dressed down occasionally with the file to keep them from glazing. Glazed stones will not cut satisfactorily.

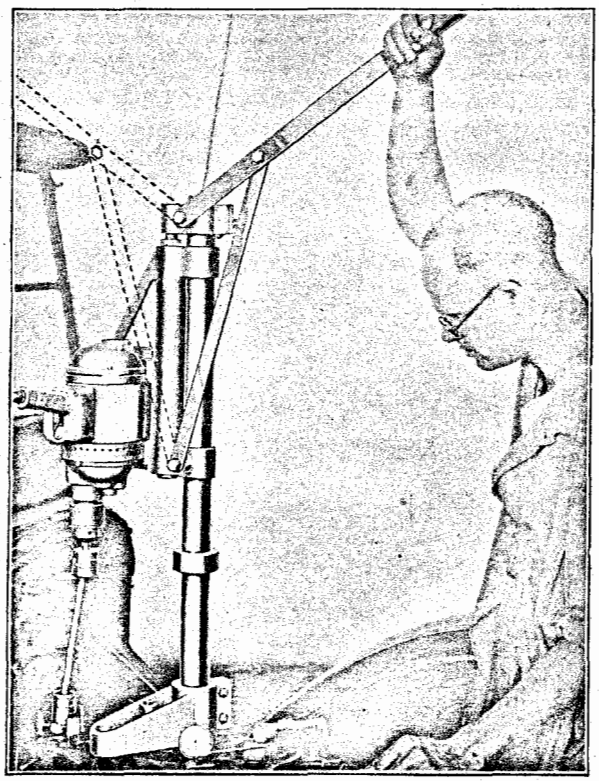


Fig. 48

A Portable Drill Stand

Figure 48 illustrates a portable drill stand designed to relieve the operator of the strain when reconditioning cylinders. It can also be used as a portable drill press. When used with above mentioned tool be sure to get the double universal drive handle and drill chuck attachment as shown. This attachment will allow you to work in No. 4 cylinder next to the dash. The handle on the stand reverse allows the operator to work from either side.

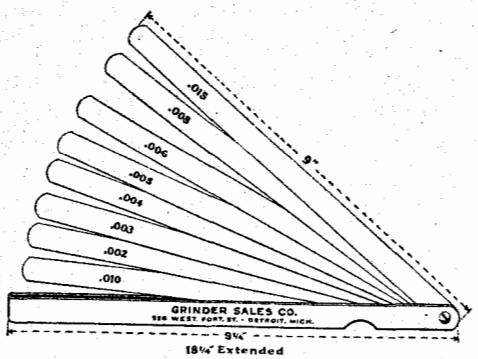


Fig. 49

Piston Fitting Feelers

Figure 49 illustrates a specially designed set of feeler gauges for piston work. The blades are 9″ long and contain 8 blades in number from .002 to .015. Extra blades can be purchased if required.

Champion Ford Spark Plug

In Fig. 50 is shown a cross section of the Champion Ford Spark Plug furnished as regular equipment in Ford cars and Fordson tractors, and sold by all Ford dealers for service.

The insulator of this plug is so designed that at the firing end it has a comparatively sharp edge which burns clean at all times and at the same time, its construction is such that the heat can readily travel down the insulator.

When this plug is taken apart for cleaning, care should be used in re-assembling it to see that the gaskets are in place and that the bushing is not screwed down too tight. It should be screwed down reasonably tight, but not dead tight. The gap between the electrodes should be set at about 30/1000 of an inch or 1/32 inch.

