

Ford Service Bulletin

No. 17

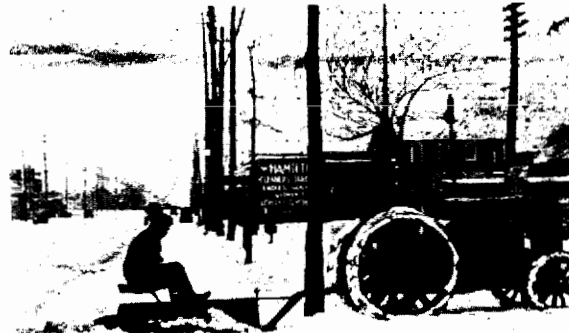
January 1921

Vol. 2

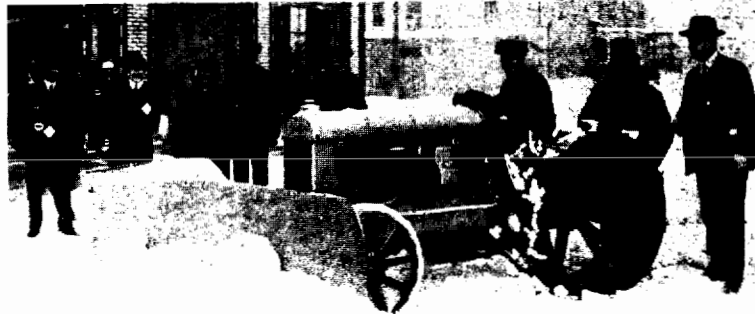
Page 129

Winter Uses for the Fordson

AFTER the recent heavy snow fall, the city of Highland Park, Michigan, used a Fordson tractor for clearing the snow from the sidewalks, as shown in the upper picture. With the Fordson drawing the snow plow, 46 miles of sidewalk were cleared in four hours. This work formerly required 20 men and horses. The experiment was entirely successful, and the city of Highland Park has purchased another Fordson to be used for the same purpose. During continuous snow falls streets and sidewalks can be kept clear by working the men in shifts and running the Fordson twenty-four hours a day. When the tractors are not engaged in this work they are used for hauling garbage and ash trailers or road scrapers; also used in excavating work.



The center picture shows the Fordson pushing a snow plow in clearing the streets of snow in one of our northern cities.



In the lower picture the Fordson is shown clearing the snow from the ice preparatory to harvesting the ice crop.

Every municipality is a prospective Fordson purchaser.



Fig. 217

Labor Operation Time Costs

Supplementing our labor operation list starting on page 97, Vol. 1, we are publishing below the labor operation time costs of the truck rear axle and the starting and lighting systems.

Truck Rear System Division

The following time covers work on Trucks driven into the Service Station:

Oper. No.	Hrs.	Min.	Oper. No.	Hrs.	Min.
96A	9	30	113A		15
97A	5	30	114A		2
98A	2	15	115A		4
99A	4		116A		1
100A	5	30	117A		1 15
101A	2	15	118A		1 30
103A	3		119A		6 30
104A	4	45			
106A	1	15			
107A	1				
108A	1	45			
109A		30			
110A	1	15			
111A		30			
112A		45			

Parts Brought In or Shipped In for Repair

140B	5
141B	1 30
142B	1
143B	30
144B	30
145B	30
146B	30
147B	15
148B	30

Starting, Lighting and Ignition Division

The following time covers work on Cars driven into the Service Station:

Oper. No.	Hrs.	Min.	Oper. No.	Hrs.	Min.
520	4		543		15
521	1		544		30
522	1		545		15
523	1		546	1	
524		30	547		15
525		15	548		30
526		30	549		45
527		45			
528		30			
529		30			
530		30			
531		45			
532		45			
533		15			
534		15			
535		30			
536	2				
537	1	30			
538		30			
539		15			
540		15			
541		30			
542		15			

Parts Brought In or Shipped In for Repair

560	1
561	1
562	15
563	15
564	15
565	15
566	15
567	15
568	15
569	15
570	45
571	15
572	15
573	30

Cars bearing motor numbers from 4,617,926 to 4,698,415 were shipped during the month of Dec.

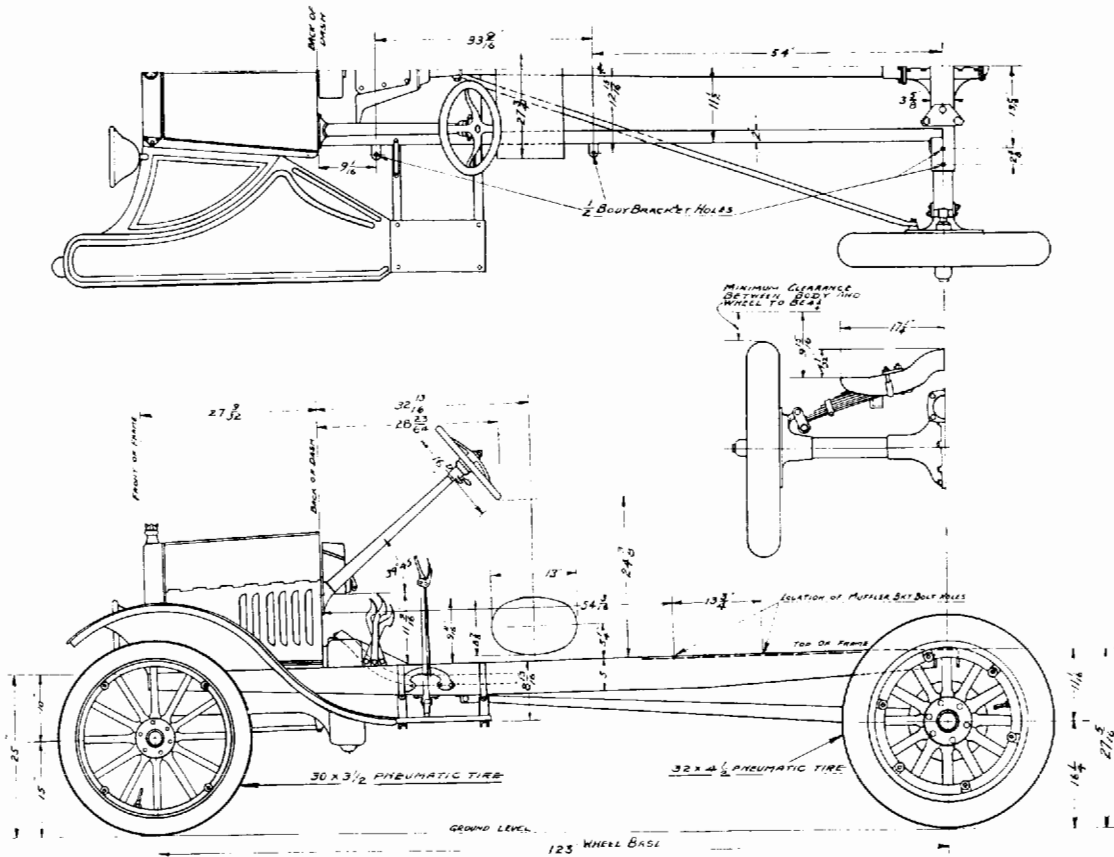


Fig. 218

Assembly drawing of Truck Chassis showing principal dimensions for body designing

New Style Connecting Rods

Ford cars are now being equipped with a new design connecting rod. This rod is six to seven ounces lighter than the old rod. When replacing a connecting rod it is advisable to replace it with a rod which corresponds with the one taken off, in order to maintain the balance of the engine.

Since we have discontinued the manufacture of the old style connecting rod, we suggest that the dealers do all in their power to have the old style rods returned for re-babbiting in order that the supply may last as long as possible.

Battery Insulator

The later cars have a piece of sheet fibre which insulates the battery to switch cable, from the battery support. We recommend that the dealers advise the owners of older cars to install this insulator to insure against a possible short circuit at this point.

This part will be listed as Battery to Switch Cable Insulator, Part No. X-2115.

Transmission Drive Plate Sleeve Oil Retainer

Our attention has been called to the fact that some repair men are not replacing the oil retainer in the transmission drive plate sleeve. If this retainer is not in place, the oil from the motor will work out through the universal joint or run back into the axle.

These parts will be listed in the catalogue as 3324-B, Driving Plate Sleeve Plug.

The plug is inserted from the universal joint end and positioned so that the convex side is toward the drive plate. Turn the plate and sleeve up the other way and spread the plug with a hammer and flat nosed bar.

Transmission Band Lining

It has come to our attention that some manufacturers of brake lining are circularizing our dealers and service stations representing their particular brand of lining to be identical with the lining which we use as regular equipment. This lining is offered at discounts which

make the price lower than that charged for our standard lining. The brake lining that we furnish is made according to very definite specifications, and the samples of lining furnished by these concerns which have reached us are not the same as the lining that we supply.

IMPORTANT

Under "Practical Methods of Repairing Ford Cars" we explain the proper method of focusing and aligning our head lamps.

This is a matter which should appeal to every Ford dealer. It is an opportunity such as is seldom offered to perform a real public service. Half of the cars in your territory are Fords and when the head lamps on these are properly adjusted, a great stride will have

been made in overcoming the fatigue and hazard of night driving.

We are strongly in favor of this movement for better lighting, and you, as our representative, should work with your local authorities in their endeavor to enact and enforce proper legislation regulating the lighting of motor and other vehicles.

Correction

In paragraph No. 383, Vol. 2, we state that the repair man should draw a wire through the magnet cap screws. After considerable experimenting we find that the wire is unnecessary when care is exercised in drawing the cap screws down tight. Therefore, engines are now being assembled without this wire.

Variation of Specific Gravity with Temperature

The specific gravity of the acid in a fully charged battery should not exceed 1.300 at 60° F. If hydrometer readings are taken at other acid temperatures than 60° F. allowance must be made for the temperature of the acid.

The figures in black are acid gravities at 60° F. The others represent readings of these same gravities at the different temperatures shown at the top of each column, i. e., 1.300 at 60° becomes 1280 when the electrolyte temperature is raised to 110°, etc.

READ THE TEMPERATURE—read the hydrometer—then follow down that temperature column below which is nearest the observed acid temp., find the figures nearest the observed specific gravity reading, and trace horizontally across to the black column—these black figures are the true acid gravity and should form the basis for any acid adjustment.

0°	10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
1170	1166	1163	1160	1157	1153	1150	1147	1143	1140	1137	1134	1130
1180	1177	1173	1170	1167	1163	1160	1157	1153	1150	1146	1143	1140
1190	1187	1184	1180	1177	1173	1170	1167	1163	1160	1156	1153	1149
1201	1198	1194	1190	1187	1183	1180	1176	1173	1169	1166	1162	1159
1211	1208	1204	1201	1197	1194	1190	1186	1183	1179	1176	1172	1168
1222	1218	1214	1211	1207	1204	1200	1196	1193	1189	1185	1182	1178
1232	1228	1225	1221	1217	1214	1210	1206	1203	1199	1195	1192	1188
1242	1239	1235	1231	1227	1224	1220	1216	1213	1209	1205	1201	1198
1253	1249	1245	1241	1238	1234	1230	1226	1222	1219	1215	1211	1207
1263	1259	1255	1251	1248	1244	1240	1236	1232	1229	1225	1221	1217
1273	1269	1265	1261	1258	1254	1250	1246	1242	1238	1235	1231	1227
1283	1279	1275	1271	1268	1264	1260	1256	1252	1248	1245	1241	1237
1293	1289	1286	1282	1278	1274	1270	1266	1262	1258	1254	1250	1247
1303	1300	1296	1292	1288	1284	1280	1276	1272	1268	1264	1260	1257
1314	1310	1306	1302	1298	1294	1290	1286	1282	1278	1274	1270	1267
1324	1320	1316	1312	1308	1304	1300	1296	1292	1288	1284	1280	1276
1334	1330	1326	1322	1318	1314	1310	1306	1302	1298	1294	1290	1286
1344	1340	1336	1332	1328	1324	1320	1316	1312	1308	1304	1300	1296
1355	1351	1347	1343	1338	1334	1330	1326	1321	1317	1313	1309	1304

Average cell voltage at 80° usually falls between 2.5 and 2.7

“ “ “ “ 100° “ “ “ 2.4 “ 2.6

“ “ “ “ 120° “ “ “ 2.35 “ 2.55

ALWAYS TAKE ACID TEMPERATURE WHEN READING SPECIFIC GRAVITY

Practical Methods of Repairing Ford Cars

Assembling the Magneto

(Continued from Page 125)

420. Insert a turning bar (see Fig. 25, Vol. 1) in the end of the transmission and, while turning the engine over, see that a good

live spark results when the contact is connected to the cylinder.

421. The rest of the assembly may now be made and the engine put back in the chassis. It is very important that the coil support and fly wheel be properly tightened. If they are not there is danger of their working loose.

Adjustment of Ford Head Lamps

422. The most important minor adjustment on a Ford car is focusing and aligning the head lamps properly. By slighting this adjustment the owner becomes liable to arrest, night driving is fatiguing to the owner and those driving toward him and in some cases is actually hazardous.

423. Our Engineers, in co-operation with the Detroit Police Department, whose regulations are similar to those in force in a number of States, have studied the matter of what light is objectionable and what desirable for automobile lighting, and after experimenting with many types of reflectors, deflectors, diffusers, etc., have found that in general they absorb or waste a large percentage of light while in many cases actual measurements show that they increase rather than decrease what is defined by the S. A. E. as glare.

424. The desired results, which, by the way, conform to the laws of the various states, such as New York, New Jersey, Connecticut,

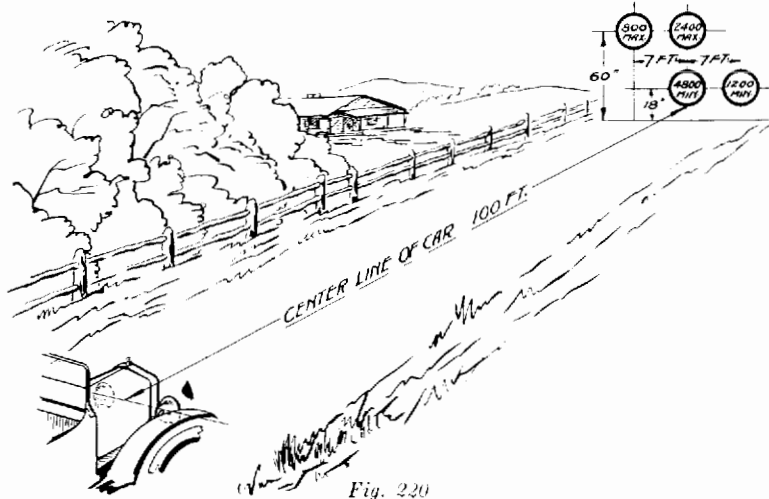


Fig. 220

Wisconsin, California and Pennsylvania, as well as the regulations in the large cities, may be summarized as follows and measured in candle power as shown in Fig. 220.

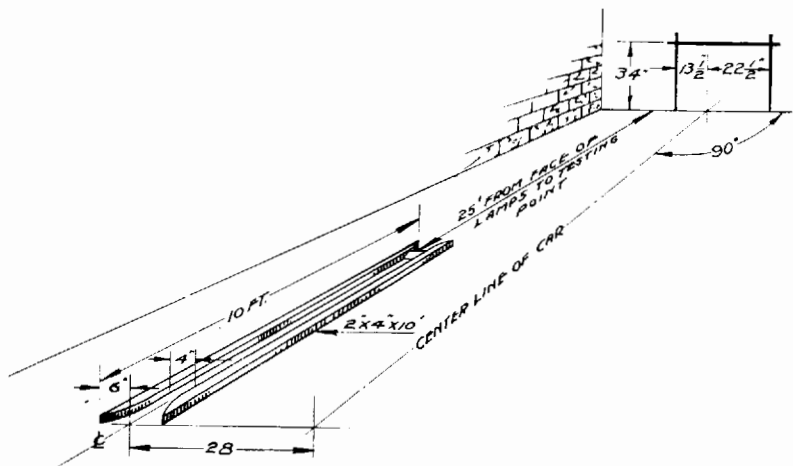


Fig. 219

1. No glare for the man driving toward the car.
2. No glare for the pedestrian.
3. Ample light to distinguish objects at 100 feet to allow sufficient braking distance.
4. Sufficient light at the right side to permit driving to the edge of the road with safety and to see persons about to cross the street.

425. While the specifications are given at a distance of 100 feet it is not necessary to have so long a range in making the adjustment. By careful experimenting we have found that these results which are both desirable and required by the law in some states, can be obtained by properly focusing and aligning the present type of lamp as follows:

1. Focus head lamps with empty car standing level in front of a white wall or screen 25 feet from the front of head lamps. This wall must be in semi-darkness or shielded from direct light, sufficiently that the light spots upon it from the head lamps can be clearly seen.
2. Turn on bright lights.
3. Focus, by means of screw at back of lamps, first one lamp and then the other, to obtain an intense concentrated circular spot of light on the wall, especially attempting to get a clearly defined line at the top of the spot. In general, the spot of light, when properly focused, will be between three and four feet in diameter. With lamps thus focused for the "bright" filament, the "dim" will be in satisfactory position.



Fig. 221

Alignment

426. Head lamps are to be aligned by bending the head lamp brackets as follows:

1. The extreme tops of the bright spots on the 25 foot wall are to be set at a line 34" above level of surface on which car stands.

2. The cone of light from the head lamp on the driver's left, is to extend straight forward.
3. The cone of light from the right head lamp is to be directed outward so that on the wall at 25 feet ahead the center of the light spot will be 9" to the right of the straight ahead position.

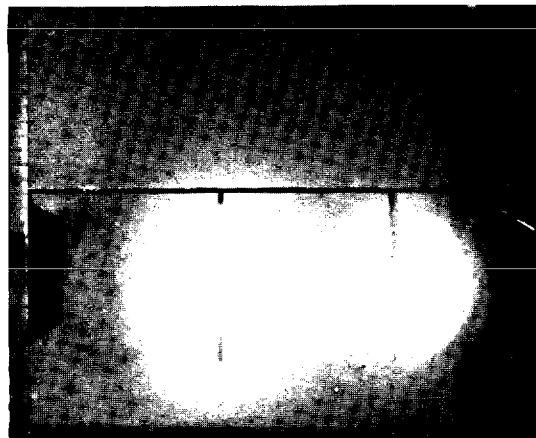


Fig. 222

427. This is readily checked by means of a pair of vertical lines on the wall in front of the car, the same distance apart as the head lamps. See Figs. 221 and 222.

428. As it will be necessary to make these adjustments whenever installing head lamps or lamp bulbs, we earnestly recommend that all dealers immediately provide the space and equipment necessary and that owners be invited to bring in their Ford cars to have the head lamps focused and aligned. For this work we recommend the minimum labor charge.

429. Fig. 221 shows the test range at the Highland Park Plant. The subdued light is obtained by means of a tunnel which extends forward from the wall. The door at the back of the tunnel is painted white with black markings. Arrangements are made to properly align the car and hold it at the proper distance from the wall.

430. In ordinary practice it is not necessary to go to the expense of building a tunnel. However, it is very desirable to have an accurate means of aligning the car. Fig. 219 gives a suggestion for laying out a test range. If it is impossible to tie up the floor space required by the aligning blocks, use painted marks on the floor to show where one set of wheels should track and where the car should be stopped.

Fordson Tractor Section

A Feat of Hillside Plowing

Fig. 223 shows a Fordson plowing on a hillside at Tazewell, Va. The plowing was done with a two bottom, twelve-inch plow and the soil was over-grown with blue grass which had not been turned under for a number of years. The hill was so steep that the oil ran out of the breather pipe on the downhill furrow. The tractor pulled the plows up, down and around the hill. An idea of how steep the hill was may be obtained from the fact that, in plowing around, the uphill wheels on the tractor were unable to obtain enough traction to start off until certain measures were taken to lighten the load.

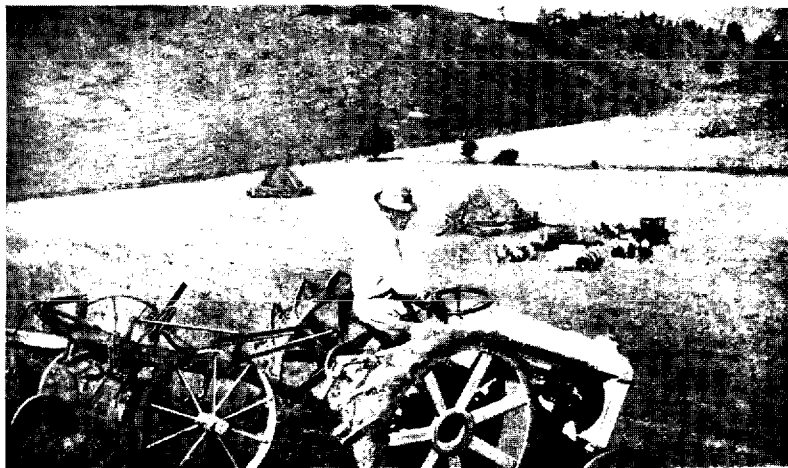
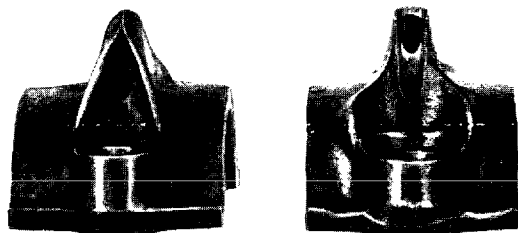


Fig. 223

Connecting Rod Caps

We find a number of connecting rod caps returned for re-babbitting have the scoop turned over on the end as shown in Fig. 224A. This defeats the purpose of the scoop (B) as the oil splashes away from rather than into the passage to the bearing.

Dealers should do all in their power to discourage this practice as it will eventually cause the failure of the bearing.



A Fig. 224 B

Undersize Connecting Rods and Crankshaft Bearing Caps

Dealers may now obtain from our Branches $\frac{1}{32}$ " undersize connecting rods and main bearing caps. These parts are designed to be used with crankshafts ground to limits of 1.967 to 1.968, and should be used in Fords on motor repairs when it is necessary to regrind the crankshaft or where an undersize rod and cap can be used to advantage.

Block for Filing Valve Stems

A very useful tool can be made from a block of steel, which when properly drilled and cut will aid a mechanic to file the valve stems square. This makes a much more perfect job than the ordinary method. The dimensions of the block are $2\frac{1}{2} \times 1\frac{1}{4} \times 1\frac{1}{4}$. Drill two holes $\frac{5}{16}$ inches, one being $\frac{1}{2}$ of an inch from one end and the other $\frac{3}{8}$ from the other end when the holes are drilled; cut down the center through both holes as shown in Fig. 225. After this is done the block should be hardened to prevent wear by filing.

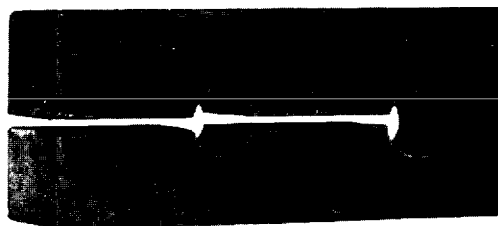


Fig. 225

Shifter Valve Handle

The shifter valve and handle are now both drilled to match. However, it is necessary to see that the gasoline hole in the shifter valve is in the proper position as shown in Fig. 39, Vol. 2, before installing the rivet.

Gaping Spark Plugs

When adjusting the gap of a spark plug the sparking point (see Fig. 126, Vol. 1) should be bent to obtain the greatest possible advantage of design. With the point in the position

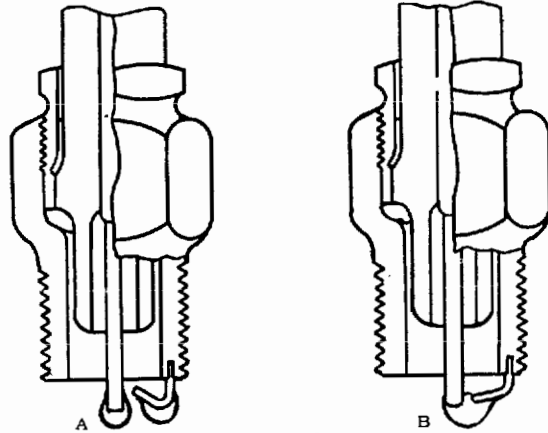


Fig. 226

shown in Fig. 226-B the oil which condenses to the body and spindle runs to a common point at the gap. If the point is set properly as shown in Fig. 226-A, the oil flows away from the gap, preventing misfiring due to an accumulation at this point.

1/64	.015625	33/64	.515625
3/64	.046875	17/32	.53125
5/64	.078125	35/64	.546875
7/64	.109375	9/16	.5625
9/64	.140625	37/64	.578125
11/64	.171875	19/32	.59375
13/64	.203125	39/64	.609375
15/64	.234375	5/8	.625
17/64	.265625	41/64	.640625
19/64	.296875	21/32	.65625
21/64	.328125	43/64	.671875
23/64	.359375	11/16	.6875
25/64	.390625	45/64	.703125
27/64	.421875	23/32	.71875
29/64	.453125	47/64	.734375
31/64	.484375	3/4	.75
1/2	.5	49/64	.765625
		25/32	.78125
		51/64	.796875
		13/16	.8125
		53/64	.828125
		27/32	.84375
		55/64	.859375
		7/8	.875
		57/64	.890625
		29/32	.90625
		59/64	.921875
		15/16	.9375
		61/64	.953125
		31/32	.96875
		63/64	.984375
		1	1

Table of Decimal Equivalents

Practical Methods of Repairing Fordson Tractors

The Dash

(Continued from Page 128)

431. Next install the small spring into the pedal shaft as shown in Fig. 216. Place the sector in mesh with the steering pinion and insert the steering arm. As the sector is splined to the shaft, it takes a little care at this point to properly enter the shaft so that the rivet holes line up. Of course, it is important that the steering rod be pointed down when the sector is up as shown in the Fig. 199. When the holes line up properly turn the sector into the position shown in Fig. 227 and drive in the rivet. The arm is then thrown up the other way and the rivet is peened, the head being supported on a bar as shown in Fig. 227.

432. The clutch lever bracket may next be assembled and so positioned that the end of the lever bears on the face of the cam (see Fig. 198). The cap screws may then be run down and wired to prevent their working loose.

433. The dash may then be assembled to the tractor as described in paragraph 131, volume 2.

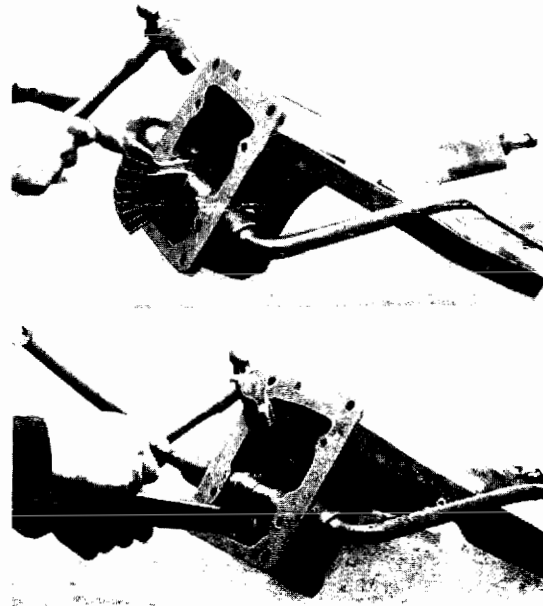


Fig. 227

Ford Service Bulletin

No. 18

Vol. 2

June, 1921

Page 137

Power Line of Fordson Tractor

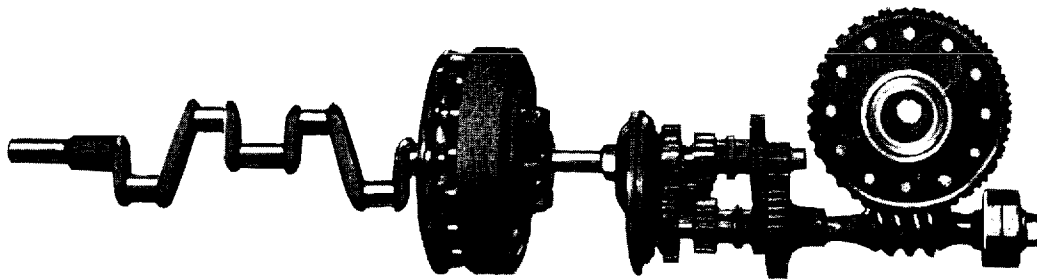


Fig. 228

The above photograph shows the power line of the Fordson Tractor.
Note the direct alignment, simplicity of construction,
and small number of parts used.

Tractor Service

Reports reaching us from all sections indicate that many dealers are overlooking tractor service.

As the tractor is used exclusively as a utility, no dealer can expect to obtain his full quota of sales who does not establish a reputation in his locality for ability to give prompt and efficient tractor service.

At this season of the year every moment counts with the farmer. Dealers must maintain adequate stocks of parts and properly equipped shops so that tractors can be kept running with as little loss of time for repairs as possible.

Your future sales will depend greatly upon your present ability to give prompt service on tractors now in use. Check this point and

if you are not carrying an adequate stock of parts order them at once.

Rebored Cylinders

Our Branches are now able to supply rebored tractor cylinder blocks to dealers at \$30.00 list less 20% discount.

It is quite possible that many owners requiring new engine blocks for their tractors will prefer to install rebored cylinders at \$30.00 rather than new standard cylinders at \$60.00.

In order to insure proper fitting of pistons these cylinders will be furnished with over-size pistons already fitted. The pistons will be charged at catalogue price less dealer's regular discount.

Locking Tractor Nuts

Every bolt and nut on the tractor has been studied carefully to determine the best means of locking it.

When building up a tractor after having repaired it, the repairman should see that all bolts and nuts are secured in the proper way. Fig. 229 is a reproduction of all the cotter pins in their exact size, together with caption stating where they go in the tractor assembly.

Extension Rims

Many of our dealers have been inquiring why the rear wheels of the tractor are not drilled for extension rims.

In the first place the number of tractors on which extension rims are installed is exceedingly small in comparison with the total production. Also there is a slight variation in both the wheels and rims and this, together with the possibility of springing the rims thru handling and shipping makes it impracticable to do the drilling before the time of installing the equipment.

