

Ford Service Bulletin

No. 1

Vol. 4

January, 1923

Page 1

Universal Lincoln Service

FOR the past several months we have been conducting a two weeks' course of instruction at each of our branches for the purpose of giving dealers' mechanics an opportunity to familiarize themselves with the Lincoln car. The accompanying photographs show mechanics attending classes at our New Orleans Branch. It will be observed that the Lincoln chassis has been disassembled and the motor removed from the frame, so as to enable the mechanics to get into the heart of the car, thereby studying its construction and operation.

This course which has been very carefully worked out at the factory has been designed to give a competent automobile mechanic a thorough knowledge of the Lincoln car. As a result of this schooling over 2,500 dealers in the United States are in a position to render efficient service to Lincoln owners—one or more men from each of these dealers having attended our schools.

While the number of Lincoln cars now in service may not require that every



Fig. 1

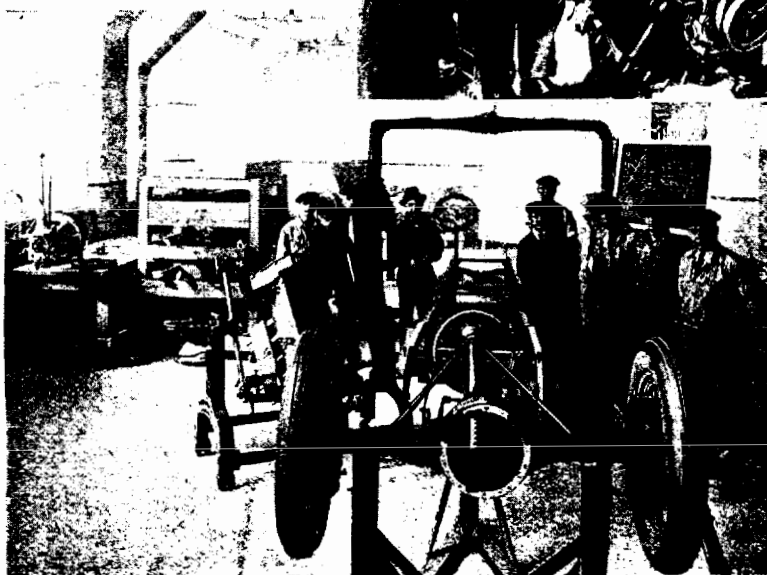


Fig. 2

dealer be equipped to give Lincoln service, it is our aim to continue training mechanics at our schools until there are competent Lincoln service men in every locality where Lincoln cars are operated.

This plan will give us one of the greatest assets that it is possible for any automobile manufacturer or merchandising organization to have—universal, efficient service that will

make it a genuine pleasure for owners to call at our dealers' places of business. In addition to this, each of our thirty-four branches will carry an adequate stock of Lincoln parts so that they can promptly supply our dealers in case the latter's stocks should become exhausted on any particular part or parts; this will eliminate the necessity of ordering replacement parts from the home factory, and will mean a great saving of time, particularly to tourists.

It is our purpose to make the Lincoln car the best motor car in the world and to follow it with a universal service, so efficient that any owner can tour the country with absolute confidence in the organization behind the product. If we are to accomplish this, we must have the co-operation of every dealer in our organization. To give us real co-operation dealers should take a personal interest in every Lincoln owner with whom they come in contact, and should make it a point to see that whenever that owner calls at their place of business he is given prompt and courteous attention.

Dealers who are undertaking to service Lincoln cars should ask themselves the following questions:

Have the necessary steps been taken to render service in keeping with the character of the Lincoln car?

Has a mechanic been selected to attend the Lincoln service clinics now being conducted by your branch?

Has the necessary tool equipment to enable that mechanic to render efficient service been purchased?

Is the Four Months' Free Inspection Service, as outlined in the June issue of the Service Bulletin, being followed in your shop?

Recently our attention has been called to several cases where small dealers, due to their lack of experience, have "bungled" repair work on Lincoln cars. It would be far better for the customers' interests and ours for these small dealers to refer owners desiring repair work to the nearest station capable of handling it. Any adjustment required in carburetion, ignition or timing on Lincoln engines should never be undertaken by the average mechanic who has received no special training along this line.

Should you be in doubt as to the proper method of correcting any mechanical difficulties that might arise, do not hesitate to telephone your branch for advice or assistance rather than experiment at the customer's expense.

Lincoln Service Tools

The special tools illustrated on the following pages are included in the set of Lincoln Service Tools listed in the June 1922 issue of the Service Bulletin.

Tools for Removing and Assembling Crankshaft Sprocket

Figure 3 illustrates the puller 15Z-4016 for removing the crankshaft sprocket. Before placing the puller in position remove the cap screw and washer from the end of the crankshaft. This is easily accomplished with a large screw-driver having a square shank and a wrench for turning the screw driver.

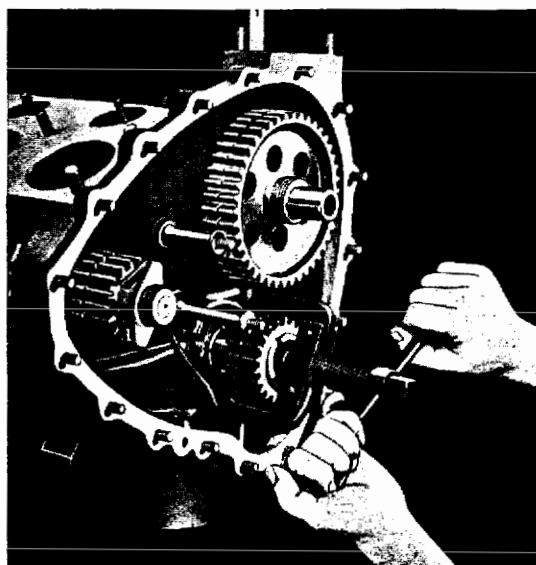


Fig. 3

Figure 4 illustrates the pusher or assembling tool 15Z-11038 for pressing on the crankshaft sprocket. When assembling, place the sprocket on the pilot of the tool, then screw the pilot into the tapped hole in the end of the crankshaft. Turn the sprocket so that the key in the crankshaft lines up with the keyway in the sprocket and press sprocket on by turning down the large nut. Make certain that the sprocket is pressed on far enough to fit tightly against the shoulder on the crankshaft.

When using either of the above tools it is well to prevent the crankshaft turning by means of a wedge between the flywheel and crankcase, or if the engine is in the chassis this can be done by putting the car in gear and applying the brakes. If the engine is in the chassis it will be necessary to jack up the front end of the engine, in order to remove the crankshaft sprocket.

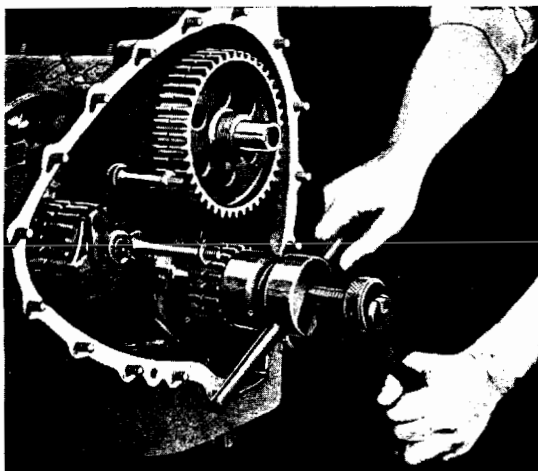


Fig. 4

Tool for Removing Distributor Shaft Bushing

In Figure 5 is shown Tool No. 15Z-3703 for removing the distributor shaft bushing. Before attempting to remove this bushing detach the oil filler body and pull out the pin "A" which locates the bushing and holds it in position. Place the tool inside the bushing, as shown in the illustration, and turn it so that the slots in the side engage the lugs on the inside of the bushing. When the tool is down as far as it will go give it a slight turn in a clockwise direction and the lugs will engage with the horizontal position of the slots in the tool. The bushing may now be easily pulled out.

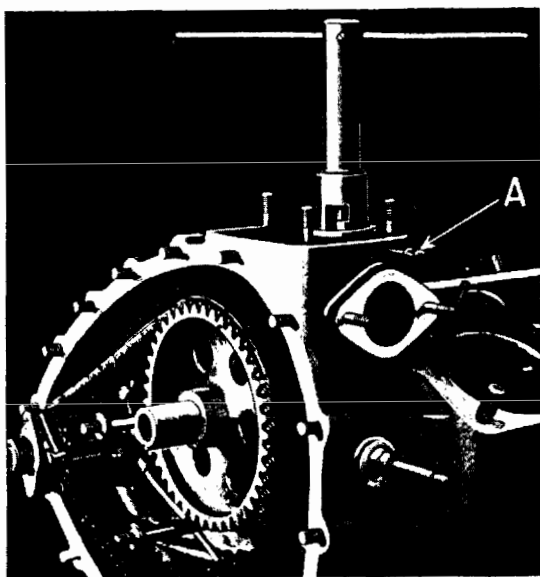


Fig. 5

Tools for Removing Steering Sector Arm

In Figures 6 and 7 are shown two tools very useful in removing the steering sector arm. Fig. 6 illustrates a wrench 15Z-6495 for removing or assembling the special screw which holds the steering arm in position. This wrench is for use when the fenders and dust-shields are removed from the car. If such is not the case a large open end or adjustable wrench with a shorter handle than the special tool may be used.

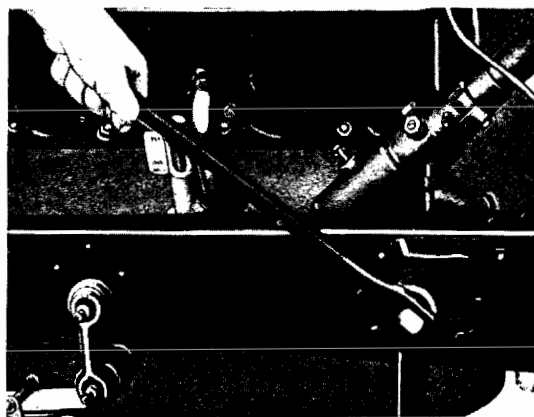


Fig. 6

Fig. 7 illustrates the puller 15Z-6494 for removing the steering arm itself. The hooks on the puller are placed back of the two ears on the steering arm. It may be necessary to start the arm moving by tapping the handle of the puller screw with a soft hammer.

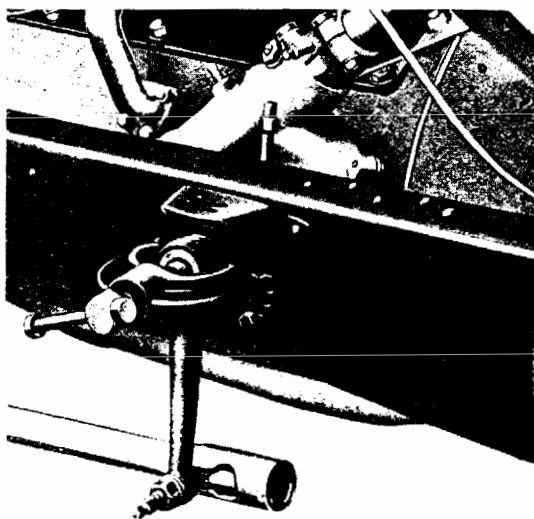


Fig. 7

Tools for Adjusting Rear Axle Drive Pinion Bearings and Cage

Fig. 8 illustrates two wrenches 15Z-9807 and 15Z-9808 which are used when making an adjustment of the pinion shaft bearing. Remove the cover on the side of the pinion shaft housing. The nut next to the cone of the Timken bearing is the adjusting nut, next to this is the special locking washer and then the jam nut. Before attempting to move either of the nuts straighten the edges of the locking washer which have been clinched down upon the flats of the nuts. Turning the adjusting nut to the right (clockwise) tightens the bearings which should be so adjusted that a scarcely perceptible amount of looseness exists and the end play of the pinion shaft is practically eliminated. When adjustment is completed draw up the jam nut as tightly as possible and again clinch the edges of the locking washer down upon the flats of the two nuts, thus providing a secure lock.

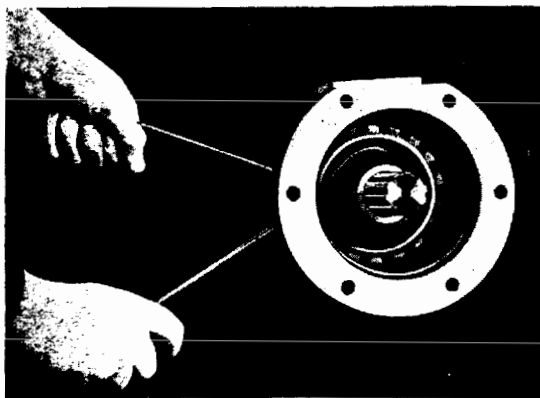


Fig. 8

The special tool 15Z-8623, illustrated in Fig. 9, is used when adjusting the rear axle pinion cage. The cage may be turned in either direction by resting the angle plate on the wrench against either the top or bottom of the inspection hole.

Puller for Transmission Counter Shaft

Tool No. 15Z-9173, puller for transmission counter shaft is shown in Fig. 10. Remove the small aluminum plate which covers the end of the shaft, also the locating screw and check nut, which holds the shaft in position. This screw is located on the right hand side at the rear of the case. Screw the threaded

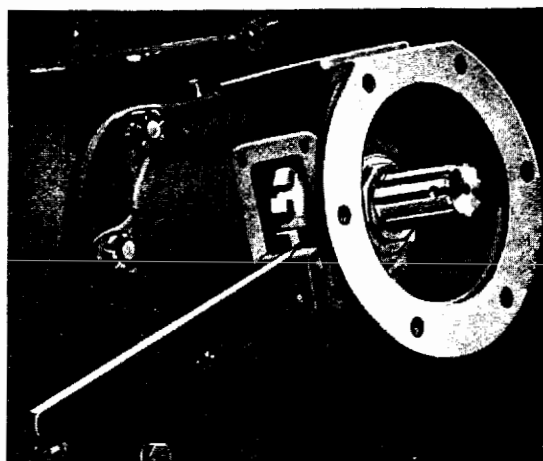


Fig. 9

end of the puller into the tapped hole in the end of the shaft. Turning down the large nut on the tool will now pull the shaft. When assembling, the shaft can be tapped into place with a soft hammer. The slot in the end of the shaft provides a means for turning it to line up the holes for the locating screw.

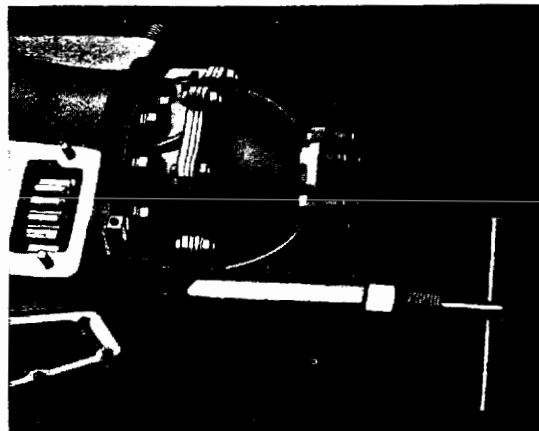


Fig. 10

Puller for Transmission Reverse Gear Shaft

A puller 15Z-1967 for the transmission reverse gear shaft is shown in Fig. 11. Before removing the shaft unscrew and remove the headless locating screw which holds the shaft in position. This screw is located under the base of the tire pump and it will be necessary to remove the pump in order to take out the screw. Slide the hollow end of the puller over the projecting end of the reverse gear shaft

and insert the pin, which is attached to the puller, through the hole in the end of the shaft. Turning the shank of the tool with a wrench will now pull the shaft.

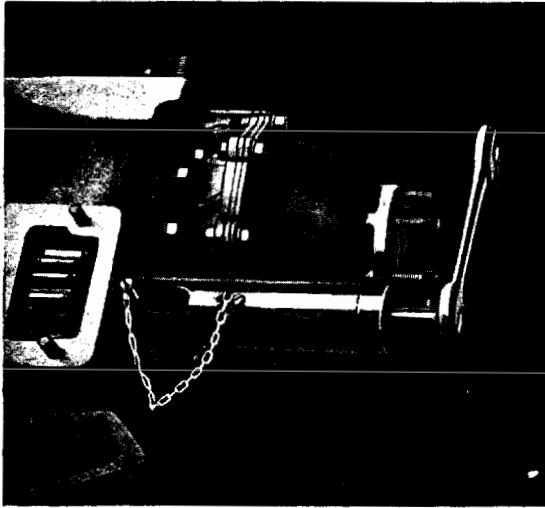


Fig. 11

Spanner Wrench for Clutch Bearing Nut

Fig. 12 shows the special spanner wrench, 15Z-10366 for the clutch bearing nut. The two pins on the side of the wrench engage with similarly spaced holes in the face of the bearing nut.

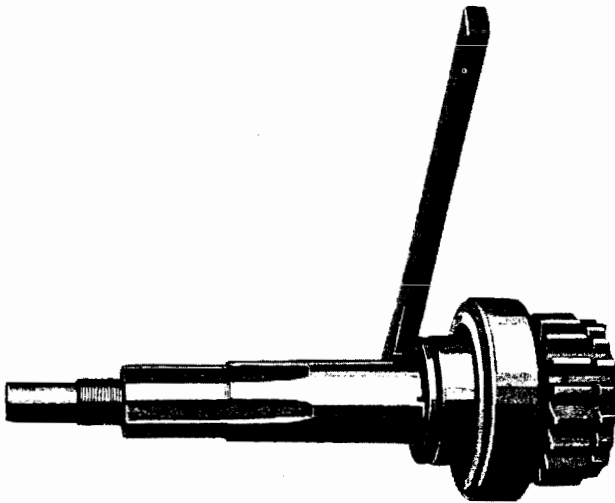


Fig. 12

Tool for Removing Clutch

Fig. 13 shows a tool 15Z-2536, for removing the clutch, the two bolts are screwed into the

tapped holes in the clutch driver and the clutch is then easily removed by turning down large screw by means of the handle attached.

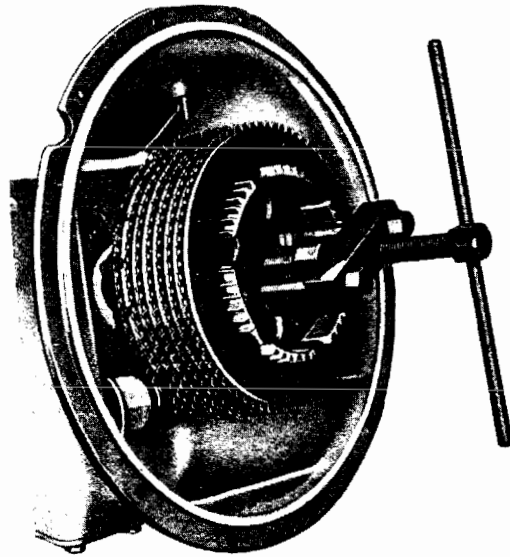


Fig. 13

Wrench for Clutch Connection Shaft Nut

Tool No. 15Z-2063, a socket wrench for clutch connection shaft nut is shown in Fig. 14. It may be necessary to tap the wrench handle with a soft hammer in order to start the nut when removing.