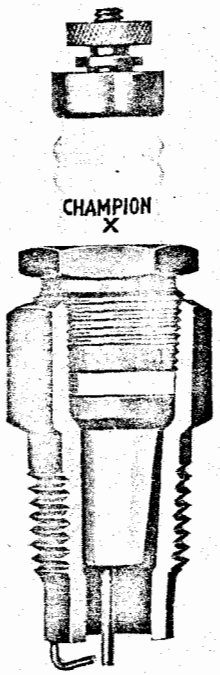
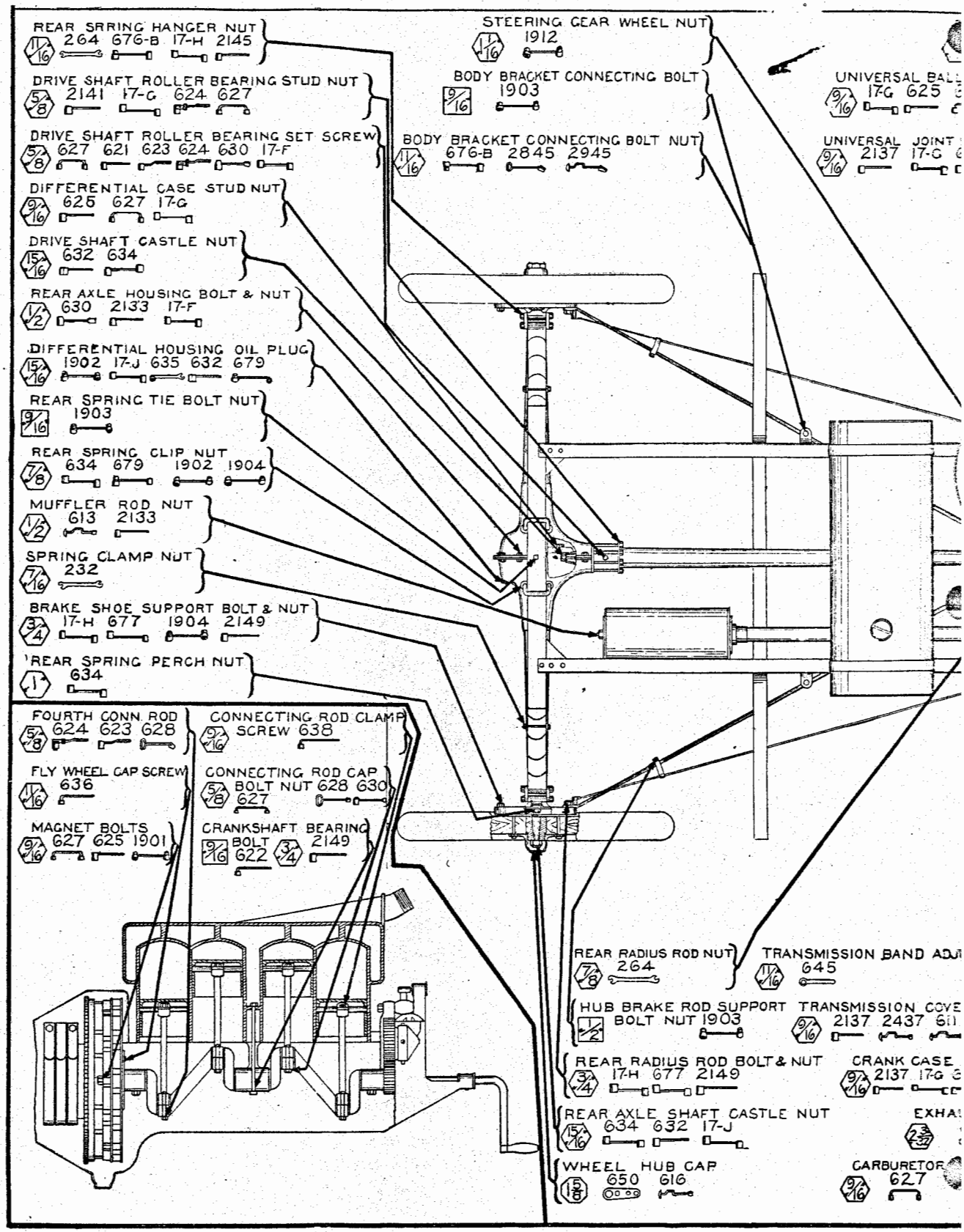