Oversize Valves

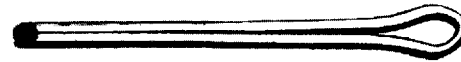
We are now supplying through our Branches, tractor valves with heads 1/16" oversize and stems 1/64" oversize. Dealers can no doubt use these parts to advantage in repairing tractor motors in which the valve seats and guides have become worn to a considerable extent.

In order to install the oversize valves, it will be necessary to reseal the cylinder and ream the bushings in the valve guides.

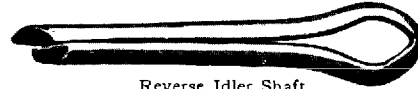
Breather Strainers

Many owners and even some dealers do not seem to realize the necessity of keeping the strainers in the breather pipe and cap in good condition and in place at all times.

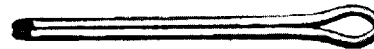
Regularly, instances come to our attention where owners have removed the strainer in the pipe or punched a hole in it in order to facilitate the pouring of oil. This results in dirt and dust being drawn into the crank case where it cuts out the crank and cam shaft bearings and wears the pistons and cylinder walls.



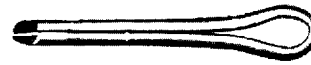
Trans. Drive Shaft



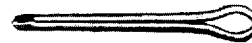
Reverse Idler Shaft



Worm Shaft



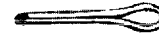
Radius Rod Pin



Front Axle Trunnion



Spindle Arm Drag Link

Con. Rod Bolt
Clamp ScrewFan Pulley Pin
Worm Wheel Bolts

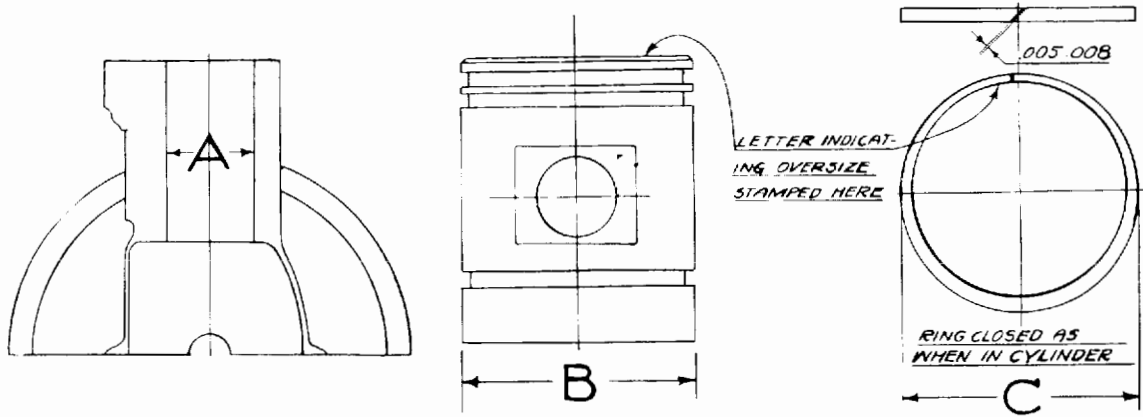
Throttle and Spark Rods



Float Chamber

Fig. 229

Dealers ought to make it a point to impress owners with the importance of the breather strainers, as much needless trouble and expense can be avoided by keeping those parts in good condition and in place.



NOMINAL SIZE	CYLINDER		PISTON		RING	
	SYMBOL	A	SYMBOL	B	SYMBOL	C
STANDARD SIZE	1535	BORED TO 4.000-4.001	1486	3.995-3.997	363	4.000-4.001
.005 OVERSIZE	1535	WORN TO 4.005	1486-D	4.000-4.002	363-D	4.005-4.006
.032 OVERSIZE	1535-C	REBORED TO 4.032-4.033	1486-C	4.027-4.029	363-C	4.032-4.033
.037 OVERSIZE	1535-C	WORN TO 4.037	1486-E	4.032-4.034	363-E	4.037-4.038

Fig. 230

The above sketch shows the sizes of standard and rebored tractor cylinders, pistons and rings.

It will be observed that in addition to the standard, the .005 oversize and the .032 oversize pistons, our Branches are prepared to furnish pistons and rings .037 oversize for installation in rebored blocks that have become worn to a considerable extent.

Markings on Pistons and Connecting Rods

Every dealer and mechanic ought to be thoroughly familiar with the markings on Tractor connecting rods and pistons.

Connecting rods are punch marked to show relative weights. (These markings will be found on the lower end of rods on the clamp screw side.)

All connecting rods having one punch mark will weigh within two ounces of each other. Those having two will weigh within two ounces of all other rods having the same marking and so on for each of the different markings.

Pistons besides being punch marked on top to indicate weight are also marked with the following letters to show size:

- "V" Standard size
- "D" .005" oversize
- "C" $\frac{1}{32}$ " oversize
- "E" .037 oversize

As with the connecting rods one punch means that all pistons having that mark will weigh within two ounces of each other. Those having two will weigh within two ounces of all other pistons with two markings and so on for each of the markings.

This information will enable mechanics to properly balance tractor motors which they overhaul. If this is done the engine will run more evenly and their work will give greater satisfaction.

Starting New Tractors

As an aid in starting new tractors fill the radiator with hot water, then remove the spark plugs and pour a small quantity of a 50-50 mixture of lubricating oil and gasoline in each spark plug hole.

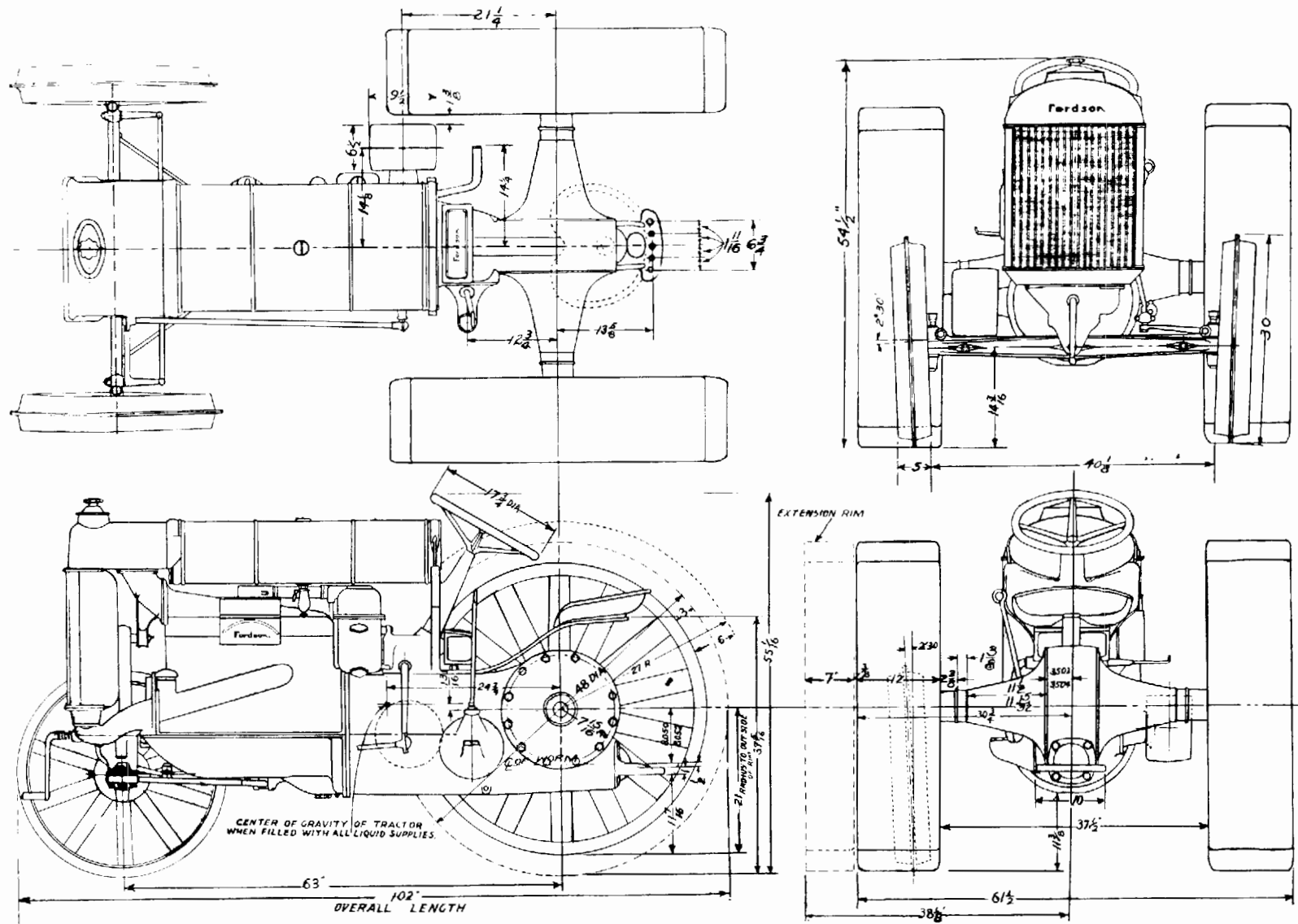


Fig. 231

Diagram of Fordson Tractor showing principal dimensions for attaching implements and accessories.

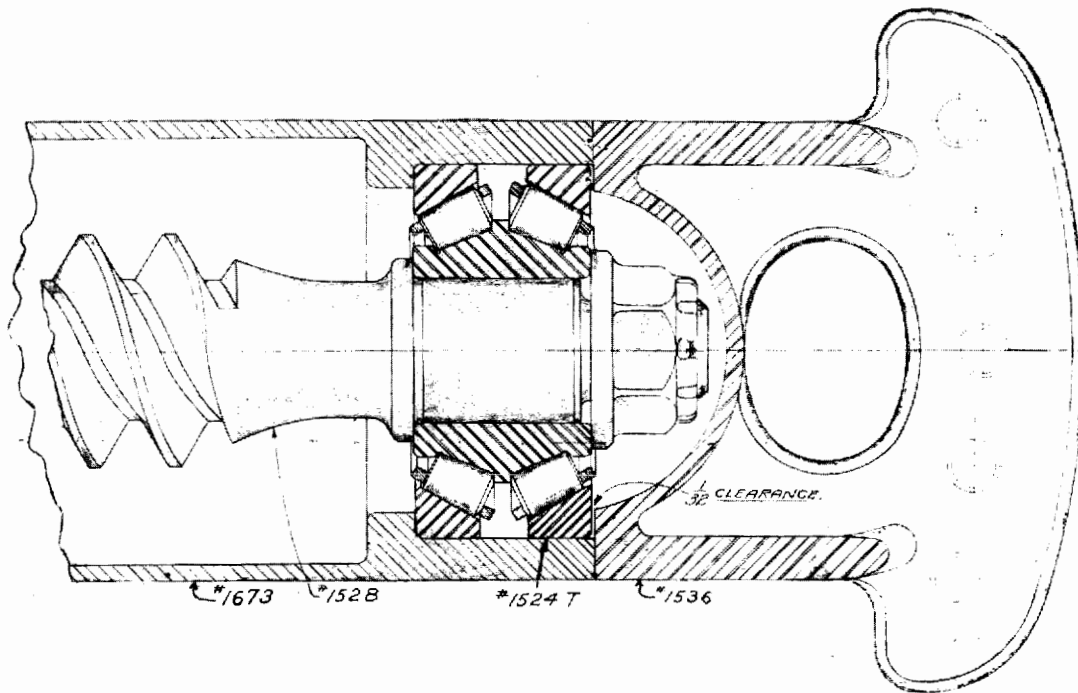


Fig. 232

Timken Worm Bearing

In Fig. 232 we show the installation of the Timken Worm Thrust Roller Bearing designed especially for use with the Fordson worm.

The two outer rings or cups of this bearing are interchangeable and likewise the cones and roller unit can be assembled on the worm either side up.

To install, use arbor press for pressing cone and roller unit on the worm. Then clamp tight by means of No. 1406 worm nut and insert cotter. Next push one of the cups into No. 1673 Transmission Housing after which

the worm can be inserted. Then tap the remaining cup into the housing as far as it will go. It is important to make sure that this cup has been pushed in beyond the end of the housing thus insuring No. 1536 drawbar cap seating on the housing instead of the cup. Should the drawbar cap clamp tight against the cup, the bearing would be injured by binding as it has been designed to have $\frac{1}{32}$ " clearance as shown in the illustration. This clearance will be transferred into the bearing itself the first time the tractor is driven in reverse gear as the worm will push the rear cup back against the drawbar cap.

**Serial Numbers of Tractors Shipped Each Month
from November 1st, 1920, to May 1st, 1921**

	Motors Assembled at Branches	Motors Assembled at Cork, Ireland	Motors Assembled at Home Plant
1920			
November		107,641 to 107,954	
December		107,955 to 108,229	
1921			
January			
February		108,230 to 108,243	169,584 to 169,840
March	158,312 to 158,326	108,244 to 108,271	169,841 to 170,000 172,001 to 175,687
April	158,327 to 158,970	108,272 to 108,386	175,688 to 181,313

Ford Car Section

Why Imitation Parts Are Sold at Reduced Prices

It is no doubt difficult for our dealers to understand how other concerns can offer parts for Ford cars at cut prices. For your information, we are citing the following cases which recently came to our attention.

One concern recently advertised front and rear hubs as identical with our production and up to our specifications in every particular. The fact of the matter is, that the hubs in question passed through a fire which destroyed the plant of the manufacturer of the material, which necessitated their selling these hubs as scrap and they later found their way into jobber's hands. These hubs were absolutely worthless, but it goes to show to what extent unscrupulous concerns will go in imposing upon Ford trade.

Another concern is cutting drive shaft pinions out of soft bar stock, whereas our pinions are made from drop forgings of alloy steel and passed through a special heat treating process.

Coil vibrators fitted with lead instead of tungsten points are also being offered to the trade.

Pistons of inferior quality are being advertised as made by the same factories supplying our product. In reality, we are producing our entire requirements of pistons. Similar claims are being made concerning a number of parts made exclusively in our factory.

While the majority of our dealers are familiar with the sales tactics of "bogus" parts manufacturers, we consider it advisable to state the facts for the benefit of those who are not so well acquainted with the situation.

For the protection of our business, it is the duty of every Ford dealer to notify owners as well as garages that material of this character is on the market.

Fixture for Bearing Cups

As practically all Ford cars are now coming through with Timken roller bearings in the

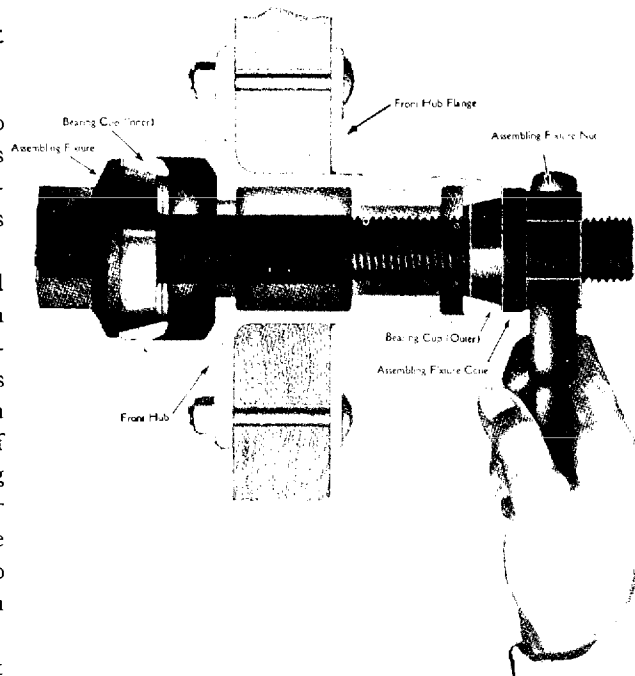


Fig. 233

front hubs, it is essential that every dealer have a fixture (3Z-2316) for properly assembling Timken roller bearing cups, as illustrated in Fig. 233.

Every shop should be equipped with one of these fixtures, not only because there is an increasing demand for its use but also because the life of the roller bearing depends largely upon the accurate installation of the bearing cups and this can only be accomplished by the use of a fixture designed for this purpose.

We are able to furnish this fixture at a price of \$4.80 net to dealers.

Ford Green Visor Headlamps

We have adopted as standard equipment on Ford cars headlamps with Green Visor lenses and clear glass double filament bulbs. These headlamps have been formally approved in Connecticut, California, New York, Pennsylvania, Maryland, Wisconsin, District of Columbia and City of Detroit, which have the most drastic laws covering automobile lights.

Branches can now supply dealers with the Green Visor lenses. When these lenses are installed in lamps originally equipped with plain lenses, it will be necessary to replace the frosted bulb with a plain Tulite bulb, then align and focus headlamps with empty car standing on a level surface in front of a white wall or screen 25 feet from the front of the headlamps. This wall or screen must be in semi-darkness or shielded from direct light sufficiently so that the light spots from the headlamps can be clearly seen.

Turn on bright lights and focus by means of screw at back of lamps, first one lamp and then the other, drawing the bulb filament slightly back of the focal center of the reflector until a semi-circular spot of light is obtained on the wall with the flat side up and with a concentrated circular central portion. In focusing, draw back the bulb to obtain as wide a spread as possible and still maintain the approximately flat top line and the concentrated central portion. In general the spot of light when properly focused will be about five or six feet in diameter, that is, as measured across the top.

With lamps thus focused for the "bright" filament, the "dim" will be in satisfactory position.

Headlamps may be aligned by bending the headlamp brackets as follows:

1—The top lines of the bright spots on the 25 foot wall are to be set at a line 28" above level of surface on which car stands. With top lines thus set for empty car, the headlamps will also have the proper tilt under full loads, as required by the various States.

2—The half cone of light from each headlamp is to extend straight forward, that is, the centers of the concentrated circular central portions must be 28" apart. (See Figs. 234 and 235.)

Fig. 236 shows a diagram of a shop laid out for focusing and alignment of Ford Green Visor headlamps.

Proper alignment is readily checked by means of a horizontal line on the wall in front of the car 28" above the level surface of car, and two vertical lines 28" apart, each one 14" from center line of car. Proper alignment of car relative to marks on the wall may

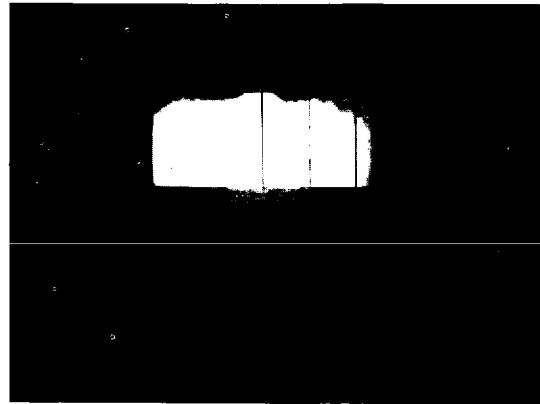


Fig. 234
Left Headlamp Properly Focused and Aligned



Fig. 235
Both Headlamps Properly Focused and Aligned

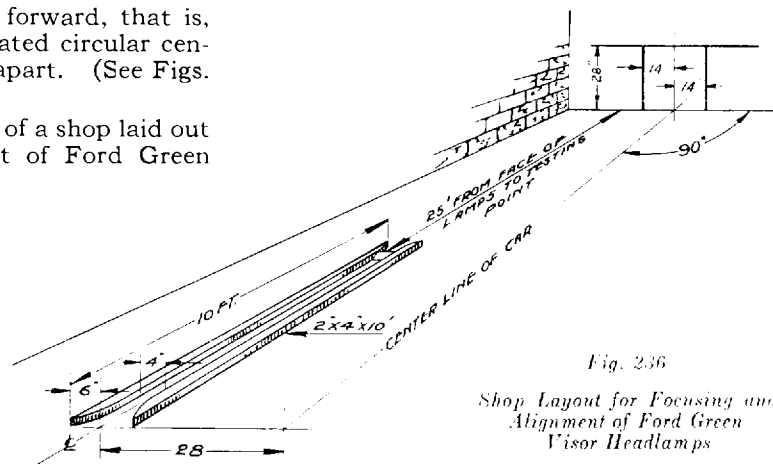


Fig. 236
Shop Layout for Focusing and Alignment of Ford Green Visor Headlamps

be readily provided by use of wheel guide blocks for one side of the car, as shown in cut. If it is impractical to tie up the floor space required by these blocks, marks painted on the floor may be used to show where one set of wheels should track and where the car should be stopped.

Sell to Garages

Production at the factory has been increased to a point that will permit our Branches supplying dealers with ample stock for Service. We realize in some sections dealers' stock orders have been cut down on account of our inability to meet the rapid increase in business which took place during the early Spring months. This temporary shortage permitted manufacturers of imitation parts to secure some business in certain localities.

It again becomes our duty to push the sale of Ford parts among the garages in order to protect owners from being supplied with material of inferior quality and which is bound to injure the reputation of our product for serviceability. It is of the utmost importance that a spirit of co-operation be maintained with the garages and every effort be made to serve them with parts promptly. In order to do this, dealers must carry a large enough stock to cover all demands from the garage trade.

If there is any reason why you cannot obtain 100% of the garage business in your locality, our Branches will assist you in accomplishing this end.

Service Gas Tanks

We have discontinued supplying the round tanks for service as we find that the oval ones may be used with the old style bodies. If it is found that the flanges bind on the heel board peen out the boards with a ball peen hammer at these points.

Novel Service

Couch-Hass Co., one of our New York dealers, has inaugurated two novel forms of service.

First, all new drivers are taught to drive in one of the Company's cars, which is maintained for that purpose, having the name of the Company and "Instruction Car" neatly printed on the doors. They find the novice progresses much more rapidly if he is not worried about damaging his new car.

The other form is the inspection service. Two runabouts and two mechanics are employed in this work which consists of visiting the owners who have purchased cars from them. They tune up the cars and make minor adjustments and give suggestions as to the repair work necessary.

Battery Boxes

In order to prolong the life of wooden battery boxes, it is essential that they be inspected at regular intervals. If the battery is allowed to get loose in the brackets the wooden case is bound to become damaged.

It is advisable also to paint the boxes occasionally in order to protect them from the acid and the elements.

Dealers can render valuable service to owners by inspecting their batteries whenever the opportunity is had, and by instructing them to carefully watch these points of maintenance.

Front Hubs

We are now supplying through our Branches, front hubs fitted with roller bearing cups to use in replacing hubs originally provided with Timken bearings. The dealer will find it advantageous to carry in stock both types of hubs, one for use in repairing demountable wheels having Timken bearings and the other for use in clincher wheels having ball bearings.

Cars bearing motor numbers 4,698,416 to 4,736,430 were shipped during February.

Cars bearing motor numbers 4,736,431 to 4,810,010 were shipped during March.

Cars bearing motor numbers 4,810,011 to 4,907,500 were shipped during April.

Ford Service Bulletin

No. 19

Vol. 2

July, 1921

Page 145

The Fordson on Golf Links



Fig. 237

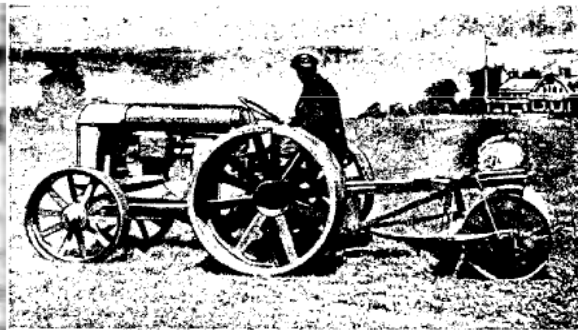


Fig. 238

THE above photographs show Fordson tractors working on golf courses. The picture on the left was taken at the Yakima Country Club, Yakima, Washington, and illustrates the Fordson cutting grass with three 30" lawn mowers. On the right the Fordson is shown pulling a roller over the Country Club Course at Waterloo, Iowa.

In both instances ordinary horse-drawn equipment is being satisfactorily utilized. The tractors engaged in this work are not only effecting a material saving in time and labor, but also the grounds have been improved and playing conditions bettered as a result of their use.

Tractor Belts

The following have been found to be satisfactory lengths for belts to be used on various machines:

Separator.....	75 or 100 ft.
Silo filler.....	75 or 100 ft.
Husker.....	75 or 100 ft.
Shredder.....	75 or 100 ft.
Baler.....	75 or 100 ft.
Grinder.....	50 or 75 ft.
Pump.....	50 or 75 ft.
Saw.....	50 or 75 ft.

In order to obtain satisfactory results from belts as well as efficient operation of both the tractor and the belt driven machine, it is necessary that some care be exercised in applying the belts.

In starting operation with any belt driven machine, the tractor should be run up before applying the belt to the pulleys. Then bring the tractor back until the belt is at the proper tension making certain that the pulleys are in alignment. When this is being done the throttle should be set so that the pulley turns very slowly. After the proper tension and alignment have been attained, the tractor may be speeded up gradually so as to allow sufficient time for the driving pulley to gain control of the belt and the belt in turn control of the driven machine. When the maximum speed has been obtained run without load until the belt and machine are running smoothly. Do not start the pulley while the driven machine is under load nor start feeding until it has reached the operating speed recommended by the manufacturer.

The driven pulley on the various machines used in order to perform its work efficiently must operate at a certain fixed number of revolutions per minute. This speed which has been determined by the manufacturer is in direct proportion to the diameter of the driving pulley of the Fordson tractor which is 9½" and which at a normal speed travels at a thousand revolutions per minute.

Below we show the particular size pulley to be used on the driven machine to obtain efficient service:

Diameter of Driven Pulley	Revolutions per Minute
5 inches	1900
5½ inches	1727
6 inches	1583
6½ inches	1462
7 inches	1357
7½ inches	1268

Diameter of Driven Pulley	Revolutions per Minute
8 inches	1187
8½ inches	1118
9 inches	1055
9½ inches	1000
10 inches	950
10½ inches	926
11 inches	863
11½ inches	826
12 inches	782
12½ inches	760
13 inches	731
13½ inches	704
14 inches	679
14½ inches	655
15 inches	634
15½ inches	613
16 inches	594
16½ inches	575
17 inches	559
17½ inches	543
18 inches	527
18½ inches	513
19 inches	500
19½ inches	487
20 inches	475

For Example: A certain machine is recommended to travel at a speed of about 1350 R. P. M. The nearest speed shown on the table is 1357 which shows that to obtain that speed a 7-inch pulley should be used.

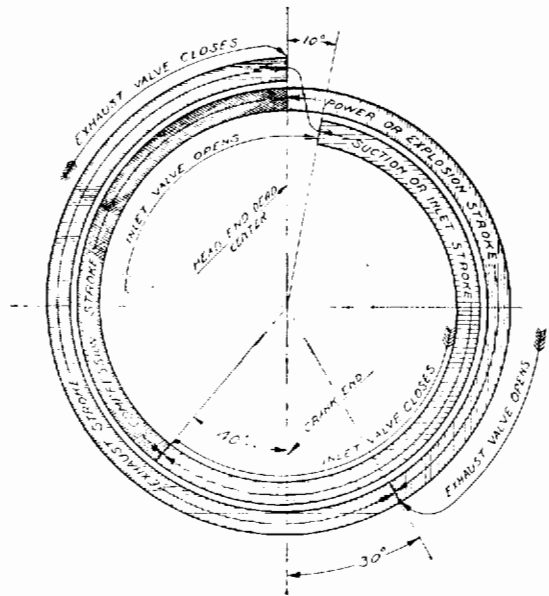


Fig. 239

The above diagram shows the Valve Action of the Fordson Tractor Motor through the four strokes of its cycle. The firing order of the cylinders is 1-2-4-3.

Removing and Replacing Tractor Radiator

If it is necessary to remove the radiator as when replacing the upper or lower tank, or to get at the time gears or cam shafts, proceed as follows:

1. Drain off water by opening pet cock under radiator (it may be necessary to insert a wire in the cock to break up the sediment before the water will flow).
2. Remove the three cap screws under the bottom tank which hold radiator to cylinder front cover.
3. Loosen front fuel tank strap by removing the two nuts on cover of radiator.
4. Unscrew the four cap screws under top tank which hold radiator to cylinder head connection.
5. Grasp radiator as shown in Fig. 240 and lift it off.

When replacing the radiator insert dowel pins in two outer holes of bottom tank; see that the surface of the upper and lower water connections and the surface around the third cap screw hole in the lower and front cover are free from dirt or burrs which might cause a leak.

To compensate the thickness of the water outlet gasket, a spacer, part S-546, is placed between the tank and the cover between the third cap screw hole.

Start all the cap screws, making sure that the gaskets and spacers are in place. Run them down to an easy seat before tightening them, after which they all should be tightened.

The fuel tank may then be held up in place while the strap is entered into the tank and drawn up tight by means of the nuts, backed up by lock washers.

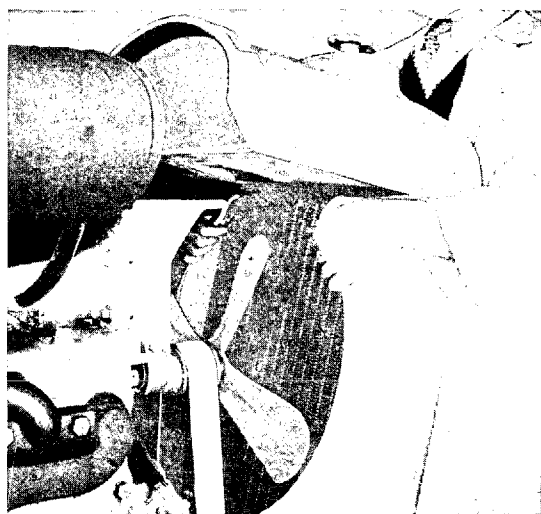


Fig. 240

Fitting of Tractor Pistons and Rings

Tractor pistons are fitted in the cylinder bore tight on .006" and loose on .004". To determine the proper clearance in fitting these parts, it is necessary to use .001" feelers. Because of the possibility of pistons being out of round the feelers should be tried at several points around the bore of the cylinder.

As the top piston ring does not travel the full length of the cylinder bore, it is necessary when overhauling a motor and fitting new pistons, to file off the small flange or ridge which will be found at the tops of the cylinder walls.