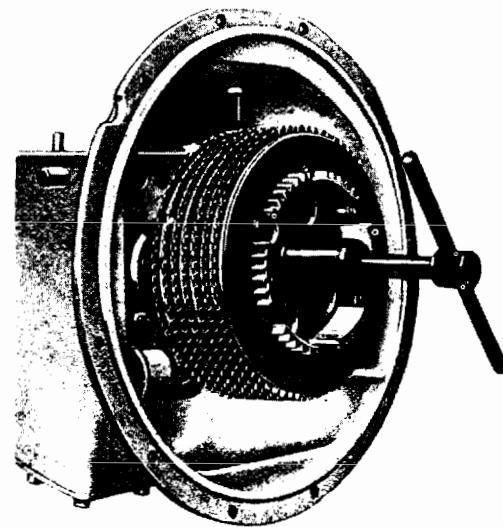


Fig. 14

Puller for Accessory Shaft Coupling

Fig. 15 shows the puller, 15Z-8136 for accessory shaft coupling. Remove the two screws from the puller and pass them through the two holes in the coupling flange and then screw them into the puller body. Turning down the screw which bears in the center of the accessory shaft will then remove the coupling.

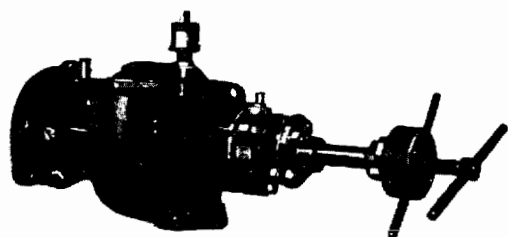


Fig. 15

Take Care of Your Battery

The battery should be inspected every two weeks.

(a) Add pure distilled water to replace evaporation. Water should be approximately one-half inch above the plates. In warm weather, it makes no difference when water is added. In freezing weather, it should be added just before using the car. The reason is that water will remain on top of the solution until it is mixed with it by the action of the battery. If not mixed with the solution it will freeze almost as quickly as outside the battery.

(b) Examine cable connections, which attach to the positive and negative poles of the battery. They must be kept tight, free of corrosion and coated with clean vaseline.

(c) Make sure that the battery is held down firmly.

(d) Test with hydrometer syringe to make sure that battery is well charged.

The solution or electrolyte as it is called, is a mixture of chemically pure sulphuric acid and distilled water. The acid does not evaporate, and therefore acid must not be added to the solution, except by an expert.

Hydrometer Readings

1.270—1.300 indicates that battery is fully charged.

1.200—1.250 indicates that battery is half charged.

1.200 or less indicates that battery is low.

If the solution is so low on the tops of the plates that no solution can be drawn up with a syringe then add water, but do not take a reading until the battery has been charged.

In cold weather the battery solution will

freeze when the hydrometer shows below 1.200 or half charged.

Water to be used in the storage battery cells must be free from minerals or the metallic content usually present in ordinary drinking water. Use only distilled water stored in glass container. This water is sold by nearly all drug stores and ice manufacturing companies.

Use of Tire Chains

Care should be taken when applying tire chains that the links are not drawn too tightly around the tire. So doing will cause the chain to remain in one position instead of gradually creeping around the tire as the car is driven, and will soon wear through the tread.

Lincoln Tire Pump

The power tire pump, with which every Lincoln car is equipped, is mounted on the left side of the transmission case. The air pipe leading from the pump projects through the heel board under the driver's seat.

A flexible air hose with an attached tire pressure gauge, which is also a part of the car equipment, can be coupled to the end of this pipe. This hose is long enough to reach any tire on the car.

OPERATION OF TIRE PUMP—After allowing a little air to escape from the valve on the tire attach the hose to the valve. Run the engine at slow idling speed. Disengage the clutch by pressing down on the left foot pedal and with a screw driver turn to the right (clock-wise) the slotted screw which protrudes through the floor board of the front compartment slightly to the left of the gear shift lever. This will mesh the tire pump gear with the transmission gearing. Then engage the clutch and speed the engine up to about 1,000 R. P. M. (see third paragraph below).

When the tire is properly inflated, slow down the engine, disengage the clutch and also the tire pump gear by turning the slotted screw to the left (anti-clockwise).

Never drive the car with the pump operating as this causes unnecessary wear.

The tire pump is most efficient when the engine is running at about 1,000 R. P. M. Under normal conditions the oil pressure gauge will show approximately ten pounds pressure at this engine speed.

CARE OF TIRE PUMP—The pump is automatically lubricated from the transmission case. An occasional inspection of the pump crank case should be made by removing the cover plate provided on the end of the case to make sure that lubrication is taking place.

Lincoln Operating Suggestion

In the October 1922 issue of the Service Bulletin we outlined the procedure for starting the Lincoln engine, but recent investigations lead us to believe that comparatively few operators understand the method of starting or why it should be followed.

The spark lever is placed in the "Driving Range" on the quadrant (see Fig. 16) rather than in a retarded position, because cold gases burn slowly and an advanced spark facilitates starting. The throttle lever is placed in a position which gives a throttle opening of about $\frac{3}{4}$ of an inch on the quadrant. To determine the proper position on the quadrant, slowly move the throttle lever upward until the carburetor throttle starts to open (indicated by movement of the accelerator pedal) (see dotted position of lever Fig. 16). From this point on the quadrant move the throttle lever to the right a distance of about $\frac{3}{4}$ of an inch which opens the carburetor throttle as shown at "A" Fig. 17. This is the place where the throttle lever should be set for starting. (See Fig. 16.)

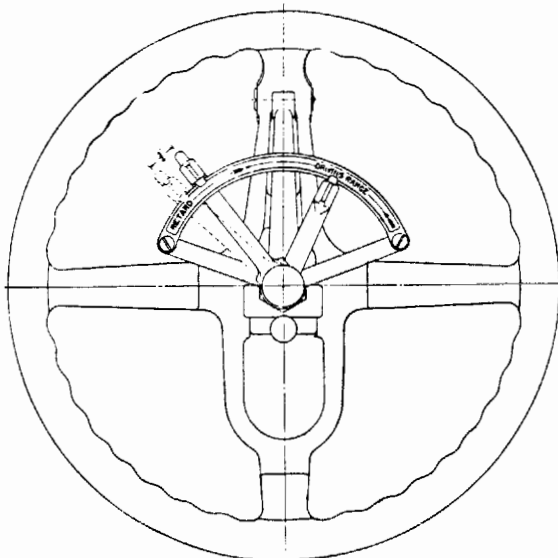


Fig. 16

With the spark and throttle levers set as above indicated, pull the carburetor choke button out or away from the instrument board until it encounters the stiff resistance of the electro fog generator spring. Turn on the ignition switch, and with gear shift lever in neutral, depress the starter pedal and crank the engine over from three to five compressions, then, still cranking, push the choke button in towards the instrument board about $\frac{1}{4}$ of an

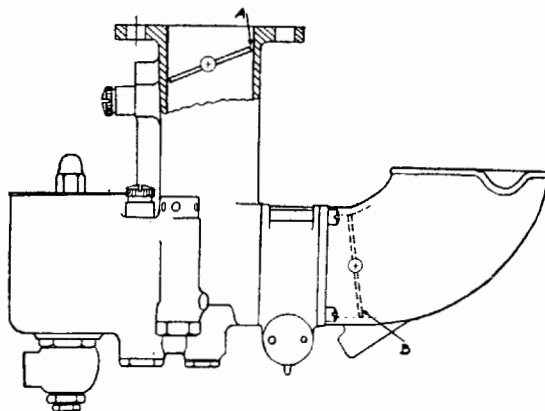


Fig. 17

inch and the engine will start within the next three or four compressions. The reason for this procedure is as follows:

The butterfly valve in the carburetor air horn must be fully closed (choke button all the way out) (see "B" Fig. 17), in order to create a maximum suction or lifting power to bring the gasoline into the intake manifold quickly, which requires turning over the engine from three to five compressions. As soon as the gasoline is in the intake manifold and before it gets into the cylinders the choke button is pushed in about $\frac{1}{4}$ of an inch, which slightly opens the butterfly valve in the carburetor air horn, allowing a sudden inrush of air which mixes with the gasoline and breaks it up, forming an explosive mixture as it goes into the cylinders.

Following this procedure carefully will invariably result in the engine starting easily and readily. In extremely cold weather the electro fog generator may be used as follows:

Pull the carburetor choke button all the way out against the resistance of the spring and hold it in this position for fifteen seconds (by the clock on the instrument board and not guess work), then release the choke button and allow to return towards the instrument board until it is in the position as outlined for starting, without using the electro fog generator.

Then proceed to start the engine as outlined in the first part of this article.

The electro fog generator is to be used when temperatures are so low that the fuel will not vaporize readily. At such temperatures it heats a portion of the fuel, which is condensed in the bottom of the carburetor, and forms a dense, white fuel fog which, when mixed with air, as outlined in the starting operations, forms the explosive mixture for starting the engine. There is no advantage to be gained by using the electro fog generator at temperatures above the freezing point.

Care must be taken in starting the engine not to hold the choke button out too long as that will result in flooding the cylinders with raw gasoline which will not ignite.

In cold weather the clutch should always be disengaged (by depressing the clutch pedal) during the starting operation. This allows the starting motor to turn the engine over faster by relieving it from moving the transmission gears through the cold grease in the transmission case.

When the engine first starts, do not open the throttle suddenly by moving the throttle lever or the accelerator pedal, but allow the engine to run slowly, regulating its action by moving the carburetor choke button in or out as may be necessary, for about one minute. If the engine starts to slow down due to a lean mixture, pull the choke button out from the instrument board slightly. If the engine starts to slow down due to a rich mixture (indicated by a sucking sound), push the choke button in towards the instrument board slightly. After the engine has been running for approximately one minute, you will be able to operate the car although you will not be able to push the choke button fully in to the instrument board until the engine has thoroughly warmed up.

Prompt and easy starting cannot be expected with an engine having dirty or improperly set distributor breaker points and spark plugs. The breaker points in the distributor should be set at .020", making sure the gap on each set of points is the same. The spark plugs should be cleaned and have the points set at a gap of .025".

Soliciting Tractor Repair Work

A problem that confronts many dealers is how to keep their repair department working full time during the winter months. With very little effort, however, any dealer can add considerably to the amount of repair work and profit he ordinarily receives at this time of the year.

One method that has been proved successful by dealers in securing additional repair work is to have their service man call on each tractor owner in their vicinity and make a thorough inspection of their tractors, outlining in detail the advantages of having any necessary repair work performed at this time rather than waiting until spring arrives with its customary rush of business and consequent delays.

All the tractors in your territory will not require a complete overhauling. Many of them will, no doubt, require such adjustments as grinding valves, cleaning carbon, soldering leaky radiators and air washers, taking up bearings, testing of coils, replacement of vibrators when necessary, examining vapor tube to see that it is free and clear, changing oil in crank case, transmission and differential. After making an inspection the service man is in position to say whether or not the work required is of such a nature that the tractor should be brought into the dealer's shop. In case he finds that course necessary he can give the owner an estimate of the labor cost of the job.

Dealers will find that tractor owners, using their tractors for agricultural purposes readily realize that delays in sowing crops and preparing seed beds are extremely costly and the best way to guard against such delays is to have their tractors thoroughly gone over during the winter months.

Our dealers should consider it their duty to see that every Fordson tractor is in first class mechanical order when it is put into the field in the spring.

Effort expended in this direction is in the last analysis simply progressive merchandising, as by so doing the volume of repair work is increased during what might otherwise be more inactive winter months. In addition the advantages of having all tractors performing satisfactorily is an excellent advertisement which is bound to be reflected in the dealer's future tractor sales.

Cars bearing motor numbers 6,953,072 to 7,084,225 were shipped during January

Serial Numbers of Tractors Assembled

January

268,583 to 276,349

Ford Service Bulletin

No. 2

Vol. 4

February, 1923

Page 9

MAR 21 1923

Clean Design is One Indication of a Perfected Mechanism

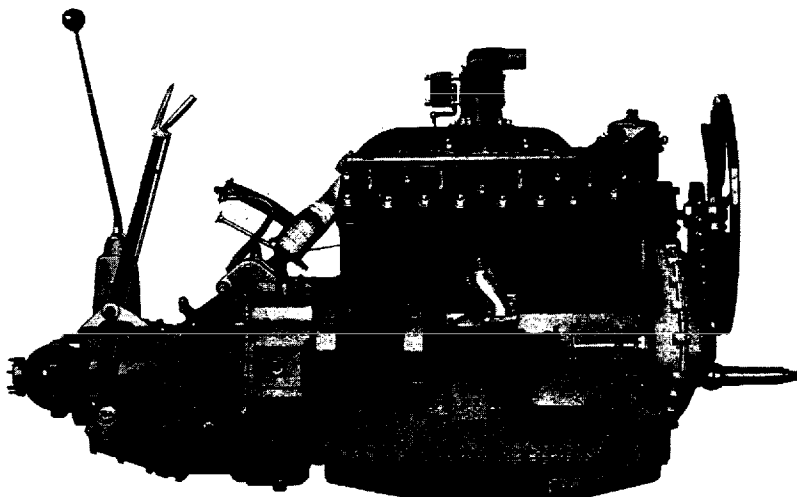


Fig. 18

THE superior quality of the Lincoln engine is reflected in its exterior design.

The cylinder blocks being set at an angle of 60° permits unequal firing intervals with the result that periodic vibration is practically eliminated. This means increased wearing quality and longer life for the engine, because vibration tears down and eventually destroys the efficiency of any piece of machinery.

The narrower angle between the cylinder blocks also makes it possible to mount the starter-generator and single water pump on the side of the crankcase instead of in the valley of the "V" as is the usual practice.

This construction not only makes the units driven by the shaft more accessible for lubrication and adjustment, but moves a considerable weight of these units from a higher to a lower position and makes possible a general lowering of the whole engine in the chassis, thus lowering the center of gravity of the chassis and giving the Lincoln its ability to "hug the road" at any speed and under all conditions.

The cylinder heads are of course easily removable, giving quick and convenient access to combustion chambers.

To the owner who does not attend to mechanical details, these features may seem of little value, yet they are important factors, contributing to the pre-eminence of the Lincoln car from the maintenance standpoint.

We believe the Lincoln car will run farther with less attention than any other car made, but when adjustments are necessary, accessibility goes a long way toward reducing both time and expense to a minimum.

Notwithstanding the unusual accessibility of the mechanism, the only exposed moving parts, when the engine is operating, are the fan and accessory drive shaft. This clean-cut design helps to keep the engine free from dirt and thereby prolongs its life.

These important mechanical features of the Lincoln car possess real selling value and Dealers should see that their salesmen are fully conversant with them.

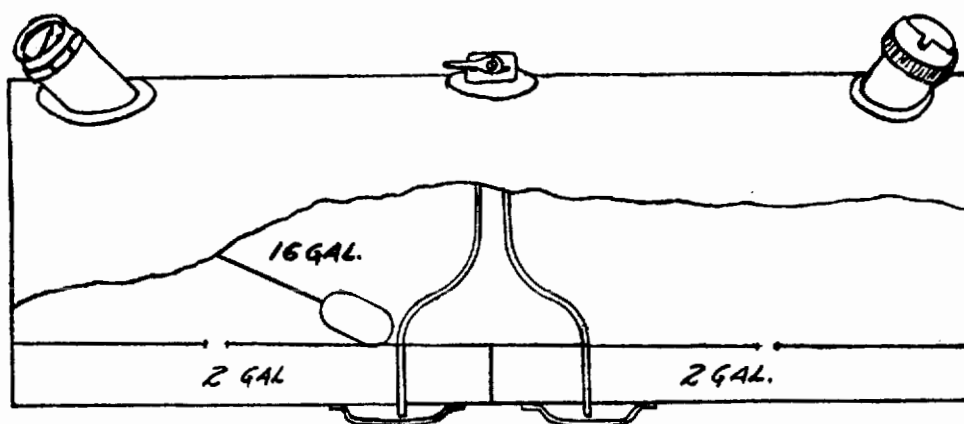


Fig. 19

Lincoln Fuel Tank

The Lincoln fuel tank is divided into three compartments. The largest or upper compartment has a capacity of 16 gallons. The lower part of the tank is divided into two separate compartments of 2 gallons capacity each (see Fig. 19), giving a total capacity of 20 gallons. Both of these compartments have an outlet tube leading to the three way control valve on the top of the tank, thus giving a reserve supply of 2 gallons regardless of whether the control valve was turned to the right or the left when the tank was filled. Fuel is drawn from the larger main compartment of 16 gallons and one of the reserve compartments (depending upon which way the control valve is turned) giving a main supply of 18 gallons. When the main supply is exhausted turn the handle of the control valve to the opposite position and the reserve supply of 2 gallons is available.

When filling the tank the handle of the control valve should be in a horizontal position against the stop pointing either to the right or to the left. Because of the reserve tanks in the bottom of the main tank, the gauge float cannot function below the five gallon mark. This means that although the tank may be empty the gauge will still register 5 gallons, consequently a blinder is utilized which covers the pointer when it reaches the 5 gallon mark. (Figure 20). When the pointer disappears behind the blinder the driver should have the tank refilled. The main tank does not commence to fill until both reserve tanks are full and the pointer does not appear from behind the blinder until five gallons are in the tank. When the pointer appears 15 gallons may be added which together with the 5 gallons already in completely fills the tank.

A drain plug is located on the bottom of each reserve tank. These plugs are slotted through the threads on one side and should be occasionally unscrewed sufficiently to allow any water and sediment to flow out. They should be removed and the tank thoroughly flushed with gasoline once a year. Sediment or dirt, if allowed to remain, may be drawn into the vacuum tank and cause trouble.

The presence of a leak in the interior of the tank which would prevent holding of the reserve supply may be easily detected by draining the main tank by removing one of

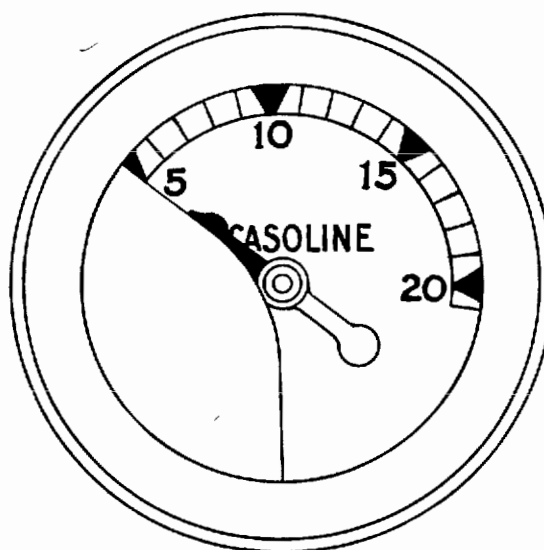


Fig. 20

the drain plugs, leaving the other tight. If, after the tank has been drained thoroughly, the fuel still continues to drain slowly through the open drain hole, a leak exists in the reserve compartment.