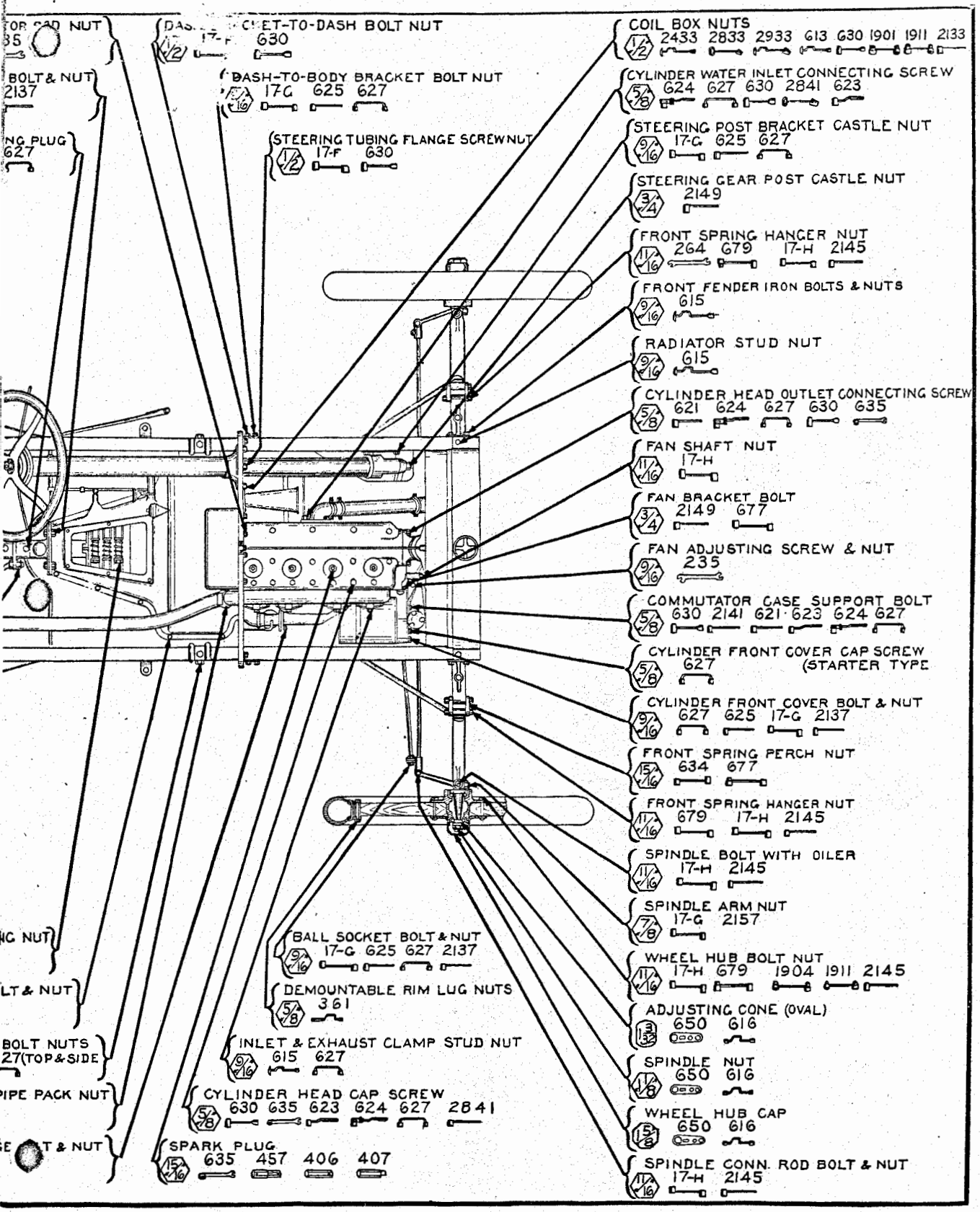