Tractor piston rings are tapered and marked so that there need be no mistake in fitting them properly. The latest rings are marked with a groove near the upper edge and fitted with edge having groove toward top of piston. Earlier style rings were punch marked and installed with side having marking toward top of piston.

When fitting a new ring, first try it around the piston by placing its outside edge in the groove to which it is to be fitted, thus making certain that it is a good fit but not tight in any position. Rings are fitted with a clearance of .0005" to .0025" between ring and ring groove.

The top piston ring should have .005" gap between the ends. The second ring is fitted with a gap of from .005" to .008", while the lower ring may have an even larger gap.

In order to maintain the balance of the motor, it is necessary when replacing pistons to make sure that the new pistons are of equal weight; this can be determined by checking the punch marks found on the tops of the pistons as described on page 139 of the Bulletin.

Discount on Tractor Parts

Your attention is called to the fact that the list prices shown in the June 1st Tractor Parts List on the following items, are subject to 20% discount to dealers and 10% discount to garages.

- S-120—2223 Rear wheel assy R—less bushing
- S-121—1777 Rear wheel assy L—less bushing
- S-200—2260 Cylinder assy
- S-200C—2260C Cylinder assy—rebored
- S-226—1145 Crank shaft
- S-226B—1145A Crank shaft—reground
- S-325—1673 Trans housing
- S-900—2451 Pulley attachment complete
- S-910—2448 Extension rim assy complete

The prices of all other items in this price list are subject to the usual 40% discount to dealers and 25% discount to garages.

One-Piece Vapor Tube

Our stock of S-676-H234-51 Vapor tubes of the two-piece type is about exhausted. We will now supply S-676B-H14210 Vapor tube (one-piece).

When installing the one-piece vapor tube in a manifold originally equipped with a two-piece tube, it will be necessary to use S-623C-H14207 Vapor tube bushing and S-623B-H14208 Vapor tube packing. (See Fig. 242.)

The packing and bushing are not required when a one-piece vapor tube is installed in replacement of a tube of the same type.

Crank Case Pet Cocks

Our road men are reporting many instances where owners are wiring the crank case pet cocks to prevent them opening when driving the tractor through stubble or low brush. This is poor practice as it makes it impossible to open the pet cocks to determine the amount of oil in the crank case.

We suggest as much the better plan to cut off the wings of the valve as shown in Fig. 241B. A shows the standard pet cocks.

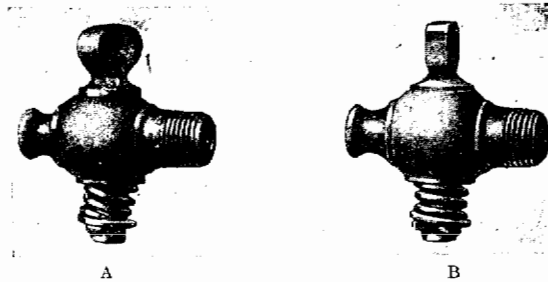


Fig. 241

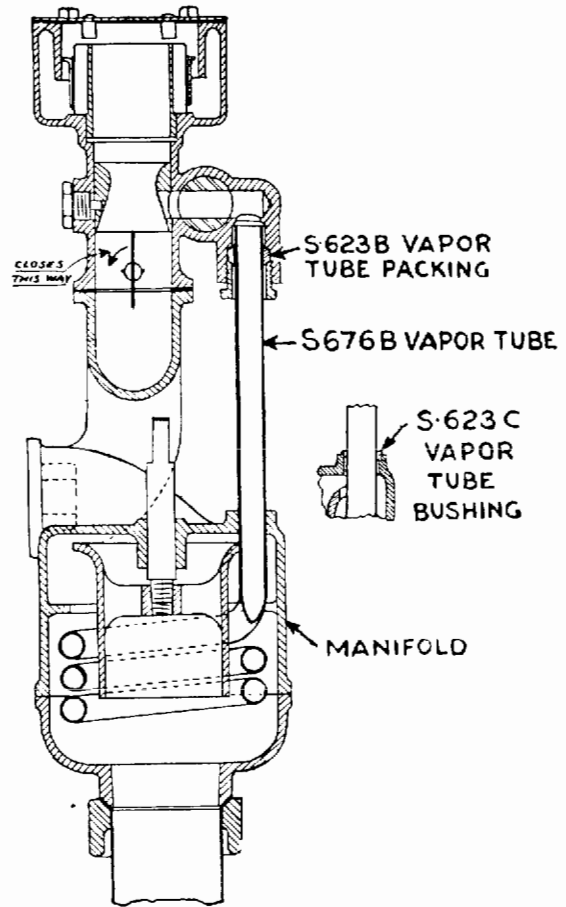


Fig. 242

Corrected List of Serial Numbers of Tractors Shipped Each Month from November 1st, 1920, to July 1st, 1921

	Motors Assembled at Branches	Motors Assembled at Cork, Ireland	Motors Assembled at Home Plant
1920			
November		107,641 to 107,954	.....
December		107,955 to 108,229	.....
1921			
January		108,230 to 108,243	.....
February		108,244 to 108,271	169,584 to 169,840
March	158,312 to 158,326	108,272 to 108,386	{ 169,841 to 170,000 172,001 to 175,687
April	158,327 to 158,970	108,387 to 108,456	175,688 to 181,313
May	158,971 to 159,453	108,457 to 108,653	181,314 to 187,794
June		108,654 to 108,680	187,795 to 193,985

Removing and Replacing Tractor Radiator

If it is necessary to remove the radiator as when replacing the upper or lower tank, or to get at the time gears or cam shafts, proceed as follows:

1. Drain off water by opening pet cock under radiator (it may be necessary to insert a wire in the cock to break up the sediment before the water will flow).
2. Remove the three cap screws under the bottom tank which hold radiator to cylinder front cover.
3. Loosen front fuel tank strap by removing the two nuts on cover of radiator.
4. Unscrew the four cap screws under top tank which hold radiator to cylinder head connection.
5. Grasp radiator as shown in Fig. 240 and lift it off.

When replacing the radiator insert dowel pins in two outer holes of bottom tank; see that the surface of the upper and lower water connections and the surface around the third cap screw hole in the lower and front cover are free from dirt or burrs which might cause a leak.

To compensate the thickness of the water outlet gasket, a spacer, part S-546, is placed between the tank and the cover between the third cap screw hole.

Start all the cap screws, making sure that the gaskets and spacers are in place. Run them down to an easy seat before tightening them, after which they all should be tightened.

The fuel tank may then be held up in place while the strap is entered into the tank and drawn up tight by means of the nuts, backed up by lock washers.

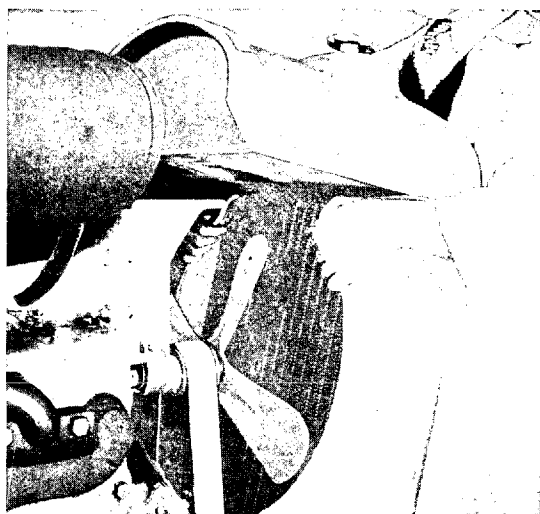


Fig. 240

Fitting of Tractor Pistons and Rings

Tractor pistons are fitted in the cylinder bore tight on .006" and loose on .004". To determine the proper clearance in fitting these parts, it is necessary to use .001" feelers. Because of the possibility of pistons being out of round the feelers should be tried at several points around the bore of the cylinder.

As the top piston ring does not travel the full length of the cylinder bore, it is necessary when overhauling a motor and fitting new pistons, to file off the small flange or ridge which will be found at the tops of the cylinder walls.

Tractor piston rings are tapered and marked so that there need be no mistake in fitting them properly. The latest rings are marked with a groove near the upper edge and fitted with edge having groove toward top of piston. Earlier style rings were punch marked and installed with side having marking toward top of piston.

When fitting a new ring, first try it around the piston by placing its outside edge in the groove to which it is to be fitted, thus making certain that it is a good fit but not tight in any position. Rings are fitted with a clearance of .0005" to .0025" between ring and ring groove.

The top piston ring should have .005" gap between the ends. The second ring is fitted with a gap of from .005" to .008", while the lower ring may have an even larger gap.

In order to maintain the balance of the motor, it is necessary when replacing pistons to make sure that the new pistons are of equal weight; this can be determined by checking the punch marks found on the tops of the pistons as described on page 139 of the Bulletin.

Discount on Tractor Parts

Your attention is called to the fact that the list prices shown in the June 1st Tractor Parts List on the following items, are subject to 20% discount to dealers and 10% discount to garages.

- S-120—2223 Rear wheel assy R—less bushing
- S-121—1777 Rear wheel assy L—less bushing
- S-200—2260 Cylinder assy
- S-200C—2260C Cylinder assy—rebored
- S-226—1145 Crank shaft
- S-226B—1145A Crank shaft—reground
- S-325—1673 Trans housing
- S-900—2451 Pulley attachment complete
- S-910—2448 Extension rim assy complete

The prices of all other items in this price list are subject to the usual 40% discount to dealers and 25% discount to garages.

One-Piece Vapor Tube

Our stock of S-676-H234-51 Vapor tubes of the two-piece type is about exhausted. We will now supply S-676B-H14210 Vapor tube (one-piece).

When installing the one-piece vapor tube in a manifold originally equipped with a two-piece tube, it will be necessary to use S-623C-H14207 Vapor tube bushing and S-623B-H14208 Vapor tube packing. (See Fig. 242.)

The packing and bushing are not required when a one-piece vapor tube is installed in replacement of a tube of the same type.

Crank Case Pet Cocks

Our road men are reporting many instances where owners are wiring the crank case pet cocks to prevent them opening when driving the tractor through stubble or low brush. This is poor practice as it makes it impossible to open the pet cocks to determine the amount of oil in the crank case.

We suggest as much the better plan to cut off the wings of the valve as shown in Fig. 241B. A shows the standard pet cocks.

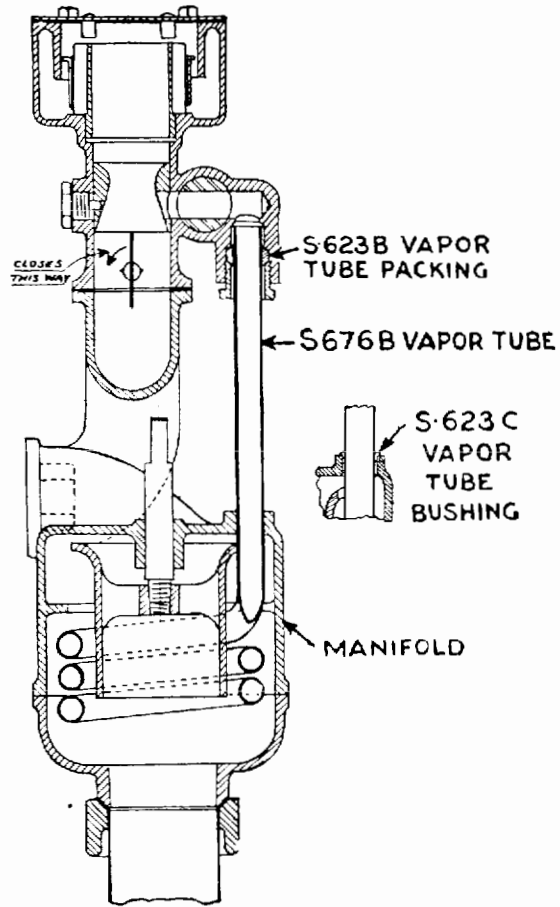


Fig. 242

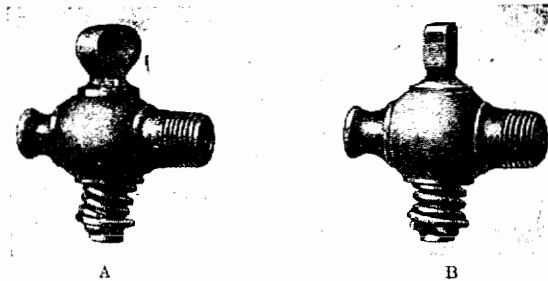


Fig. 241

Corrected List of Serial Numbers of Tractors Shipped Each Month from November 1st, 1920, to July 1st, 1921

	Motors Assembled at Branches	Motors Assembled at Cork, Ireland	Motors Assembled at Home Plant
1920			
November.....	.....	107,641 to 107,954	.....
December.....	.....	107,955 to 108,229	.....
1921			
January.....	.....	108,230 to 108,243	.....
February.....	.....	108,244 to 108,271	169,584 to 169,840
March.....	158,312 to 158,326	108,272 to 108,386	169,841 to 170,000 172,001 to 175,687
April.....	158,327 to 158,970	108,387 to 108,456	175,688 to 181,313
May.....	158,971 to 159,453	108,457 to 108,653	181,314 to 187,794
June.....	.....	108,654 to 108,680	187,795 to 193,985

Ford Car Section

Cutting Labor Charges

Dealers in many sections are cutting their prices on labor for many of the repair operations and report that the reduced prices are proving a great stimulant to their business.

This appears to be good business, particularly, since it is in keeping with the times and for that reason is bound to have a pleasing effect on the public. There have been marked reductions in practically every line. Ford cars and parts have been materially reduced in price. It naturally follows that war-time labor schedules are creating unfavorable comment and tend to discourage Ford owners in having needed work performed.

Almost daily we receive reports of dealers attempting to justify labor charges which their customers consider excessive, by stating that "regardless of the length of time taken for the job we are obliged to charge the rate established by the Ford Motor Company." If the dealer cannot justify the labor charge for any particular job by his own time costs, overhead expense, etc., then the rate should be reduced to the proper basis.

We believe that dealers should check each repair operation with the time required for performing the work in their shop and make reductions accordingly. This will unquestionably promote better feeling among your customers and will also result in their having their work performed at properly equipped shops, thereby adding materially to the volume of your repair business.

Body Prices

The prices on Ford bodies have been revised as follows:

Runabout.....	\$ 65.00
Touring.....	90.00
Coupe.....	300.00
Sedan.....	400.00

These prices are subject to the same discount that applies on cars, with an additional charge of \$10.00 to cover expense of crating touring and runabout bodies, and \$20.00 for closed bodies. Orders will be filled from nearest Assembly Plant. An extra charge will be made to cover freight from factory to Assembly Plant filling the order.

Special Prices on Tools

Our branches can supply the following tools to dealers and garages at the special net prices quoted:

5-Z-206	Special 61/64 open end wrench	-	-	40c
5-Z-212	" 23/32 " " "	-	-	15c
5-Z-232	Standard bushing driver	-	-	20c
5-Z-196	Special 57/64 open end wrench	-	-	20c
5-Z-154	45/64 socket wrench L-handle for steering spindle connecting rod bolt nut	-	-	20c
5-Z-159	41/64 socket wrench T-handle for connecting rod cap bolt nut	-	-	35c
5-Z-161	45/64 socket wrench T-handle for body bracket	-	-	35c
5-Z-165	61/64 socket wrench T-handle for drive shaft castle nut	-	-	40c
5-Z-193	Special 19/64 open end wrench	-	-	15c
5-Z-195	" 37/64 " " "	-	-	15c

Dealers and garages will find it to their advantage to have these tools for their own use and can no doubt sell a number of them to their customers.

Ford Batteries

Ford batteries will be available for distribution through our various Branches in about 30 days. These batteries will bear our trade mark and be made to our specifications. The battery will retail at a price of \$25.00 subject to the usual discount.

We believe our dealers will appreciate the opportunity of offering their trade a first-class battery at a reasonable price.

It will facilitate shipment of batteries if dealers will notify their respective Branches as to their probable requirements in this line for the month of August.

Further information on this subject will be given in the next issue of the Bulletin.

Relieving Strain on Rear Curtains

Touring car and runabout top stay straps should be tightly secured, otherwise the tops will sway back and forth causing a strain on the back curtains that will eventually tear them.

Excessive Repair Charges

An inspection of dealers' service stations in various parts of the country, leads us to believe that a great many parts are being unnecessarily replaced in customers' cars during the course of repair operations. In many instances these parts were found to be in perfect condition and were evidently discarded at the whim of the repair man, or for the purpose of realizing a profit on the new parts.

For instance, some shops follow the practice of discarding cylinder head gaskets whenever the head is removed for any purpose. In other places pistons are thrown out when new rings properly fitted would have answered the purpose. Crank shafts are replaced when out of true instead of being straightened.

Repair work handled economically for the customer is equally as important as turning out a job in proper mechanical order. There is nothing more vital to the success of your business than retaining the good will of your customer, through the medium of efficient service at reasonable cost. The reputation of the Ford car for low operation costs is one of its greatest selling factors. Dealers who increase customers' repair bills unnecessarily are therefore working against their own best interests. That this is true, is proven by the results achieved by dealers and garages who have maintained service that was always efficient and yet economical.

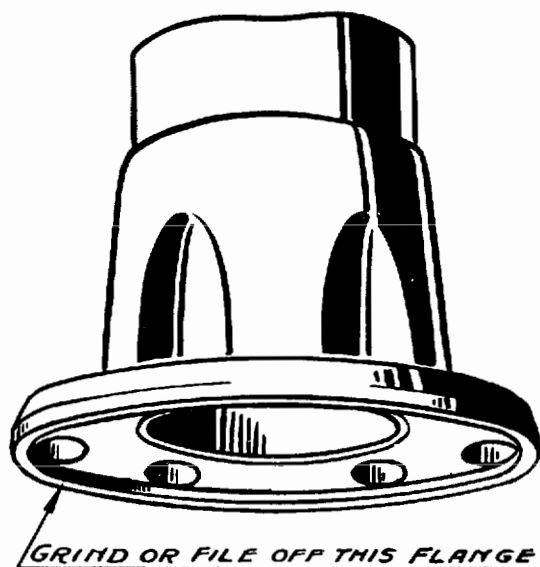


Fig. 243

New Style Roller Bearing Housing

We have discontinued the manufacture of the malleable casting type drive shaft roller bearing housing (T-2583-191B). This part has been replaced with a drop forged housing (T-2583B-191C) which is machined on the inside to fit the roller bearing, and eliminates the roller bearing sleeve.

The installation of the present type housing necessitates installing T-2589C-185B Drive shaft thrust bearing consisting of two T-2591-188 Drive shaft ball thrust collars and one T-2591B-162 Drive shaft thrust ball and retainer assembly. (See Fig. 244.) The old style T-2589B-185 Drive shaft ball bearing assembly cannot be used with the new type bearing housing.

It is also necessary when installing the new bearing housing in cars having the old style drive shaft tubing, to grind or file the flange off of the tubing as shown in Fig. 243.

As this change in design improves the construction of the rear axle system, dealers should promptly stock the parts required to replace the old style material whenever necessary.

Quantity Prices on Parts

Lists of prices of Ford parts in lots of one hundred to dealers and lots of ten to garages effective July 15th, are available at our Branches for distribution to Dealers and Garages.

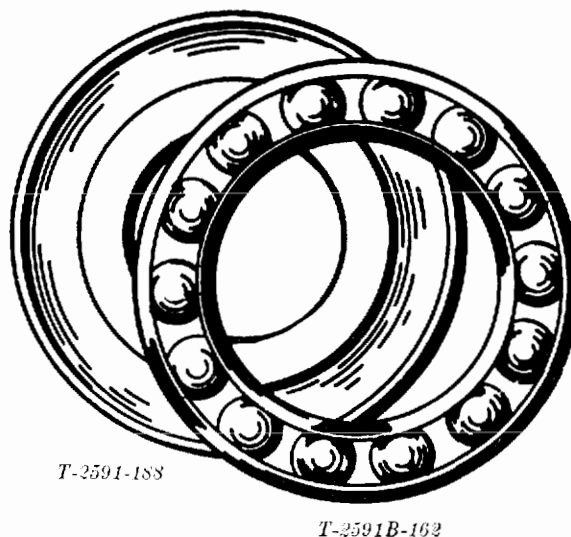


Fig. 244

Alignment of Front Axle

The important points in the alignment of the front axle and wheels are shown in Figs. 245, 246 and 247. The pitch backwards (caster) shown in Fig. 245 is obtained by the offset in the perches. The camber shown in Fig. 247 is obtained by the offset in the spindle body, while the gather, Fig. 246, is obtained by adjusting the steering arm connecting rod yoke.

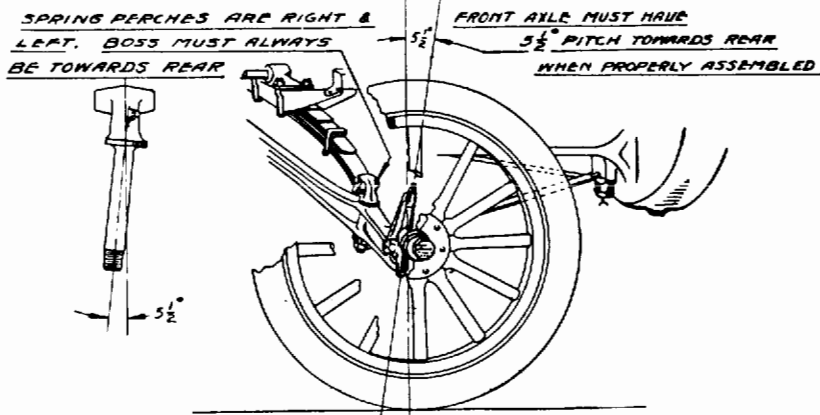


Fig. 245

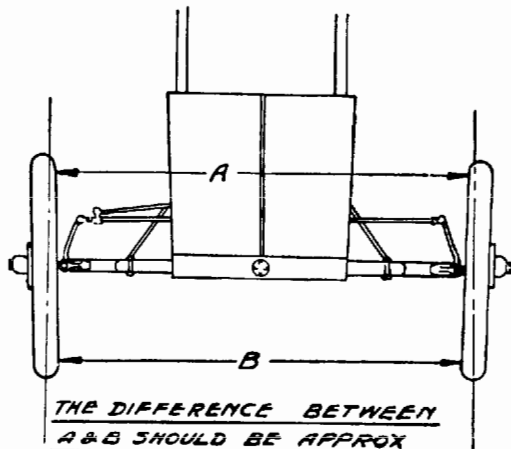


Fig. 246

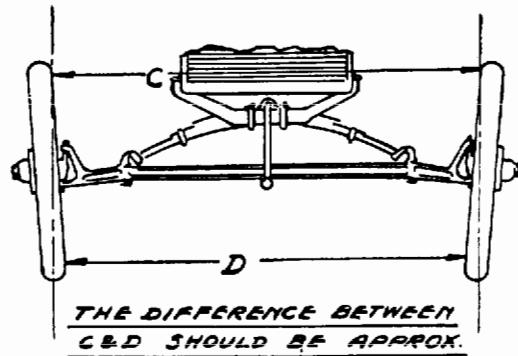


Fig. 247

“Tulite” Headlamp Bulbs

The “Tulite” headlamp bulbs, T-6572D frosted, and T-6572E clear, were designed to meet our specifications, and Ford headlamps equipped with these bulbs comply with the lighting requirements in those States and municipalities which have the most rigid laws governing automobile lighting.

Substitution of other bulbs may impair the efficiency of our lamps so that they will not meet with the approval of the authorities.

Dealers and garages should carry at all times an adequate stock of these bulbs to meet the needs of their customers.

Effective at once, the list price of both the frosted and clear “Tulite” bulbs has been reduced from 75c to 55c each.

The Ford Motor Company are exclusive distributors of “Tulite” bulbs.

Parts Price List

The July 1, 1921, edition of the Model “T” Parts Price List is now ready for distribution to Dealers and Garages.

Garages and Dealers who have not already been supplied with lists should take the matter up with the Branch immediately.

Oversize Crank Shaft Bearing Cap

In order that end play in crank shafts may be taken up, all T-3031-405AR Crank shaft rear bearing caps furnished hereafter, will be babbitted 1/32” oversize. The babbitt may be filed down to make the proper fit.

Keeping the Repair Department at Work

The complaint is often made that repair work has its "ups and downs." One day the shop is rushed with work, while the next day practically no repair business is received. As a result the shop cannot be operated economically. A working force that rushes today and is idle tomorrow soon becomes demoralized.

Conditions of this kind are apt to prevail where the service rendered is generally unsatisfactory, or where no effort is made to follow up customers. Every dealer should have a list of Ford owners or Service customers in his locality and should keep in frequent touch with them. When there is a lull in repair work the superintendent should write or 'phone those owners whose cars he has reason to believe are in need of overhauling.

Inviting the owner to bring his car in for inspection or adjustment will frequently lead to further repair work.

Circularizing the smaller garages for repair work which they are not equipped to do, such as reboring and rebabbitting cylinder blocks, is another means adopted by many dealers to increase their repair business.

Dealers who have heretofore made no real effort to secure repair work should look into its possibilities at once. The business is there; all that is required to secure your full share of it is conscientious and well directed effort.

Removing Rust-Proof

Our attention has been called to the fact that some dealers are using emery cloth and sand paper to remove rust-proof from parts shipped to them. This is poor practice as the sand paper does not remove the rust-proof entirely and invariably results in abrasive getting into the assemblies.

New Crank Case Front Bearing

T-3076-320-B Crank case front frame bearing is now obsolete. Instead we are supplying T-3076-B-320-C Crank case front bearing and spring clip. (See Fig. 248.)

When the latter is substituted for the former it is necessary to use the following parts:

- 2 T-753 Front spring clip cotters
- 2 T-3076-C-77 Front spring clip nuts
- 1 T-3077-321 C.C. Front bearing cap
- 2 T-3078-B-550-C C.C. Front bearing screws
- 2 T-3078-C-5636 C.C. Front bearing lock washers
- 1 T-3664-493 Front license bracket
- 1 T-3810-342 Front spring clip bar

The advantage of the present type frame bearing over the old style is that it permits of greater flexibility, thereby not only reducing the possibility of front spring breakages but also improving the riding qualities of the car.



Fig. 248—3076B-320-C Crank Case Front Bearing and Spring Clip

Dealers whose shops are equipped with washing tanks can remove the rust-proof by submerging the parts in the soda ash and caustic solution ordinarily used in such tanks. If your shop is not equipped with a washing tank, we recommend the use of kerosene for removing rust-proof.

Cars bearing motor numbers 4,907,501 to 5,008,000 were shipped during May

Cars bearing motor numbers 5,008,001 to 5,114,530 were shipped during June

Ford Service Bulletin

No. 20

Vol. 2

August, 1921

Page 153

City of Dallas Buys Fordsons

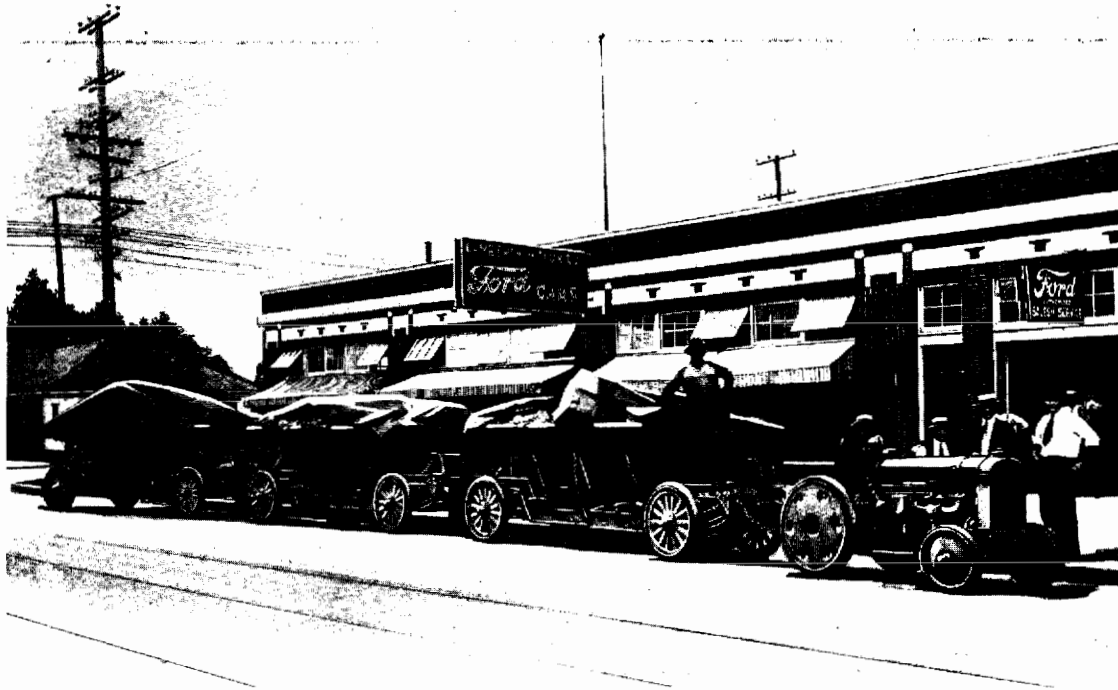


Fig. 249

THE above photograph shows one of five Fordson Tractors recently purchased by the City of Dallas, Texas, for use in the Garbage Department. A particularly interesting fact in connection with the delivery of these tractors is that Fordsons were decided upon after competitive demonstration with some of the best known makes of motor trucks. It is understood that these tractors are giving such satisfactory service that the City is contemplating the purchase of additional Fordsons for use in other departments.

Tractor Horsepower Rating

WHEN speaking of the horsepower of a tractor, one of three things may be meant:

1. Horsepower *available* at the engine crankshaft.
2. Horsepower *available* for belt work.
3. Horsepower *available* for drawbar work.

A tractor rating may be determined either by horsepower tests, or by means of a formula. As a matter of information both methods are here described.

Engine Horsepower

Figure 250 shows the horsepower of the Fordson engine at various speeds.

The most common formula used for engine horsepower rating is that given by the National Automobile Chamber of Commerce (formerly A. L. A. M.):

$$\text{Engine Horsepower} = \frac{D^2 N}{2.5}$$

Where D = Diameter of Cylinder.
N = Number of Cylinders.