Superiority in Design and Construction of Lincoln Spring Bolts and Shackles

The design of the Lincoln spring bolt and shackle affords a splendid and interesting example of the attention which is given to small details to make the Lincoln "self-sustaining" and a car which will stand up and give satisfactory service over a period of many years.

The Lincoln spring bolt has, to the best of our knowledge, a larger diameter for the width of the spring than is used in any other motor car or for that matter any motor truck. This not only affords a liberal margin of safety, but provides a large bearing surface, thus lowering the pressure for a given area and hence reducing wear. The bolt is made hollow so that it combines lightness with strength.

In Fig. 21 the Lincoln spring bolt at the right is compared with one taken from a standard make of car of similar size. The Lincoln bolt is designed and made in such a way that it is proof against the wear shown in the bolt on the left.

After being heat treated it is ground on centers to insure straightness and an exact

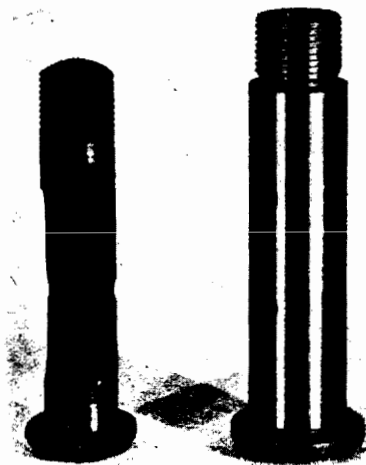


Fig. 21

diameter. Ordinary practice is to simply polish the surface after heat treatment.

Lubricant is discharged from the hollow center through holes drilled to the surface on a horizontal plane. When the holes are drilled

on a vertical plane, as is usual practice, the upper opening is sealed by the pressure between the bushing and the bolt, allowing the lubricant to work out through the bottom hole where there is no contact between bolt and bushing so that it can be easily forced out at the ends of the bolt. In Lincoln practice, the grease is distributed through a groove

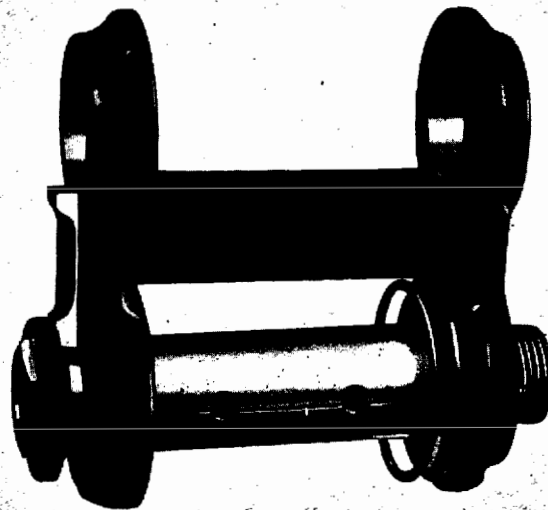


Fig. 22

in the side of the bolt which insures maximum lubrication.

A positive means of retaining the lubricant in the bearing and at the same time keeping out the dirt and grit is provided by an exclusive Lincoln feature of great importance, yet very simple in design. It consists of a flat steel washer and a spring wire, placed between the spring eye and the shackle at each end of the bolt. The inside of the washer is beveled at the circumference and when placed against the spring eye and the shackle forms a groove at each end of the bolt. The spring wire, which is constantly under contracting tension, is placed into this groove and seals the joint so that no foreign matter can work its way into the bearing (see Fig. 22). If excessive pressure is applied to the bearing from within by means of the grease gun, the wire ring expands to let out the surplus grease but immediately contracts sealing the joint, when the pressure is released.

In summing up the advantages of the Lincoln spring bolt, note the numerous points bearing on proper functioning and maximum resistance to wear as follows:

First, the bolt is of maximum size, the relative diameter actually exceeding that in standard makes of trucks.

Second, it is keyed to the shackle in such a way that the two parts have the consistency of a solid piece.

Third, the interior of the bolt is channeled in such a way as to give light weight with strength and also efficient lubrication.

Fourth, the bolt is ground by precision methods which insure perfect mating with the bushing to about one-half the thickness of a human hair.

Fifth, the circular spring wire, in combination with the beveled washer, seals the joint in such a way as to keep the dirt out and the lubricant in.

Sixth, the heat-treated steel bolt and bronze bushing are of materials scientifically selected for durability.

Seventh, if through neglect slight wear does come it acts on the bronze bushing or the bolt, which is replaceable at little cost, and there is absolutely no wear on the basic structure or skeleton of the car.

Lincoln Wiring Diagram

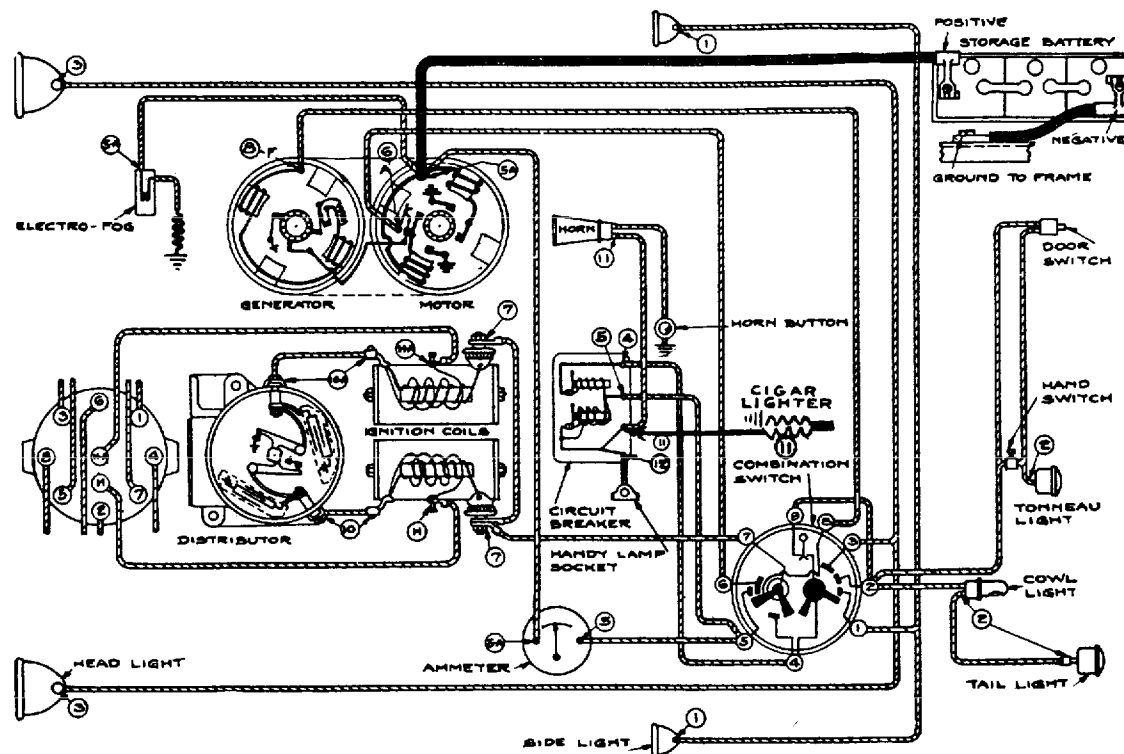


Fig. 23

Figure 23 is a simplified wiring diagram of the electrical equipment on the Lincoln car. The connections shown in this diagram are applicable to any Lincoln car built to date with the exception, of course, of the electro-fog and cigar lighter, which were not installed on cars of early production, and the closed car electrical equipment

such as smoking set, dome light, etc.

It will be noted that each end of the wires have been numbered thus making it a simple matter to trace a certain wire from one unit to another. The numbers 1 to 8 inclusive appearing in the distributor head are for the spark plug wires leading to the corresponding cylinders.

Care of Snubbers

The Gabriel Snubbers over the Lincoln rear axle check the spring rebound on rough roads. They should be adjusted after the car has been used about 500-1000 miles on account of the firmer seating of the belt by usage.

Method of Adjustment

In making adjustments have the gasoline tank full, and spare tires on the tire carrier, but no weight in the seats. If no tires are on the tire carrier, have a passenger sit in the center of the back seat while making the adjustment.

Pull the belt out of the housing as far as possible or until the coil spring within the snubber is entirely compressed. This operation is made easy by the use of a wrench such as shown in Fig. 24. (This wrench may be procured from the Gabriel Mfg. Co. Cleveland, Ohio or their distributors at a nominal charge.) Then allow the belt to return into the housing two inches, but no more, and secure in that position with a wire nail passed through the belt in such a manner as to stop on the housing or place a wedge between the belt and housing at the top of the opening to hold the tension or adjustment on the coil in this position. If there has been wear or seating of belt or mechanism, this will leave the end of belt, which is projecting from housing, slack between the snubber and the axle. Now remove the clamp around belt which secures the loop of the belt around the axle attachment and without removing belt from attachment pull the end of the belt up thus taking up all slack, and then replace and tighten the clamp. Cut off the surplus belt about one inch above the clamp and remove the fastening which was inserted to temporarily hold tension on the belt, and adjustment is complete.

Lubrication of Snubbers

Every 5000 miles it is recommended that the snubbers be disassembled and lubricated with a heavy graphite grease in accordance with the following instructions:

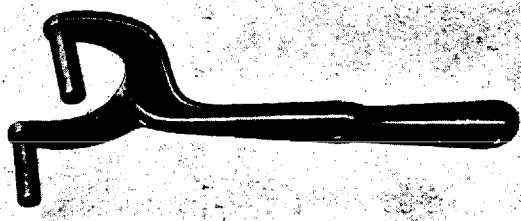


Fig. 24

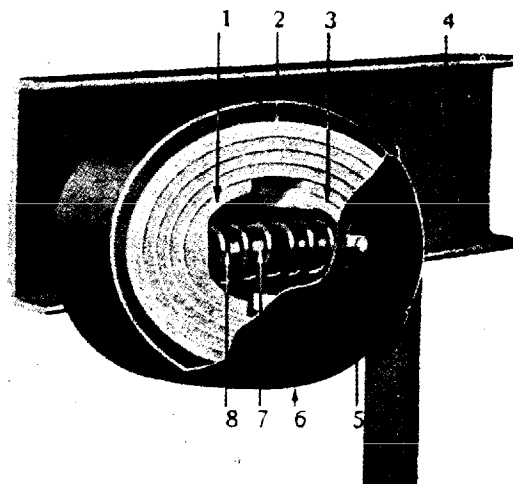


Fig. 25

Remove clamp and disconnect snubber belt from axle. Unscrew the cap screws which fasten the snubber base to the side bar of the frame and remove the snubber.

Secure the base casting in a vise. Unscrew the cap screw (5), Fig. 25, on the snubber cover or housing (6) and remove the housing. Unwind the coils of the belt (2) and remove the sleeve casting (1) and the spring (8). Thoroughly lubricate the plunger (7) which slides in the sleeve (1). Lubricate the side of the casting (1) where it slides on the base casting. Replace the sleeve (1), making sure that the long arm is opposite the end of the snubber belt where it is riveted at (3). Pack the coil spring (8) well with grease.

Do not lubricate any surfaces which contact with the snubber belt except to place a small amount of grease on the rivets at (3) where the belt is fastened to the base casting.

Coil the belt (2) four and one-half times around the base casting (3) and the sleeve (1), and work the coils a few times to make sure the coil spring compresses properly. Replace the cover (6) and the screw (5).

Bolt the snubber to the side bar and adjust it in accordance with the instructions given under "Method of Adjustment."

In replacing the belt through the eye in the bracket on the axle housing BE SURE the end of the belt is first passed DOWNWARD through eye and then UNDER AND FORWARD around the forward side of loop in attachment, as belt will be quickly broken if looped backward and under reinforcing rib on the bracket.

Lincoln Steering Gear

The worm and sector semi-reversible type steering gear is used on the Lincoln car and is adjustable for wear.

The steering gear usually requires little attention. The gear housing is filled with lubricant at the factory. With ordinary usage, an inspection every 2,000 miles will be sufficient. If the lost motion or back lash at the steering wheels becomes too great, an adjustment should be made.

Should the car seem to steer harder or stiffer than normal see that the front tires are inflated to the normal pressure. If so, then examine the front wheels and see that they are in proper alignment. If the fault is not here, then jack up both front wheels clear of the ground and turn the steering wheel. If it turns hard the trouble is probably due to insufficient lubrication. Fill the gear housing with one pint of gear lubricant.

NEVER put cup grease into the steering gear housing. Examine carefully all working parts not enclosed in the housing, and see that they are well lubricated. Thoroughly lubricate with gear lubricant all the steering mechanism of the front axle, including both ends of the steering connecting rod or drag link.

REMOVAL OF COMPLETE STEERING UNIT

The steering gear can be removed without disturbing the engine or body.

To remove the steering gear, proceed as follows:

Disconnect horn wire from terminal on the junction block located on right hand side of the dash under the hood.

Remove floor and toeboards from the driving compartment. Disconnect the spark throttle and the tilting headlight operating rods at bottom of column.

Remove the screw (25) Fig. 26 and pull off the steering arm (28).

Remove the sector eccentric bushing lock (26).

Unbolt 3 bolts (24) also 1 (27).

Uncap the bracket that secures the steering column to the instrument board and the steering gear can be removed through driver's compartment.

In replacing the column observe the following precautions:

First put in upper rear bolt (24). Then cap the bracket at instrument board. After the unit is bolted to the chassis frame omitting the lower rear bolt (27), make any adjustment necessary for back lash in the teeth of the worm and sector. (Always have wheels in a straight ahead position when adjusting steering worm and sector). Replace the lock (26) and bolt (27).

Make sure that the steering wheel and front wheels are properly positioned, relatively, before securing arm (28) on the sector shaft (32).

LUBRICATION OF STEERING GEAR

The internal mechanism of the steering gear may be lubricated at (6) Fig. 26, with the lubricator gun provided in the tool kit. Use gear lubricant. NEVER use cup grease. An oil hole will be found under lever arm at back side under steering wheel (see Fig. 26), also oil all joints at top of steering column.

ADJUSTMENTS, INCIDENTAL TO WHEEL ALIGNMENT—At (31) Fig. 26 are two stop screws. These screws act as stops for the sector in the housing. They are properly adjusted when the car leaves the factory and will need attention only in case of re-

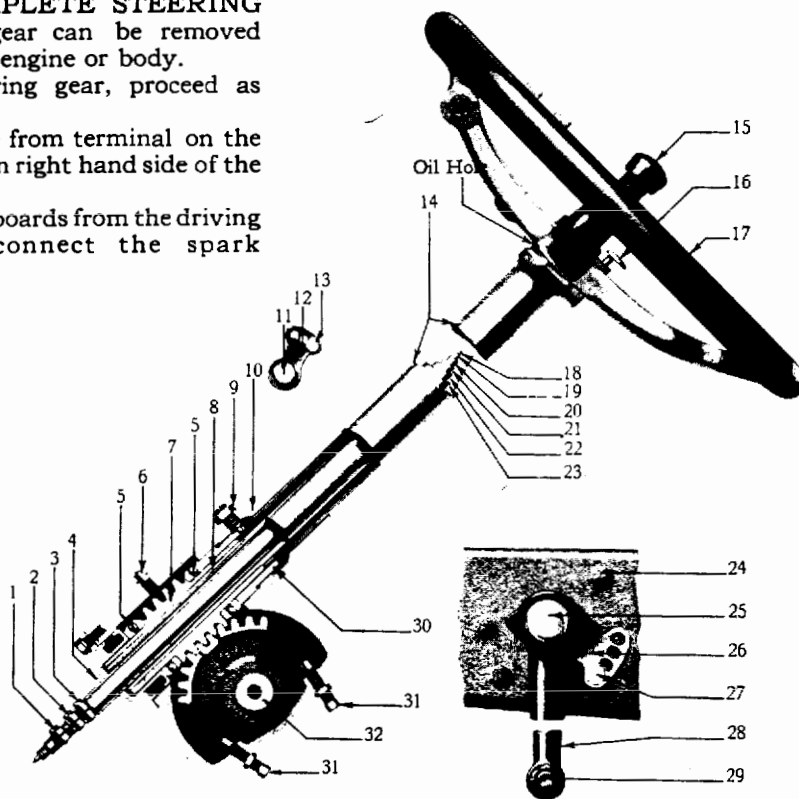


Fig. 26

alignment of the front wheels or accidents. In such cases the steering knuckle stop screws on the front axle **MUST** always be first set to properly limit the turning movement of front wheels. The sector stop screws (31) must then be set correspondingly. Locking nuts should be backed off and the screws (31) turned several revolutions in an anticlockwise direction in order to provide clearance for making adjustment of steering knuckle stop.

For example, when the steering wheel is revolved hard over in the position to give the car direction to the left, after having adjusted steering knuckle stop screws, to insure tire clearing nearest interference by from $\frac{3}{8}$ " to $\frac{1}{4}$ " when the wheel is revolving, the upper stop screw (31) is to be screwed in until it just touches the steering sector (32) without pushing the steering knuckle away from its stop more than $\frac{1}{64}$ inch. Place a piece of paper between the steering knuckle and its stop screw on axle. When the sector stop screw (31) properly engages sector (32) the paper will fall or can be easily pulled out. Proceed same for steering to right then lock adjusting screws (31).

ADJUSTMENTS TO COMPENSATE FOR WEAR—Provision has been made in the design of the steering gear so that all wear which finally results in excessive back-lash at the steering wheel can be taken up.

Owing to the fact that tooth wear between the worm and sector cannot easily be distinguished from worm and sector end play when tested at the steering wheel, it is always advisable to make adjustment for tooth wear after an attempt has been made to eliminate back-lash play in worm and sector.

If this procedure is not followed, and an attempt is first made to reduce the back-lash by adjusting the eccentric bushing and bringing the teeth of the worm and sector together, it is probable that the teeth of the worm and sector will be crowded together with excessive force. This may appear to eliminate the back-lash, due to friction alone but it is done in a manner which will probably introduce destructive wear of teeth and a sacrifice of steering qualities.

By proceeding as advised, first eliminating end play in the worm and sector, it is possible to adjust the teeth of the worm and sector together as directed under "To Take up Tooth Wear in Worm and Sector," and reduce the back-lash at wheel to a satisfactory condition, which should be a minimum of $\frac{3}{8}$ inch, measured at circumference of wheel, for the best steering qualities.