Fig. 50

It is not necessary to use pliers on the knurl nut to make a tight connection; the nut can be screwed down with the fingers and then the cable moved with the nut slightly and it will be sufficiently tight to carry the current.


REAR SRRING HANGER NUT 11/16 264 676-B 17-H 2145
DRIVE SHAFT ROLLER BEARING STUD NUT 5/8 2141 17-G 624 627
DRIVE SHAFT ROLLER BEARING SET SCREW 5/8 627 621 623 624 630 17-F
DIFFERENTIAL CASE STUD NUT 9/16 625 627 17-G
DRIVE SHAFT CASTLE NUT 15/16 632 634
REAR AXLE HOUSING BOLT & NUT 1/2 630 2133 17-F
DIFFERENTIAL HOUSING OIL PLUG 15/16 1902 17-J 635 632 679
REAR SPRING TIE BOLT NUT 9/16 1903
REAR SPRING CLIP NUT 7/8 634 679 1902 1904
MUFFLER ROD NUT 1/2 613 2133
SPRING CLAMP NUT 7/16 232
BRAKE SHOE SUPPORT BOLT & NUT 3/4 17-H 677 1904 2149
REAR SPRING PERCH NUT 1 634
STEERING GEAR WHEEL NUT 1 1/16 1912
BODY BRACKET CONNECTING BOLT 9/16 1903
BODY BRACKET CONNECTING BOLT NUT 11/16 676-B 2845 2945
UNIVERSAL BALL 9/16 17-G 625
UNIVERSAL JOINT 9/16 2137 17-G
FOURTH CONN ROD 5/8 624 623 628
CONNECTING ROD CLAMP SCREW 9/16 638
FLY WHEEL CAP SCREW 1/16 636
CONNECTING ROD CAP BOLT NUT 5/8 628 630 627
MAGNET BOLTS 9/16 627 625 1901
CRANKSHAFT BEARING BOLT 9/16 622 3/4 2149
REAR RADIUS ROD NUT 7/8 264
TRANSMISSION BAND ADJ 11/16 645
HUB BRAKE ROD SUPPORT BOLT NUT 1/2 1903
TRANSMISSION COVE 9/16 2137 2437 611
REAR RADIUS ROD BOLT & NUT 3/4 17-H 677 2149
CRANK CASE 9/16 2137 17-G
REAR AXLE SHAFT CASTLE NUT 15/16 634 632 17-J
EXHA 23/32
WHEEL HUB CAP 15/16 650 616
CARBURETOR 9/16 627


COIL BOX NUTS
1/2 2433 2833 2933 613 630 1901 1911 2133
CYLINDER WATER INLET CONNECTING SCREW
5/8 624 627 630 2841 623
STEERING POST BRACKET CASTLE NUT
9/16 17-G 625 627
STEERING GEAR POST CASTLE NUT
3/4 2149
FRONT SPRING HANGER NUT
11/16 264 679 17-H 2145
FRONT FENDER IRON BOLTS & NUTS
9/16 615
RADIATOR STUD NUT
9/16 615
CYLINDER HEAD OUTLET CONNECTING SCREW
5/8 621 624 627 630 635
FAN SHAFT NUT
11/16 17-H
FAN BRACKET BOLT
3/4 2149 677
FAN ADJUSTING SCREW & NUT
9/16 235
COMMUTATOR CASE SUPPORT BOLT
5/8 630 2141 621 623 624 627
CYLINDER FRONT COVER CAP SCREW
5/8 627 (STARTER TYPE
CYLINDER FRONT COVER BOLT & NUT
9/16 627 625 17-G 2137
FRONT SPRING PERCH NUT
15/16 634 677
FRONT SPRING HANGER NUT
11/16 679 17-H 2145
SPINDLE BOLT WITH OILER
11/16 17-H 2145
SPINDLE ARM NUT
7/8 17-G 2157
WHEEL HUB BOLT NUT
11/16 17-H 679 1904 1911 2145
ADJUSTING CONE (OVAL)
3/32 650 616
SPINDLE NUT
1 1/8 650 616
WHEEL HUB CAP
1 5/8 650 616
SPINDLE CONN. ROD BOLT & NUT
11/16 17-H 2145
DASH-TO-BODY BRACKET BOLT NUT
5/16 17-G 625 627
STEERING TUBING FLANGE SCREW NUT
1/2 17-F 630
BALL SOCKET BOLT & NUT
9/16 17-G 625 627 2137
DEMOUNTABLE RIM LUG NUTS
5/8 361
INLET & EXHAUST CLAMP STUD NUT
9/16 615 627
CYLINDER HEAD CAP SCREW
5/8 630 635 623 624 627 2841
SPARK PLUG
15/16 635 457 406 407