This is the formula used extensively as a basis for computing state license fees for motor vehicles. It is supposed to give the horsepower output of engines running on gasoline at 1000 feet per minute piston speed. The formula is not suited for kerosene tractors as these usually have a lower compression than automobile engines. The Fordson engine is rated 25.6 horsepower by this formula at 1000 feet per minute (1200 r. p. m.). By referring to Figure 250 it is seen that the actual horsepower is 23.6 at this speed.

A more suitable formula, perhaps, is that recommended by the Society of Automotive Engineers:

$$\text{Nominal Engine Horsepower} = \frac{0.7854 D^3 L R N}{13,000}$$

Where D = Diameter of Cylinder in inches.
L = Stroke in inches.
R = Revolution per minute of crankshaft.
N = Number of Cylinders.

This formula merely expresses in figures the statement, "A kerosene tractor engine should develop one horsepower for every 6,500 cubic inches of gas mixture entering it per minute."

It is intended by the S. A. E. that this formula shall give a lower horsepower than the actual tested horsepower of an engine. This is to insure a reserve of power for emergencies.

The formula rates the Fordson engine 19.33 H. P. at 1000 R. P. M., while the actual tested horsepower is 20.4 at this speed as shown in Figure 250.

Belt Horsepower

The Fordson is rated 18 belt horsepower at 1000 R. P. M. by the Ford Motor Co., this being based on actual tests.

The power available at the belt is always less than the engine power. This is due to belt slippage. There is also of course a slight loss in transmitting the power through the bevel pulley gears, but this is very small. The actual belt horsepower output of the Fordson as tested by the University of Nebraska is 18.16 H. P. at 1000 R. P. M. and similar results have been obtained at the factory with an electric dynamometer.

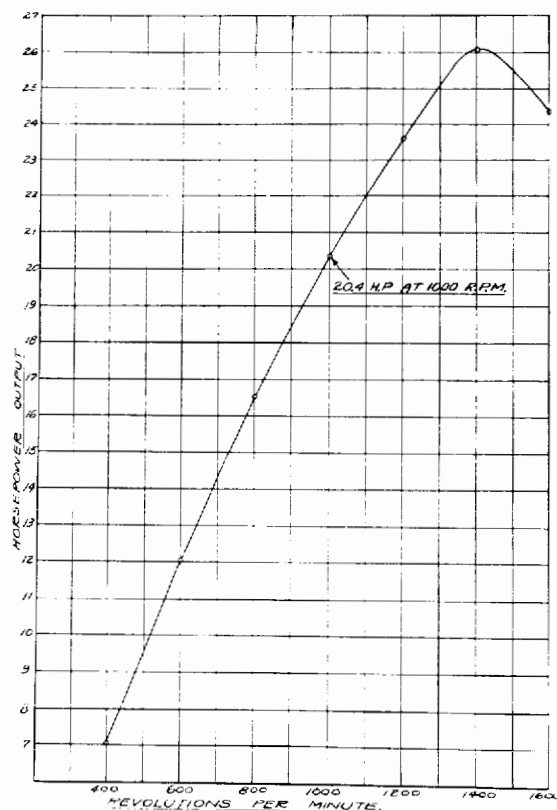


Fig. 250

Drawbar Horsepower

The Society of Automotive Engineers recommends, that, if a drawbar rating is desired, one-half the engine horsepower obtained by the S. A. E. engine rating formula should be taken.

According to this the Fordson would be rated 9.66 drawbar horsepower. The S. A. E. points out, however, that this formula gives

only a rough estimate, as the mechanical design has much to do in determining how **great** a percentage of the engine power can be delivered to the implement in actual drawbar horsepower.

Since no formula has been invented that considers these mechanical design factors, formula rating of drawbar horsepower is at present impractical.

But supposing the drawbar horsepower, as obtained by tests, were given. This would be of no practical use to the average user as he has no way of knowing just how much power (and reserve for emergencies) is needed for the particular plow or implement he has, and for the soil conditions of his farm and at the speed it is to be pulled by the tractor. The soil conditions alone may cause the pull for a single 14 inch plow to vary anywhere *from 100 to over 2000 pounds*.

We, therefore, do not recommend the use of a drawbar rating with the Fordson.

If it were possible to rate tractors accurately by means of formula, it would be a simple matter to compare various tractors and tests and demonstrations for the purpose would be unnecessary. The formula method is *not* accurate and for this reason the user does not want a formula rating. He wants to know:

First: The actual belt horsepower output so he may buy the proper size of belt-driven machine. This information has been given under the heading of Belt Horsepower.

Second: He wants to know the size and the number of implements that can be pulled by the tractor.

The Fordson will pull two 14-inch plows through *stiff soil at 8 inches depth*. (Other implements usually require less power so it is unnecessary to mention them.)

This is a sufficient rating for a tractor.

Plow Adjustments for Hard Ground

Soon summer and fall plowing will begin. It usually happens that the operator has

greater difficulty to keep the plow in the ground than in the spring on account of its dryness. A great deal of unnecessary experimenting can be saved when one understands the principle of the vertical draft.

Figure 251 shows the perfect line of draft between the tractor and the plow bottoms. This line of draft must be adhered to if the operator expects to keep his plows in hard ground.

The imaginary line A-A (draft line) runs from the center of the tractor hitch D through the hinged point of the plow clevis E, straight to the center of draft—at the intersection of line C-C and B-B.

Observe that the lower tooth of the plow clevis jaw is fastened to the beam. This gives the points a better opportunity to penetrate the ground in their natural manner. This also has a tendency to keep the plow point from wearing upward on the underside.

The ordinary method pursued by people who do not understand the principle of draft is to throw the bottoms more on their points, assuming that they will take the ground better. Observe such a procedure will have a tendency to wear the underside of the share point rounding and after a few hours' wear the share points become so rounded that they will not stay in the ground.

The additional work required of the tractor plow wears out the shares more rapidly than on horse plows. This fact is not commonly known among farmers but should be explained to them so that they will be more careful in seeing that the plow is properly adjusted.

Fordson Spark Control

The fact that there is no set rule for regulation of the spark lever of the Fordson tractor is probably the reason why many operators overlook the importance of proper spark control with resultant injury to the tractor as well as inefficient operation.

While it is generally understood that the

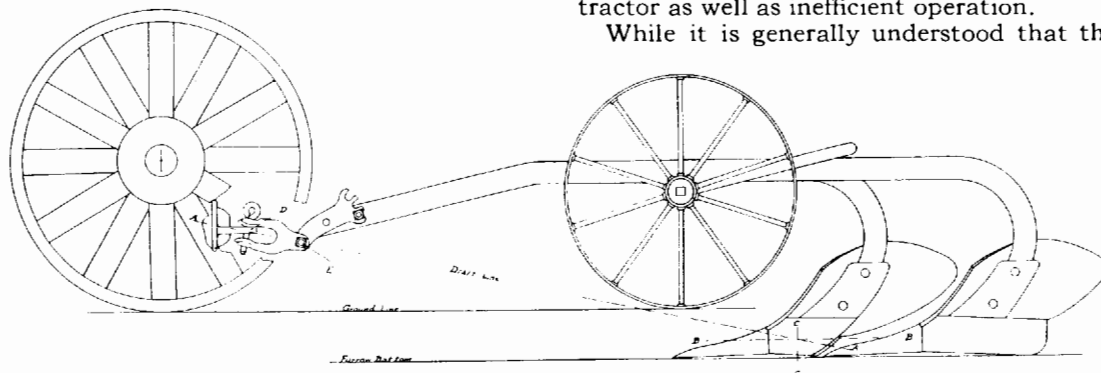


Fig. 251

spark should be set at all times so that the maximum pressure of the explosions takes place just as the pistons start to come down on the power stroke, it is only from experience that a driver knows just where to set the spark to obtain this condition. As it is well known, at cranking speed correct timing of the explosion occurs when the spark lever is retarded and at high speeds it occurs when the lever is advanced. In other words, to maintain the *same* timing of the explosion with reference to the position of the pistons for high engine speeds as for low, the lever must be advanced.

Let us take for example, a driver starting out with a tractor to plow. He retards the spark lever to get the proper timing of the explosion for starting as shown in Fig. 252. As soon as the engine is started it speeds up so that the explosions are occurring late, as in Fig. 253. Power is, of course, being lost as the explosion pressure is not being applied to the piston at all during the early part of the stroke. Besides, heating occurs as the explosions taking place only after the piston has uncovered part of the cylinder wall, allow too much heat to radiate through the water jacket as well as burning up the oil film on the surface. A burned out vapor tube and burned, cracked and warped valves will result from continued operation of the tractor motor with retarded spark.

The operator now advances his spark, thus again giving the condition shown in Fig. 252. The power output then increases and the engine runs cooler.

Now if heavy drawbar work is being done, the operator notices after some time, when the engine has become thoroughly heated, that knocking begins. This is due to the fact that the charges entering the cylinder are now hotter and ignite quicker and with more snap than when the engine is cold. Therefore, with the spark fully advanced the firing is now occurring too soon and the condition shown in Fig. 254 is taking place. This corresponds to the condition obtained when driving a car up a hill. The result is the same as in the case shown in Fig. 253. The knocking which now occurs is an added abuse which tends to loosen the bearings and which, if it were not for the flywheel, would turn the crankshaft backwards.

The spark is therefore retarded *until* the condition shown in Fig. 252 is again obtained whereupon the power increases and knocking stops.

The matter of spark control is entirely too vital to be overlooked and dealers should

make it a practice to instruct owners fully regarding it.

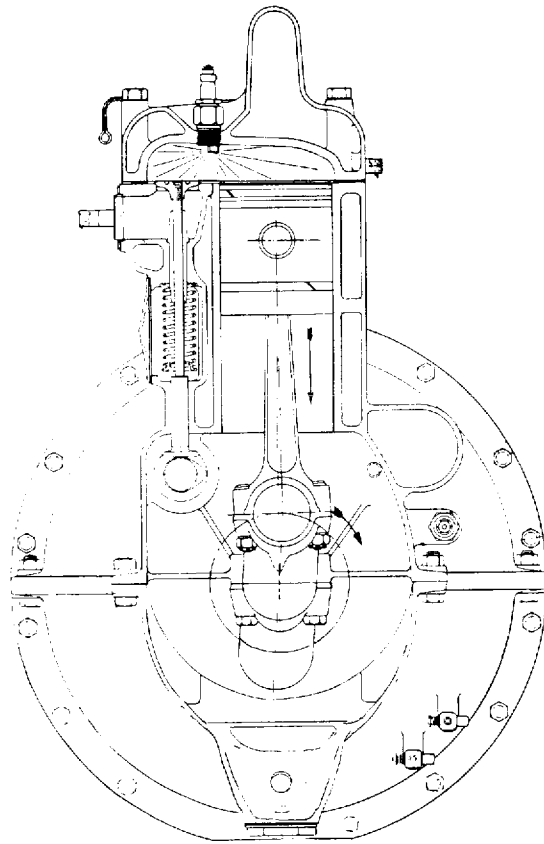


Fig. 252—Explosion occurs just as piston starts down on power stroke—spark set correctly

Starting New Tractors with Stiff Motors

Notwithstanding that instructions have been issued in the past on the subject of starting new tractors with stiff motors, we are giving the following suggestions for the benefit of new dealers.

If difficulty is experienced in starting the motor in a new tractor, the spark plugs should be removed and a small quantity of lubricating oil and kerosene poured into the spark plug holes, allowing this to stand for a good half hour. Afterwards, heat some lubricating oil and pour it into the crank case through the breather pipe, at the same time filling the radiator with hot water. The purpose of the oil which is mixed with kerosene and poured into the spark plug holes, is to form a bearing between the piston rings and the cylinder walls, while the heat from the oil and water will expand the metals

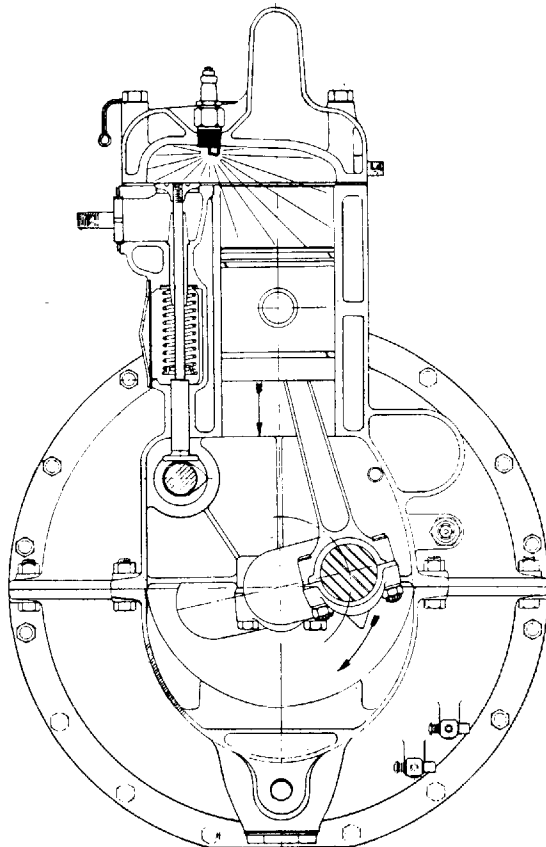


Fig. 253—Explosion occurs too late—spark retarded too far

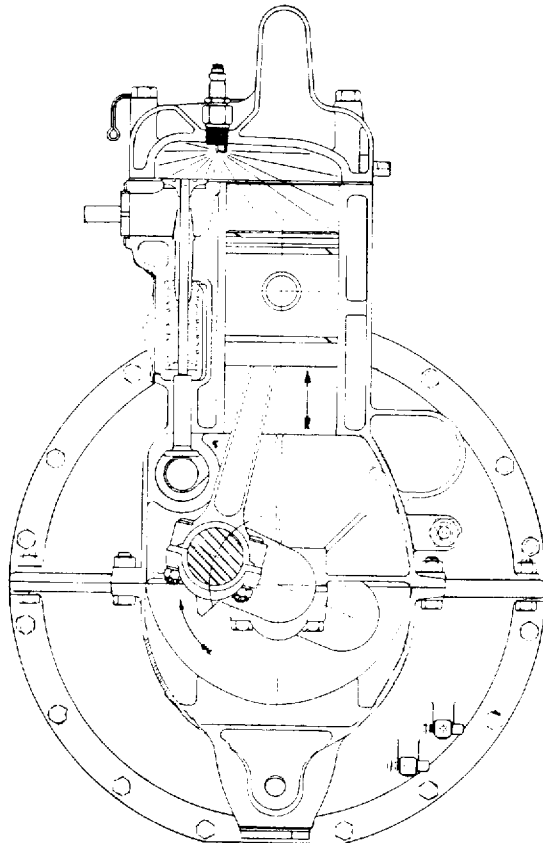


Fig. 254—Explosion occurs too soon—spark advanced too far

which have set, and give them a chance to free themselves.

After the tractor has been prepared in this manner, and by using a bar on the starting crank, it will be found that little difficulty will be experienced in getting the motor started.

As soon as a stiff tractor motor is started, it should be operated slowly with plenty of water and oil. Usually one hour's work will free such a tractor sufficiently to eliminate further starting trouble.

Inspect Tractor Crankshaft for Regrinding

Dealers are called upon frequently to furnish either new or reground tractor crankshafts for worn shafts in accordance with our regular allowance on the latter.

Before accepting the old crankshaft inspection should be made to ascertain whether or not it can be reground. Tractor crankshafts for regrinding must not be worn on any bearing under 1.985 inches diameter at lowest point. (See Fig. 255.)

No credit will be allowed on crankshafts worn below 1.985 inches and dealers must not return such shafts to our branches with that expectation.

Unnecessary Replacement of Tractor Ball Bearings

An inspection of tractor ball bearings returned to Branches by Dealers shows plainly that many bearings are being replaced during the course of tractor repairs, that are entirely fit for further service. While it is not our

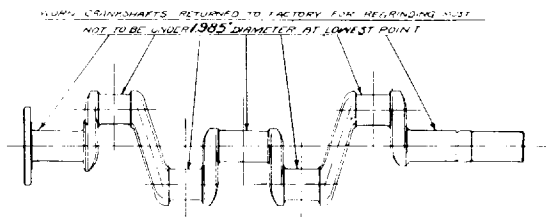


Fig. 255

desire that any worn out bearings be put back into tractors, nevertheless we feel that in justice to owners as well as ourselves Dealers should inspect all bearings removed from tractors to determine how badly they are worn and whether or not they will give additional service.

Experience has proven that many bearing failures can be traced to lack of lubrication or the presence of dirt and grit in the parts. It is therefore necessary when repairing tractors and removing the bearings for any cause whatsoever to see that they are properly washed out with *clean* gasoline, oiled with light oil, and wrapped in paper to prevent the intrusion of dirt or grit.

Bearing failures are indicated by broken and pitted inner or outer races; broken ball retainers; and broken and chipped balls.

A ball bearing is considered worn out when there is a considerable play or movement between the inner and outer races and the balls are too free in the race-way. This condition

may develop after long periods of service, or because of lack of proper lubrication, or due to dirt or grit in the parts.

A number of bearings used in the Fordson are of the radial thrust type and are plainly marked with the letters "RT" on the side of the outer race. These bearings, due to their design and construction, have considerable side play when new. It is important therefore when inspecting bearings for wear not to confuse the side play of "RT" bearings with the natural wear of other types of bearings.

New bearings when shipped out for stock are oiled and packed in a specially prepared oiled wrapping which insures retention of the lubricant and at the same time keeps them free from dust and dirt. Dealers should not under any consideration remove this wrapper until the part is ready to be installed in the tractor. This is of vital importance and strict adherence to this request will materially reduce the number of bearing failures.

Serial Numbers of Tractors Shipped During July 1921

Motors Assembled at
Branches
159,454 to 159,887

Motors Assembled at
Cork, Ireland
108,681 to 108,744

Motors Assembled at
Home Plant
193,986 to 198,363

Ford Car Section

School for Owners

Couch-Haas Co., Ford Dealers at Brooklyn, N. Y., report some very pleasing results from the Weekly Service Classes for Ford owners, which they are conducting.

These dealers, several months ago, established a school for instructing Ford owners in the construction, operation, and care of their cars. They hold classes every Monday evening and owners and their friends are cordially invited to attend with absolutely no expense or obligation on their part.

Our dealers have mapped out a course of instruction as free as possible from technical terms. These classes are conducted by their Superintendent, Shop Foremen, and Electrical Experts. That Brooklyn owners consider the course of study beneficial is attested to by the fact that in three months over six hundred persons attended the classes, many taking the course three times.

Couch-Haas Co. state that outside of the benefits obtained by those who have attended the classes, they, too, have found the work productive of good results, as it has enabled them to extend their acquaintance among Ford

owners and to build up good will at a minimum of expense.

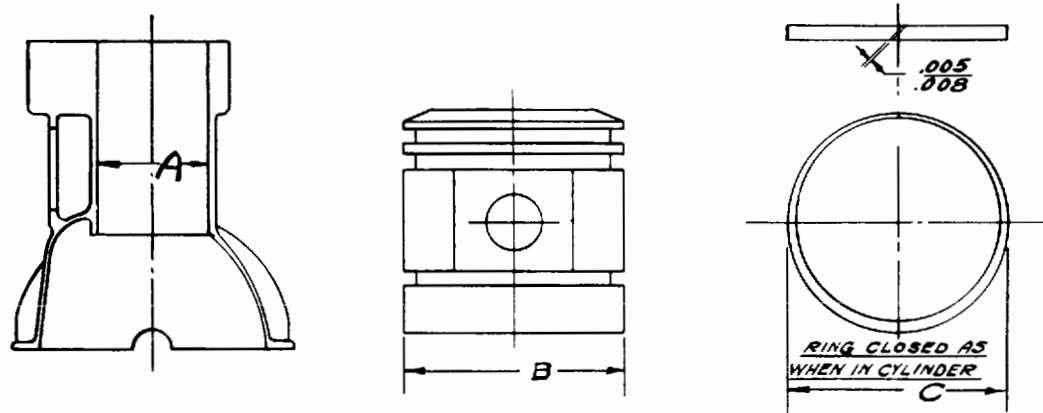
T-1902 Screw Driver Now Obsolete

We have discontinued furnishing T-1902 screw driver in the tool kit with Ford cars. As our stock of these tools is entirely exhausted, we will no longer supply them on dealers' orders.

To take the place of the screw driver we have redesigned T-1903 pliers by beveling and hardening one handle so as to make a combination screw driver and pliers.

Broken Springs

The breakage of many springs can be traced to failure to keep spring clips and clamps properly tightened. When those parts are loose the spring leaves are allowed to get out of alignment with each other. Also greater side play occurs at the tie bolt causing the bolt to shear off, which allows the body and frame to shift to one side as well as causing spring leaves to break. This is particularly true of front springs.



NOMINAL	CYLINDER		PISTON		RING	
	SYMBOL	A	SYMBOL	B	SYMBOL	C
STANDARD SIZE	T-400D	BORED TO 3.750-3.751	T 418-C	3.747-3.748	T 422-C	3.750-3.751
STD. - OVERSIZE		WORN TO 3.753-3.754	T 418-DR	3.749-3.752	T 422-DR	3.757-3.758
REBORED, .031-OVERSIZE		REBORED 3.781-3.782	T 418-ER	3.779-3.780	T 422-ER	3.781-3.782
REBORED (WORN) OVERSIZE		WORN TO 3.784-3.785	T 418-FR	3.781-3.784	T 422-FR	3.788-3.789

Fig. 256

THE above sketch shows the sizes of Standard and Rebores Model T Cylinders, Pistons, and Rings.

It will be observed that in addition to the standard our Branches are prepared to supply three sizes of oversize pistons as follows:

- T 3021B-418 DR Piston only .0025" oversize
- T 3021C-418 ER Piston only .03125" oversize
- T 3021D-418 FR Piston only .033" oversize

Also we can furnish the following piston rings:

- T 3023-422 C Piston Ring standard
- T 3023B-422 ER Piston Ring .03125" oversize
- T 3023C-422 DR Piston Ring .007" oversize
- T 3023D-422 FR Piston Ring .038" oversize

The .007" oversize ring is to be used on the standard piston when there is necessity for a larger than standard ring and also it is to be used with the .0025" oversize piston.

The .038" oversize ring is to be used on the .03125" piston when an oversize ring is necessary and also on the .033" piston.

This gives us two additional oversize piston rings. Desired fit in assembling to pistons may be obtained by filing rings sufficiently to give proper gap between ends.

Rear Spring 8th Leaf

We have discontinued supplying T-3832-368A Rear spring 8th leaf—taper end, for

repairs. Instead, we are furnishing T-3832B-368B Rear spring 8th leaf—square end, which can be used satisfactorily in place of the tapered part.

Adjustment of Timken Roller Bearings

Our roadmen have discovered considerable differences of opinion among dealers as to the proper adjustment of Timken Roller Bearings in Ford Front Wheels. In order to correct any erroneous ideas we give below information on the subject as worked out by our engineers and those of the Timken Roller Bearing Company. These instructions which are in effect at all Ford Assembly Plants can be used to advantage by dealers both in the setting up of new cars and the replacement of wheels and bearing parts.

No. 1.—After the hub has been sufficiently filled with grease install the inner cone, T-2834-205-B, in the large end of the hub, making sure that it has been packed with a liberal quantity of grease.

No. 2.—Install the dust washer T-2841-350 in the end of the hub making sure that the felt does not get wedged tightly between the hub of the cone and the metal retainer of the dust washer. The dust washer should be pressed in until the metal retainer contacts with the end of the bearing cup.

No. 3.—Place the wheel on the spindle—pack the outer cone, T-2837-206-B with grease and screw on the threaded portion of the spindle until the cone is properly seated in the front end of the hub.

No. 4.—Screw the threaded cone up as far as it can be made to go, then revolve the wheel several times to insure all parts being properly seated. If there is a perceptible bind or stiffness in the wheel back off the threaded cone until the wheel will rotate freely but without end play.

No. 5.—Install lock washer, T-2709-210, and spindle nut, T-2707-209-B, drawing the spindle nut up snug. Care should be taken to be sure the nut does not force the threaded cone farther into the hub on the lead of the threads and cause the adjustment to be too tight. If this is the case release the spindle nut and back the cone off slightly. Then put cotter pin in place.

When the wheel is finally adjusted it should rotate freely but without any end play.

Proper Assembling of Tire Carriers

Instances have come to our attention recently of tire carrier brackets not being properly assembled to the chassis and body with resultant breakage of the brackets.

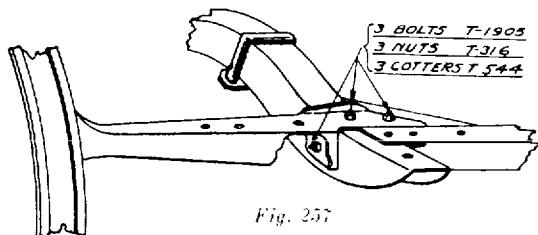


Fig. 257

Fig. 257 shows the proper assembly of the tire carrier brackets to the chassis. It is very essential that the bracket be attached with three bolts and nuts and cottered as shown in the sketch. In some cases which came to our notice it was only fastened with two bolts which necessarily increased the leverage on the part when the tire carrier and tire were installed, and this additional strain was sufficient to break the bracket.

In Fig. 258 we show the relation of the body bracket bolts to the spare rim bracket bolts. It will be observed that the same size

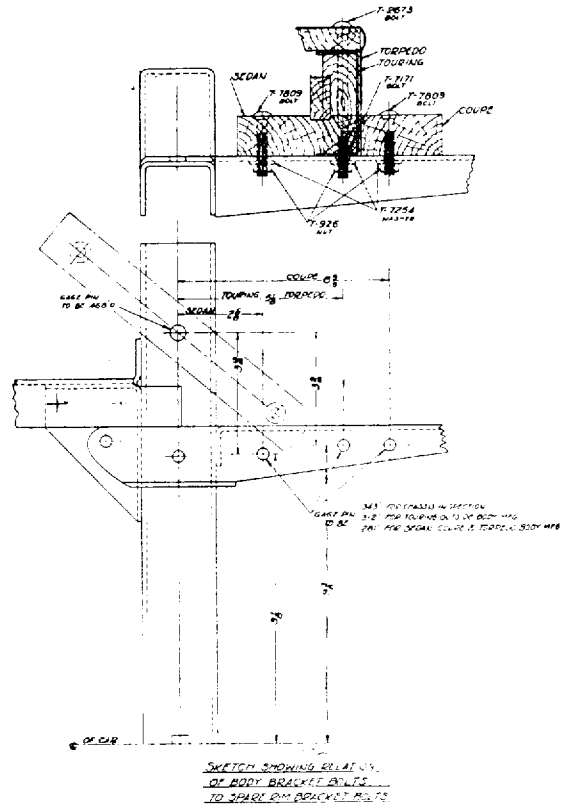


Fig. 258

bolts T-7809 are used with the Coupe and Sedan; with the Touring car, bolt T-7171 is used, while with the Torpedo a much longer bolt is required, T-2673.

In order to check the installation of these parts, we show on the sketch the distances on each type of car between the center line of the body and the centers of the holes in the tire carrier brackets for attaching same to body. With the Coupe, Touring, and Torpedo, this distance is $9\frac{3}{8}$ " , while with the Sedan it is $9\frac{1}{8}$ ". The distances between the center of holes of the tire carrier brackets for attaching same to the body and the center of hole of the rear body bracket bolt is $3\frac{9}{16}$ " , for the Coupe, Touring, and Torpedo. For the Sedan $3\frac{1}{8}$ ".

If dealers will check the installation of tire carrier brackets using the dimensions shown on these sketches, and making certain that the correct number of bolts of the proper sizes are used on each job we are certain that no trouble will be experienced with these parts.

**Cars bearing motor numbers 5,114,531 to 5,223,135
were shipped during July**

Ford Service Bulletin

No. 21

Vol. 2

September, 1921

Page 161

The Fordson in the Industrial Field

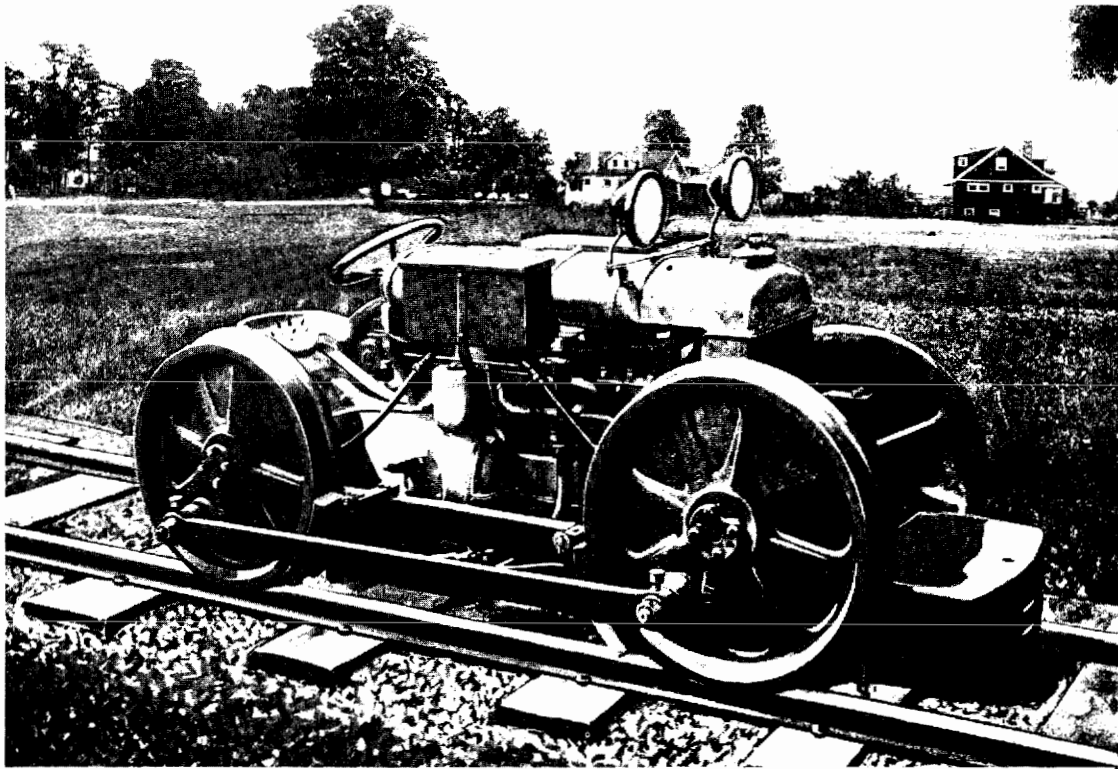


Fig. 259

NOTWITHSTANDING that the Fordson tractor was designed exclusively for agricultural purposes, business concerns everywhere have been quick to recognize its utilitarian possibilities in the industrial world.