TO TAKE UP END PLAY IN THE WORM
—The end thrust of the worm (7) is taken on

ball thrust bearings. Adjustment is provided to take up end play. To do this proceed as follows:

Loosen lock nut (9) and remove the lock screw, also the plug (located similarly but not shown). Then with a stout screw driver applied to the notches in the adjusting collar (30) which can be seen through the holes from which the lock screw and plug were removed, screw down (turn clockwise) the adjusting collar (30) until the endwise movement of worm is corrected.

The holes for the lock screw and plug are so positioned in the steering gear housing that when one is directly over a slot in the castellated end of the adjusting collar (30) the other will be between two of the slots.

After adjusting the collar (30) it will be necessary to insert the lock screw in the proper hole for locking the adjustment, and the plug in the other hole.

NOTE: Frequently after an ideal adjustment is made, the slots in the adjusting collar (30) will not register in the center of either locking screw hole. In such cases **NEVER** tighten the adjustment, but select the position which most nearly matches—and unscrew (turn anti-clockwise) the adjusting collar (30) until the lock screw can be inserted.

TO TAKE UP END PLAY IN SECTOR SHAFT—An adjustment is provided at the inner end of the sector shaft (32) for taking up end play. To do this proceed as follows:

Remove the locking screw (13) and without removing the locking arm (12) turn the adjusting screw (11) (clockwise) until all end play is compensated for, then replace locking washer and screw (13) and tighten.

NOTE: Frequently when an ideal adjustment has been made and all end play and wear is compensated for, the holes in locking arms (12) or (26) will not register with screw holes by which they are to be secured. In such cases **NEVER** turn the adjustment up tighter, but loosen it until locking screw can be applied. This caution applies most particularly to the adjustment for wear between teeth of worm and sector.

TO TAKE UP TOOTH WEAR IN WORM AND SECTOR—This should be the last adjustment to be attempted when it is desired to take back-lash out of steering wheel.

The sector (32) has its bearing in an eccentric steel bushing and wear between the teeth of the worm (7) and sector (32) may be taken up by turning this eccentric bushing so that it throws the sector into closer mesh with the worm. To do this proceed as follows:

First turn the front wheels so that they point straight ahead. Unscrew the nut on

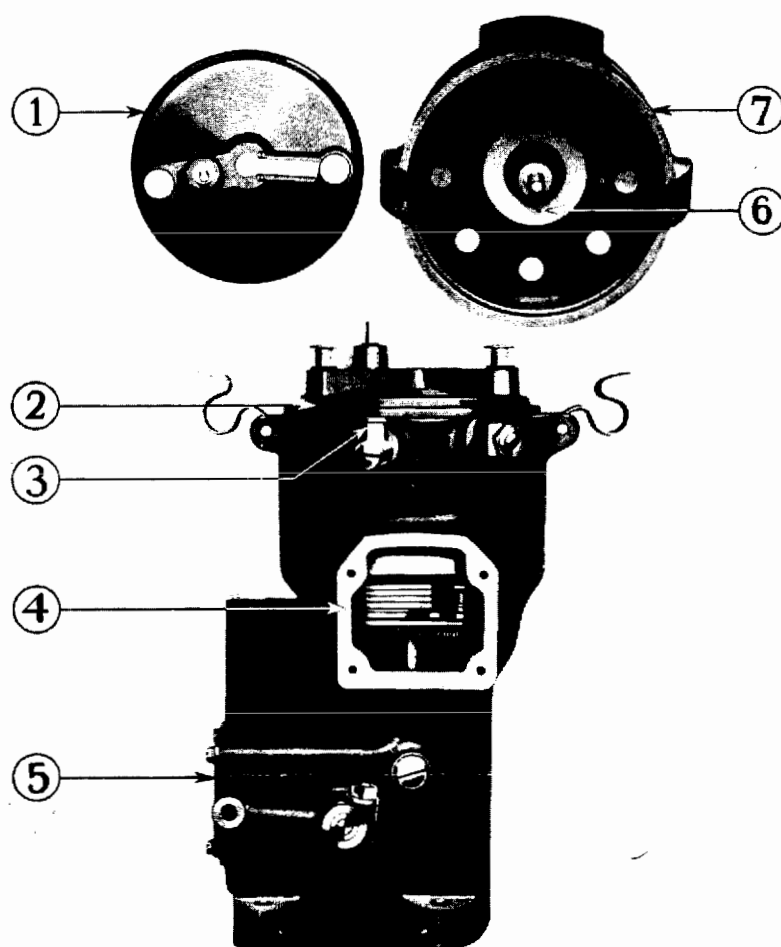


Fig. 27

the inside of frame from bolt (27) and withdraw the bolt. This releases the arm (26). To take up wear in teeth, turn the arm (26) down (clockwise). This should be carefully done as it is possible to apply a heavy load with this adjustment. There should be a perceptible amount of play after this adjustment is complete.

Care and Lubrication of Lincoln Distributor

Lubrication of the upper ball bearing of the distributor shaft is taken care of by placing 3 or 4 drops of engine oil in the oil cup (3) Fig. 27, every 250-500 miles. Care should be taken not to over-oil at this point, as we have had cases of breaker point trouble caused by the excess oil being thrown off the cam and getting on the points with consequent corrosion and burning. The lower ball bearing and mechanism of the spark control receive

their lubrication from the light cup grease carried in the lower part of the distributor housing. This section of the housing should be kept filled with light cup grease to a level just above the cover plate (5) Fig. 27. It can be filled through the higher opening (4) on the left side of the distributor.

A very small amount of vaseline should be applied to the surface of the breaker cam each 2,000 miles. The inner surface of the distributor head (7) containing the 8 inserts or contacts should receive a very slight amount of vaseline, occasionally applied during the first 1500 miles of driving. The surface will then become glazed and further lubrication will not be necessary. It is then only necessary to wipe out the distributor head occa-

sionally with a clean cloth. No lubricant is required on the contact ring (6) in the distributor head, against which the carbon brush operates.

A slight blackening of the surface of the contacts inside distributor head has no effect upon the performance of the ignition system. Never use sand-paper or other abrasive for polishing the contacts in the distributor head. If desired use a few drops of light oil such as 3 in 1 on the cloth used for wiping out the head.

Care should be exercised in removing the distributor rotor (1) as on some cars these fit rather tightly on the shaft and if forced are liable to break. Should a rotor fit so tightly as to prevent removing it by hand, insert a screw driver in each of the slots (2) in the rotor edge; these slots are located directly under the contact brushes. Then by prying slightly first on one screw driver, then the other, the rotor is easily removed with no danger of breakage.

Ford Service Bulletin

No. 3

Vol. 4

March 1923

Page 17

Fordson Fenders

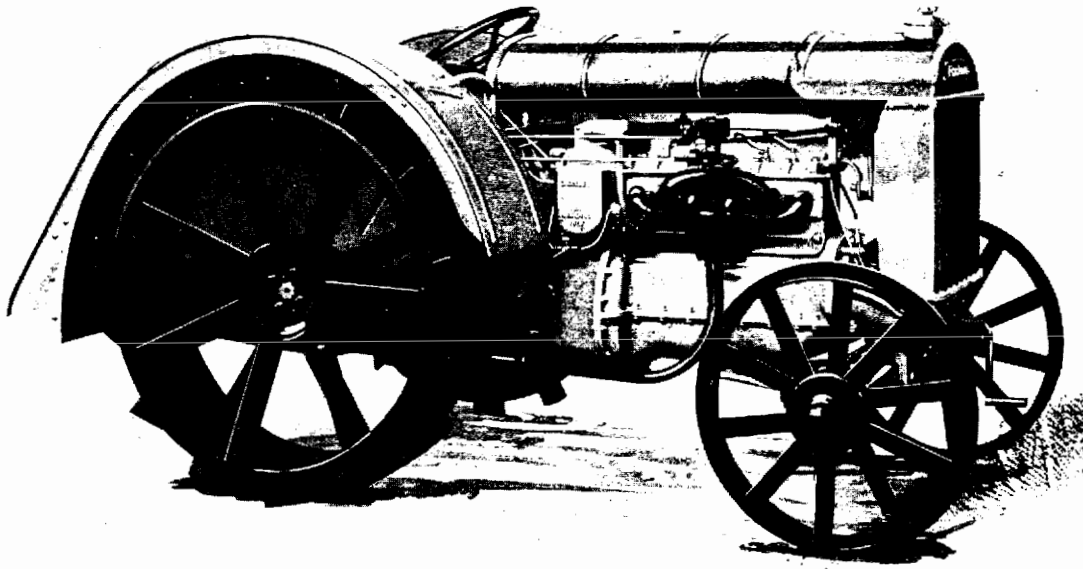


Fig. 28

FENDERS designed and manufactured by this company are now being supplied as optional equipment for Fordson Tractors. These fenders are made of **exceptionally heavy gauge steel** and are substantially constructed to harmonize with the tractor.

This fender assembly embodies a running board as shown in Fig. 29, which enables the operator to step on or off the tractor easily. A compartment is provided in the rear end of each fender for carrying tools, supplies, etc. A longer draw bar cap is provided on the fender equipped tractor which permits a shorter turning radius when the draw bar hitch is in use. The attachment of these fenders does not interfere with the use of grousers or extension rims.

Tractors are now coming through equipped with an improved dash. The breather which was located at the front end of the engine is now incorporated in the dash casting and in such a position as to be protected from much of the dust and dirt to which it was exposed in its former

position, thus reducing the possibility of grit and foreign substance getting into the engine.

When replacing tractor dashes always replace an old type dash with a new type with breather. Under no circumstances should an old type dash be used on a present type tractor as in that event the engine would be without a breather.

When fenders are to be attached to tractors having the old style dash it will be necessary to purchase the following parts in addition to those listed for installation on a tractor having the new style dash. These parts will be billed at the prices listed in the parts price list.

Req. Factory

No.	No.	Part Name
1	F-2976R	Fender adapter
4	F- 582	Cap screw
2	F- 583	Cap screw
6	F-3032	Bolt
6	F- 584	Nut
6	F-5636	Lockwasher

The complete fender assembly retails at \$35.00 f. o. b. Detroit, and as this equipment may be included with tractors without increasing the freight on the complete carload, no additional expense is involved when transporting them in this manner. Consequently, we recommend that fender equipment be specified on all tractor orders, and should any purchasers not desire this equipment, the surplus fenders so accumulated may be retained by the dealer for service purposes.

As this fender price of \$35.00 is f. o. b. Detroit, any deliveries eventually made out of Branch service stock will carry an extra charge of \$10.00 per set net to cover the cost freight and handling.

However, until our production exceeds the demand for fender equipped tractors no shipments will be made to branches as service stock on account of the extra cost involved.

With the two piece support as illustrated in Fig. 29 the following parts are required to make the installation:

Req. Factory

No.	No.	Part Name
1	F-3000	Fender, left
1	F-3001	Fender, right
2	F-3032	Bolt
4	F- 583	Bolt
6	F- 584	Nut
6	F-5636	Lockwasher
2	F-3018	Axle bracket clamp
2	TT- 327	Nut
1	F-3027	Fender step
4	T-1897	Bolt
4	T- 44	Nut
4	T-7254	Lockwasher
1	F-1536C	Drawbar cap, long
1	F-3046B	Fender, rear support right
1	F-3047B	Fender, rear support left
18	F- 582	Bolt
18	F- 584	Nut
18	T-5636	Lockwasher
4	TT- 328	Cotter

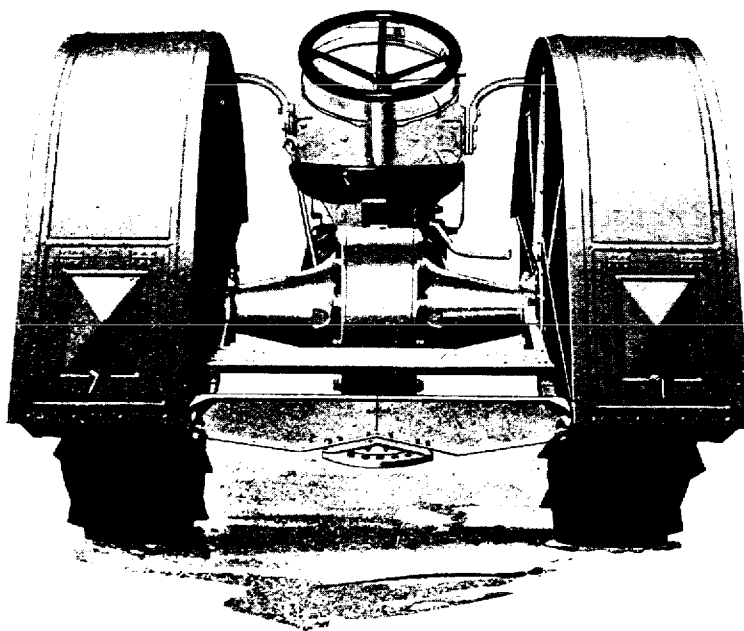


Fig. 29

Adjust Headlamps ! ! !

Complaints are reaching this office from every section, that Ford cars are being operated with headlights out of focus. As a matter of fact, several owners of new cars report that they have been arrested and fined because of glaring headlights and State Officials advise that dealers in many localities are neglecting to properly focus and align head lamps before delivering cars to new owners.

This company has spent thousands of dollars in automobile lighting research work and in developing headlight lens that give bright lights with exceptional light distribution and yet are free from glare. That we have been successful is proven by the fact that Ford "H" headlight lens have passed the requirements of all existing State laws.

All of our efforts will count for very little if dealers send out cars without first checking and focusing the lights. This adjustment is just as much a part of the dealers duty as putting oil in the engine and water in the radiator of a new car, and the dealer owes this attention not only to the purchaser of the car, but to this Company and the public in general.

The necessity of focusing and adjusting head lamps is well illustrated by the following pictures taken in the test shed of the Memphis Police Department, Memphis, Tennessee. Fig. 30 shows the lighting effects from lamps that are not properly focused, while Fig. 31 shows the light from lamps that are in adjustment. It is obvious that lights in the case of Fig. 30 would cast ob-

jectionable glare, and it is equally obvious from Fig. 31 that glare can be eliminated and the light distribution improved by focusing the lights.



Fig. 30

In order to prevent the possibility of any complaints arising because of glare, due to inaccuracy in focusing the lights, over-loading the car, variations in aligning the lamps, stray

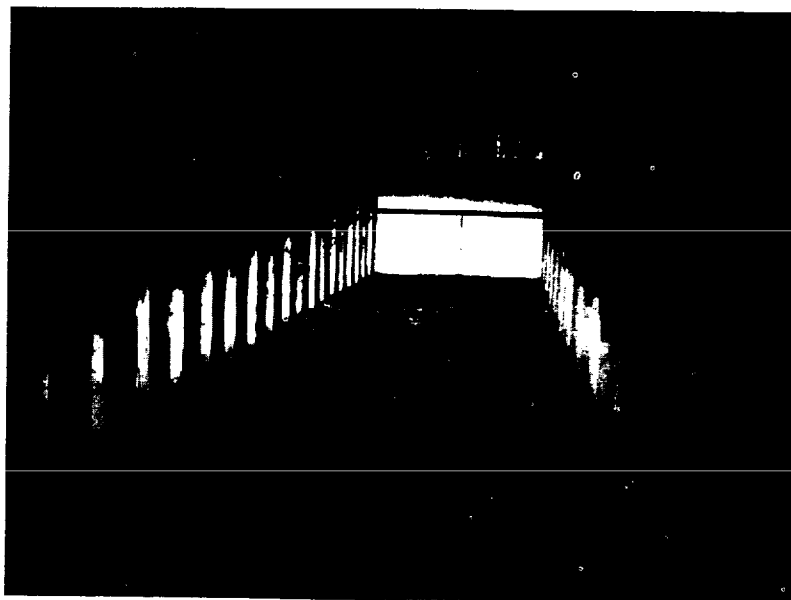
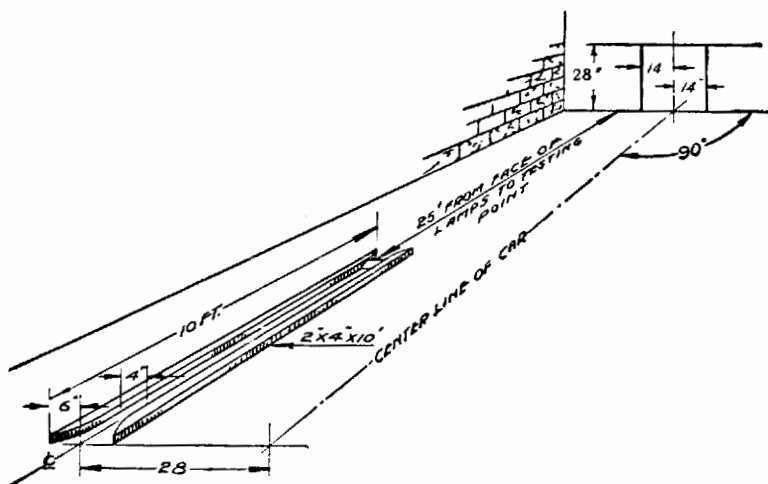


Fig. 31



Shop Layout for Focusing and Alignment of Ford "H" Headlamps.

Fig. 32

glare rays from center portion of reflector due to "V" filament variations, and variations in chassis springs when new headlights are put on old cars, it was decided some time ago to change the height of the line above the level of the surface on which the car stands from 32 inches to 28 inches, as shown in Fig. 32. This change involves no work other than drawing a new line on your present screen at the proper distance below the one you are now using and dealers who have not made this change should put it into effect at once.

The matter of correctly adjusting and focusing Ford headlights is of vital importance. Can we count on the co-operation of our dealers in correctly checking the headlight adjustment on the new cars which they deliver and on customers' cars which are brought into their shops?

Ford Battery

Branches are now in position to supply dealers with Ford batteries, cut in cross section, for display purposes. This battery clearly shows the high standard of workmanship as well as the quality of material used and if properly displayed is bound to create a great interest in our product.

The Ford battery possesses three outstanding points of superiority to other batteries being marketed for Ford cars, namely, capacity, starting ability and life.

CAPACITY: In general the capacity of a battery is in proportion to the number and size of the plates used in its construction. The Ford battery is a 6 volt 80 amp. hour battery, having 13 plates, whereas practically all the batteries on the market for Ford cars

have 11 plates. In order to compete with the Ford battery from a price standpoint other battery makers have reduced the number of plates in their batteries with the result that they are selling batteries of less capacity than ours.

STARTING ABILITY: It should be obvious that the starting ability of a battery is dependent upon its capacity. The Ford battery when fully charged will turn the engine over faster and for a longer period than batteries having fewer or smaller plates. This point which can be easily demonstrated in any efficiency test is of vital importance

in cold weather, when starting conditions are very often unfavorable.