Good Wrenches

Among the list of small tools the speed wrenches hold first place. Suitable wrenches save more time and help to turn out better work than almost any other tool or combination of tools. They are important because they are used in practically every repair operation from morning until night, day in and day out. They are also subject to more abuse than any other piece of equipment, and it is due to this that we have spent considerable time experimenting with wrenches of different manufacture with an end in view of getting a wrench which would meet our requirements and stand up under the excessive abuse meted out by repair men, and we must admit that to a certain extent we have failed to obtain a wrench which would stand up under this abuse. However, there are good speed wrenches on the market which will stand up for a considerable length of time if given reasonable care by the mechanics. Then, of course, these wrenches are backed by the manufacturers who absolutely guarantee that should any wrench prove in any way defective, they will replace it free of charge. However, this guarantee does not cover wrenches broken through abuse which we feel causes 90% of breakage in wrenches. Speed wrenches themselves are not intended as tightening wrenches, and where any heavy tightening is to be made it is necessary to get a socket wrench with sufficient stock to stand up under the strain. Wrenches of the 3/8 inch type do not require so much stock as some of the heavier wrenches, and the manufacturers have invariably cut this stock down in order to make them accessible in tight corners. When a nut has been drawn up tight there is very little advantage to be gained by giving it the extra heave which is so often injurious to the wrench. This extra heave which is often given the nut does nothing more than practically ruin the threads of a nut, or stretch the bolt. When you have a metal to metal contact under a nut you cannot do any more than either stretch the bolt or the threads of the nut. The illustration on the preceding page was loaned to us by courtesy of Frank Mossberg Company, and illustrates their complete line of wrenches in a very outstanding manner. By referring to this illustration you can determine just what size wrenches are needed for the different bolts and nuts on the car.

New Steel Tractor Valves Possess Many Advantages

Chromium silicon alloy steel valves are being used as standard equipment in the Fordson tractor (see Fig. 51). This type of valve is particularly desirable in a heavy duty type of engine such as the Fordson, since the conditions of service produce much higher temperatures in cylinders.

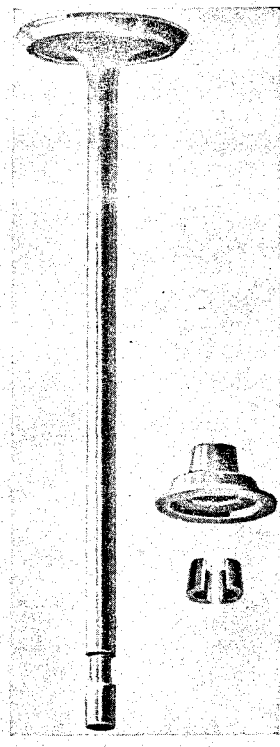


Fig. 51

The principal advantages of the new type valve are:

Practically Eliminates Oxidation—The chromium silicon alloy steel prevents warping of the valves. It also reduces oxidation or scaling to a minimum, thereby preventing pitting or breaking off of valve heads.

Longer Life—Valves are heat treated, hardened and ground. This prevents any wear on the end of the stem by coming in contact with the tappet and also reduces wear to a minimum between valve stem and guide bushing, which makes for better carburetion as it reduces air leakage at this point.

Easily Removed and Installed—The valve spring being held in a compressed position by a steel seat which is locked in position by a split collar. (See "A" and "B," Fig. 51.) Eliminates the use of a pin at this point which has to be lined up with a hole in the valve stem.

Less Frequent Valve Grinding—The new design valve being made of chromium silicon alloy steel is considerably harder than the old type valve and consequently does not require as frequent grinding. Owing to its hardness the new valve forms and maintains an ideal seat in the cast iron cylinder block, which is a considerable factor in maintaining good compression.

Instructions for Charging Batteries Shipped Dry

(*Continued from page 51, December, 1924, Service Bulletin*)

The Ford O-Lite Green Seal batteries are delivered from the factory completely assembled without electrolyte and, in this condition, may be stored at least a year if the following precautions are observed:

On receipt ascertain whether the vents are securely inserted, and then be sure that they remain so until the cells are to be filled with electrolyte.