The Adamson Motor Co., our dealers at Birmingham, Alabama, have reconstructed a Fordson tractor for use as a locomotive, as illustrated in the above photograph.

That the Fordson is readily adaptable for this class of work, is shown by the fact that the change from tractor to locomotive was accomplished almost entirely by the substitution of flanged wheels for the regular equipment.

Several of these tractor locomotives have been sold to lumber and mining interests and are proving very satisfactory for such operations.

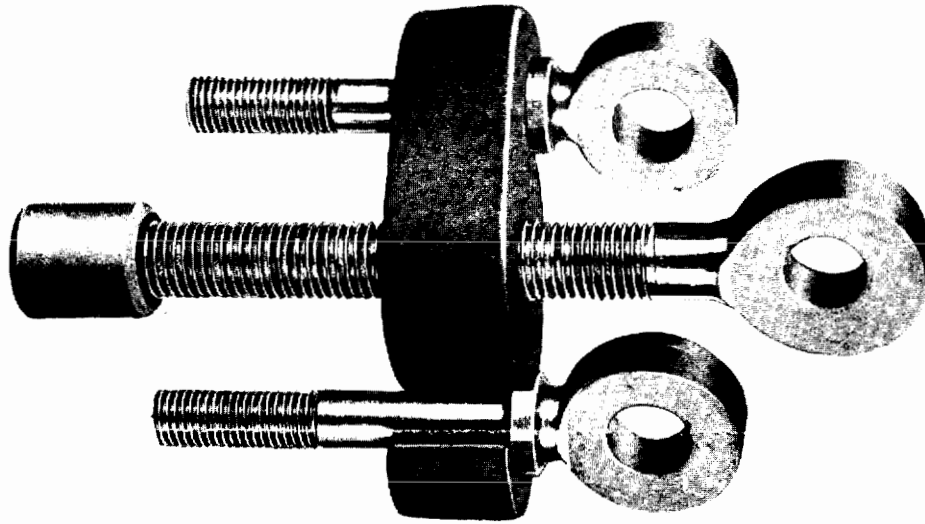


Fig. 260

Fordson Wheel Puller

Fig. 260 shows a specially designed puller for removing the rear axle bushings from the wheels of the Fordson tractor. Dealers desiring this puller should place their order with the nearest Branch.

Tractor Clutch Springs

Tractor clutch springs S-407-944 now coming through, are shorter than the springs

previously used. This change has been made to eliminate the possibility of the springs taking a permanent set under compression. The tension of the old and the new style spring remains the same.

Dealers should use up their stocks of old style springs though it is understood that both new and old style springs are not to be installed in the same clutch, i. e., either all six springs must be of the old style long type or all six must be the new style short spring.

Serial Numbers of Tractors Shipped During August, 1921

Motors Assembled
at Branches
159,888 to 160,000
170,001 to 170,243

Motors Assembled
at Cork, Ireland
108,745 to 108,902

Motors Assembled
at Home Plant
198,364 to 200,018

Ford Car Section

Cuts Labor Charges

Jos. F. Haas Motors, Inc., Brooklyn, N. Y., dealers, have announced a 25% reduction in their labor charges for repairing Ford cars. This is in line with the suggestion contained in the June number of the Service Bulletin and we believe it a very good business policy as it follows the recent substantial reductions in the prices of Ford Cars.

War-time labor schedules will not harmonize with after-war prices on cars. Dealers who check up their labor charges and revise

them downward wherever it is possible will find their action well received by the public. Furthermore it will show that they are in step with the Ford Motor Company which made three very substantial cuts in its prices on cars during the past year.

Reducing labor charges for repairs looks like a very good means for increasing your volume of repair work and stimulating your sales of parts. Dealers in all sections can afford to give this vital question some very careful thought.

Ford Battery Service

IN Fig. 261 we show an illustration of the new Ford Battery which our branches are now supplying at \$25.00 subject to regular parts discount. It will be noted that the battery box as well as the connections between the cells are stamped "Ford" in script.

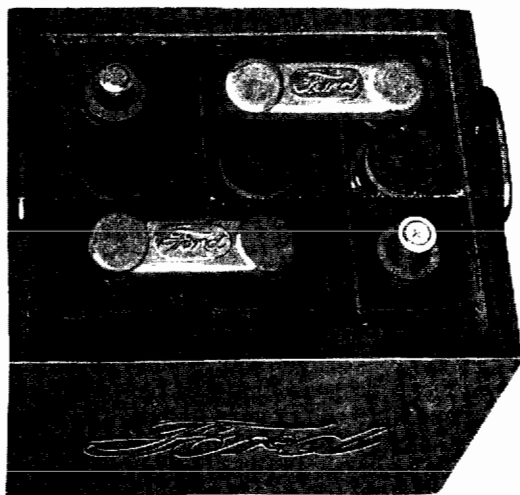


Fig. 261

This battery is designed for long life, high starting ability and freedom from failures during its normal life. It represents the highest development of battery engineering, and in selling it you may feel absolutely confident that the Ford battery compares favorably with the very best batteries manufactured, and that it is not in any sense an inferior battery built to be sold at a low price.

In order to develop a satisfactory battery business it is necessary for dealers to establish intelligent and dependable battery service. To do this each dealer should have at least one man in his organization who is thoroughly familiar with the care and testing of batteries. It will also be necessary to install a recharging outfit capable of recharging ten or more batteries at a time.

In connection with service on batteries it must be borne in mind that in order to secure satisfactory life from any storage battery, water must be added to replace evaporation. The battery must be kept approximately fully charged and any slight trouble which may develop, such as a leaky jar should be repaired immediately to prevent serious damage and more costly repairs.

The following tests and inspection should be made about every two weeks:

Gravity Test and Solution Height—

This test requires a hydrometer syringe, and is described in the Ford Manual. Unless the solution is above the tops of the plates a gravity test cannot be taken conveniently, and water should be added as described in the manual, but as the water floats on the solution and does not mix thoroughly until after a "gassing" charge, the correct gravity cannot be obtained just after water is added.

The gravity reading of a charged cell should be between 1.270 (1.200)* and 1.300. If any cell reads above 1.310 (1.240)* someone has probably added acid to the solution and the battery should be given the "Water Treatment," i. e., taking the battery out and dumping the solution, after which the cells are refilled with "pure" water. Then the battery is charged on the bench at two-thirds the normal charging rate of 6 amperes until the hydrometer reading of every cell goes as high as it will. Then charge ten hours longer. A cell that is half charged will read between 1225 and 1250. If one cell is much lower in gravity than the others this is an indication of trouble in the low cell and it should be carefully inspected. If the cells are approximately uniform, that is, all within fifty points of each other and any cell is below 1225, the battery should be taken out and given a bench charge.

High Discharge Test -An excellent test to determine uniformity in the condition of the cells is to discharge each cell individually or the entire battery at a high current and read the voltage of each cell while being discharged. This test is only of value when the battery is at least half charged, as there is always some variation in discharged cells, which do not all run down simultaneously. This test can only be made with an adjustable rheostat and ammeter to secure the current of twenty-five amps. per positive plate, or one hundred and fifty amperes. Simple, convenient and inexpensive cell testers may be purchased for discharging single cells through prods attached to a fixed resistance, and if proper contact is made the results are very satisfactory.

Terminal Connections If the terminal connections are corroded they should be cleaned and covered with vaseline or heavy grease.

Lock Nuts -Corroded terminals usually indicate seepage of acid because of loose lock

*Readings apply only in tropical climates.

nuts around the terminal posts, and any loose nuts should be tightened.

Holddowns—If the battery is not fastened securely to the cradle broken jars may result. The holddowns should always be tightened if the nuts work loose.

When a battery requires recharging or repairs, it is customary for battery stations to rent a battery to the car owner, the usual charge being twenty-five cents a day. Rental batteries should be painted a distinctive color and used for this purpose only.

Worn Out Batteries—When an inspection indicates that the plates are not fit for further service, every effort should be made to sell a new Ford battery to the car owner. It is not considered good practice to rent a battery to an owner who requires a new one, the rental batteries being reserved for the convenience of customers who leave batteries for recharging and repairs.

Repair Charges—While it is not our purpose to establish labor charges for repairs, we are giving below for the guidance of dealers and garages some of the charges rendered by local battery concerns.

Separator renewal (including re-charge)	\$ 8.00
Positive plate renewal (including re-charge)	16.50
Jar replacement (including recharge)	4.00
Cover replacement	2.00
Recharging	.75
Changing batteries in car	.25
Rental batteries, per day	.25
Winter storage, per month	.75

Unpacking and Storage of Batteries

When unpacking shipments of batteries from Branches, dealers must be careful to keep the packing case right side up so as to avoid spilling the battery solution. At this time batteries should be carefully inspected to see if there is any indication of injury received in transit. If such is the case, claim should be immediately entered against the carrier. For the present, at least, all batteries shipped to dealers will be charged before leaving the Branches.

After batteries have been unpacked and carefully examined, the filling plugs should be removed and the strength of the fluid tested by taking hydrometer readings as previously described.

Dealers will have to provide some means for storing shipments of batteries which they receive from the Branch. There are two methods of storing batteries, that is, they

may be stored dry, or they may be put in wet storage. As it is not likely that dealers will find it necessary to store batteries for any extended period, we will only give suggestions pertaining to the wet storage method.

In order to put batteries in storage, a bench or shelf should be provided in a dry clean location where the temperature can be kept above freezing and below 110 degrees Fahrenheit. Batteries should be placed upon wood strips in order to keep the bottom of the batteries clear of the bench, and the storage space should be large enough to provide a little air space around each battery. All the necessary wiring, switches, and charging resistance should be installed so that the batteries can be easily connected up and charged, where they stand on the bench. Vaseline should be applied freely to battery terminals and exposed copper wires.

Before batteries are placed in storage, they should be given a bench charge, and once every month the filling plugs should be removed and distilled water added to the proper level, then they should be charged at the proper charging rate of six amperes. When a battery is removed from storage and placed in service, distilled water should be added and a bench charge given it.

Mutilate Material Sold Junk Dealers

Dealers and service stations should be careful to mutilate all Model T and Fordson parts sold as scrap so that they cannot possibly be used again on Ford cars or Fordson tractors.

Jobbers Offering Ford Parts

Circulars are being distributed by jobbing concerns offering genuine Ford parts at considerably better than the regular discounts. According to statements contained in some of this literature, millions of dollars' worth of Ford parts are available, which naturally raises a question as to the source of this material.

Perhaps the material offered represents army stocks shipped to France several years ago, and the price at which it is being offered may possibly reflect the condition of the material at the present time.

Repair Shop Form

Fig. 262 shows a form for recording the efficiency of the repair shop and each individual man, with a single entry.

REPAIRMAN	1175		1176		1177		1178		1179		1180		1181		1182		TOTAL OF MEN'S		
	\$	HRS.	\$	HRS.	\$	HRS.	\$	HRS.	\$	HRS.	\$	HRS.	\$	HRS.	\$	HRS.	\$	HRS.	
Andrews			3	2½														3	2½
Thompson	12	10	3	2½														15	12½
Butler					6	5												6	5
Vallan							3	3										3	3
Low									5	6								5	6
Jones											4	2						4	2
TOTALS ON JOBS	12	10	6	5	6	5	3	3	5	6	4	2						36	31

Fig. 262

The size of the sheet depends on the number of men employed and the number of jobs handled daily.

The first column contains the names of the repairmen. The order numbers of the jobs are written at the top of remaining columns in numerical order. Each of these columns is divided into two parts, one for dollars, the other for time. When the work is completed, the time and charge are written in under the job number. If two men work on the same job, the time and charge are divided equally between them. If two operations are performed, as axle and time gears, the separate times of the men are recorded. The efficiency of the job may be obtained by summing up the column vertically. The efficiency of the repairman may be observed by summing up the columns horizontally. By totaling the totals both ways, a check is made on the sheet, and figures are obtained by which the efficiency of the shop may be checked.

D. S. R. B. Stud Now Obsolete

T-2584-B—183-B Drive shaft roller bearing stud has been obsoleted and as soon as our present stock is exhausted, will no longer be supplied.

This part is replaced by a drive shaft roller bearing cap screw which will be carried under the same catalog and factory number, viz. T-2584-B—183-B. The lock washer used with this cap screw is T2584-D-157 D. S. R. B. cap screw lock washer.

We will, however, continue to furnish T-2584-C—184 Drive shaft roller bearing stud nut for use on studs now in cars.

New Style Commutator Pull Rod

The new style T-3534B-2082 commutator pull rod which is now being used in production eliminates the necessity for using T-3536-1362A ball and socket joint, and T-3537-1327 ball and socket joint nut.

The new style commutator pull rod can be used to replace the old style pull rod with ball and socket joint and nut, on all cars.

Fixture for Assembling Roller Bearing Cups

The fixture for assembling roller bearing cups to front hubs as shown in Fig. 233 Vol. 1, has been re-designed to permit the use of the fixture in the present as well as the old style hubs. This re-designed fixture will be carried under number 5Z-313 instead of 3Z-2316.

The old type 3Z-2316 fixtures having the one inch shaft can be brought up to date by turning down the threaded part of the shaft to ¾", rethreading it for a ¾ x 10 U. S. nut, and using a new cone and nut. Branches are now in a position to supply these parts and Dealers or Garages desiring same should place their order with the nearest Branch.

Speak for Themselves

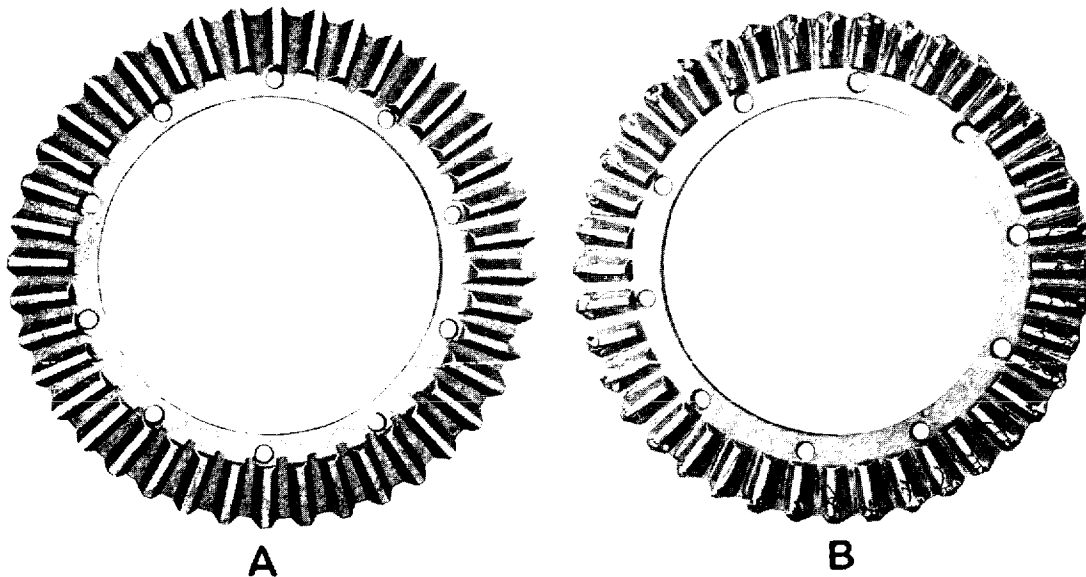


Fig. 263

THE above photographs ably illustrate the merits of genuine Ford parts as compared with spurious parts marketed by outside concerns.

In Figure 263 (a) we show a genuine T-2518, Differential Ring Gear, removed from car 1205165 owned by Rev. W. H. Faust, Winder, Ga. This Gear was removed after having been in continuous service since 1916.

In Figure (b) is shown a spurious Ring Gear taken from a car owned by Sheriff H. D. Camp, Winder, Ga., after less than 90 days' service. Observe that the genuine Ford part after five years of service is in far better condition than the spurious part after less than three months of service.

Such cases as this prove conclusively that Ford owners can not afford to purchase spurious parts or allow them to be put into their cars during repairs. Dealers and Garages should make it a practice to constantly impress owners with the importance of using only Genuine Ford Parts. Concerted effort along this line is bound to reduce the volume of spurious parts sold in your territory.

Wholesale Parts

Almost every mail brings complaints from Garages that dealers who are their logical source of supply for Ford parts are denying them the regular garage discount.

This proves conclusively that many dealers are overlooking the possibilities of wholesaling Ford parts. In our estimation this is poor business, not alone because it is profitable to wholesale parts but also because of the effect such an attitude on the part of the dealer has on his future car business.

Dealers may ask how their failure to give garages discounts on parts can ultimately affect car sales. A careful study of conditions will show that it is not only possible but very probable.

At present more than 50% of all the cars on the road are Fords. As a consequence garages everywhere find it to their advantage to make Ford repairs. To make these repairs they must have Ford parts. If the garages cannot buy Genuine Ford Parts from the Ford Dealer then they will purchase Spurious Ford Parts and pass them off as "just as good." What follows? The garages will do almost as much Ford repairing as they would have done if the Ford Dealer had sold them parts and they are doing it with defective material that will not stand up. Who gets the blame if a Ford car equipped with a spurious Ford Axle breaks down? Is it the Garage which repaired it, or is it the Ford organization as a whole? The answer is the Ford organization.

Unfortunately the public does not discriminate as it should between Genuine Ford Parts and Spurious Ford Parts. Therefore Ford failures because of defective spurious parts are bound to hit at Ford sales. This will affect the dealer who was blind enough to allow garages to use spurious parts when he had genuine Ford Parts in his stock room.

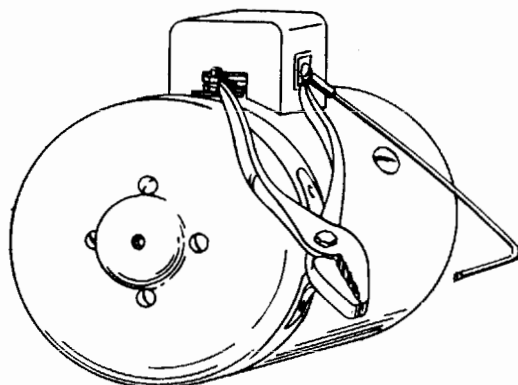
Dealers, don't be short-sighted. Garages are obliged to render Ford service. Unless you co-operate with them they will render bad service and affect Ford sales which will deal a blow at your business.

The wholesaling of parts can be made a decidedly profitable side to your business. Don't overlook its possibilities any longer.

Simple Method of Testing Cutout Trouble While Installed on the Car

Figure 264 shows a method of testing the cut-out when the generator is assembled in the car and engine is running. The method of procedure is as follows:

AVOID TOUCHING PLIERS TO GENERATOR YOKE OR TO CUTOUT COVER



SKETCH SHOWING METHOD OF TESTING CUTOUT OR REMAGNETIZING FIELDS OF GENERATOR WHILE IN POSITION WITH ENGINE RUNNING

Fig. 264

1st. Vary the speed of generator to see if the cutout functions properly, that is cuts out and cuts in within certain limits of zero, with the lights off and ignition on the mag-neto.

2nd. If there is no indication of charge when the generator is speeded up, short the cutout out of the circuit with a wire or pair of pliers, from the generator terminal to wire to battery terminal, and if immediately the system shows charge then the trouble lies in cutout. (Be sure that the terminals and base screws of the cutout are tight before the test; also that the generator commutator is clean and brushes are making good contact.)

3rd. If by shorting out cutout as mentioned in No. 2 there is still no indication of charge, open cutout to ground circuit and then repeat test number two. If the system shows charge, the trouble is in cutout but if there is still no charge the trouble is elsewhere.

4th. If there is indication of discharge when generator is stopped, with lights and ignition off, remove the wire to battery terminal and if immediately there is indication of no discharge, the trouble lies in the cutout, but if still there is indication of discharge the trouble will be found elsewhere.

5th. It is best to always short generator terminal to wire to battery terminal with pair of pliers or otherwise after any change has been made in generator or battery and before the generator is started to insure correct polarity of generator. This will prevent unnecessary burning of cutout points that will occur should the polarity happen to be reversed. This burning of points often causes the points to freeze.

Adjust Headlamps!!

The June issue of the Service Bulletin contained complete instructions on the proper method of adjusting headlamps equipped with green visor lenses.

These green visor lenses were designed to comply with the laws governing the use of headlamps in all States, and if properly focused and aligned they are far within the requirements of all States both as to quantity and distribution of road light and freedom from glare. But it is of the utmost importance that the lamps be in proper focus and alignment on the car at all times to meet those requirements.

It appears, however, that in setting up cars received from Assembly Plants, some of our dealers are paying no attention to the proper aligning and focusing of the lamps. Dealers are permitting cars to leave their places of business with lamps that either glare too much

or otherwise throw an illegal light, thus seriously injuring the reputation of our product in that vicinity.

The responsibility for this situation rests with the dealer who has failed to make provision for testing and focusing headlamps, and who has no one in his employ capable of doing this work in the proper manner.

This matter is of such vital importance we shall insist that every dealer make immediate provision for testing headlamps as directed in the Service Bulletin mentioned above.

Ford cars now in service equipped with the new headlamps should be frequently called into the dealer's service station for inspection.

Hood Hinge Rod Tool

A very convenient tool for inserting a hinge rod in the hood may be easily made from a piece of drill rod. (See Fig. 265.) The rod fits over the small diameter of "A" and "B." "A" is then entered into the hood and the rod is driven through, "A" acting as a pilot while "B" protects the other end from the hammer blows. The dimensions given are sufficient to make them up.

If the mechanic wishes to put in the time, he may undercut the shoulder of "B" to eliminate any possibility of the tube spreading.

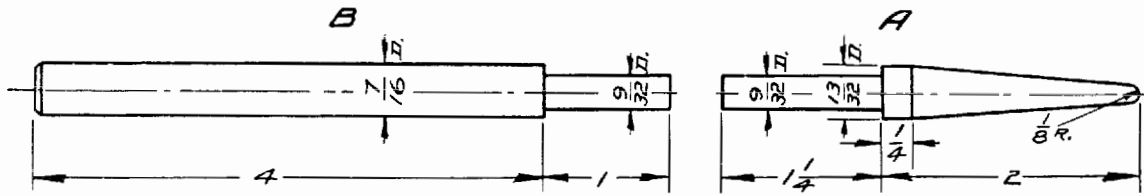


Fig. 265

FORD FAN BELTS

Sizes

We are supplying through our Branches the following sizes of Fan Belts for Ford cars: T-3964 Fan Belt 23" long for cars put out from 1909 to 1916.

T-3964-C 26" long for cars put out from 1917 to 1920.

T-3964-D 27" long for cars put out from August 1920.

Markings

Ford Fan Belts are marked so that Dealers should not make any mistake in furnishing the proper belt for the right car. The markings are as follows:

T-3964 Fan Belt 23" long marked "A"

T-3964-C Fan Belt 26" long marked "B"

T-3964-D Fan Belt 27" long marked "C"

Adjustment

Inasmuch as the care and adjustment or application of the Fan Belt has all to do with the service rendered by the belt irrespective of the belt itself or what kind of a

belt, the following suggestions, if carefully studied by Dealers and Garages, will result in car owners obtaining better results from their Fan Belts.

1. Be sure the belt is not adjusted too tightly. A tight belt forces the pulleys out of line, and may cause engine trouble. The test for proper tension is the point where the belt moves easily at the touch of the hand. If the belt is hard to turn, it is too tight. If it spins freely, the belt is too loose, and will cause trouble.

2. Before putting on a new belt, place a straight edge against the fan pulley and power pulley to see if the pulleys are in line. If they are "out," be sure that they are lined up properly before the belt goes on.

Oiling the Generator

The tendency of the average owner is to put too much oil in the generator. Excess oil will work down onto the commutator, cutting down the flow of current and raising the speed at which it will begin to charge the battery. The ball bearing requires very little lubricant. Add only a few drops of oil every two weeks.

**Cars bearing motor numbers 5,223,136 to 5,337,545
were shipped during August**

Ford Service Bulletin

No. 22

Vol. 2

October, 1921

Page 169

Selling Parts Over the Counter

How many dealers are giving any thought or attention to the matter of selling parts over the counter?

Is the customer waited on promptly?

Does the customer receive courteous treatment at all times, or is he merely "tolerated" by your parts man?

How many customers are turned away from the parts counter daily with the abrupt statement "we haven't got it," leaving this thought in the customer's mind: "we don't intend to exert ourselves to help you either"?

What is your daily loss through poor stock keeping—which means disappointed customers, and finally business turned away never to return?

Is your Service generally so good that your customers will drive a few blocks further just to do business with you—or can they get equally as good treatment from the nearest garage?

IN order to sell parts over the counter, every dealer should have a parts man who is capable of meeting the public. The parts man should understand repair methods and be able to intelligently advise Ford owners as to making their own repairs, the parts needed, and the tools required. He should be able to distinguish between a job that the owner can do and one that the dealer should perform because of the knowledge, experience and equipment required. In those cases he can refer to the dealers' labor schedule and show where it will be cheaper and more satisfactory from the owner's viewpoint to have the work done in the dealer's shop than to attempt it himself.

A point of salesmanship which should not be neglected is to sell all the parts necessary to complete the repairs. The parts man should know all the parts that are assembled together so that when the customer orders a certain part he can suggest the other part or tools which go with it. For instance, if the customer is replacing

an old style commutator brush with a new one, remind him of the short pin now used. If he purchases a hub remind him that the old hub bolts are peened over and that he will save time by shearing them off and using new bolts.

Valves

When a customer wants valves the parts man should immediately suggest a cylinder head gasket, upper radiator hose, hose clips, valve grinder, valve lifter, grinding compound and shellac. He should also call the customer's attention to the wear on valve stems and that we sell not only standard stems but also those which are 1/32 oversize in order to take up wear.

Front Wheel Parts

If a customer wants to buy front wheel bearings such as bails and cones, suggest the advantages of Timken Roller Bearings, not only for one wheel but for both. If the customer cannot be interested in Timken

parts sell him the ball bearing assembly complete, including cones, washers and dust ring and perhaps hub cap.

Bolts, Nuts and Bushings

When a T-2710 spindle bolt is sold always include a T-2713 spindle body bushing and vice versa.

The same holds true with T-2718 spindle arm bolt and spindle arm bushing T-2714. The parts man can also suggest having the bushings pressed in and reamed in the dealer's shop.

Whenever a bolt that requires a nut is sold, sell the bolt and nut as a unit.

Rear Axles

A customer purchasing parts for the rear axle should be made to see the economy of buying all new assembled parts, for instance, if a ring gear is needed nine times out of ten the pinion should also be replaced, even if only slightly worn, because a new ring gear and old pinion will not work well together in that the proper mesh is not obtained, causing a noisy rear axle and that again means undue wear. If a pinion is needed the same holds true of the ring gear. If either of the parts is badly worn adjacent parts have necessarily been affected and it will be extremely wise for the owner to replace T-2587 drive shaft roller bearing, T-2586 drive shaft sleeve, T-2598B dust washers, differential parts T-2512C, T-2513C, T-2520B, T-2521B, T-2524C, T-2526B and probably the axle shaft T-2505. If an axle shaft is needed, ascertain if the old shaft was bent. If it was the chances are that two new roller bearings T-2508, will be needed. The same holds true if the shaft is crystallized. Include hub key T-2816B, axle shaft washer T-2506, axle shaft roller bearing felt washer T-2510R, hub washer T-2809, axle housing cap T-2510 or T-2510½.

At this time the repair man can call the customer's attention to the fact that it is possible to secure a rear axle overhaul in the dealer's shop and granting that the customer may have the mechanical ability to do the work, what equipment does he possess to insure a satisfactory job?

How is he going to change the differential gears and how will he remove the worn roller bearing sleeves? If he has not given these points consideration that is all the more reason the dealer should be allowed to do the work, as an overhaul in the dealer's shop will undoubtedly save him considerable time and even money.

Transmission Bands

When you sell an owner transmission bands remember that he requires two transmission cover gaskets T-3377 and one ball cap gasket T-2580. At the same time, in a pleasant manner, call his attention to the fact that re-lining transmission bands is considerable of a job and that great care must be taken to fit the gaskets so that oil leaks will not develop afterwards. Unless an owner is really experienced in work of this kind the best plan is for him to allow the dealer to perform the work in his shop.

When the parts man has succeeded in influencing a customer so that he seems on the point of buying more parts than he originally intended, always make it clear to him and set him at ease by stating that any parts which he finds are not required can be returned for credit if accompanied by the invoice showing sale.

Every Ford owner purchases approximately \$40.00 worth of parts per year, which means that someone is going to sell this amount of material to every Ford owner in your community. Are you going to get your share of this business?

Increase Your Sales of Fenders

How many Ford owners in your vicinity have old dilapidated rusty fenders barely hanging on their cars?

Since the retail price of fenders has been reduced to \$16.00 per set every Ford dealer should call the owner's attention to the improvement that can be made in the appearance of his car by this low expenditure.

As the majority of your later customers are not acquainted with the reductions made in the price of Ford parts during the past season, you should make it a point to call this matter to their attention.

A Card Index for Following Up Service

The first step necessary in establishing a system for following up service, is for the dealer to card index every Ford owner in his community. A letter should then be sent to each of these owners calling their attention to the facilities which the dealer has for giving first class service, and inviting them in for an inspection of their cars.

When the customer drives in, the dealer's service man will diagnose the trouble and determine the immediate repairs necessary on that particular car and at the same time

will encourage the owner to make such other repairs as inspection shows are necessary or will be necessary in the near future. For instance, the owner may only have time for adjustment of the bearings in the front wheels, but is convinced of the importance of having his axle overhauled.