LIFE: The life of a battery depends in a large measure upon its capacity and starting ability. Deterioration is much faster in a battery that is practically always in a discharged state, due to lack of capacity and starting ability. In addition all the parts such as plates, cells, and separators used in the construction of the Ford battery are made from the highest grade of material obtainable.

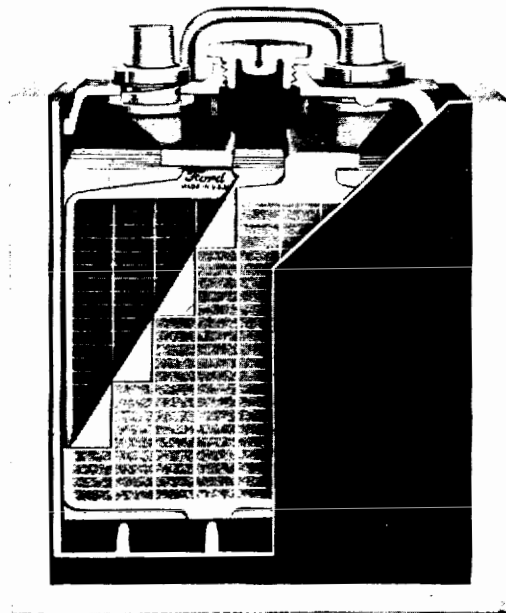


Fig. 33

This alone is sufficient to insure greater efficiency and durability.

Dealers will, of course, have to point out these facts to customers so that they will look for "dependable quality" rather than extravagant "long time guarantees" when purchasing batteries. The battery cross section will aid the dealer to make these arguments more convincing to the customer. At the nominal price of \$5.00 net, this cut-away battery should be displayed by all dealers. In promoting the sale of any article, some means of demonstration is absolutely essential.

Lincoln Service Tools

The special tools illustrated in Figs. 34-36 are included in the set of Lincoln Service Tools listed in the June, 1922, issue of the Service Bulletin.

Tools for removing and Assembling Front End Chain

When removing the chain for replacement or removal of the hunting or offset link, place

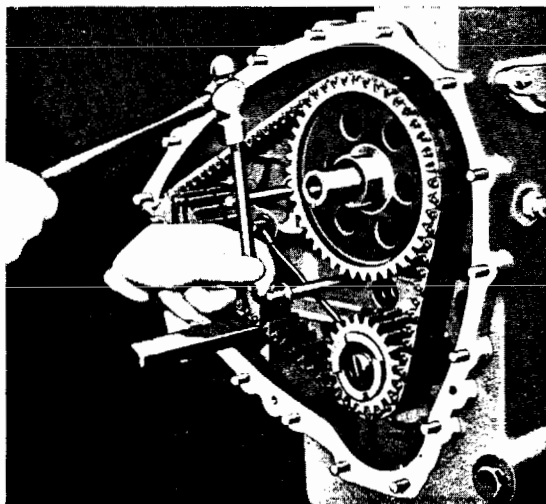


Fig. 34

the bucking tool, 15Z-4543, under the chain as shown in Fig. 34 and with a small cold chisel and hammer cut off the head of one of the seat pins. When removing the chain for replacement any seat pin may be cut, if the hunting link is to be removed, cut the pin at one end of the hunting link.

When assembling set the camshaft and crankshaft sprockets correctly with the "O" timing marks in line with the line through the centers of the sprockets. Wrap the chain around the sprockets so that the ends come together just to the left of the bottom center of the crankshaft sprockets.

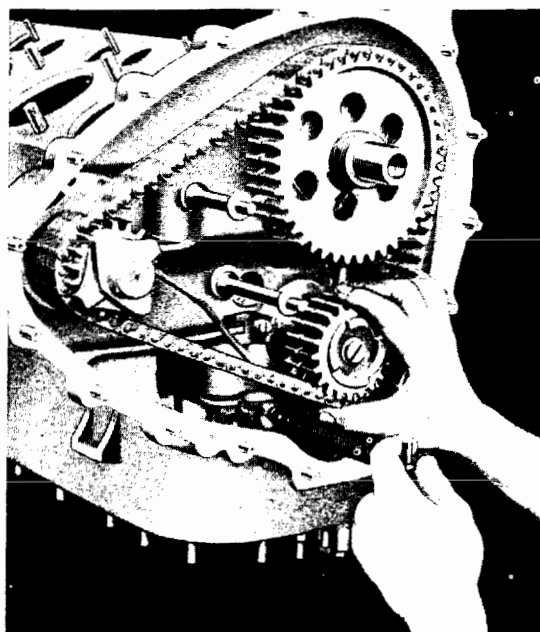


Fig. 35

Clamp a new seat pin in a vise with copper jaws so as not to injure it and with a light hammer carefully rivet the washer on the end which will be inside the chain. Slip this seat pin into the special holder tool, 15Z-4542, and insert the pin from the back of the chain. Pressing the two ends of the chain firmly into position on the sprocket with the thumb of the right hand will line up the holes in the links and enable the operator to easily insert the seat pin. See Fig. 36. Insert the rocker pin and tap lightly into position. Make certain that the seat and rocker pins are assembled in correct relation to each other. See Fig. 116 December Bulletin.

Turn the engine over until the joint in the chain is approximately midway between the crankshaft and accessory shaft sprockets.

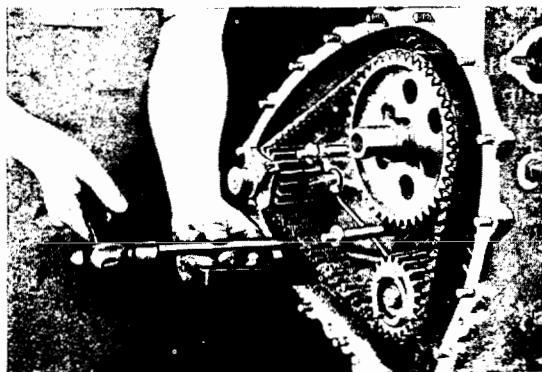


Fig. 36

This can be easily accomplished by means of a long screw driver or similar tool used as a lever between one of the starting ratchet teeth on the crankshaft sprocket and the large fillister head screw in the center of the sprocket. Place a seat pin washer in the special holder and with the bucking tool in place against the rib on the crankcase, tap the washer into position using tool No. 15Z-5124. Fig. 36. Then rivet over carefully.

Ford Tire Repair Kit

Dealers are finding the sale of Ford Tire repair kits very profitable. A particularly desirable feature of the canvass reinforced tire

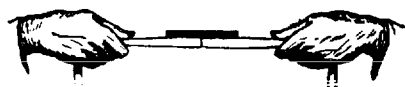


Fig. 37



Fig. 38

patch, furnished in this outfit, is that it provides a highly satisfactory material for repairing both casings and tubes. In addition, this material can also be used both inside and outside of the casing, thus preventing the tube from blowing out and keeping sand and water out of cuts on the outside of the casing.

The superiority of the canvas reinforced tire patch over the ordinary rubber patch is further illustrated by Fig. 37 and 38. The fabric reinforced patch in Fig. 37 absorbs all strains and road shocks without stretching. It holds the cut firmly and does not permit any gaping apart regardless of the strain applied. Fig. 38 shows how the ordinary rubber patch stretches directly over the cut when the tube is inflated and a strain put upon it. This permits the cut to spread apart and invites further trouble.



Fig. 39

With the canvas reinforced patch, the tube is strongest at the repair while with the ordinary rubber patch it is weakest.

Dealers should see that tire repair kits are given prominent display in their parts department and show windows. Automobile owners will appreciate having their attention called to an article that will bear the dealers unqualified endorsement.

Lincoln Brakes

All Lincoln cars after car No. 6030 are equipped with external brake bands 3" wide instead of 2½". These brake bands are interchangeable with the 2½" width, no change in brake, drums, brackets, etc., being necessary for their installation.

The 2½" brake band is covered by the following numbers:

L-5706AR—External brake band lining and fixtures assembly—right.

L-5702AR—External brake band lining and fixtures assembly—left.

The 3" brake bands are:

L-5706B—External brake band lining and fixtures assembly—right.

L-5702B—External brake band lining and fixtures assembly—left.

The dimensions of brake lining used on Lincoln cars is as follows:

External—2½" wide, ⅜" thick, 49¾" long.

3" wide, ¼" thick, 49¾" long.

Internal—2½" wide, ⅜" thick, 46 ⅜" long

Fourdoor Sedan Cowl Panels

When replacing four-door sedan cowl panels without ventilators with the present type cowl panels with ventilators, it is necessary to order the following parts in addition to the T 17019 cowl panel assembly—ventilator type.

1 T 17045—Cowl ventilator quadrant

2 T 17046—Cowl ventilator spring

2 T 17047—Cowl ventilator clevis pin

1 T 17048—Cowl ventilator cover assembly

2 T 7992—Cowl ventilator clevis pin cotter

2 T 1308—Cowl ventilator quadrant bolt

2 T 1068—Cowl ventilator quadrant bolt nut

2 T 1966—Cowl ventilator quadrant bolt washer

In order to install a cowl ventilator quadrant it is necessary to remove the instrument panel and bore holes in the instrument board for the quadrant bolts, counter-boring the holes sufficiently to permit the top of the bolt head to come flush with the surface of the instrument board.

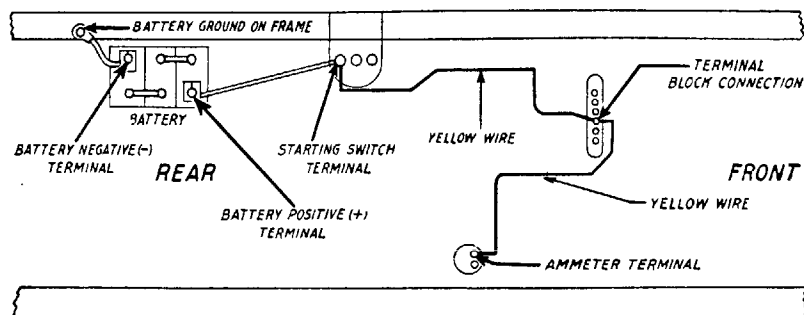


Fig. 40

Check Electrical Connections

In order to prevent headlamp bulbs burning out prematurely, dealers should make it a point to see that the connections on all electrical circuits are clean and tight before delivering a car to an owner. This is especially true of the connections on the battery circuit, such as terminals on battery; ground connection of battery, and battery wire terminals on terminal block.

In Fig. 40 are shown the connections which should be inspected by dealers. Any loose connection at these points is bound to affect the lamps, as it adds to the resistance in the battery circuit, which in turn increases the voltage at both the generator and lamps, and consequently shortens the life of the lamps.

It is also extremely important that all connections on the back of the switch be checked to insure their being in correct position and that the rubber insulation on the different wires is sufficiently near the end of the terminals so that it is impossible for the metal part of any of the terminals to come in contact with each other. Should the metal part of the terminals touch each other at any time, serious trouble will result, such as burning out lamps, demagnetizing magnet, or short-circuiting the lighting system.

If dealers will check these points carefully long life from the bulbs is assured, as regardless of price, there is no headlamp bulb on the market that is the equal of the bulbs we are using either from a standpoint of light efficiency or length of service.

Change Oil Frequently

The opening of Spring affords the dealer an excellent opportunity to circularize his service customers, calling their attention to the advisability of changing the lubricating oil in their engines. Experience has shown that too many Ford owners overlook the importance of frequently changing the oil in the crank case, particularly during cold weather, when there is a greater tendency toward crank case dilu-

tion, due to the gasoline being less volatile with the result that it works past the pistons to a much greater extent. Frequent use of the primer in starting a cold engine also tends to create a similar condition.

Car owners are beginning to realize that the life of the engine depends largely upon how frequently "oil changes" are made, and the difference between a long and short lived engine rests mainly on this point of lubrication. The mere fact that the oil in the crank case is up to a certain level, does not, necessarily, mean efficient lubrication. That the customer is ignorant on this point is indicated by the expression which is frequently heard "Why, my car does not use any oil—in fact, there is more in the crank case than there was a month ago." This goes to show that the lubricating oil is being diluted by a rich gasoline mixture, and within a short time its lubricating properties will be broken down and destroyed.

In order to be insured against using thin, broken down, diluted oil, it is essential that the oil be changed in a new engine after the car has traveled 400 miles. This operation should be repeated every 750 miles thereafter.

The dealer should also take this opportunity to impress upon his customers the value of using a high grade oil, as a cheap lubricant means rapidly wearing pistons, cylinders and other bearing surfaces.

Lincoln Top Boots

The top boot for the Lincoln four passenger phaeton with trunk is made up in Burbank material to match the top on this car and will be furnished on request at a price of \$35 list.

Top boots for the seven passenger touring car and the four passenger phaeton without trunk are furnished in black leather at \$25 list.

The two passenger roadster carries a top boot as part of the car equipment.

The prices quoted above are subject to the dealer's regular car discount.

Selling Flat Rate Service

In some localities Ford dealers have discarded the flat rate system of labor charges for repair work, and are now computing their labor charges at a certain rate per hour.

The practice of charging a flat rate for labor required in handling the various repair operations was established by this Company several years ago, after we had demonstrated its practicability in our branch service stations. The fact that this method of determining labor charges has since been adopted by automobile manufacturers generally is convincing proof that the flat rate system had proven most satisfactory to the customer as well as the service station.

Our experience has proven that the greatest point of dissatisfaction in handling service work is eliminated when the customer understands in advance exactly what the labor cost will amount to on a certain repair job. In all well organized service stations the repair order which the customer signs clearly specifies the labor cost of the work to be performed. This precludes the possibility of any misunderstanding or argument with a customer when the job is completed and the bill presented for payment. The customer is entitled to an estimate of the repair charges before the work is undertaken, and on the other hand the dealer must have the assurance that the labor bill will be paid when the work is finished.

The flat rate system possesses still another advantage. It establishes definite selling prices for the various repair operations—based upon the average time required for the work, plus a reasonable profit. This enables the dealer to check the efficiency of the shop and places, directly on the foreman, the responsibility for turning out repair jobs within the time scheduled for each job. Furthermore, the dealer can readily check the labor profit on every repair turned out of his shop. This makes for efficiency, because it places the shop on its mettle and compels consideration of costs by both foreman and men.

Dealers and garages that are well equipped and organized need not be affected by the

competition of poorly equipped, unorganized repair shops, providing their service customers' attention is called to their facilities for handling service, and their flat rate charges are not out of proportion with the time required for the job and the prevailing labor rates.

Dealers should make it a point to invite owners into their shops and explain, in detail, their facilities for handling repair work. Show your customers your fixtures for aligning and testing connecting rods, cam-shafts, crank-shafts, pistons, etc., Explain the purpose of your burnishing machine and the probable results of not properly burnishing in an engine. Make these points thoroughly understood by your customer, through conversation, circular letters, advertising, etc. so that he will know the character of service he will receive at your place of business when he wants any particular unit of his car completely overhauled or repaired.

If the dealer will sell his customers on the quality of the work he is capable of turning out, through having up-to-the-minute equipment and tools, very little business will be lost to garages whose sole appeal are lower repair charges computed on the indefinite hourly basis.

The most convincing argument in favor of the flat rate charges is the fact that wherever dealers have adopted that system and followed it with intensive advertising, a tremendous increase in business has been noted.

Theft of Lincoln Sedan

We are in receipt of advice from New York, that a Lincoln Seven Passenger Sedan finished in Cobalt Blue was recently stolen. This car carries the following assembly numbers:

Car	No. 6910
Motor	No. 6910
Chassis	No. 6910
Body	No. 358
Key	No. 508

We request that dealers and garages be on the lookout for this car in order that we may render all the assistance we can in its early recovery.

**Cars bearing motor Numbers 7,084,226 to 7,217,971
were shipped during February**

Serial Numbers of Tractors Assembled

February

276,350 to 284,254

Ford Service Bulletin

No. 4

Vol. 4

April, 1923

Page 25

Anniversary Number 1919 - 1923

WITH this issue, the Service Bulletin enters its fifth year. Articles have been published dealing with efficient methods of repairing Ford Cars, Trucks, Fordson Tractors and Lincoln Cars; means employed by dealers to increase the efficiency of their shops and to enlarge the volume of their parts and labor sales; information concerning changes in design and improvements in our products from which very useful selling arguments were created. These policies are to be continued and every effort will be made to make subsequent issues of the Bulletin more interesting and valuable.

The purpose of the Bulletin is to establish a more direct contact between the Factory and the Ford dealer, and to assist the latter in servicing Ford products. The Bulletin not only applies to the Dealers service organization, but contains mechanical information of interest to the selling organization as well.

We are satisfied that a large percentage of our dealers' organizations are using the information contained in the Bulletin to good advantage; we are equally certain however there are some dealers who are not deriving the benefit from the Bulletin that it is possible to obtain. This is revealed daily through needless correspondence concerning matters of policy, and inquiries on the adjustment of bearings, fitting of pistons, etc., all of which have been covered in detail in previous issues of the Bulletin.

If your organization is to be benefited by this publication, your co-operation is essential. Make it a point to see that all of your employees, particularly the mechanics, read each issue of the Bulletin, and put into practice the ideas which have been worked out for their benefit.

We will appreciate the further co-operation of dealers in submitting suggestions for improving service work which can be published in the Bulletin for the benefit of the entire organization.

The Lincoln Frame

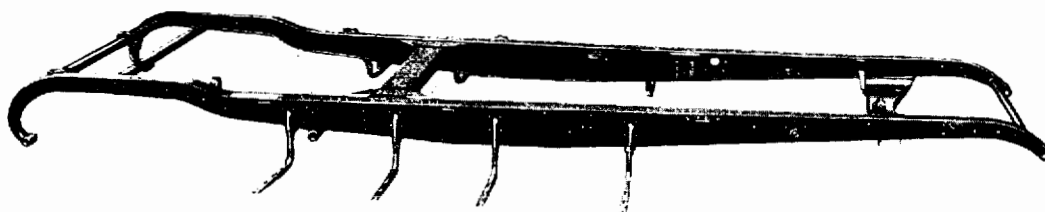


Fig. 41

The Lincoln frame is another evidence of Lincoln superiority. The frame is in reality the foundation of the automobile and upon its strength and ability to retain the units mounted upon it in their original perfect alignment depends the life of the car as a whole.

The Lincoln frame by reason of the following points of superiority has this vitally necessary ruggedness to a marked degree:

Extra deep and heavy side members.

Tubular cross members.

All rivet holes drilled, not punched.

All cross members and brackets hot-riveted.

Accurate machining and workmanship.

The side members are extra heavy, being $7\frac{1}{2}$ inches deep at the widest portion and tapering towards the front and rear end and $5\frac{3}{32}$ inch thick. In addition a reinforcement is riveted to the inside of each side member where the motor supports and steering gear are mounted. See Figs. 41 and 43.