Store batteries in an ordinarily humid atmosphere, shielded from direct sunlight. Avoid storing in abnormally dry room near heating plant or suction ducts.

TO PREPARE BATTERY FOR USE

1. Prepare sufficient chemically pure electrolyte (dilute sulphuric acid) having an acid density of 1.300 specific gravity (33.5° Baume). If during the mixing considerable heat is evolved, allow electrolyte to cool down to 90 degrees Fahrenheit (32 degrees Centigrade). Never pour electrolyte that is warmer than 90° F. (32° C.) into cells.

When mixing electrolyte. DO NOT ADD WATER TO THE ACID but ADD ACID TO THE WATER SLOWLY.

2. Within 15 minutes from the time the vents are removed fill all cells to the bottom of vent openings with the electrolyte prepared as per Section 1, above.

3. Allow the electrolyte to remain in the cells, not less than one hour. At the end of this time, should the electrolyte level recede below the tops of the separators, add enough electrolyte to bring level at least ½ inch (13 mm.) above separators. If the temperature in the cells does nor rise above 100° F. (37.8° C.), proceed **immediately** (before two hours have elapsed) with the Initial Charging Operation as per (Section 4). If the temperature remains above 100° F. (37.8° C.) allow the battery to stand until the electrolyte cools down to 100° F. (37.8° C.) then proceed **immediately** with the charge. It is important that the acid does not stand in the cells for more than two hours, unless it is necessary to allow the acid to cool.

4. Initial Charging Operation.

Place the battery on charge at the ampere rate given in the table. This ampere rate may be found by noting the type of plate indicated in the brand on the side of the box.

For example, a battery box brand such as "611 RHN" indicates a 6-volt battery, 11 plates per cell, made up of the RHN type of plate. From the table, the initial charging rate for this particular battery is 6 amperes as is found in the column headed "RHN" and on the same line with "11" in the column headed "Plates per Cell," or "127 SHC" indicates 12 volts, 7 plates per cell and "SHC" type of plate. The charging rate is found in the table to be 4 amperes.

INITIAL CHARGE, 52 HOURS
Type of Plate

Plate per Cell	AHS	WHN	RHN	SHC	BHN	JFN	GM	CLN	KPN
3	.....	.....	.....	.....	.....	.....	1.5	.....	.....
5	2	2	2.5	3	.....	.....	.....	.....	.....
7	3	3	3.5	4	.....	3	.....	.....	5
9	4	4	5	5	.....	.....	.....	.....	7
11	5	5	6	7	7.5	5	.....	.....	9
13	6	6	7.5	8	9	6	.....	10.5	10.5
15	7	7	9	9.5	10.5	7	.....	.....	12
17	.....	.....	10	11	.....	.....	.....	.....	.....
19	9	9	11	12	.....	9	.....	.....	.....

The total initial charge must be for fifty-two (52) hours, but at no time permit the electrolyte temperature to rise above 115°F. (46°C.). If the temperature should reach 115°F. (46°C.), discontinue the charge and allow the electrolyte to cool, but be sure that the total of fifty-two hours actual charging at the ampere rate specified is completed.

5. The electrolyte density at the end of the fifty-two (52) hour charge should be near 1.290 specific gravity. A variation between 1.285 and 1.300 is permissible. If, after fifty (50) hours of the initial charge, the electrolyte density of any of the cells is outside these limits, adjustment should be begun while still charging. For those cells in which the density is heavier than 1.300 specific gravity replace some of the electrolyte with distilled water. In those cells where the density is lighter than 1.285 specific gravity replace some of the electrolyte with previously prepared electrolyte of density not heavier than 1.400 specific gravity. Wait until the cells have charged one hour before taking readings to determine the effect of adjustment, which if not accomplished should be attempted again as before. Practice will enable the attendant to estimate the amount of electrolyte necessary to replace in order to accomplish the proper density desired at the end of Initial Charge.