When the repair order is first written up, a notation is made at the bottom of the order stating what is necessary to put the car in good condition. The work requested by the owner is done and the repair order is turned in to the office. The date, repair order number, and amount is filled in on the customer's index card, and a letter is written him thanking him for his business, and asking him for suggestions that will better the dealer's service. His attention should also be called to the fact that his front axle requires an overhauling, to the importance of having this work taken care of promptly, and the nominal labor charge the dealer makes for such work. The last paragraph of the letter should suggest that the customer bring his car in on a certain day at which time the work in the dealer's shop is so scheduled that it can be given immediate attention. A copy of this letter should be filed and marked to come to notice at some future date, say, two weeks distant. On that date the service man will call the owner again, reminding him for a second time of the necessity of having the repairs made, and if it is impossible for him to come in arrangements should be made to send for the car.

Soon every customer will have been in at least once, thus, from the card record, the dealer can easily determine who are his customers, how many are coming into his service station for repairs, and if they are not giving him all of their repair work he should find out why.

When more work can be satisfactorily handled in the shop, the service man can go through his index cards, which will be filed alphabetically, and intelligently solicit repair work from his customers. In other words, the index cards will serve as a ready reference to the needs of Ford owners in the way of repairs to their cars.

1914 Windshields For Sale

We have a limited quantity of T-7026 Windshields complete, 1914 type, which we will sell at the special price of \$8.00 net, subject to prior sale.

DEALERS !!

Are You Pushing The Sale of Ford Batteries?

The Ford storage battery for Service creates wonderful merchandising possibilities for Ford dealers.

Here is a battery made expressly for Ford cars in accordance with the specifications of our engineers. It bears the name "FORD" which identifies it as a Ford product and is an evidence of efficiency, durability and strength.

The price of the Ford battery is right. Besides it carries the guarantee of the FORD MOTOR COMPANY and is backed by the service facilities of the greatest dealers' organization in the world.

Think of the number of Ford cars equipped with starters in your territory. The owners of those cars are bound to require replacement batteries. Are you, the dealer, making an effort to sell the Ford battery to these owners? Or will you allow some outside battery manufacturer to supply his battery simply because he is more aggressive?

You have the battery and the selling arguments are all in your favor. Don't be satisfied with less than 100% of this business.

Runabout Top Dust Hoods

We have a limited quantity of T-6939 Runabout Top Dust Hoods, which we desire to close out as they are no longer furnished as regular equipment. Subject to prior sale we can offer these at 50c net each, which is considerably below cost. Dealers by calling this to the attention of owners in their territory ought to be able to sell a quantity of these hoods.

New Body Prices

The following prices are now effective on Ford bodies:

Runabout	\$ 60.00
Touring	80.00
Coupe	235.00
Sedan	300.00

These prices are subject to the same discount that applies on cars, with an additional charge of \$10.00 to cover expense of crating touring and runabout bodies, and \$20.00 for closed bodies. Orders will be filled from nearest Assembly Plant. An extra charge will be made to cover freight from factory to Assembly Plant filling the order.

Genuine Ford Connecting Rod Trade Marks

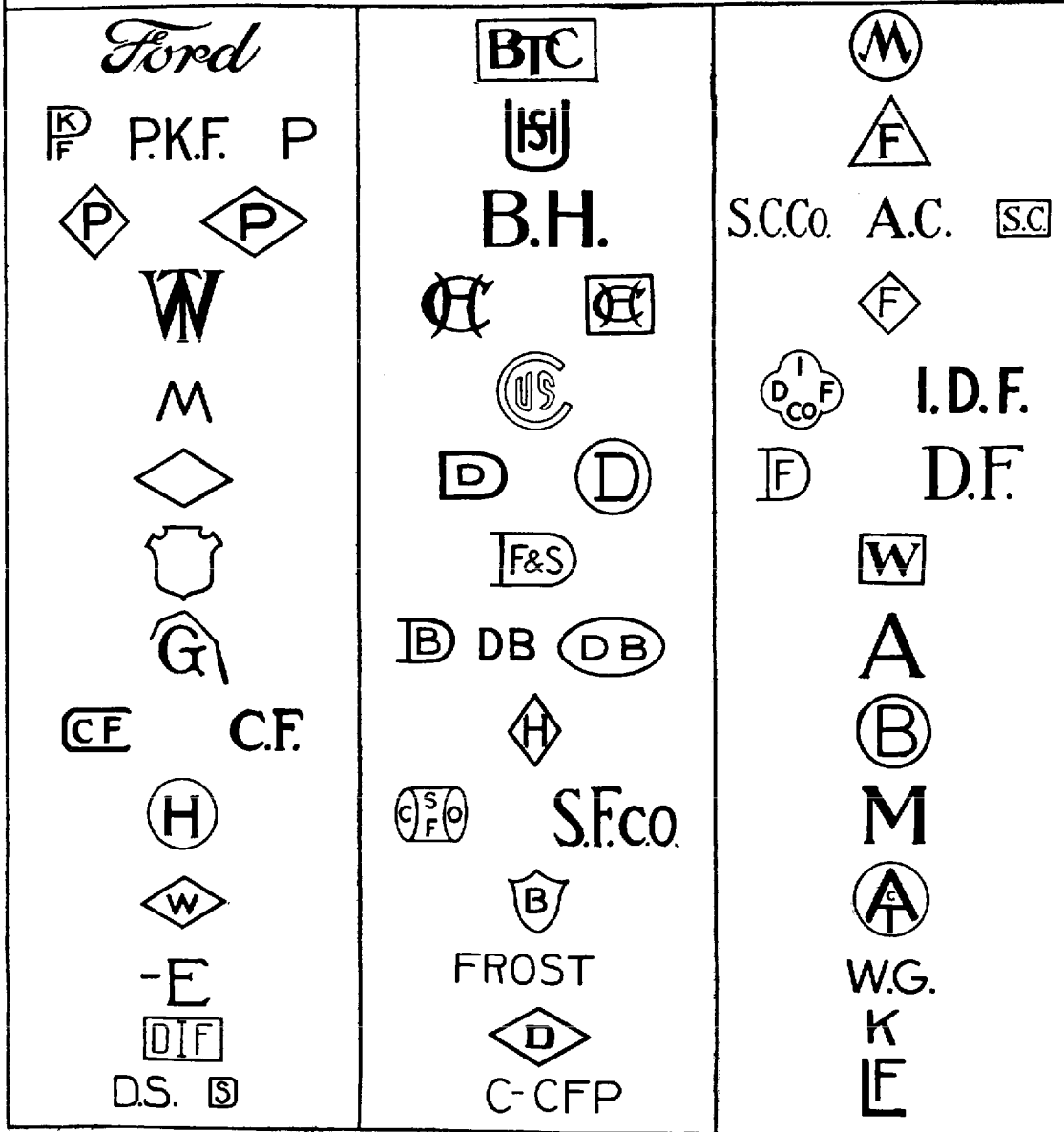


Fig. 266

Above is shown a revised list of genuine Ford Connecting Rod forging trade-marks. Dealers can use this information to advantage in exchanging connecting rods. Rods bearing any other trade-marks are to be considered as imitation parts.

Anti-Freezing Solutions

With the approach of cold weather, it is necessary to give some thought to the ques-

tion of anti-freezing solutions for the radiator and cooling system.

Dealers should caution owners against attempting to get along without an anti-freez-

ing solution and explain that even if the water is drained after every trip, there is a possibility of the radiator becoming frozen. In very cold weather, or when driving against a cold wind it is possible to freeze the radiator after circulation starts. Also if one or more tubes are blocked up with dirt the water will not drain off.

The ideal anti-freezing compound is, first, one that will prevent freezing of the radiator liquid without injuring either engine or radiator; second, that will not lose its non-freezing properties after continued use, and third, that does not materially change the boiling point of water when dissolved in it.

Kerosene has a lower freezing point and a higher boiling point than water but the inflammability of its vapor makes it dangerous to use, and its high and uncertain boiling point might lead to the serious overheating of the engine, or even to the melting of the solder in the radiator. It has marked solvent action on rubber parts. These facts clearly indicate that kerosene should not be used as a non-freezing solution.

Most of the anti-freezing solutions sold under trade names have a calcium chloride base. The calcium chloride compounds exert a greater corrosive action than water on the engine jacket and on the solder in the radiator. Tests have shown that calcium chloride solutions will completely remove solder from copper and brass. Another troublesome effect with calcium chloride solutions is experienced if small leaks occur in the radiator, and the solution comes in contact with the spark plugs and ignition wires, as a short circuit is liable to result. Calcium chloride compounds should be used with caution, if at all, on account of their corrosive action.

The alcohol solutions do not exert a greater corrosive action than water alone. Solutions made from either wood or denatured alcohol seem to be the most desirable anti-freezing solutions to use. The table below shows the approximate point at which the different alcohol solutions freeze:

- 20% solution freezes at 15° above zero.
- 30% solution freezes at 8° below zero.
- 50% solution freezes at 15° below zero.

A solution composed of 60% water, 10% glycerine and 30% alcohol is very often used, its freezing point being eight degrees below zero. Although glycerine tends to retard evaporation the alcohol will evaporate much faster than water. The solution will become weak and ineffective unless more alcohol is added from time to time.

The circulating capacity of the Model T motor with the present type radiator is 2 gallons, 7½ pints; with the former type radiator 3 gallons, 1¾ pints. It can readily be determined from these figures the amount of alcohol to use.

When storing a car for the winter, first drain the circulating system. Then put about a quart of alcohol in the radiator, allowing it to run through. This will prevent the freezing of any water that on account of stoppage in the tubes did not drain out.

As with the car radiator, it is also necessary to put an anti-freezing solution in the radiator of the Fordson tractor during cold weather. The capacity of the tractor cooling system is 12 gallons.

Due to the rush of cold air through the air washer, it is necessary to give some attention to that part during extremely cold weather. Some operators run the tractor with the float removed or raised in the air washer. Others have been known to replace the water with kerosene. Water should be used as late in the season as possible, draining it at night to prevent freezing. Kerosene, if used at all, should only be put in when the temperature is around zero.

DEALERS AND GARAGES!!! Quantity Prices on Parts Reduced

Revised lists of prices of Ford parts in lots of 100 and lots of 10 are now being distributed by our branches. There has been a considerable reduction in these prices and if you have not already obtained your copies of these lists, get in touch with nearest Branch or dealer at once.

Do not lay these Quantity Price Lists aside. Look them over carefully and see for yourselves the advantage of buying in quantities. There is no better way of increasing your profits.

November 1st Parts Catalogues Available

All Service Dealers and Garages should call on the dealer for a copy of our November 1st Parts Catalogue, providing a copy has not already been supplied them.

The new catalogue shows price reductions on a large number of items, and the garage doing repair work must necessarily have this information in order to properly invoice customers.

Data for Use in Obtaining Licenses

Serial Numbers of Model T Cars Manufactured During the Fiscal Years

YEAR	SERIAL NUMBER	
Oct. 1, 1908 to Sept. 30, 1909	Car and Motor	1 to 11,100
Oct. 1, 1909 to Sept. 30, 1910	Car and Motor	11,101 to 31,900
Oct. 1, 1910 to Sept. 30, 1911	Car and Motor	31,901 to 69,876
Oct. 1, 1911 to Sept. 30, 1912	Car No.	80,000 to 150,000
	Motor No.	69,877 to 157,205
Oct. 1, 1912 to Sept. 30, 1913	Car No.	150,001 to 332,500
	Motor	B-1 to B-12,247
Oct. 1, 1913 to July 31, 1914	Motor	169,452 to 370,147
	Car	332,501 to 539,000
Aug. 1, 1914 to April 30, 1915	Motor	370,148 to 570,790
	Car	539,001 to 742,313
May 1, 1915 to July 31, 1915	Motor	570,791 to 773,487
	Motor	773,488 to 855,500
Aug. 1, 1915 to July 31, 1916	Motor	855,501 to 1,362,200
Aug. 1, 1916 to July 31, 1917	Motor	1,362,201 to 2,113,500
Aug. 1, 1917 to July 31, 1918	Motor	2,113,501 to 2,756,251
Aug. 1, 1918 to July 31, 1919	Motor	2,756,252 to 3,277,851
Aug. 1, 1919 to July 31, 1920	Motor	3,277,852 to 4,233,350
Aug. 1, 1920 to Dec. 31, 1920	Motor	4,233,351 to 4,698,415
Jan. 1, 1921 to June 30, 1921	Motor	4,698,416 to 5,114,530
July 1, 1921 to Sept. 30, 1921	Motor	5,114,351 to 5,447,816

Shipping Weights of Model T Cars

Year	Coupe	Sedan	Runabout	Touring	Chassis	Truck Chassis
1915 to 1916	1540	1730	1395	1510	1200	....
1916 to 1917	1540	1730	1380	1500	980	....
1917 to 1918	1580	1745	1385	1480	980	1450
1918 to 1919	1580	1715	1390	1500	980	1450
1919 to 1920	1580	1750	1390	1500	1060	1395
1920 to 1921	1525	1725	1400	1500	1020	1380
1921	*1685	*1875	1380	1485	1070	1430

*This weight includes starter and demountable rims.

When cars are equipped with starter add 90 pounds.

When cars are equipped with demountable rims and tire carrier add 45 pounds.

Can Supply Wheels Less Hubs

Our Branches are now in position to supply both clincher and demountable wheels, less hubs, at the following prices less dealers' regular discount:

T-2800-D-295	Front wheel, clincher, less hub	\$6.00
T-2814-D-2816	Rear wheel, clincher, less hub	6.50
T-2800-E-293	Front and rear wheel, demountable, less rim and hub	5.50

Formerly wheels, less hubs, were not supplied due to the tendency of the wheels to warp after being carried in stock for a considerable period. The new steel fellow will

eliminate this condition and dealers should immediately order sufficient wheels, less hubs, to meet their requirements.

This will enable dealers to secure business that was oftentimes lost in the past because of their inability to obtain wheels, less hubs, from us.

Service Feature

The unsightly condition in which Ford cars are being turned out of many dealers' shops into owners' hands after repairs or adjustments have been made, is certainly a discredit to those dealers' organizations.

Can you imagine anything more displeasing to an owner than to receive a car from a

Service Station and find upon inspection that the upholstery is soiled by grease stains from mechanics' clothing, that steering wheel and door locks are covered with oil, and the finish of the fenders badly marred by careless handling of tools?

To guard against this condition, many dealers have designed and made out of canvas, covers or protectors for the fenders and upholstery which are placed on the car before a repair job is made. (See Fig. 267.) In addition the car is very carefully inspected before delivery to the owner.

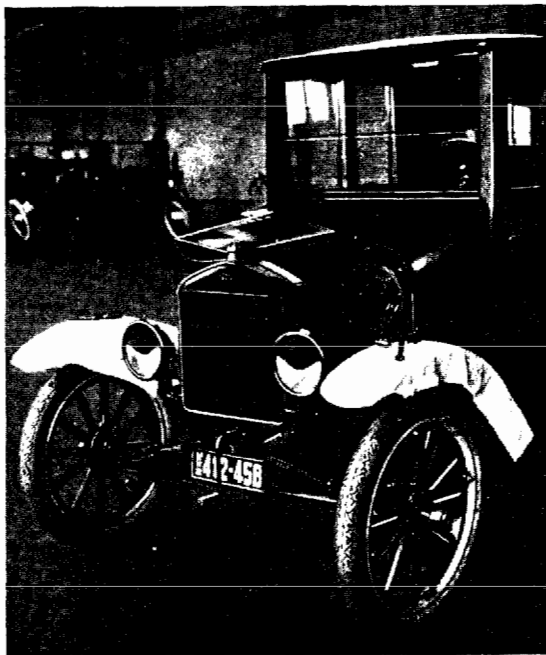


Fig. 267

Service customers appreciate these attentions on the part of the dealer; if nothing more, they like to feel that the dealer has their interest at heart and desires to protect their property.

We believe that every dealer should check his shop on this point. It is real service and it will make customers.

Increase Your Spark Plug Sales!!!

It appears that dealers are not soliciting the spark plug business of Service Stations and garages, consequently this business is allowed to drift into other channels.

On such plugs as are sold exclusively through our organization, the dealer has the opportunity of securing the wholesale busi-

ness on the same basis as regular Ford parts. Why not build up a business along a line that is free from the price cutting methods of many supply houses?

FREE SERVICE To All *Ford* Owners While You Wait

Do your headlights comply with the law? Don't wait for a traffic officer to tell you. Drive in and let us inspect and adjust them for you **free of charge.**

Our free complete service for Ford owners includes also

- | | |
|--------------------------------------|---------------------------------------|
| 1. Clean Spark Plugs | 13. Test Magneto |
| 2. Replace Spark Plugs or Porcelains | 14. Flush Out Radiator |
| 3. Replace Spark Plug Wires | 15. Install Hose Connection |
| 4. Clean Commutator | 16. Oil or Grease Entire Car |
| 5. Replace Commutator | 17. Test Storage Battery |
| 6. Replace Commutator Roller | 18. Line Up Street Wheels |
| 7. Replace Commutator Wires | 19. Install or Replace Tires or Tubes |
| 8. Adjust Coil Points | 20. Install Tire Chains |
| 9. Replace Coil Unit Points | 21. Replace Headlight Lens |
| 10. Replace Fan Belt | 22. Replace Electric Bulbs |
| 11. Adjust Bands | 23. Inspect Whole Car |
| 12. Replace Priming Wire | |

Gasoline to Ford Owners At COST

You are invited to avail yourself of this service which reduces your car upkeep by half and doubles its efficiency. Prompt and Courteous Treatment.

Why Not Trade Your Old Car For a New Ford

— or —

Trade Your Open Car For a Closed Ford

"Service that Makes Transportation Economical!"

ELLER MOTOR CO.

Authorized Ford Agent

E. H. PAINTER, General Manager

Randolph 7284 7000 Euclid Ave. Princeton 3211

Fig. 268

In Fig. 268 is shown a reproduction of a mailing card which the Eller Motor Co., Ford dealers at Cleveland, recently mailed to Ford owners in that city.

The fact that these dealers are willing to give considerable free service shows that they are alive to the advantages of constantly keeping in touch with Ford owners through their Service department. As a result of this policy the Eller Motor Co. has been able to increase not only their sales of parts and labor, but their car business as well.

Every Ford dealer should leave nothing undone in his efforts to keep his shop with its trained mechanics, labor-saving equipment, and the use of genuine Ford parts before the public. Keep Ford owners coming to you. It's good business and as such it is bound to pay.

Sedan Floor Carpets

From 1916 to 1920 Ford Sedans were equipped with a one-piece floor carpet (9669). In 1920 this carpet was obsolete and replaced by T-10277-A floor carpet assembly—front, and T-10278-A floor carpet assembly—rear.

Recently a change in design was made and we are now equipping Sedans with T-10277-B and T-10278-B.

When a customer desires to replace the entire carpet, the dealer should supply the latest design. When either the front or the rear carpet only is desired make sure that the carpet of the proper design is furnished. (See Fig. 269.)

Dealers should put into effect at once the new price of \$9.00 list on Sedan carpet com-

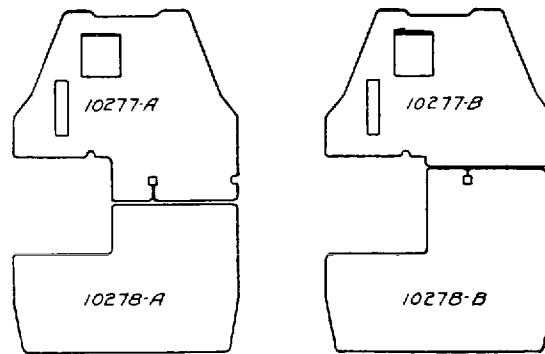


Fig. 269

plete in order to discourage owners from buying mats of inferior quality through other sources.

Cars bearing motor numbers 5,337,546 to 5,447,816 were shipped during September

Reduction in Price of Rebored Tractor Cylinder Blocks

The price of rebored tractor cylinder blocks has been reduced to \$20.00 list, subject to a special discount of 20% to dealers.

There are no doubt many tractor owners who will be glad to avail themselves of this opportunity to save money in overhauling their tractor providing the dealer will make it a point to draw the matter to their attention.

Tractor Fan Belts

The tractor fan belt S-591 has been selling for some time at 75c list, which is an exceedingly low price for a belt of its quality.

This figure should enable Ford dealers to obtain all of the fan belt replacement business on tractors in their localities.

Price on Tractor Covers Reduced

The price of S-920 Tractor Cover has been reduced from \$7.50 list to \$6.00 list.

While a cover is furnished as part of the equipment of every tractor, no doubt many tractors in your territory are without them because of their becoming worn out or mislaid. At this low price there should be a ready sale for covers, particularly if the matter is called to the attention of owners.

Don't forget to examine oil level in tractor crank case before starting motor.

Don't forget to clean air washer at least once each day.

Don't forget to change the oil in tractor crank case once each week.

Serial Numbers of Tractors Shipped During September, 1921

Motors Assembled at
Branches

Motors Assembled at
Cork, Ireland
108,903 to 109,208

Motors Assembled at
Home Plant
200,019 to 200,431

Ford Service Bulletin

No. 23

Vol. 2

November, 1921

Page 177

Display Ford Parts!!!

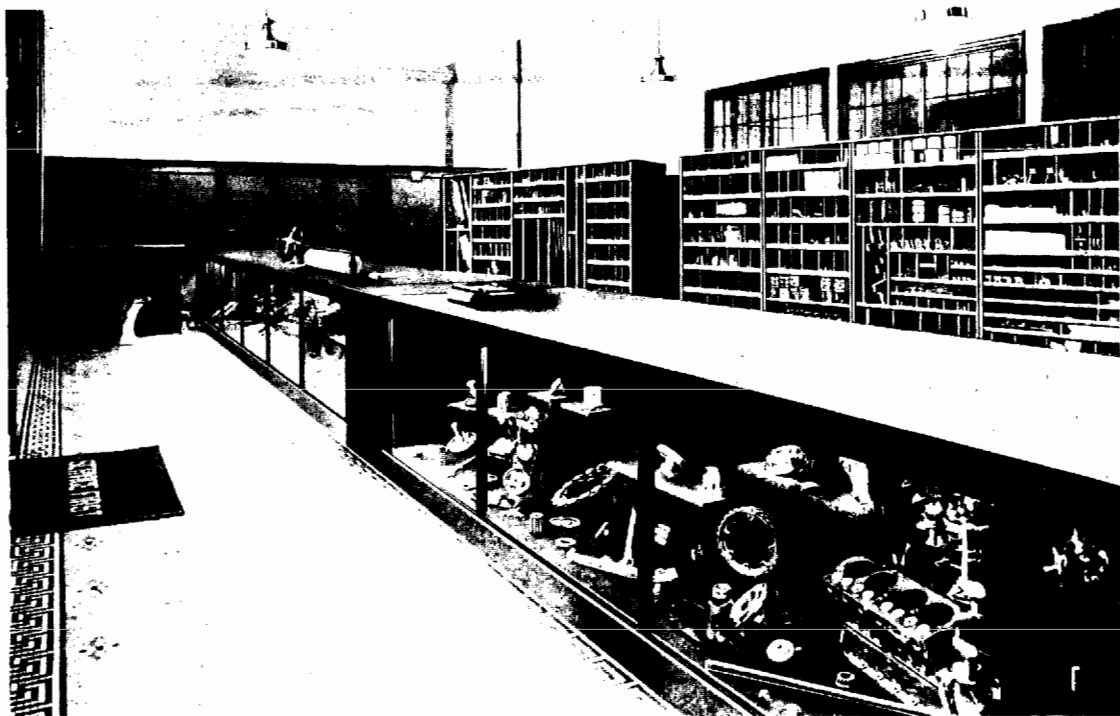


Fig. 70

AN attractive display is a most important step in the successful merchandising of any product.

The attention of the public is at once attracted to the convenient and efficient arrangement of the parts stock shown above, which is significant of the service the dealer is prepared to give.

The appeal of this well organized parts store compared with the average stock room in which Ford parts are too often pushed into the background, cannot help but impress the customer that the real aim of the dealer is to render service rather than push the sale of articles not essential to the operation of a car.

Another important feature of this bin system is that it facilitates the maintenance of a complete stock. The quantity of parts in any bin can be easily seen by the stock clerk which enables him to replenish the stock as required. Furthermore, the fact that all parts are in plain view tends to prevent losses from over or under stocking.

Service Follow-up Produces Car Sales

David T. Bussey, Ford and Fordson Dealer at Atlanta, Georgia, is firmly sold on Service Follow-Up and believes it a determining factor in influencing both car and tractor sales. It has been the custom of the Bussey Company for many years to maintain a file of Service Customers. This file serves as an absolute record of each customers' work and is referred to at regular intervals by the service follow-up man in making personal calls on customers for the purpose of checking up work done in the past as well as soliciting new business for the shop.

Mr. Bussey says that some time ago in going over the follow-up file, he observed that a certain gentleman to whom his firm had delivered a Ford car, had brought that car to his shop on four different occasions over an interval of only two weeks. He further observed that each Repair-Order called for the same minor operation and that after the last repair there was no further record of the customer. This indicated that the shop had not succeeded in locating the trouble and that either that customer was still experiencing trouble or had taken his work elsewhere.

Investigation showed the former. The car was quickly sent for, brought into the shop, the trouble found and corrected and the car delivered to its owner, who was deeply gratified not only because of the satisfactory operation of the car but also on account of the interest manifested by the dealer.

Later, when Mr. Bussey delivered eight Ford Roadsters to one of Atlanta's largest commercial houses, he learned that his Service Follow-Up work in connection with the particular case mentioned above, had been directly responsible for his obtaining the order for the eight roadsters.

This is but one concrete example of the value of following your Service customers. It shows conclusively that real service will help in selling cars and tractors; and successful dealers are becoming more and more convinced on this point each day.

A Comparison Between Genuine and Spurious Connecting Rod Bolts

In Fig. 271 is shown a photograph of a Genuine and a spurious Connecting Rod Bolt.

The Genuine Bolt has a tensile strength of over 10,000 pounds while the spurious Bolt broke at less than 5,000 pounds.



Fig. 271

Every Ford Dealer should make it a point to impress Ford owners with the importance of insisting upon Genuine Ford Parts. Show owners that their safety demands Genuine Ford Parts. Educate them to discriminate between Genuine and Spurious Parts and to patronize only such places as sell Genuine Parts.

This can be accomplished by placing "Genuine Ford Parts Sold Here" signs in your stock room, on your parts counter and in your show windows. Feature the sale of Genuine Ford parts in your newspaper and billboard advertising. Call owners' attention to the use of Genuine Ford parts in your Service follow-up letters.

Every dealer will find it to his advantage to wage a 100% campaign against spurious parts. Are you doing it?

Special Prices on Reamers

Subject to prior sale we can offer the following reamers at prices considerably below cost.

- 28-Z-67 Cam Shaft bearing bushing Det. No. 1 Reamer \$1.50 net.
- 753 Steering bracket bushing and starting crank sleeve T. S. H. S. Reamer \$2.75 net.
- 28-Z-97 Slow Speed Gear Bushing Reamer \$7.00 net.
- 28-Z-253 Reverse Gear Bushing Expansion Reamer \$10.00 net.

These reamers were made in accordance with the specifications of our engineers. A dealer or garage buying them is therefore certain of obtaining reamers of the best quality and of correct size and design for the operation for which they were intended.

Dealers or garages may place their orders for these reamers with the nearest Ford Branch.

Equipment for Repairing Ford Starting and Lighting Units

It is necessary for all dealers to give some thought to efficient equipment for making repairs to Ford starting and lighting systems because of the enormous number of Ford cars in service.

Work of such a nature can only be

done in a clean, well lighted location.

The experience gained by our dealers in handling electrical repair work on Ford cars indicates that the most satisfactory results are obtained from a testing outfit that is both simple in design and operation.

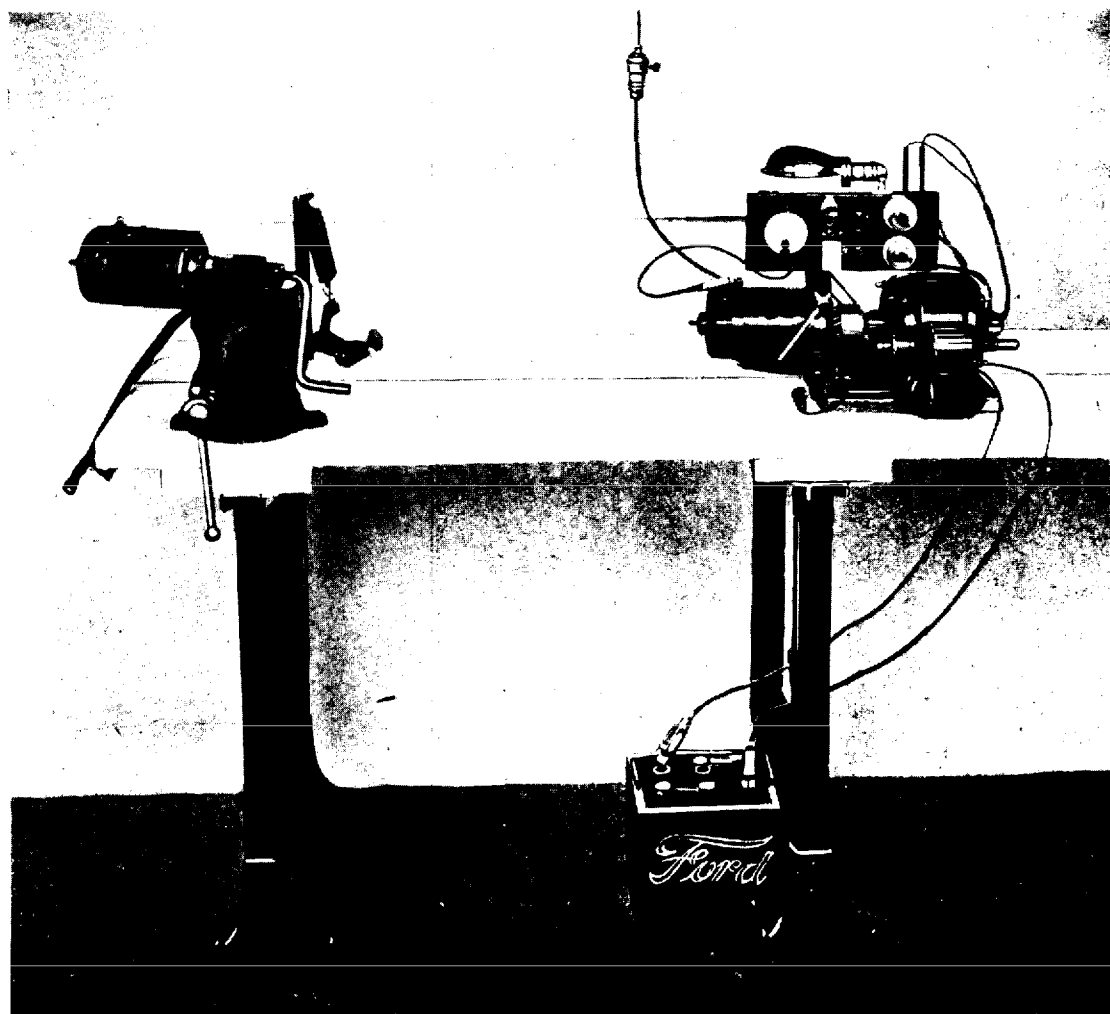


Fig. 272

A test stand for this work should possess the following features: A motor with ample power to drive the generator with brush set at 20 amperes. An accurate ammeter. A simple system of switching to obtain the different connections to the generator. A positive means of testing cutouts. A growler to test armatures and the means of making a motor test. Test stands possessing these features and capable of meeting all require-

ments can now be obtained at a price within reach of every dealer. For further information concerning equipment of this nature communicate with the nearest Ford Branch.