Instead of the conventional pressed steel cross members the side members are held together and in perfect alignment by three seamless steel tubes. These tubes are splined or notched on the ends and are forced, under pressure of $3\frac{1}{2}$ tons, into brackets riveted to the cross members, which are similarly splined. See Fig. 44. In Fig. 42 the special press that is used for this operation is shown. The two side members, with the cross tube brackets riveted in position, are placed in the press with the cross tubes between them, power is then applied and the cross tubes are pressed into the brackets on the cross members.

The advantage of this method of frame construction is that it prevents twisting of the side members and holds the two sides of the frame parallel. Thus when one wheel of the car drops into a rut or hole, bringing down that side of the frame these rigid cross tubes tend to bring down the opposite side of the frame proportionately, which reduces the great strain usually imposed upon the body of the car with the resultant loosening and weakening of the joints which invariably follows the twisting action, due to one side of the frame acting more or less independently from the other. This construction also adds materially to the riding comfort of the passengers in the car.

In addition to the three cross tubes a heavy pressed steel cross member is provided in the center of the frame and in the front. The former furnishing a support for the brake operating mechanism and the latter acting as a support for the front end of the engine. See Fig. 41.

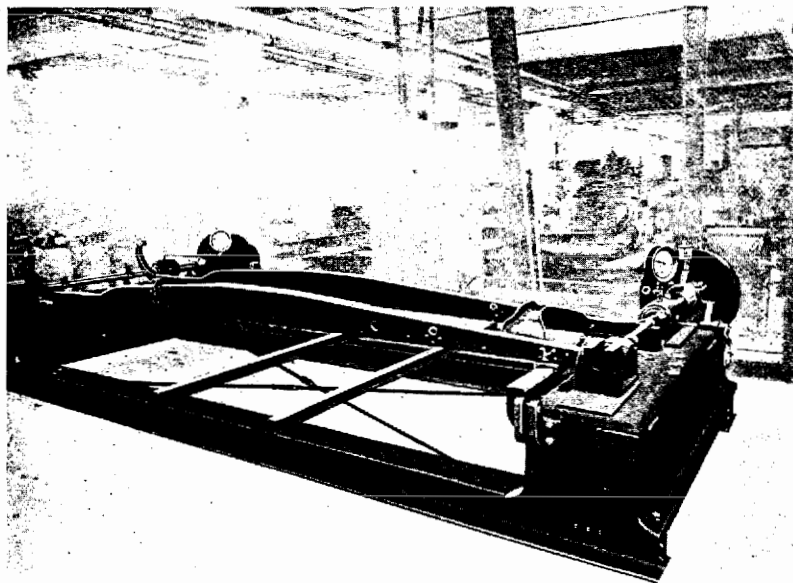


Fig. 42

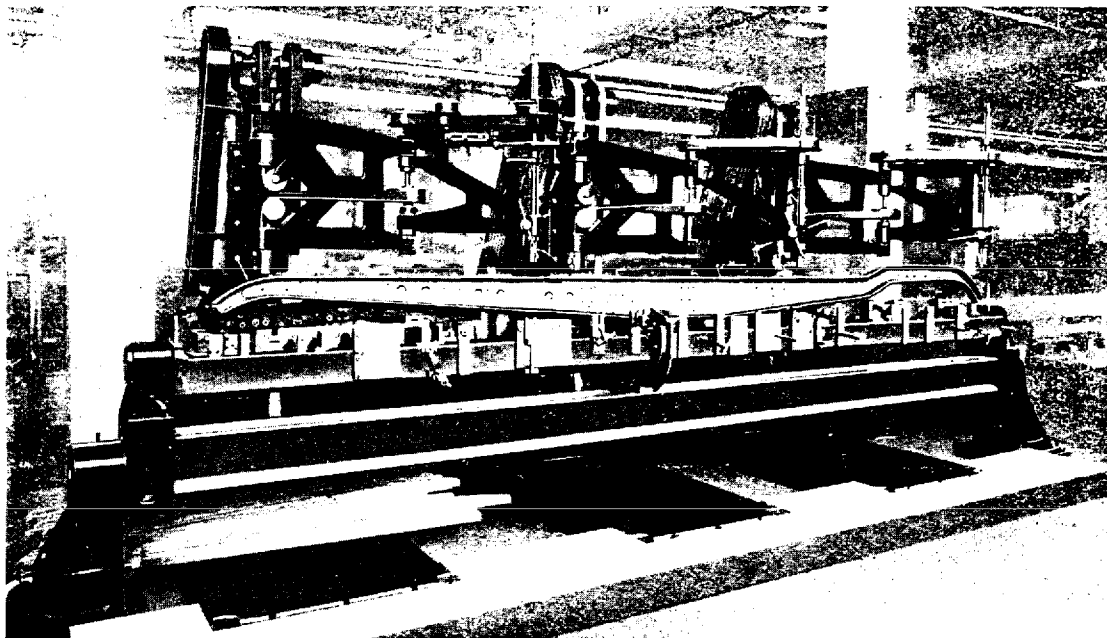


Fig. 43

The width of the frame tapers, without offsets, from rear to front, giving a short turning radius. The Lincoln will turn in a 42' circle to the right and to the left in a 48' circle.

All the rivet holes in the Lincoln frame are drilled by means of the special designed fixture illustrated in Fig. 43. This fixture is large enough to carry the whole side member and is equipped with locating bushings for accurately positioning the spindles of the four swinging drill presses. Drilling the rivet holes eliminates the danger of fracturing the metal that is incurred when following the usual method of punching rivet holes.

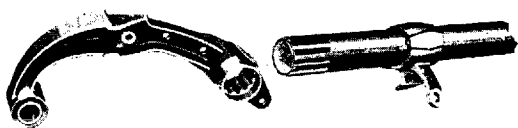


Fig. 44

All cross members and brackets are attached by hot riveting. This method insures the parts being drawn tightly together by reason of the contraction of the rivets as they cool.

Another point of interest, although unimportant in affecting car operation and life but illustrating the extreme care that is taken to insure workmanlike appearance is the fact that the spring brackets or spring horns are fitted to the contour of the frame ends and the joined parts are perfectly matched by grinding the faces to a uniform smooth surface.

The frame of the car is one of its hidden and generally overlooked units, but to the prospective buyer who studies the underlying features of a car, the points discussed above will prove to be of great interest.

Lincoln Engine Oil

We are listing below the specifications for a Lincoln engine oil which should give satisfactory results in the Lincoln engine during summer weather.

Viscosity @ 210°F— 59" Min.
@ 100°F—500" Max.

Flash	410° Minimum
Fire	460° Minimum
Cold	34° Maximum
Gravity	22 Maximum

Dealers and owners should purchase high-grade engine oils conforming as closely as possible to these specifications. Only recognized quality oils marketed by refiners with established reputations should be used in the Lincoln engine. Never buy cheap inferior lubricants as the best will be found by far the most economical in the end.

Owners should be encouraged to purchase high grade oils on the cost of consumption per mile rather than poor oils on the price per gallon basis.

Tractor Draw Bar Caps

We have discontinued making Long Draw Bar Caps, F-1536BR and F-1536C, and hereafter the Short Draw Bar Cap, F-1536A, will be furnished with all Tractors whether equipped with fenders or not.

Systematic Care Essential

Below is a reproduction of a card which the Dow Motor Company, Ford Dealers, Houston, Texas, are sending to Ford owners in that city.

This brief, to-the-point word of warning impresses the owner with the advantages of systematic care of his car. It also indicates the dealer's interest in the welfare of the owner.

The Dow Motor Company advise that this card has been the means of attracting many owners to their shop with the result that their sales of parts and labor have been increased.

These dealers are also featuring a "Wash, Polish and Touch-up Service," which consists of washing and polishing the car, painting of front and rear systems and touch-up of rusty spots on running boards and fenders. The charge for this work is \$2.50 and a large number of Ford owners are taking advantage of this service, many of them bringing their cars in regularly to have this work done.

IMPORTANT

Give Your FORD a Chance

TO obtain the greatest amount of satisfaction and long life for your FORD CAR it is highly essential that it be lubricated at regular intervals. The greatest factor in running up repair bills is due to lack of oil and grease, which results in rapid wear squeaks and rattles, and last but not least—a dissatisfied owner. } A locomotive is oiled and greased at least every twenty-four hours, and it runs on a track of its own, so doesn't it seem reasonable that your Ford should receive similar attention every five or six hundred miles? It too, like the locomotive, is a well-constructed piece of machinery.

We will be very glad to do this work for you at a very reasonable price, in the event that you do not care to do it yourself; but, no matter who does it, the all-important feature is—HAVE IT DONE.

DOW MOTOR CO.

FORD SERVICE

Milam and Walker

Houston

Fig. 45

Lug for Jack on Lincoln Rear Axle

One of the small items for the convenience of the driver which have been provided through out the Lincoln car is the provision which has been made for placing the jack under the rear axle for removing or applying a tire.

This is a lug extending from the rear bracket on the brake drum (see Fig. 46), which is in a very convenient position for placing the

jack and is keenly appreciated by Lincoln owners who have had previous experience with other cars in the usual difficulties encountered when endeavoring to place jacks under the rear axle.

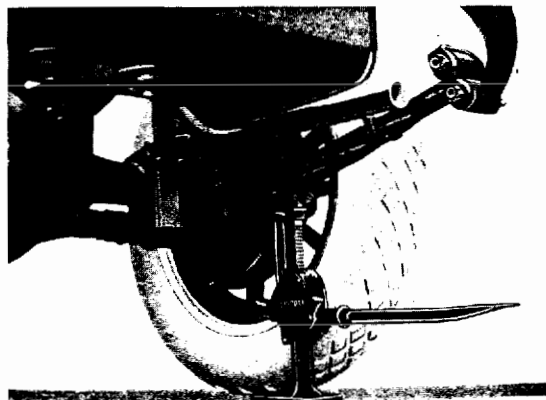


Fig. 46

Lincoln Cylinder Blocks and Heads

All Lincoln engines after motor No. 7820 have a new design of cylinder block and cylinder head.

This change does not affect the efficiency or performance of the engine but does give greatly improved appearance.

The compression ratio of the engine with the new cylinder head is exactly the same as that with the old head but there is slightly more water space around the compression chamber.

On account of the bead which is carried around the upper edge of the cylinder block and lower surface of the cylinder head, the gasket used with the new design parts is larger than the one used with the old type. Therefore, care should be taken that the correct gasket is furnished for service. Use Cylinder Head Gasket L-8357AR for engines with the first design blocks and heads and L-8357B for engines with the latest design.

The intake manifold used with engines after No. 7820 also has been slightly changed as to the shape of the flange which is bolted to the cylinder head. Here also a different gasket is required. Use L-2338-AR for the first design and L-2338-B for the latest design.

It should also be noted that on engines having the new cylinder block and head, nickel plated acorn type nuts are used on the cylinder head and intake manifold studs. The thread size remains the same.

The Lincoln Front Axle

The front axle is of I-Beam section. The steering knuckle tie rod between the two steering knuckle yokes (14), Fig. 47 is at the rear of the axle, and is adjustable to properly align the front wheels to insure easy steering and prevent excessive tire wear. The steering knuckle bearings and all movable parts on the front axle, except the wheel bearings, are lubricated by the pressure gun. To adjust the steering knuckle bearing (6) Fig. 47, jack up both front wheels and remove the draw key (21). Then remove the cotter pin from the nut at the lower end of the spindle (7). Tighten up on the adjusting nut on lower end of spindle (7), from which cotter pin has just been removed, until the lost motion in the bearing disappears, but still allows the knuckle to move freely. Replace the draw key and then turn back the adjusting nut as much as necessary to insert the cotter pin. Replace and clinch the pin. Care should be taken not to get the bearing too tight. In case this happens it will be necessary to remove the draw key, loosen the adjusting nut and then by driving on the knuckle, force down the bushing which is in lower arm of the axle fork and in which the spindle (7) has a bearing. Then make the adjustment correctly as stated above.

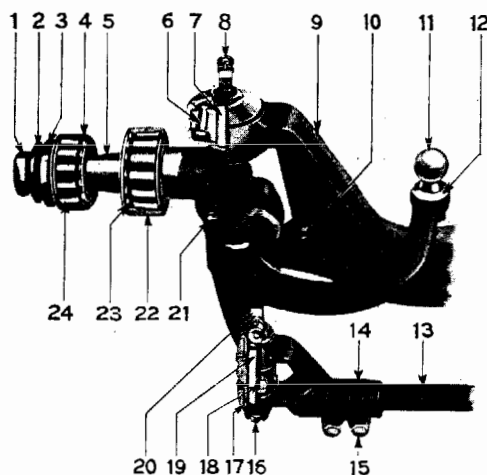


Fig 47

ALIGNMENT OF FRONT WHEELS—Alignment of the front wheels is an important factor in tire economy and ease of steering. With the front wheels improperly aligned, the tires roll over the ground with a sliding motion that wears them rapidly.

See instructions under "Adjustments, Incidental to Wheel Alignment," page 14, February

Bulletin, which must be made on steering gear when wheel alignment is changed or wheel clearance adjusted.

The front wheels should have a toe-in of from 0 to $\frac{3}{8}$ -inch. This measurement to be taken between the felloe bands at the front and rear of the wheels at a height equal to the distance from the center of the spindle to the ground. The distance between the felloe bands at the rear measurement should never be more than $\frac{3}{8}$ -inch greater than a front measurement taken at the same height. To adjust the wheels proceed as follows:

Loosen the two clamp bolts (15) in the steering knuckle tie rod yoke (14).

Remove the nut (16) at the bottom of the bolt (19).

Drive out taper pin (18) on the side of the yoke. (Drive on the D Shaped end).

Remove the bolt (19).

Swing yoke off from steering knuckle and remove dust rings.

Turn the yoke (14) on tie rod (13) to give proper adjustment.

Replace dust rings when reassembling.

Lengthening the steering knuckle tie rod by turning the yoke (14) in an anti-clockwise direction increases the amount of toe-in.

NOTE: In case the necessity arises for considerable adjustment, both yokes should be loosened and equal adjustment made on each.

FRONT WHEEL STEERING KNUCKLE STOPS—Stop screws (10) provide adjustment to prevent the wheels from turning to such a degree as to cause the tires to scrape against the springs and steering connecting rod. Set wheels so that neither tire will revolve closer than $\frac{3}{8}$ to $\frac{1}{4}$ inch to the nearest interfering point.

TIRES OF EQUAL DIAMETER—Use the same size tire on each front wheel. The car holds the road better and steers more easily.

TO ADJUST AND LUBRICATE THE WHEEL BEARINGS—The front wheels are mounted on roller bearings. These are carefully adjusted at the factory and should need very little attention other than an occasional cleaning with gasoline and repacking with cup grease about once every 5,000 miles under normal running conditions.

To tighten the front wheel bearings after loosening, turn (anti-clockwise) the locknut (1) sufficiently so the lock washer (2) will disengage from pin in adjusting nut (3). Turn the adjusting nut (3) in a clockwise

direction, with hand pressure only on the special wrench, until there ceases to be any looseness in the bearing. Then turn back the adjusting nut (3) approximately one half turn, and slip the locking washer (2) over the engaging pin on nut (3) and tighten the nut (1) in this position. Great care should be taken not to get the bearings too tight. The wheel when clear of the ground should turn freely from the weight of the valve stem, with a scarcely perceptible looseness in the bearing when tested by shaking the wheel at rim.

Lincoln Engine Stand

In the accompanying illustrations is shown an Engine Assembly Stand which is very useful for complete engine overhaul jobs which, although infrequent, require some sort of equipment of this nature.

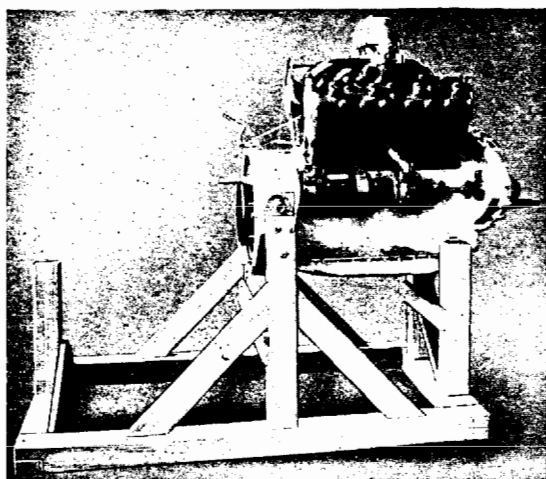


Fig. 48

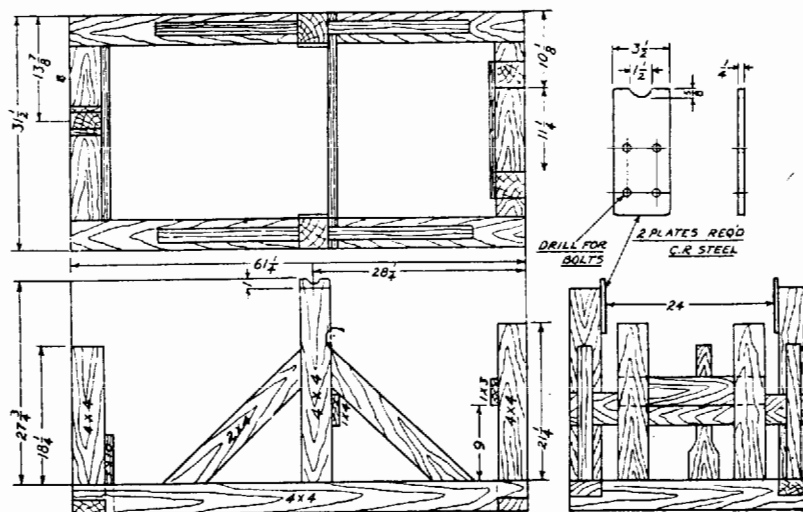


Fig. 49

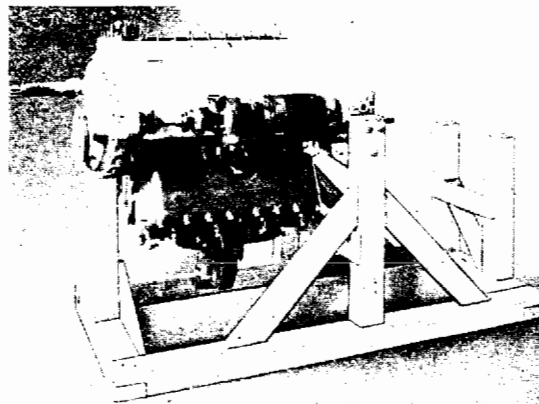


Fig. 5'

The stand illustrated in Figs. 48-49-50 can be constructed cheaply and the necessary materials are easily obtainable. Fig. 49 gives the more important dimensions for constructing the stand. These dimensions should be closely adhered to but the braces may be varied slightly to suit the ideas of the builder. The two steel plates which are bolted to the upright posts form the supports for the rear engine support trunnion and should be attached with countersunk head bolts so that the bolt heads are flush with the surface of the plate.