6. The average fully charged cell voltage taken when the battery is still on charge, usually falls between:

2.5 and 2.7 Volts at 80° F. (26.7° C.) Temperature.
2.4 and 2.6 Volts at 100° F. (37.8° C.) Temperature.
2.35 and 2.55 Volts at 120° F. (48.9° C.) Temperature.

7. At the end of the fifty-two (52) hour charge if all conditions are normal, replace the vents, wash all exterior surfaces with clean water and dry quickly. The battery is then ready for service.

Change in Camshaft

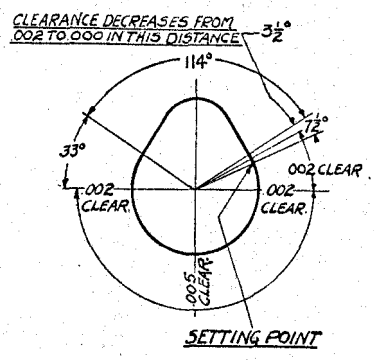


Fig. 52

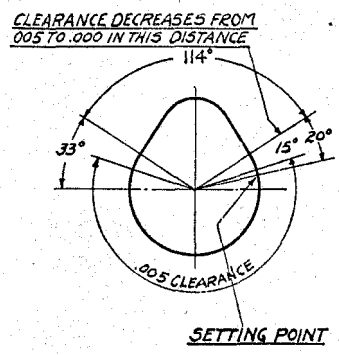


Fig. 53

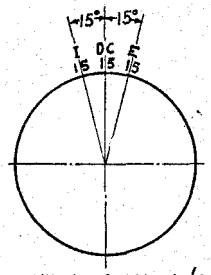


Fig. 54

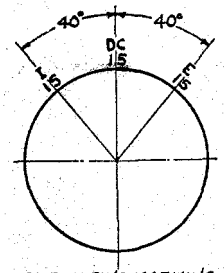


Fig. 55

The shape of the cam has been changed in such a way that the valve is lifted from its seat slowly, then rapidly lifted to the wide open position, dropped rapidly to within a short distance of the seat then lowered slowly onto the seat. The design gives a much quieter action to the opening and closing of the valves, as by far the greater part of so-called tappet noise is caused by the valve being raised abruptly and dropped sharply upon the valve seat.

The latest design camshaft may be identified by the letter "B" stamped on the front end. See Fig. 56.

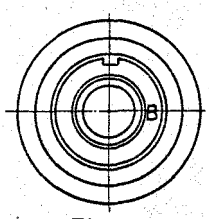


Fig. 56

The tappet setting position on the cam is changed. Figs. 52 and 53 show the setting arcs and clearances on both the new and old style camshafts.

With the new camshaft, the tappet clearance is set at .004 instead of .002 minimum as formerly. With the new camshaft, flywheel and clutch driving ring, the gap between the valve lifter adjust screw and valve should be set at .003 to .004 with the engine cold at the point indicated by the timing marks, but this clearance may be set at any point on the heel of the cam if desirable, which is not the case with the old style cam, flywheel and driving ring. The wheel of the new cam is concentric, that is, there is .005" clearance all around the back of the cam instead of .005" on the heel tapering to .002" at the beginning of the concentric valve setting arcs as on the old style cam. The markings on the new flywheel and clutch ring for setting valve clearance with the new style camshaft are similar except that they are now further from the dead centerline, being 40 degrees instead of 15 degrees, and also being much more concisely designated. The dead centers are marked D. C. and the inlet and exhaust points for setting are identified with an I & E respectively. See Figs. 54 and 55.

The parts affected by this change, i.e., the camshaft, flywheel and clutch driving ring, are all interchangeable. When a new style camshaft is used with an old style flywheel and clutch driving ring, set the clearance at .002 to .003 at the place indicated by the markings on the old style clutch ring the same as with the old style camshaft. If a new style flywheel and clutch ring are used with an old style camshaft, the new setting marks will give proper operation with .002 to .003 clearances. It is inadvisable, however, to assemble an engine with this latter combination of parts as the new style camshaft gives much better and quieter engine performance.

It is also inadvisable to assemble the two different styles of clutch ring and flywheel as the mixing of the different markings would be very confusing.