Fig. 272 illustrates a test stand mounted on the left hand side of a work bench. On the right hand side a 4" jaw vise is mounted.

In addition to the test stand and vise, it is necessary to provide three different size

pullers or a combination tool such as is illustrated in Fig. 273-2 or a small arbor press for removing pinion and bearing. When an arbor press is used it is necessary to provide proper plates so that the bearings will not be injured. Also a Third Brush wrench, Fig. 273-5, and two Brush Hooks, Fig. 273-6, together with screw drivers, hammer, etc., are required.

When the volume of electrical repair work permits, the following tools will be found very helpful:

Pole piece driver for repairing or replacing field coils. (Fig. 273-8)

Pole expander to insure tight poles with correct air gap. (Fig. 273-9)

Pole gauge to check air gap. (Fig. 273-1)

Brush sander for sanding brushes to fit commutator. (Fig. 273-3)

Bearing extractor for bearings that stick in end bonnet. (Fig. 273-1)

Bearing driver to drive bearings on shaft without injury. (Fig. 273-10)

Generator and motor plate. (Fig. 273-11)

Compressed air for cleaning purposes.

Testing the Generator.

Remove cover and see that brushes contact and that connections are complete. Revolve armature with the fingers and try bearing for looseness. If this inspection shows generator not in running condition tear down and test parts individually before building up.

Place generator in test stand and make necessary connections so that the generator runs as a motor and the ammeter indicates the current draw.

(A) Ammeter reads 4-5 Amps. generator runs steady, and when slowed down by placing fingers on the coupling, ammeter reading increases steadily until generator is stopped when ammeter reads 18-20 Amps. This indicates generator is O. K.

(B) NOTE: It may be necessary to sand

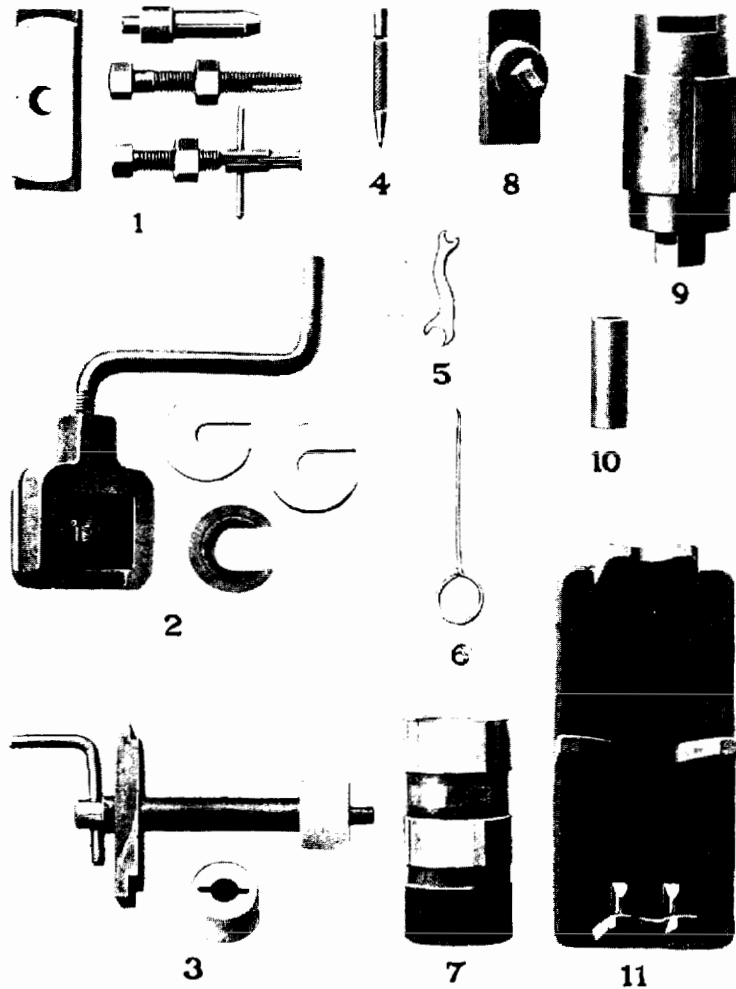


Fig. 273

commutator and brushes (if they are dirty) to get this effect.

(C) Same as (A), except ammeter always reads one or more amperes high. Cause — stiff bearings or grounded field. Raise third brush half way. Change generator wire from generator terminal to third brush. Close battery switch down. Ammeter should read two amperes, if more field is grounded.

If field is grounded, disconnect wires from third brush and grounded brush, bring ends out and test for ground with test points.

(D) Ammeter needle flies off scale every time switch is closed. Caused generally by ground in brush holder, though terminal screw or wire may be grounded. Remove from stand, disconnect wire from positive

or lower right hand brush (as you look at commutator end), raise positive brush from commutator and look for ground in brush holder and terminal as follows: Hold one test point on brush holder, other point on frame of generator. Lamp should not light. Test terminal same way.

(E) Ammeter needle vibrates as armature is allowed to turn slowly. Cause—armature trouble.

A grounded armature causes the needle to swing clear off the scale once each revolution.

A shorted coil causes the needle to swing slightly while two or more shorts together will give the same effect as a ground.

An open circuit causes the needle to swing and the armature to lose power. Two or more open circuits will make the machine dead, armature will have no power at all and ammeter will only read two or three Amps. NOTE—a bad case of class (B) will indicate the same as this until commutator is cleaned.

The above tests cover most of the trouble in the Ford generator. The next article will cover tearing down and building up with the necessary tests and precautions to be observed at each step to insure perfect work.

Rack for Springs

In Fig. 274 is shown an efficient means of storing and exhibiting Ford springs and spring parts behind the parts counter. A rack of this kind can easily be made in the dealer's shop.

20 Z 340 Valve Seat Reamer

We have a limited quantity of 20 Z 340 valve seat reamers available for immediate shipment.

This is a properly designed high grade tool for garages, at the low price of \$1.20 net.

Orders should be placed with the nearest branch.

T-9955 Coupelet Roof Assembly

Subject to prior sale we will offer a limited quantity of T-9955 Coupelet Roof Assembly 1918-19 at the exceedingly low price of \$12.00 net to dealers and garages.

This affords a wonderful opportunity to replace the roofs of 1918-19 Coupelet bodies at far less than cost.

Orders may be placed with the nearest branch.

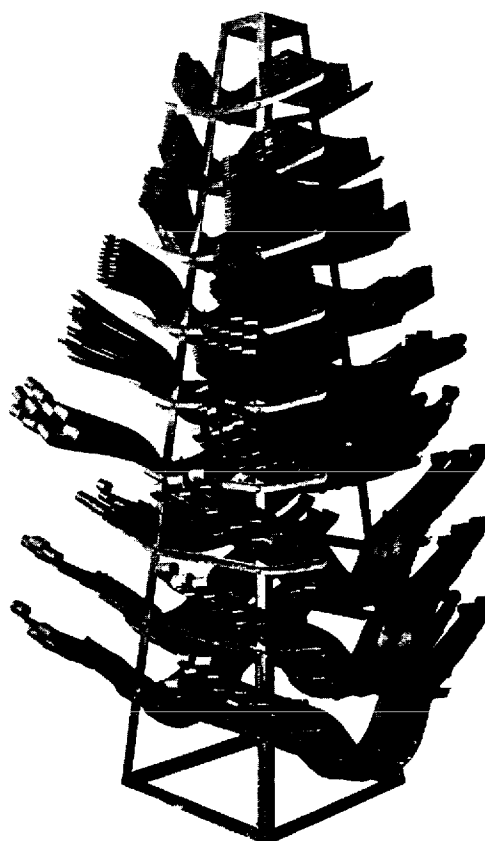


Fig. 274

Piston Bushing Removing and Replacing Fixture

An efficient fixture, Fig. 275, for removing the bushing from the light weight pistons may be made in any repair shop which is equipped with a lathe. The fixture consists of:

1. Collar to support boss when inserting bushing (made from a standard $\frac{5}{8}$ nut).
2. Bushing driver for forcing in the bushing.
3. Shaft which will slip through the rough bushing provided with shoulders to support the collars 2 and 5.
4. Base to support the fixture made from a scrap Model T crankshaft flange.
5. Collar for pressing out the bushing.
6. Support for piston while removing the bushing, made from a tractor piston pin.

The two assembly drawings show how the parts go together when performing these operations.

Genuine Ford Parts Assure Service and Safety

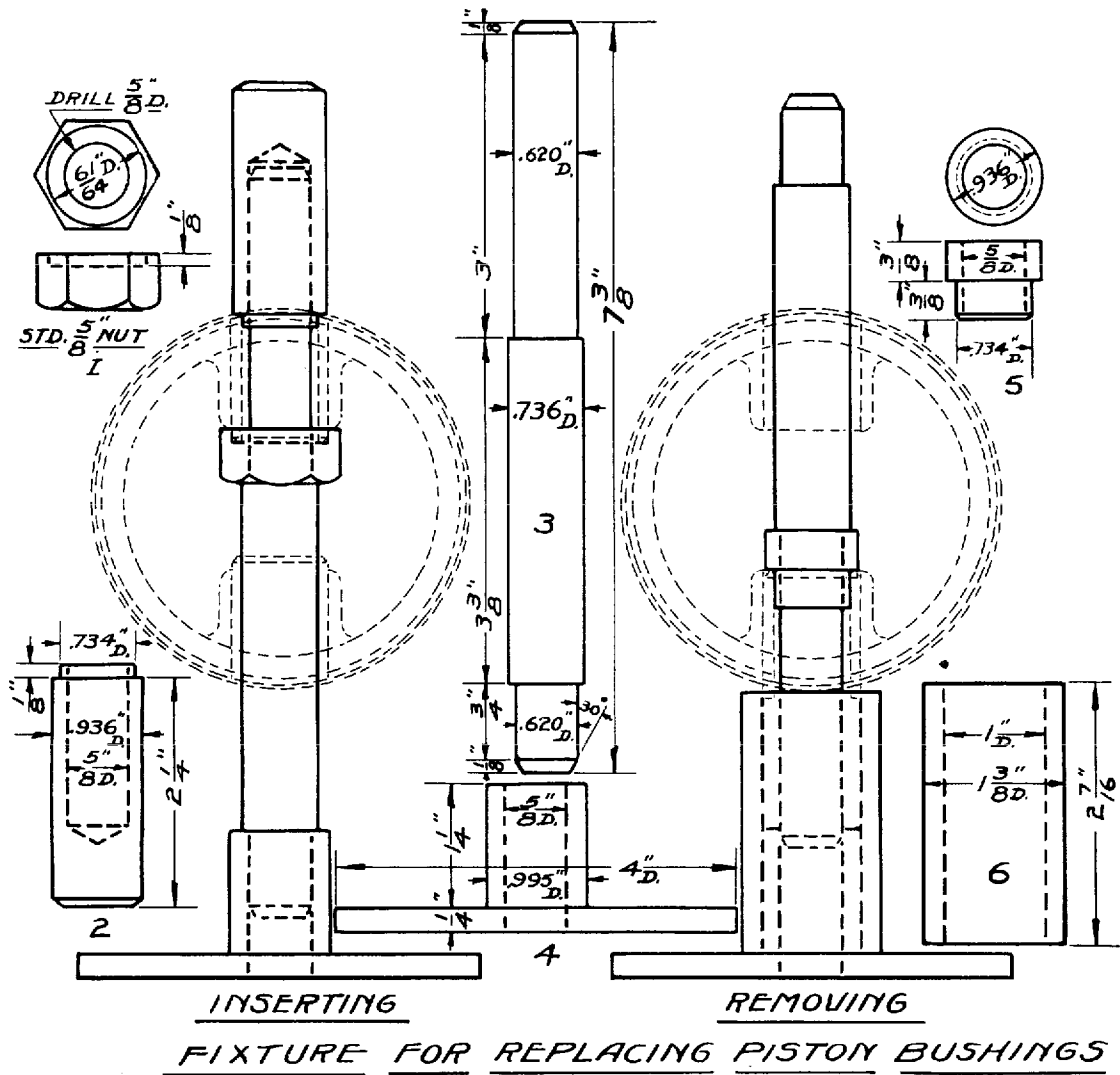


Fig. 275

Cars bearing motor numbers 5,447,816 to 5,529,519 were shipped during October

Tractor Lubricating Oil

It has been found that oil which tests in accordance with the following specifications can be used with very satisfactory results in both the Fordson tractor motor and transmission:

- Flash point 400 deg. F. minimum.
- Fire point 450 deg. F. minimum.
- Viscosity at 100 deg. F. 650 maximum.
- Viscosity at 210 deg. F. 66 minimum.
- Cold 45 deg. F. maximum.

Two and one-quarter gallons of lubricating oil is required for the motor and three and three-quarters gallons for the transmission, making six gallons of oil required per tractor.

Fitting Tractor Crank Shaft

When a tractor block has been rebabbitted, it is necessary to give particular attention to the fitting of the tractor crank shaft. After the crank shaft has been burned in, it should

or lower right hand brush (as you look at commutator end), raise positive brush from commutator and look for ground in brush holder and terminal as follows: Hold one test point on brush holder, other point on frame of generator. Lamp should not light. Test terminal same way.

(E) Ammeter needle vibrates as armature is allowed to turn slowly. Cause—armature trouble.

A grounded armature causes the needle to swing clear off the scale once each revolution.

A shorted coil causes the needle to swing slightly while two or more shorts together will give the same effect as a ground.

An open circuit causes the needle to swing and the armature to lose power. Two or more open circuits will make the machine dead, armature will have no power at all and ammeter will only read two or three Amps. NOTE—a bad case of class (B) will indicate the same as this until commutator is cleaned.

The above tests cover most of the trouble in the Ford generator. The next article will cover tearing down and building up with the necessary tests and precautions to be observed at each step to insure perfect work.

Rack for Springs

In Fig. 274 is shown an efficient means of storing and exhibiting Ford springs and spring parts behind the parts counter. A rack of this kind can easily be made in the dealer's shop.

20 Z 340 Valve Seat Reamer

We have a limited quantity of 20 Z 340 valve seat reamers available for immediate shipment.

This is a properly designed high grade tool for garages, at the low price of \$1.20 net.

Orders should be placed with the nearest branch.

T-9955 Coupelet Roof Assembly

Subject to prior sale we will offer a limited quantity of T-9955 Coupelet Roof Assembly 1918-19 at the exceedingly low price of \$12.00 net to dealers and garages.

This affords a wonderful opportunity to replace the roofs of 1918-19 Coupelet bodies at far less than cost.

Orders may be placed with the nearest branch.



Fig. 274

Piston Bushing Removing and Replacing Fixture

An efficient fixture, Fig. 275, for removing the bushing from the light weight pistons may be made in any repair shop which is equipped with a lathe. The fixture consists of:

1. Collar to support boss when inserting bushing (made from a standard $\frac{3}{8}$ nut).
2. Bushing driver for forcing in the bushing.
3. Shaft which will slip through the rough bushing provided with shoulders to support the collars 2 and 5.
4. Base to support the fixture made from a scrap Model T crankshaft flange.
5. Collar for pressing out the bushing.
6. Support for piston while removing the bushing, made from a tractor piston pin.

The two assembly drawings show how the parts go together when performing these operations.

Genuine Ford Parts Assure Service and Safety

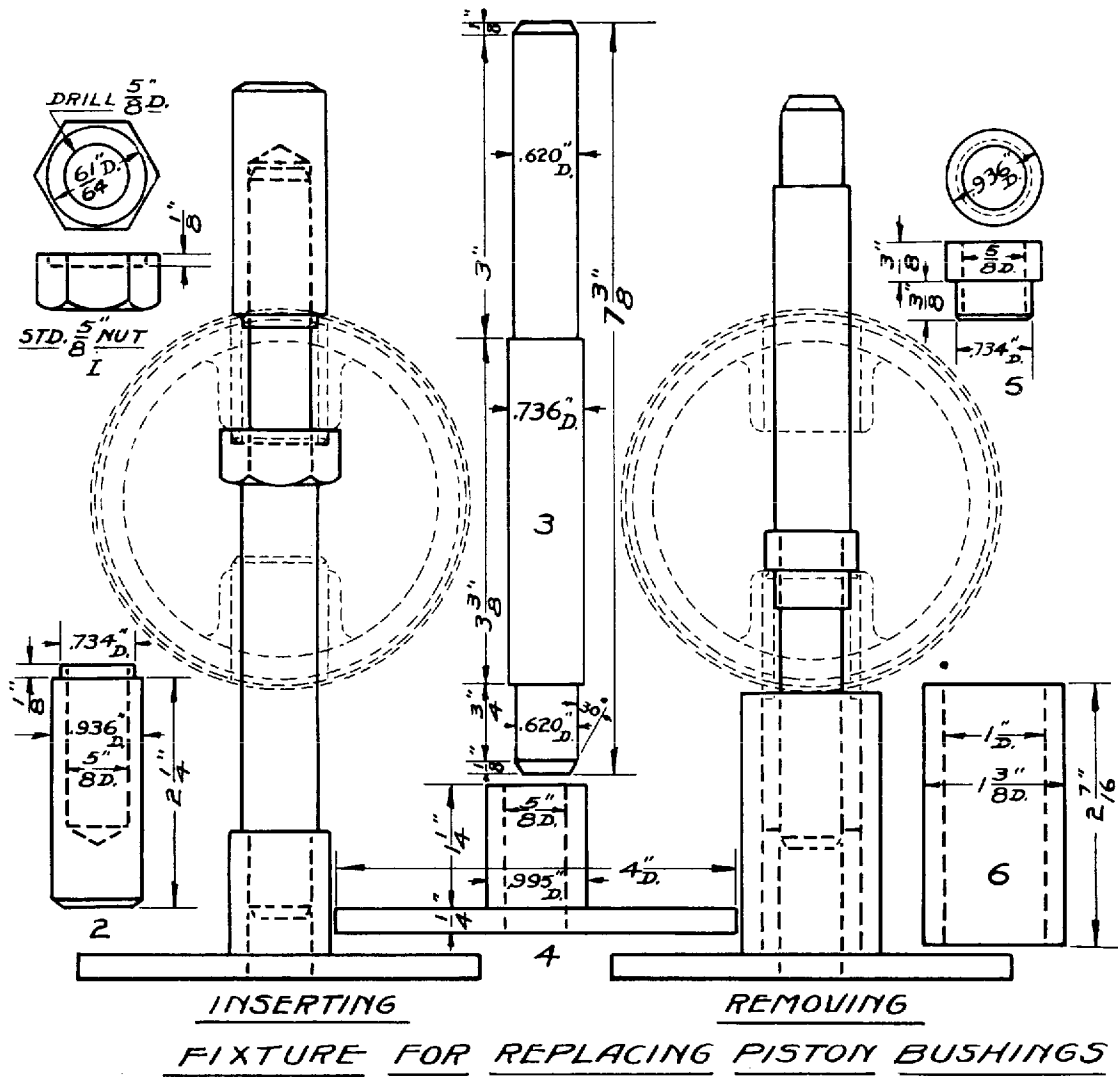


Fig. 275

Cars bearing motor numbers 5,447,816 to 5,529,519 were shipped during October

Tractor Lubricating Oil

It has been found that oil which tests in accordance with the following specifications can be used with very satisfactory results in both the Fordson tractor motor and transmission:

- Flash point 400 deg. F. minimum.
- Fire point 450 deg. F. minimum.
- Viscosity at 100 deg. F. 650 maximum.
- Viscosity at 210 deg. F. 66 minimum.
- Cold 45 deg. F. maximum.

Two and one-quarter gallons of lubricating oil is required for the motor and three and three-quarters gallons for the transmission, making six gallons of oil required per tractor.

Fitting Tractor Crank Shaft

When a tractor block has been rebabbitted, it is necessary to give particular attention to the fitting of the tractor crank shaft. After the crank shaft has been burned in, it should

be removed to determine whether or not the oil grooves in the babbitt have been closed. If it is found these grooves are closed, they should be re-cut. As a matter of fact, it is a good plan, regardless of whether the grooves are open or closed, to run the bearing scraper through them to remove any rough edges.

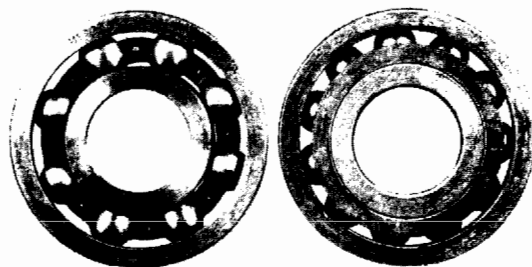
Worm Shaft Thrust Ball Bearings

Investigation at our Branches shows that Ford dealers are being called upon to make adjustments on S-22 Tractor Worm Thrust Ball Bearings which were not supplied by this Company.

Fig. 276-B shows a Worm Thrust Ball Bearing manufactured by The Standard Steel and Bearings Co., trade-marked "SRB" which has been used in a large number of Fordson Tractors. This bearing is approximately $2\frac{19}{32}$ " in thickness and has a double row of balls. Fig. 276-A shows a Thrust Bearing also of Standard manufacture and also trade-marked "SRB" but not supplied to this Company for installation in Fordson tractors. This bearing has a single row of balls and is $1\frac{13}{32}$ " in thickness.



B A
Fig. 276



A B
Fig. 277

Fig. 277-A shows a Worm Bearing manufactured by the Gurney Ball Bearing Co., and trade-marked "Gurney" but not furnished by this company in the Fordson tractor. Fig. 277-B is the Gurney Bearing which we supplied; this is also trade-marked "Gurney." Dealers will find it easy to check these bearings by remembering that we never furnished a Gurney Worm Thrust Ball Bearing with a ribbon retainer.

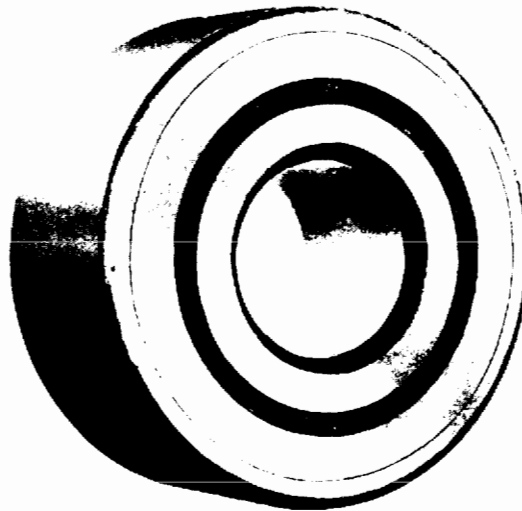


Fig. 278

Fig. 278 shows a Worm Ball Bearing manufactured by the New Departure Mfg. Co., a limited quantity of which were put out in Fordson tractors. All tractors having bearings of this type were put out over two years ago.

Fig. 279-B shows a Hess Bright Worm Thrust Bearing, many of which we have used in tractors. This bearing is $1\frac{11}{32}$ " in thickness and is used with two spacers. Fig. 279-A shows the latest type of Hess Bright Worm Thrust Ball Bearing Assembly. Supplied by the Hess Bright Manufacturing Co. This bearing is $1\frac{21}{32}$ " in thickness.



A B
Fig. 279

This bearing is being used in tractors constructed with the latest type three lead worm and worm gear and with that construction should give entirely satisfactory results. There is, therefore, no occasion for removing the latest type Hess Bright Ball Bearing from such tractors and replacing it with a Timken Roller Bearing. Hess Bright bearings are trade-marked "Hess Bright."

We have not supplied any worm thrust ball bearings not mentioned above, and Dealers should refuse credit on bearings furnished through other sources, if presented to them for adjustment.

It is desired that dealers return bearings on which they have made adjustments, to our Branches promptly and not hold them for indefinite periods.

Tongue Hitch

The following photograph is of a tongue hitch that can be easily made and used to good advantage when hauling a horse drawn farm wagon with the Fordson tractor.

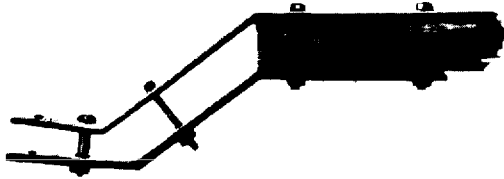


Fig. 280

Don't Race Tractor Motor

One of the worst abuses that can be given the Tractor is by racing the motor. Drivers must avoid this at all times. The proper speed to run the motor is 1000 revolutions per minute. This will give the Tractor the correct working speeds. When the motor is idling cut the speed down as low as possible and retard spark (spark lever down). When starting do not speed the motor to heat up the vaporizer quickly. This is destructive to the Tractor and will not accomplish your purpose.

Splitting the Tractor

When removing a fly wheel it is important that the rear end be drawn back far enough to remove all possibility of the wheel striking the drive shaft. The weight of the fly wheel together with long leverage of the shaft, is likely to crack the transmission plate or spring the shaft.

Do Not Use Shellac

We find that many of our dealers are using shellac in fitting cylinder head gaskets. This is unnecessary and is not considered good shop practice.

Installing Tractor Commutator Case Spring

Tractors are now coming through with the commutator case spring S-279-1750 and commutator case spring stud S-280-2022 assembled in the next hole above their former location in the cylinder front cover. (See Fig. 281.)

This is to make it easier to oil the present type commutator which is now used on both Model T car and Fordson tractor.

When installing present type commutator cases on old tractors, dealers should assemble the commutator case spring stud and case spring as shown in Fig. 281.

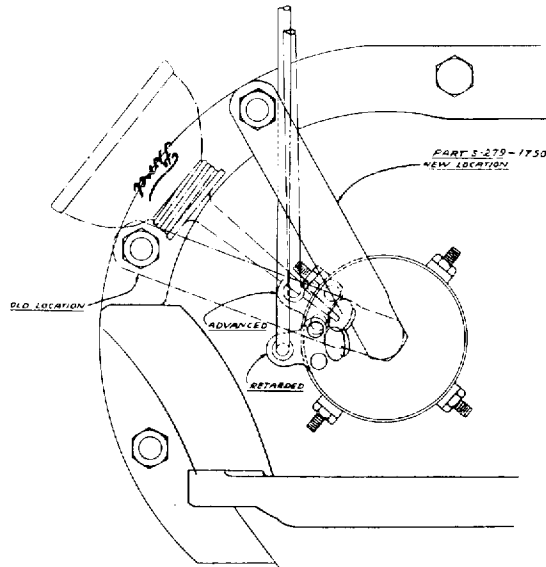


Fig. 281

Don't choke the engine while running on kerosene, as this will foul the spark plugs.

Don't run your tractor with loose bearings —adopt the "stitch in time" policy.

Don't forget to release clutch before shifting gears.

Serial Numbers of Tractors Shipped During October 1921

Motors Assembled at
Branches
170,244 to 170,394

Motors Assembled at
Cork, Ireland
109,209 to 109,397

Motors Assembled at
Home Plant
200,432 to 200,942

Ford Service Bulletin

No. 24

Vol. 2

December, 1921

Page 185

Making Your Service Department of Real Value to Your Business

THE beginning of the New Year is opportune for every Ford dealer to carefully analyze every department of his business. This should be done not only for the purpose of seeking out present inefficiencies and overcoming them, but also that your service generally may be improved to better serve the individual Ford and Fordson owner and with greater profit to yourself.

To assist dealers in analyzing conditions we submit the following questionnaire calling attention to several points which deserve particular attention.

1. Does your organization as a whole appreciate the necessity of giving first class service and is service considered of vital importance from a sales standpoint?
2. Have you the proper equipment to make repairs on Ford cars and Fordson tractors in the shortest possible time?
3. Have your labor charges for repair work been revised to correspond with present conditions and are they low enough to secure the repair business?
4. Can you afford to lose repair work that should rightfully come to your shop, labor charges being equal, when you take into consideration the long discount applying on parts?
5. Are repair jobs being turned out of your shop mechanically fit and covered by a real guarantee against defective workmanship?
6. Can you attract business into your shop on the strength of turning out "quality work?"
7. Is your service man careful to explain the necessity of replacing certain parts so the customer has some idea of the cost before the job is completed?
8. Have your repairmen been instructed not to scrap parts which inspection shows can be put back into a repair job, and is any effort made to satisfy a customer when the material charge is higher than ordinary?
9. Is due care exercised to prevent cars getting out soiled by mechanics' clothing and marred by careless handling of tools?
10. Have you inaugurated Card Index files and follow-up methods to bring you in closer touch with Ford owners so as to increase your sales of parts and labor?
11. Do you analyze your parts stock monthly with the idea of keeping your investment in proportion to your sales?
12. Do you anticipate the parts requirements of your territory so that an adequate, well balanced stock of parts can be maintained at all times without constantly resorting to telegraphic and express orders?
13. Do you know how courteously and promptly your customers are being served at the Parts Counter?
14. Do you exhibit and feature the sale of Genuine Ford Parts and are you educating Ford owners to discriminate against spurious parts?
15. Have you issued letters calling Ford owners' attention to the advantages of the Ford Storage Battery and soliciting their battery replacement business?
16. Do you send out letters calling attention to reasonable items such as curtains, hood covers, anti-freeze, etc.?
17. Do you systematically solicit the parts business of garages, accessory stores, etc., with a view of increasing your wholesale volume?
18. Do you advertise your Service Department by personal contact, by letters, posters, and hand bills?
19. Do you invite Ford owners to bring their cars in for inspection at regular intervals, thereby assisting them to obtain maximum efficiency?
20. Are you able thru your Service Department to secure and retain the good will of your customers and do you capitalize that good will by soliciting customers for Ford and Fordson prospects?