The engine is supported by the two rear support bearings and on the two lugs on the front end of the crankcase. See Fig. 48. After the distributor and distributor drive shaft have been removed the engine may be swung over for work on the bearings, etc., the rear end resting on the trunnions and the front upon the pad to which the distributor is attached. See Fig. 50.

We do not believe it will be necessary for every dealer to equip his shop with a stand of this sort on account of the infrequent occurrence of repair jobs in connection with which it is necessary to remove the engine from the chassis. However, it will be found that this stand will repay its cost on one job, not alone in the saving of time resulting but also in the increased ease and convenience with which the various operations can be performed.

Lincoln Water Pump

In the conventional design of water pump the pump shaft is supported on plain bronze bearings. When these bearings become worn there is excessive wear on the packing, and it is forced to act partially as a bearing for the shaft in addition to preventing the water from leaking. This makes it necessary to repack the pump frequently.

On the Lincoln water pump in addition to the plain bearings, a ball bearing is provided at each end of the pump shaft which keeps the shaft in perfect alignment and leaves the packing free to act as packing only and does not subject it to undue wear. This results in freedom from trouble and occasion for repacking the pump arises very seldom. To the best of our knowledge the Lincoln water pump is the only one incorporating a ball bearing shaft.

When the pump does develop a leak at the packing gland, care should be taken not to draw up the packing gland nut too tightly, as this will cause unnecessary friction and undue wear on the packing and pump shaft. Draw up the gland nuts just enough to stop the leak and no more.

If the packing gland nut can be drawn up to the limit of the thread without stopping an existing leak it will be necessary to replace the packing. In order to accomplish this operation satisfactorily the water pump should be removed from the engine. Considerable time will be saved in removing this assembly by observing the following procedure:

- 1, Drain cooling system—loosening radiator cap so that the water will flow readily.
- 2, Remove the right hand dust pan.
- 3, Remove the water connection from pump to radiator at the pump end. It is unnecessary to disturb the hose clamp.
- 4, Remove accessory shaft by removing the two opposite bolts at each end.
- 5, Detach water pipe which connects the pump and cylinder block.
- 6, Remove the cap screws which hold the pump to the crankcase and generator. The pump may now be removed from underneath.
- 7, Remove the generator clutch using service tool No. 15Z-12121.

8, Loosen clamp screw on the bottom of the pump housing remove dowel screw on the side and pull the rear bearing and cage assembly.

9, Pull yoke on front end of pump shaft, using tool No. 15Z-12121.

10, Remove front bearing and cage assembly.

11, Remove throw-off rings from each end of the pump shaft. The packing nuts and glands may now be backed off and the packing replaced.

Make certain that the packing is driven down well or else when the pump is re-assembled it will be found that the packing nuts can again be tightened to the limit of the thread for an initial setting.

After pump is re-assembled make sure that the pump shaft can be turned easily by hand. See that the clutch is well greased; thoroughly clean the finished surface on the crankcase to which the pump is attached and also the pad on the pump. Grease the gasket used at this point. Turn the pump shaft so that the yoke is in a vertical position. Also turn the generator shaft so that the openings in the clutch are vertical.

When assembling the pump to the engine, slide the pump on to the pilot on the generator making sure that driving flanges engage the slots in the cross and start the cap screws which bolt the pump to the generator. Start the screws which hold the pump to the crankcase and tighten down. Then tighten pump to generator screws. Assemble water pipe from cylinder to pump and water inlet pipe. Connect accessory shaft, replace dust pan and fill cooling system.

High Test Gasoline

In order to get full efficiency from present day fuel the carburetor intake manifold on the Lincoln engine is heated by the exhaust gases and also by the hot water returning to radiator.

Due to this feature the Lincoln engine will not operate satisfactorily on the high test gasoline sold in some localities. This high test fuel being so much more volatile than the fuel on which the engine is designed to run, the mixture is greatly expanded by the heat before reaching the cylinders and consequently a full charge is not drawn in, resulting in a decided loss of power.

Special Carburetors For Ford Cars

The fact that certain carburetor manufacturers are making extravagant claims as to mileage to be obtained by the use of their product on Ford cars, is, no doubt, responsible for the frequent inquiries which the dealers receive regarding the authenticity of these reports. Advertisements have appeared in which the user of such carburetors is pictured as obtaining anywhere from thirty to fifty miles to a gallon of gasoline. Every Ford dealer understands that the result of a special gasoline test does not represent the efficiency of that particular carburetor under actual every day working conditions.

There is no question that the experienced driver can secure one hundred per cent greater gasoline mileage in running a test mile with his hand on the needle valve than can be secured by the average driver operating his car under every day conditions. On the one hand, you have the ideal condition of the engine, road, temperature, wind, and in fact everything that makes for increased mileage, while with a car used in practical service the carburetor must be so adjusted as to give ample power for starting as well as pulling a load under slow speeds.

Considering the conditions under which Ford cars are operated the fuel consumption is as low as can be expected with present day gasoline. It must be remembered that the wide point of variance between the mileage record of one driver and another depends mainly upon the driver's willingness to adjust the flow of gasoline through the carburetor by turning down the needle after his engine has become thoroughly warmed up. No carburetor will give maximum results when the adjustment remains unchanged between a cold and heated engine.

Lincoln Service Suggestions

When scraping carbon from piston heads do not use a wire brush as particles of carbon will be forced between the pistons and cylinder wall with a possibility of scoring the wall or pistons when the engine is started.

Before replacing the cylinder heads pour at least a tablespoonful of engine oil on each piston to insure sufficient lubrication when the engine is first started.

With the engine thoroughly warmed up after the heads have been removed and replaced it will be found the cylinder head nuts may be taken up slightly. Attention to this detail may prevent the gasket blowing out.

Always inspect the screen at the gasoline inlet, when replacing the carburetor and clean if necessary. This should be done each time the carburetor is removed. Be sure to open the valve at the bottom of the vacuum tank occasionally to allow any accumulation of water to drain.

Care of the Lincoln Engine

It is advisable at this time of the year to remove the oil pan and clean thoroughly when changing oil. It will be found that considerable sediment has accumulated in the bottom of the pan which will not drain off with the oil.

This condition is especially apparent after continued winter driving due to condensation and sweating on the walls of the crankcase and cylinders. The water thus formed mixes with the oil in the oil pan and frequently an emulsion or jelly-like mixture is formed which is of practically no value as a lubricant.

The oil pan should be removed and cleaned at least every 5,000 miles.

**Cars Leaving Motor Numbers 7,217,972 to 7,386,111
were shipped during March**

Serial Numbers of Tractors Assembled

March

284,255 to 295,531

Ford Service Bulletin

FORD MOTOR CO.
DEARBORN

No. 5

Vol. 4

May, 1923

Page 33

Hoo-dye Shock Absorbers

JUN 29 1923

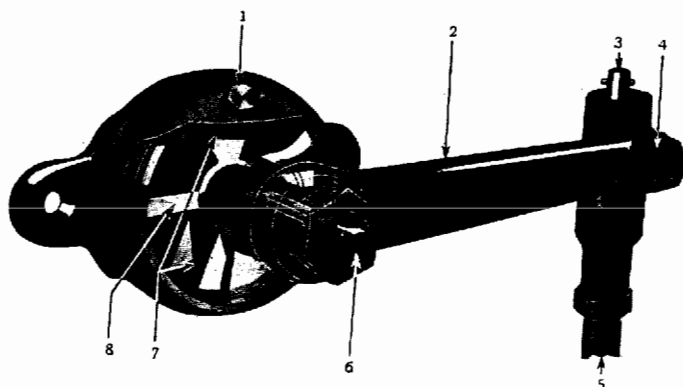


Fig. 51

- | | | |
|---------------------------|---------------------|--------------------------|
| 1. Filler Plug | 2. Lever arm | 3. Lubricator connection |
| 4. Nut for link stud ball | 5. Link stud | 6. Adjusting pin |
| 7. Moving wings | 8. Stationary wings | |

All Lincoln cars are now being equipped, at the factory with Hoo-dye shock absorbers both front and rear. This shock absorber operates entirely upon the principle of hydraulic resistance. Glycerine is forced from one chamber to another by the movement of wings (7) Fig. 51 inside the working chamber which are operated by the lever (2).

A special by-pass incorporated in the working chamber allows the lever to move approximately one inch either up or down without placing any restriction upon the action of the chassis springs. This is a very important feature, since a shock absorber or snubber, that begins to function at the slightest movement of the springs, stiffens the riding of the car considerably on good roads where the spring action is slight and there is no quick rebound. This by-pass (an improvement suggested by Lincoln engineers) has been incorporated by the Houdaille Company in all of their shock absorbers.

The working chamber or body of the instrument is bolted to the side bar of the frame and the lever (2) is attached by means of the link (5) carrying a ball joint at each end. These joints are covered with leather boots to keep out dirt and water.

The length of the link stud (5) determines the position of the instrument lever (2) and consequently the position of the movable wing

in the working chamber. To obtain a correct range of action on both spring compression and expansion the lever must be in line with the bolt holes in the base of the instrument when the car is in its normal or body load only, position. If for any reason springs are altered, care must be taken to adjust the link to suit the altered condition.

Adjustment

Adjustment is obtained by varying the size of a by pass within the instrument by turning the adjusting pin (6). When the arrow on the end of the pin points to "open" the resistance is at a minimum. At "O" the resistance begins to increase and reaches its maximum at "4"—See Fig. 52.

Generally it will be found that No. 2 position for front and No. 3 for rear instruments will give satisfactory results on Lincoln cars.

This setting is approximate however, and will vary slightly according to the conditions under which the car does service and to the various desires of owners.

Note:—In cold weather it is usually desirable to turn the adjustment back slightly, about one division, to compensate for the increased viscosity of the glycerine at low temperatures.

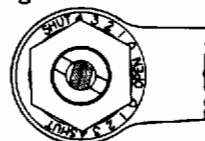


Fig. 52

Care and Lubrication

Every 5,000 miles remove filler plug (1) and fill reservoir with glycerine. The working chamber is kept full automatically when the reservoir contains glycerine. Do not use lubricating or other oils.

The ball joints have lubricator connections attached, and should be lubricated every 500 miles.

Periodical inspection should be made to see that all attaching bolts and clamps are tight.

Do not attempt to disassemble this instrument for purposes of inspection or repair. Instruments upon which repairs are necessary should be returned to the nearest Hoo-dye representative or to the Houdaille Co.

Tractor Brake

Fordson Tractors are now equipped with a transmission brake as illustrated in Fig. 53.

CONSTRUCTION: The brake shaft extends through the hollow reverse idler shaft into the transmission. The plates, one in front and one in back of the idler gear are mounted on this shaft. A coil spring is mounted on the rear end of this shaft and the whole assembly is held in place by a nut and cotter pin at the rear end of the shaft. The present type clutch pedal has an extension at the bottom, in the end of which a screw is assembled.

OPERATION: When the clutch pedal is depressed beyond the point where the clutch is released the screw at the lower end of the pedal pushes the brake shaft forward causing the two brake plates to grip the idler gear. The coil spring reduces the strain on the parts and prevents excessive pressure being applied to the plates.

ASSEMBLING: The brake parts together with the reverse idler gear are first assembled to the new style transmission plate, F-1678B. This assembly, F-2388B,

is interchangeable with the old style transmission plate and reverse idler assembly. In assembling the brake shaft, F-3310, the foot at the forward end must always be pointing upward in order to have the adjusting screw strike it. When equipping old tractors with the brake a new clutch lever, F-1760B, must be applied as it is the leg extending downward on this lever which operates the brake.

ADJUSTMENTS: The screw at the lower end of the clutch lever provides the

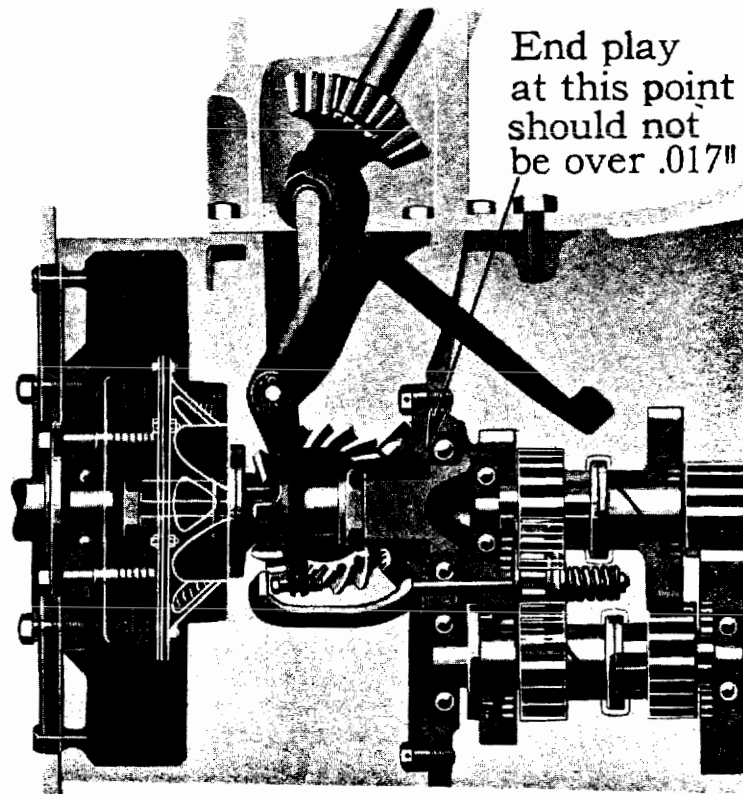


Fig. 53

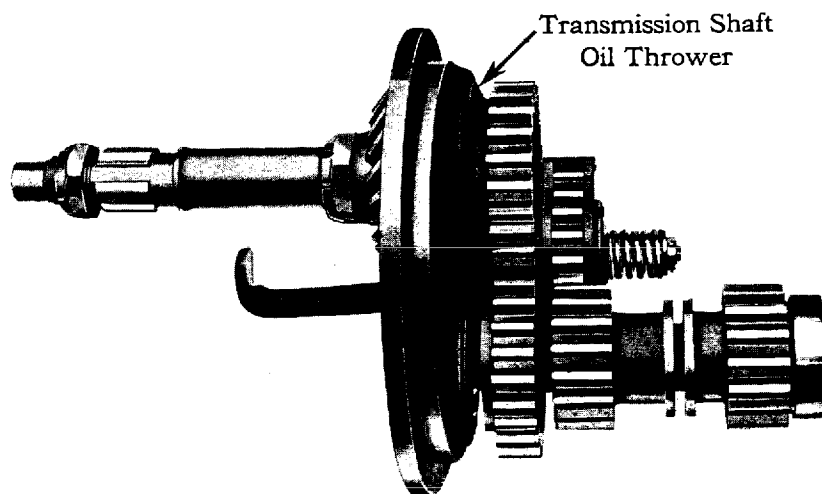


Fig. 54

only adjustment necessary. This screw is adjusted at the factory with a gap of about $\frac{1}{8}$ " between the head of the screw and the brake shaft. In time it may be found necessary to screw this out a few turns to get proper action. The screw should never be turned end for end but always have the head pointing toward the front of the Tractor. This adjustment can be made by removing the foot bracket from the side of the Tractor just below the clutch pedal.

The spring at the rear end of the brake shaft is adjusted at the factory to give a pressure of 250 pounds and is held in this position by means of a nut and cotter pin. The tension of the spring is not affected in any way by wear of the brake plates and needs adjustment very rarely. The spring, although under compression at all times, is held by a shoulder on the brake shaft, thus allowing the reverse idler gear to run perfectly free.

INSTALLING TRACTOR BRAKE IN OLD TRACTORS: When installing the new transmission brake on old Tractors, it is necessary to replace the following parts:

Clutch Lever	S-459	F-1760A
Reverse Idler Gear	S-344	F-2265A
Reverse Idler Shaft	S-346	F-2442AR
Reverse Idler Collar	S-348	F-2443R
Reverse Idler Shaft Collar	S-355	F-2475R
Transmission Housing plate	S-327	F-1678AR

These parts with the exception of the clutch lever are assembled together. Thus they can be removed with the Transmission Housing Plate.

The new transmission plate, reverse idler, and brake assembly, F-2388B, is then put into place using the old screws to hold it in place.

The latest type clutch lever, F-1760B, with adjusting screw F-4052 inserted must then be installed on the bracket, which is located on the underside of the dash.

Transmission Drive Shaft

The Tractor transmission drive shaft, F-1548B, has been changed by the addition of an oil thrower portion near the gear as shown in Fig. 54.

When the latest type drive shaft is installed in Tractors previous to engine No. 249,359 it will be necessary to replace the transmission housing plate as the construction of the housing plates previously used was such that the oil thrower portion would be left uncovered.

In order to prevent the possibility of oil leaking from the engine into the transmission it will be necessary whenever a drive shaft is installed to check the end play in the drive shaft. This can be determined by the distance between the F-1522, transmission shaft ball bearing, large, and the bearing seat of the transmission housing plate. The distance at this point should not exceed .017", see Fig. 53. If it is found that the end play is greater it will be necessary to install one or more F-2584 transmission housing plate oil shields between the ball bearing and the housing plate to take up the end play.

A few thousandths clearance should be left at this point in order to prevent undue wear on the ball bearings.

The end play between the bearing and housing plate should be checked every time a Tractor is disassembled for any purpose.

Lincoln Headlamps

Focusing and Adjusting

Proper focusing and aligning of Lincoln headlamps is made on all new cars at the factory and readjustment should only be necessary in case of accident or when replacing bulbs.

Focusing and alignment of Lincoln Headlamps should be done with the unloaded car standing on a level surface, with the light from the headlamps falling on a white wall or other light colored vertical surface at a measured distance of 25 feet from the front of the head lamps.

This wall must be in semi-darkness or shielded from direct light sufficiently that the light spots upon it from the headlamps can be clearly seen. Cover or disconnect one headlamp while adjusting the other.

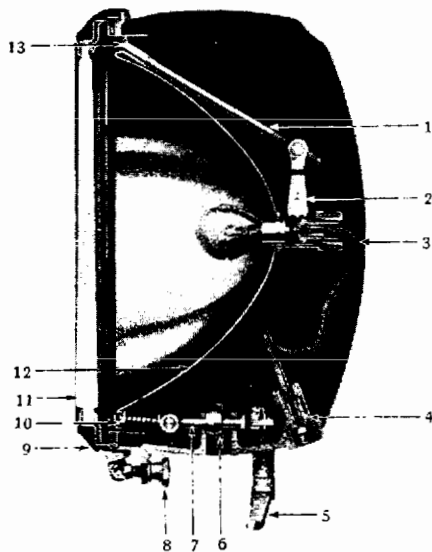


Fig. 55

Headlamp (Drum Type)

Reference Number	Name of Part
1.	Focus adjusting rod.
2.	Focus adjusting lever.
3.	Wire—connection plug to bulb socket.
4.	Connection plug socket.
5.	Tilting lever.
6.	Operating rod locating spring.
7.	Tilting reflector operating rod.
8.	Headlamp door catch nut.
9.	Headlamp door.
10.	Tilting adjustment screw.
11.	Headlamp lens.
12.	Reflector.
13.	Focus adjusting screw.