It is to be hoped that every Dealer will plan to make his Service Department more efficient so that 1922 will find every one better prepared to handle the Service on Ford Cars, Trucks, and Fordson Tractors.

Advertise Service

The Deignan Motor Company, Ford Dealers at Oklahoma City, Oklahoma, are distributing memorandum pads on which they advertise 7:00 a. m. to 11:00 p. m. Service on Ford Cars.

A large number of these pads have been passed out to restaurants in that city to be used as meal checks by waiters. The waiter writes the charge on the blank side of sheet; thus, when the sheet is passed to the customer the Deignan Motor Company's advertisement is placed face up.

These pads are also used by the Deignan Motor Company salesmen in figuring prices on Ford cars for prospective buyers. When the price is submitted to a customer he naturally notices the service the dealer is prepared to give, which is an added sales leverage.

Many Ford Dealers are not obtaining their share of Service Business because they are content to take it for granted that the Public knows they are equipped to render Ford Service. The Public may know that Ford Dealers render Service but the Public must be constantly reminded of that fact.

Dealers will find it profitable to keep their Service facilities before the Public at all times. Advertising helps to do it.

The Motor Power

An engine is like a man in that it has two strength ratings. A man may be able to lift a weight of 100 pounds, but he cannot run with it. With a load of ten pounds he can run. The amount an engine can "lift" is termed "torque," while the rate at which it can carry (turn over) that weight is termed "horsepower." The torque and horsepower increase with the R. P. M. (revolutions per minute) for a time and then gradually decrease. (See Fig. 283)

While we have obtained ratings as high as 22½ horsepower, we believe the figures given in the following are representative of the motors in general use:

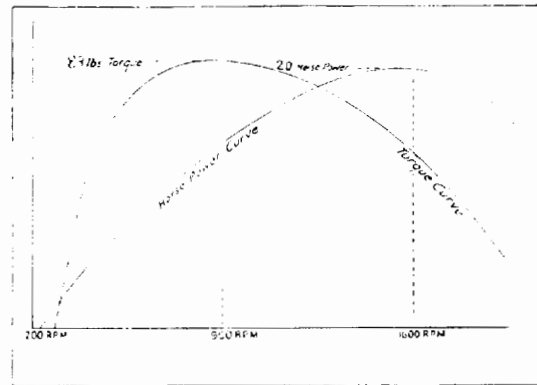


Fig. 283

R. P. M.	Speed in Miles Per Hour	Pounds Torque	Horsepower
300	7.5	35	2.
400	10.	57	4.5
500	12.5	69	6.5
600	15.	73	8.5
700	17.5	78	10.40
800	20.	81	12.33
900	22.5	83	14.20
1000	25.	82	15.00
1100	27.5	81	16.66
1200	30.	79	18.20
1300	32.5	77	19.
1400	35.	73	19.66
1500	37.5	70	20.
1600	40.	65	20.
1700	42.5	60	19.40
1800	45.	53	18.20
1900		47	17.

These figures were obtained with a wide open throttle. They represent only the maximum power that can be developed at the given speeds. As the throttle is seldom wide open when driving the car, speed is rarely indicative of the horsepower the engine is developing. You will notice that the "torque" (pounds pull) begins to drop off at about 900 R. P. M. As the engine exerts its greatest pull at this speed, the futility of racing the engine when attempting to pull out of a hole is apparent.

Spurious Parts Dangerous

The design and construction of the front axle of a motor car is of vital importance. It not only supports the weight of the front end of the automobile, but it must also be strong enough to withstand the most severe shocks, as when the wheels strike some obstruction when the car is travelling at high speed. Furthermore, the car is guided through the front axle assembly.

Therefore, it naturally follows that the front axle, including the spindles, radius rods and spindle connecting rod, be constructed out of high grade materials, properly heat-treated and designed with a high factor of safety.

Phone Walnut 0916



604 West Main St.

Fig. 282

Open 7 A.M. to 11 P.M.

Open 7 A.M. to 11 P.M.

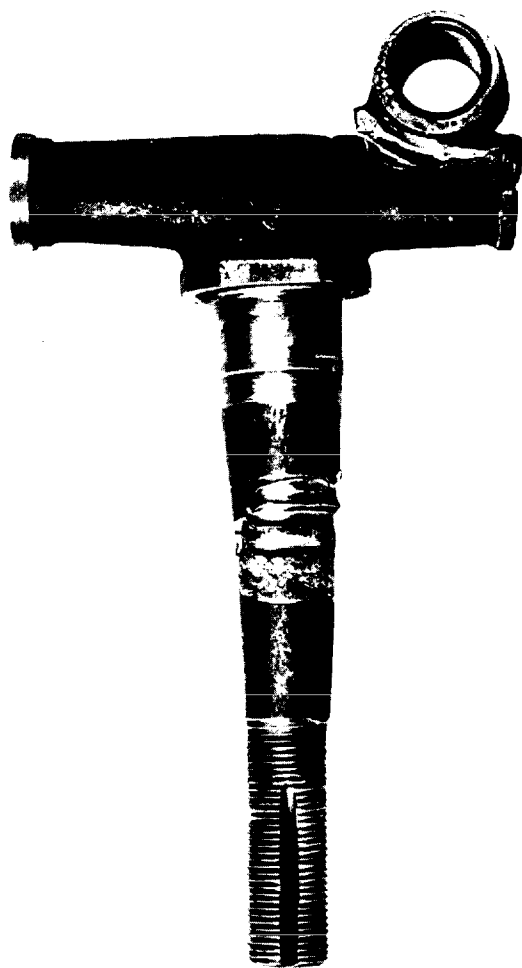


Fig. 284

The broken spindle illustrated in Fig. 284 is a spurious part which caused a serious accident resulting in injuries to the occupants of the car. Laboratory tests show that this spindle was made from low grade carbon machine steel, whereas the standard Ford spindle is made from alloy steel properly heat-treated and fully 100% stronger.

There are still many owners who do not appreciate the fact that they are jeopardizing their safety and that of their family and friends by using spurious parts. It, therefore, is necessary for every dealer to educate owners to purchase only Genuine Ford Parts.

Guarantee on Ford Battery

The Ford battery is guaranteed against defect by the Ford Motor Company the same as any other Ford part.

Experience has proven, however, that defects in batteries will ordinarily develop within three months after delivery to the owner.

Beyond that period short life can be safely attributed to neglect or abuse.

It is, of course, understood that batteries will not be considered defective that have been damaged by lack of charge, failure to keep the plates covered with solution by filling the cells with pure water at specified times, or driving with battery hold-downs not properly tightened. Neither is it expected that the guarantee will cover the charging of batteries. On the other hand, a battery which proves incapable of delivering its rated capacity when fully charged will be considered defective.

The fact that a battery may develop a defect does not mean that it is necessary to replace the entire battery, no more than there is need to replace the complete motor assembly because of a defective valve or piston. Branches are now in position to supply Dealers with battery repair parts and Dealers who have not already done so should order battery parts to meet their requirements. Likewise, Dealers not equipped to make battery repairs should communicate with the Branch for information as to the equipment needed.

When an alleged defective battery is brought into a Dealer's shop it should be inspected immediately to ascertain whether it is actually defective or has given out because of abuse or neglect. The Dealer will then make necessary repairs by replacing the units that are not up to standard and returning them in their regular shipments to the Branch. Such parts are to be listed on the "Goods Returned" sheets accompanying the shipment in exactly the same manner as other Ford and Fordson Parts.

Dealers should test all new batteries received by them. Likewise, it will be necessary to give batteries proper care while in stock. It is suggested as a means of determining the age of a battery that Dealers stamp the date of delivery on the cell connector of every battery delivered by them whether in a new car or when sold outright to replace a worn out battery.

The Ford battery is backed by the reputation, responsibility, and experience of the Ford Motor Company. This fact, together with the unusually high quality of the battery makes a longer guarantee period unnecessary. As a matter of fact lengthy guarantees on batteries are usually made as a sale argument, and are not an indication of quality. The buyer usually finds that securing any redress under such a guarantee is quite a different matter as the responsibility for defect can be evaded by the manufacturer.

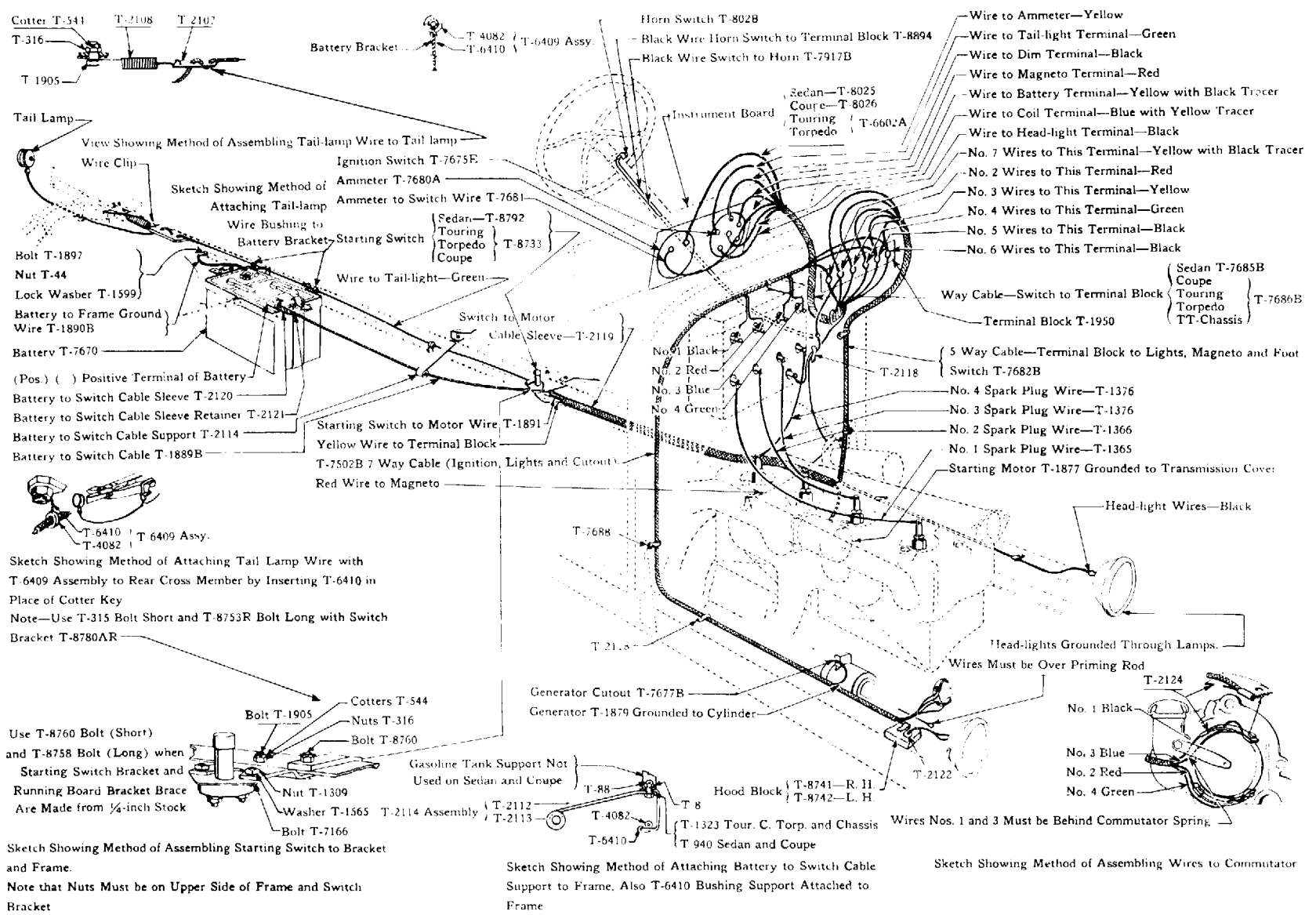


Fig. 285

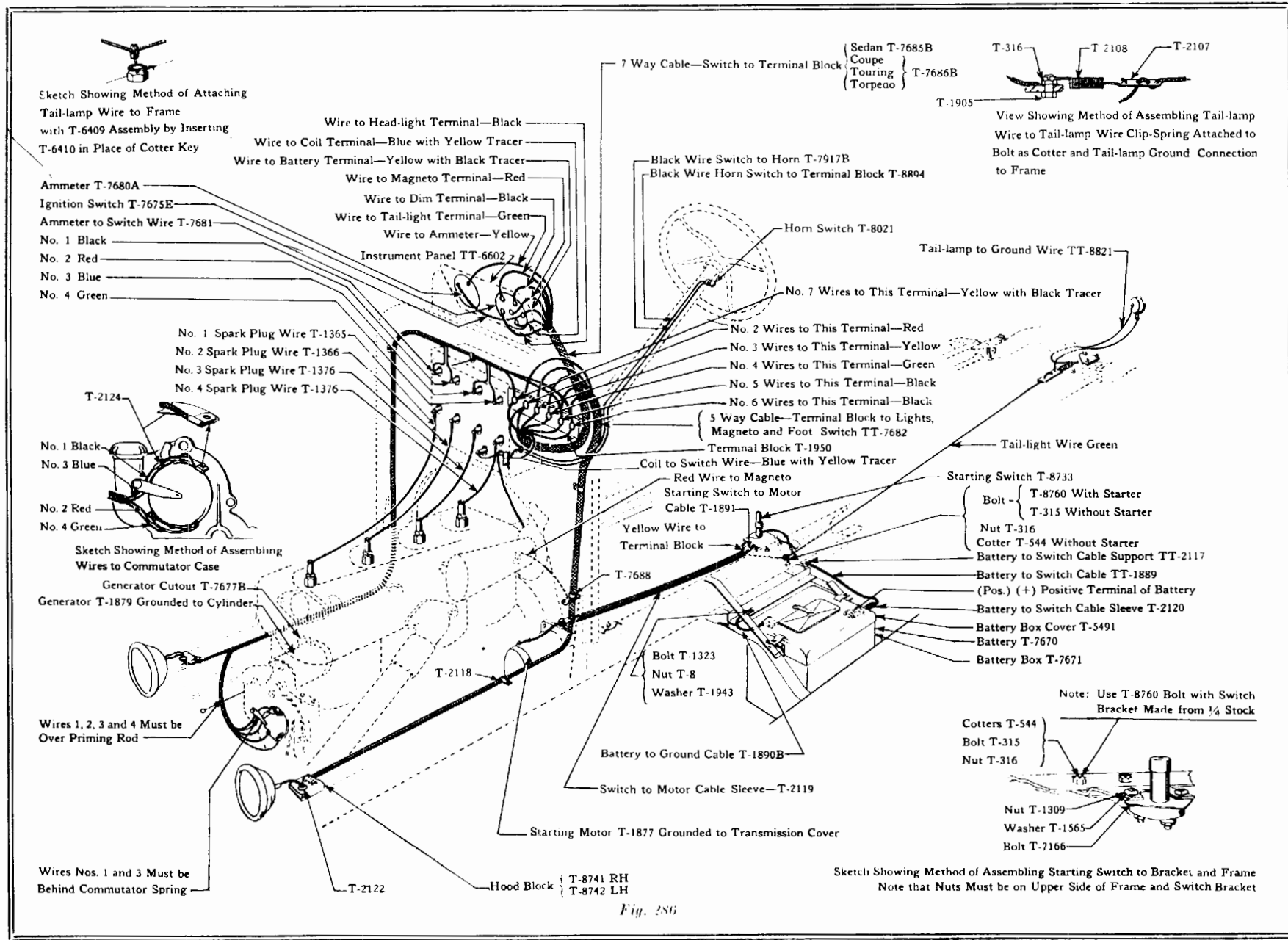


Fig. 286

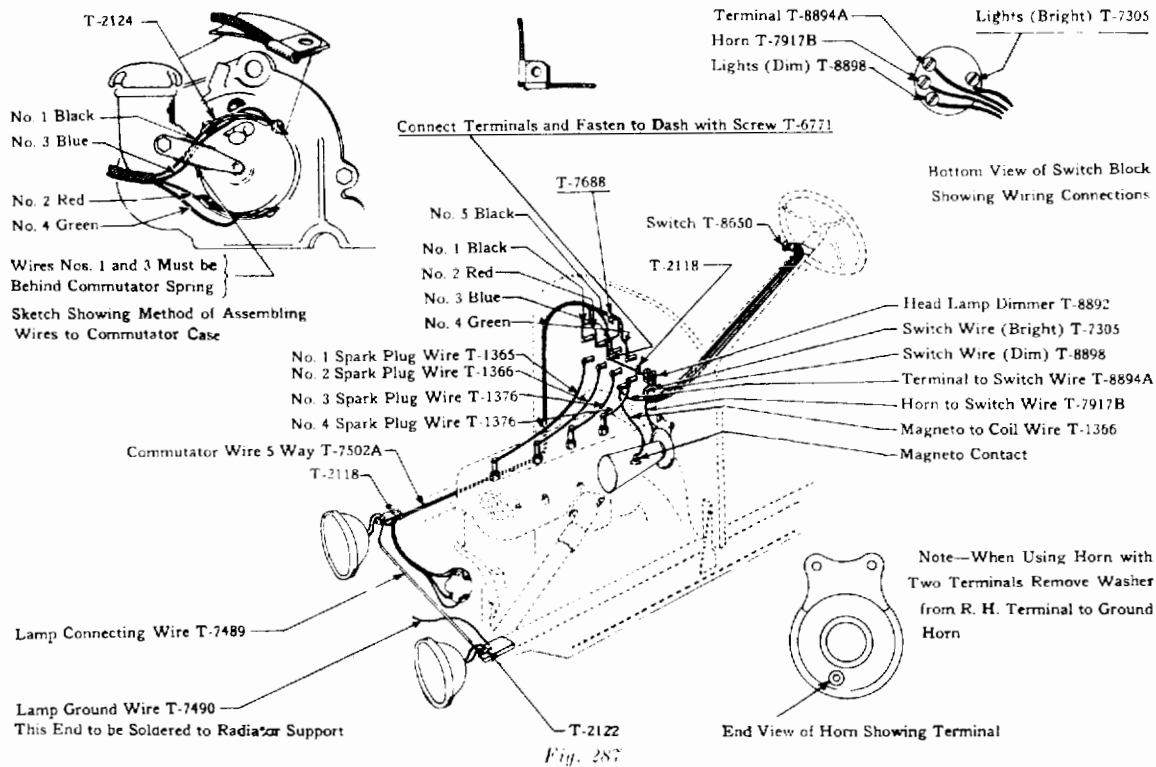


Fig. 287

Wiring of Ford Cars

THE Ford Motor Company has gone to a great deal of expense in redesigning the wiring of Ford cars so as to enable Ford owners to secure reduced insurance rates.

All cars are now being equipped with improved wiring assemblies as listed below:

- T 5031-7502B Commutator wire assembly
- T 5041-7682B Wiring assembly on chassis
- T 5042-7685B Wiring assembly on body (Sedan)
- T 5043-7686B Wiring assembly on body (Touring)
- Torpedo, Coupe and Truck with starter
- T 5030-7502A Commutator wire assembly (cars without starter)
- T 5041-B TT7682 Wire assembly on Chassis (Truck with starter)

The new design looms (Fig. 288) carry not less than No. 16 Gauge Wire throughout and are heavily insulated in accordance with the specifications of the Insurance Underwriters. Practically all of the cheap looms on the market carry undersize wire poorly insulated, and owners using them cannot obtain the lowest insurance rates.

The mechanical strength of the new looms and wires is much greater than that of any spurious looms. This reduces the possibility of breakages and shorts and makes for increased operating efficiency.

The Ammeter to cut-out wire is included in the commutator loom assembly, and Wiring Assembly on Body, thus affording a compact protected wire with short outlets at the terminal block and cut-out. This point should be particularly emphasized to customers as with this design there is practically no chance for short circuits and fire.

The appearance of the looms has been materially improved by the black glazed loom covering.

If the advantages of using standard Ford wiring assemblies are called to the attention of owners there will be less inclination on the part of the latter to purchase spurious assemblies. Dealers can therefore, increase their sales of these items by giving them prominent display and explaining their advantages over the Parts Counter.

Figures 285, 286, and 287 show the wiring arrangement of Ford car equipped with starter, Ford truck with starter and car or truck without starter.

In order to rewire a car so as to incorporate all of the latest changes it is necessary to bear in mind several points of installation which we will cover briefly for the benefit of the repair man.

The T-5044-1950 Terminal block (5 way type) has been replaced with a redesigned

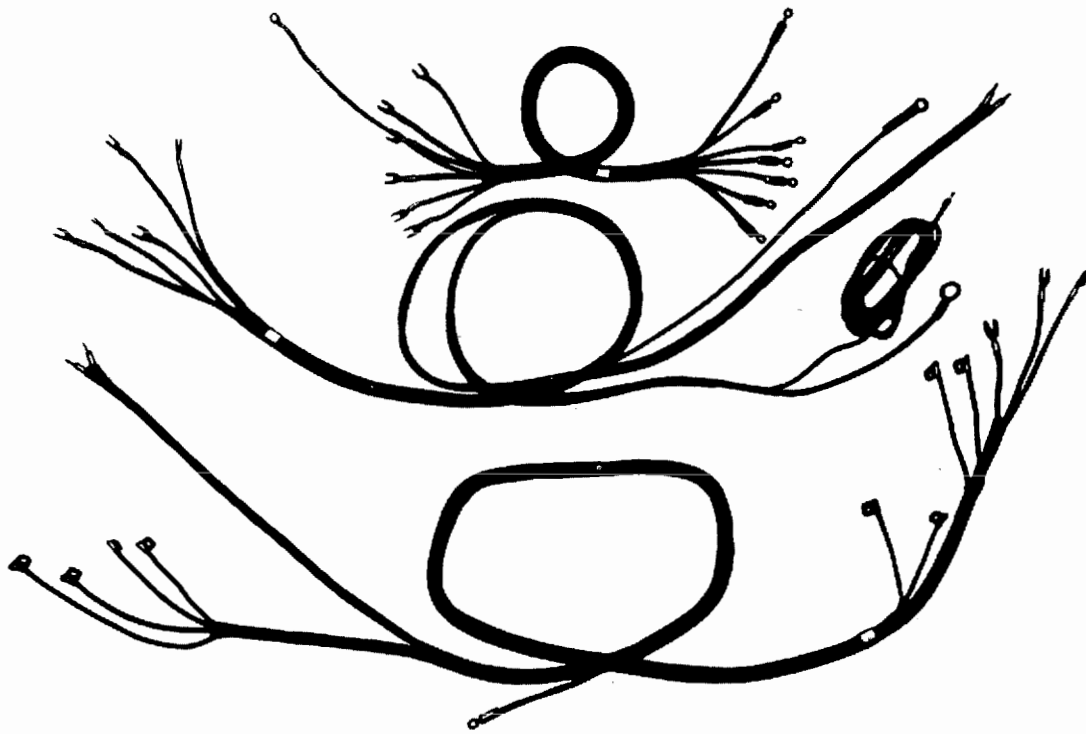


Fig. 288

6 way block. The new terminal block is installed one inch higher on the dash than the old one.

It is necessary to bore a $\frac{7}{16}$ " hole one inch below and $1\frac{1}{8}$ " to right of present $\frac{3}{4}$ " hole for wire on the dash assembly. This new hole is for the Horn Switch Wire and Terminal Block to Switch Wire. Also a $\frac{1}{2}$ " hole should be drilled in dash opposite point where Red Magneto Wire comes out of Wiring assembly on Chassis loom. This is $1\frac{7}{8}$ " from center of upper dash bracket Bolt and 1" below.

The T-5033C-7688 Wire on dash clip has been redesigned. Six of these clips are used on front of dash and one on the rear. One replaces radiator rod washer and holds commutator wires at center of dash.

In the new wiring arrangement T-5033-1390 Wire support has been replaced by T-2916-2118 Wire clamp. The installation of these require longer bolts. Accordingly, T-4808-C-4088 Bolt has been lengthened. Eight of these clamps are now required on Commutator Wire Assembly and Headlight Wires to Frame. One is installed in place of the washer on the lower left hand bolt of coil box to dash and clamps Horn Wire and Coil-terminal to Switch Wire

T-2122X Headlamp wire bushing has been designed to go through hood blocks. In

order to install these bushings it is necessary to file out holes in hood blocks. If desired new style hood blocks with holes of the proper size to take the bushings can be purchased.

Two T-5033B-2124 Commutator Wire Terminal Retainers have been designed to fit on commutator terminals. These are fiber insulators and their purpose is to prevent terminal turning in case of loose terminal nut and chafing of insulation against commutator case. The method of installation is shown in one of the small details of Fig. 285.

The Wire from Ammeter to Cut-Out is included in Commutator Wire Assembly and Wiring Assembly on Body connecting together at terminal block on dash.

The switch to motor cable together with tail lamp wire and wire to starting switch are now enclosed between the starting switch and starting motor in T-5051B-2119 Switch to Motor Cable Sleeve. This replaces T-2105X and 2106X Cable Clamps.

T-5047-E-2120 Battery to Switch Cable Sleeve replaces T-2115X Battery to Switch Cable Insulator. T-2121X is the retainer which holds this sleeve in position.

Instead of anchoring T-6409X Tail Lamp Wire Bushing Assembly to the tire carrier bracket bolt it is fastened to rear spring clip in place of cotter formerly used at that point.

Installing Starter Equipment on Ford Trucks

The Installation of Starter Equipment on Ford Trucks built since November 1st, 1921 requires the installation of the following parts:

No.	Req. Number	Starting Motor
1	T-5099	Starting Motor
1	T-5018	Bendix assembly
1	T-5119	Generator complete
1	T-5055	Cut-out
1	T-5031	Commutator wire assembly
1	T-5043	Wiring assembly on body
1	T-5041B	Wiring assembly on chassis
1	T-5051	Switch to motor cable
1	T-5046C	Battery to switch cable
1	T-5049	Battery to ground cable
1	TT-8821X	Tail lamp to ground wire assembly
4	T-2916	Wire clamp
4	T-5033C	Wire on dash clip
1	T-5044	Terminal block
2	T-6572E	Head lamp bulb (double filament)
6	T-2073X	Wood screws
1	T-5038	Ammeter to switch wire
1	T-5016	Ammeter
1	T-5012	Ignition switch
1	TT-6602X	Instrument panel
3	T-3513C	$\frac{1}{8}$ "-18 Carriage bolt (Inst. Panel and wire to dash)
3	T-3514	$\frac{1}{8}$ "-18 Nut
2	T-925X	Washers
1	T-5051B	Switch to motor cable sleeve
1	T-5047E	Battery to switch cable sleeve
1	T-5014	Starting switch
1	T-8780A	Starting switch bracket
1	T-5015	Starting switch plunger extension
2	T-3452	Bolt (starting switch brkt to frame)
8	T-3452B	Nut
2	T-544	Cotter
2	T-7166X	Bolt (Starting switch to brkt)
2	T-3088E	Nut
2	T-3261C	Washer
1	T-6409X	Tail lamp wire bushing assembly
1	T-5014B	Bolt
1	T-5047B	Battery to sw cable support
1	T-5047D	Battery to sw cable support bushing
1	T-5153	Battery support angle
2	T-5154	Battery box support
1	T-5155	Battery clamp support R H
1	T-5156	Battery clamp support L H
1	T-5159	Battery box cover assembly
1	T-5158	Battery box less cover
5	T-3074	Bolt
1	T-4808	Bolt
6	T-2515	Nut
5	T-88	Cotter
1	T-4806C	Spring washer

No.	Req. Number	Starting Motor
5	T-1905X	Bolt
2	T-5152B	Battery clamp
2	T-5151	Battery clamp bolt
2	T-5151B	Battery clamp nut
2	T-3078C	Battery clamp bolt washer
1	T-2107X	Tail lamp wire clip
1	T-2108X	Tail lamp wire spring
1	T-7669X	Electric tail lamp assy
1	T-3380	Bendix cover

Besides the foregoing the following additional material is required to install starter equipment on trucks built previous to November 1st, 1921 providing the truck has a starter block motor:

No.	Req. Number	Material
5	T-2916	Wire clamps
2	T-5033B	Commutator Wire term. retainer
2	T-2122X	Headlamp wire bushing
3	T-5033C	Wire on dash clip
4	T-4808C	Fender apron to frame bolt
1	T-3513C	Bolt
1	T-3514	Nut

The trucks which we have built since November 1st have holes punched in the frame and left running board brackets for starting switch and battery supports.

Starter installation on Trucks previous to November necessitates drilling the following holes:

Two $\frac{11}{32}$ " holes in frame for starting switch
One $\frac{13}{32}$ " hole in top of each left running board Bracket for T-5153-TT-8816 Battery Support Angle.

Two $\frac{11}{32}$ " holes on inside of each left running board bracket for T5155-TT8818 and T5156-TT8819 Battery Clamp Supports.

Two $\frac{13}{32}$ " holes in Running board $\frac{7}{8}$ " from inside edge for T5154-TT8117 Battery Box Supports.

In installing tail lamp on Truck with starter it must be borne in mind that if tail lamp bracket is fastened to wood frame of body it will be necessary to connect shell of lamp to chassis frame by TT-8821X Tail Lamp to ground wire assembly. (See small detail of Fig. 286.)

Cars bearing motor numbers 5,529,520 to 5,602,301 were shipped during November

Serial numbers of tractors shipped during November 1921

Motors Assembled at
Branches
170,395 to 170,890

Motors Assembled at
Cork, Ireland
109,398 to 109,575

Motors Assembled at
Home Plant
200,943 to 201,025