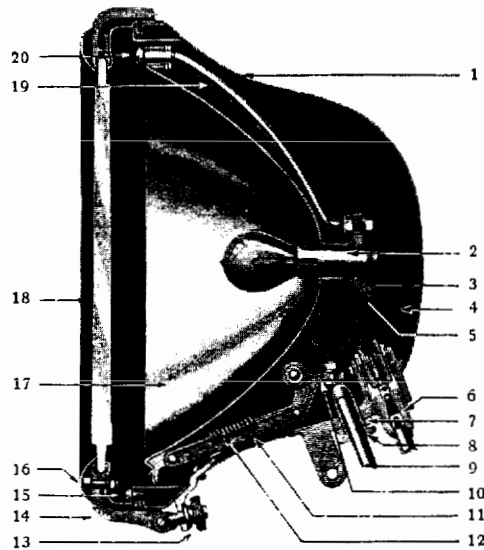


Fig. 56

Head Lamp (Bell Type)

Reference Number	Name of Part
1.	Headlamp shell.
2.	Socket for bulb.
3.	Bracket for socket.
4.	Wire-socket to connection.
5.	Socket bracket clamp screw.
6.	Connector plug assembly.
7.	Lock for stop adjustment.
8.	Tilting reflector stop adjustment.
9.	Tilting reflector plunger.
10.	Tilting reflector bell crank assembly.
11.	Tilting reflector return spring.
12.	Tilting reflector anti-rattling spring.
13.	Door clamp thumb nut.
14.	Door frame.
15.	Felt dust ring retaining screw.
16.	Glass ring retaining screw.
17.	Reflector.
18.	Headlamp lens.
19.	Bulb focus adjusting rod.
20.	Bulb focus adjusting screw.

FOCUS. Cut out a piece of heavy paper or cardboard to the dimensions given in Fig. 57. Open the lamp door and hold this card against the front of the lamp so that the centers of the two holes in the card lie in a vertical plane. If the bulb is properly focused, the images of the bulb filament will appear as a solid spot of light as shown in Fig. 58. If the bulb is too close or too far away from the reflector, two images will appear as shown in Fig. 59. In this event the bulb should be adjusted until a single spot of light is shown, by turning the adjusting screw (20) at the side of the reflector.

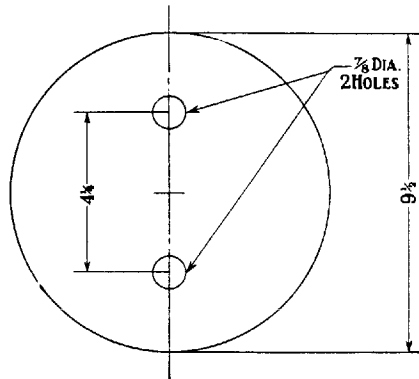


Fig. 57

ALIGNMENT AND TILT. With the unloaded car standing on the level surface with

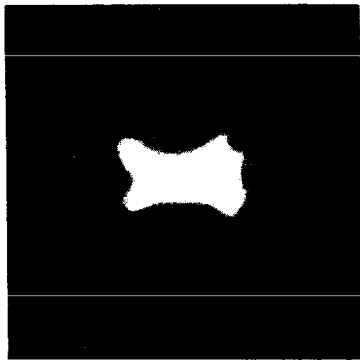


Fig. 58

the front of the headlamps 25 feet from the wall and with the headlamp doors removed, align and adjust tilt of reflectors as follows:

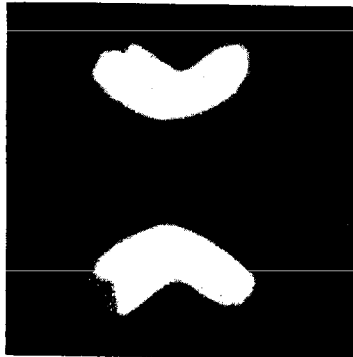


Fig. 59

The fronts of the two headlamps must be square with front of the car both vertically and horizontally. Do not attempt alignment by bending or twisting the headlamps themselves, but if necessary slightly bend the lamp brackets.

With the drum type headlamps properly aligned as above, adjust the tilt of each reflec-

tor by turning the adjusting screw (10) Fig. 55 at the bottom of the reflector to aim the beam. On the bell type lamp loosen check nut (7) Fig. 56 and turn adjusting screw (8) to aim the

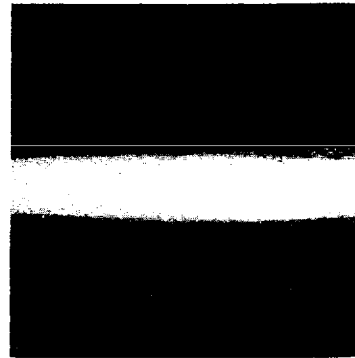


Fig. 60

beam. With the reflector in its normal upper position, the center of the spot of light as in Fig. 58 is $6\frac{1}{2}$ inches below the level of the center of the headlamp.

After properly focusing and aligning the headlamps as explained above, the door with lens should be carefully replaced. Due to the special lens, the light beam will now be spread to give a single band of light on the



Fig. 61

wall with its center line $12\frac{1}{2}$ inches below the level of center of headlamp. This will insure a tilt of 9 inches in the beam when the car is fully loaded, as required by the various state laws.

As a check on focal adjustment and alignment, the card shown in Fig. 57 may again be applied in front of the lens. If properly focused, a single band of light will appear on the wall as in Fig. 60.

If improperly focused, two bands of light will appear as in Fig. 61. If the reflector is improperly adjusted, a tilt of more or less than $12\frac{1}{2}$ inches will occur.

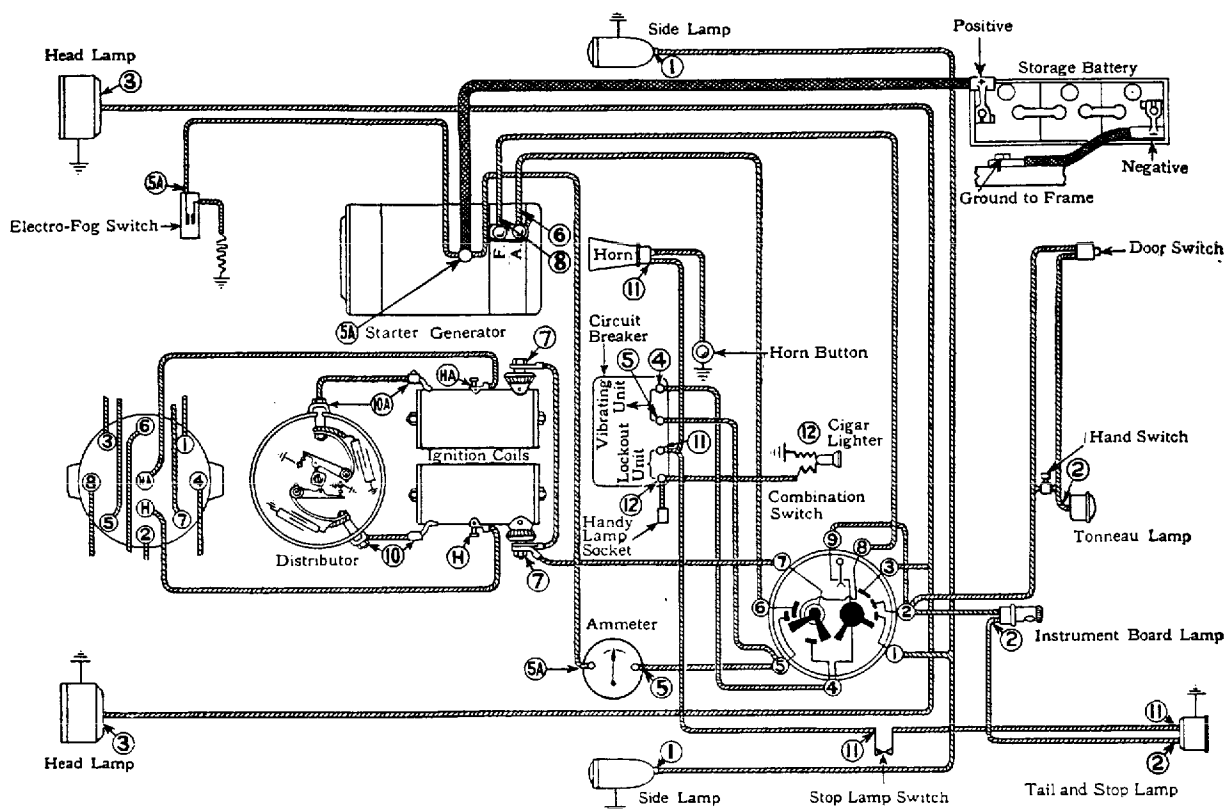


Fig. 62

Lincoln Wiring and Bulb Sizes

All Lincoln Cars are now being equipped at the factory with nickel plated drum type headlamps and a nickel plated drum type combination stop and tail lamp.

Fig. 62 is a simplified wiring diagram incorporating the necessary connections for the combination stop and tail lamp.

The various sizes of bulbs for use in the different lamps are as follows.

Lamp	C. P.	Contact	Voltage
Head	21	Single	6-8
Side	4	Single	6-8
Instrument	2	Single	3-4
Tail	2	Single	3-4
Stop	21	Single	6-8
Handy	4	Single	6-8
Dome	4	Single	6-8
Corner	4	Single	6-8

Reserve Supply in Lincoln Fuel Tank

The driver of a Lincoln always has a two gallon reserve supply of fuel after the main supply has been exhausted.

When the engine stops on account of lack of fuel simply turn the fuel control valve handle on top of the fuel tank over against the stop in the opposite direction.

Of course the vacuum tank will also be dry and it will be necessary to pump fuel into the vacuum tank before the engine can be started. This is done by closing the throttle and cranking the engine over with the electric starter for a few moments.

Lincoln Production Data

Car No.	Date	Car No.	Date
8500—	Dec. 22, 1922	10000—	April 4, 1923
9000—	Jan. 15, 1923	10500—	April 24, 1923
9500—	Feb. 20, 1923	11000—	May 19, 1923
		11500—	June 4, 1923

Number Markings on Model "T" Motors

Many dealers have raised the question as to the meaning of the several numbers which appear on different parts of the engine assembly.

In the assembly of the Ford engine there are several important operations, such as fitting of pistons, timing, hanging of transmission, testing, etc., that are numbered.

The men performing these operations are assigned numbers which are stamped upon the engine assembly at the completion of the operations. Thus the individual responsible for any particular line of work is obliged to leave his inspection mark upon the engine assembly.

This system of numbering operations assures us of workmanship of a high character, as it places the responsibility for satisfactory work directly on the workman.

Service Bulletin Binders

The Branches now have in stock binders for Service Bulletins as shown in Fig. 63.

These are very attractive, of fine imitation leather in a dark blue with gold imprint "Ford Service Bulletin."

The price is exceedingly low, i. e. \$.50 net each.

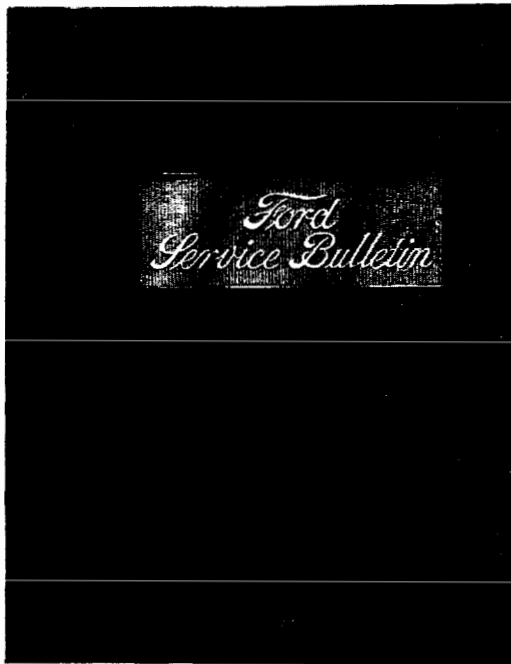


Fig. 63

A Timely Parts Display

Buchanan-Lyon Company, Ford dealers, Campbellsville, Kentucky, recently displayed "Old King Tut," made from genuine Ford and Fordson parts, in their show window.

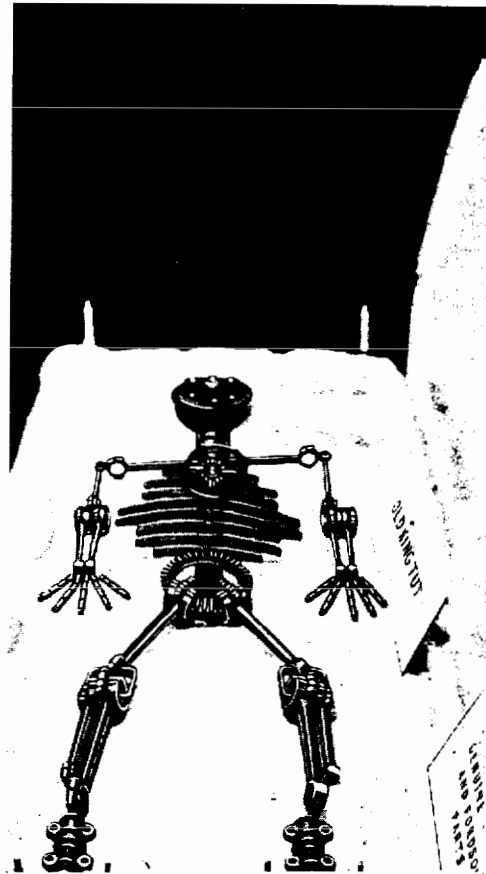


Fig. 64

It goes without saying that this timely display created a great deal of interest and attracted a large number of people to our dealer's place of business.

Model "T" Rear Axle Housing

The present type Rear Axle Housing cannot be used in connection with T 2583-191-B Drive Shaft Bearing Housing malleable type. No more of the previous type axle housings will be available after the present stocks are exhausted and thereafter when replacing axle housings on cars equipped with the malleable type roller bearing housing it will also be necessary to replace the drive shaft bearing housing and drive shaft ball bearing assembly using T 2583B-191C Drive Shaft Bearing Housing, two T 2591-188 Drive Shaft Ball Thrust Collar and one T 2591B-162 Drive Shaft Thrust Ball and Retainer Assembly.

Cut Away Model "T" Motor for Display Purposes

Fig. 65 illustrates the cut-away model "T" Ford engine, which we are now offering to dealers for display purposes.

There is no question but what this cut-away engine, if properly displayed in a dealer's sales room is bound to prove very interesting to prospective Ford purchasers. In addition, dealers will find that valuable advertising can be obtained by loaning such engines to schools for use in their mechanical courses.

The price of the cut-away engine complete with stand is \$65.00 net. In view of the fact that we are only able to build a limited number of these engines daily, it will be necessary for dealers, desiring them, to place early orders with their branches.

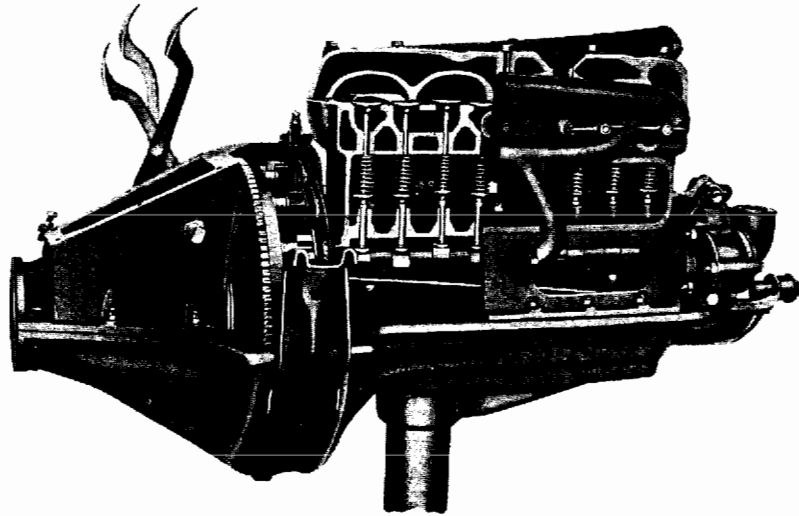


Fig. 65

Assembling Glass in Upper Windshield Frame on Lincoln

Some dealers have experienced difficulty in replacing upper windshield glass on the Lincoln touring, phaeton and roadster, due to the fact that the windshield is approximately $\frac{3}{4}$ " wider at the top than the bottom.

This makes it necessary to spring out the lower or open ends of the frame before sliding the glass into position.

The easiest method for accomplishing this is illustrated in Fig. 66. Hold the felt packing strip in position around the edge of the glass then spring downward and outward on the bar inserted in the end of the frame until the frame is sprung open far enough to receive the glass.

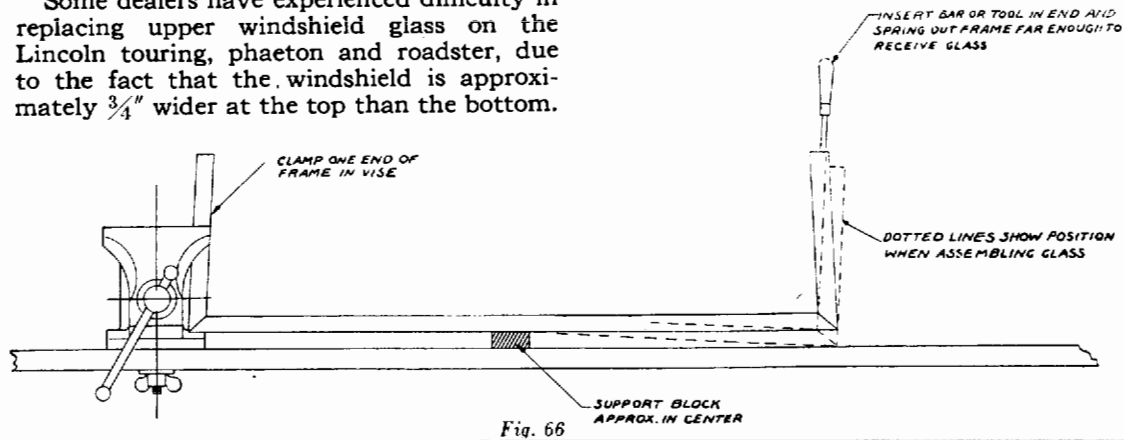


Fig. 66

**Cars bearing Motor Numbers 7,386,112 to 7,564,111
were shipped during April**

Serial Numbers of Tractors Assembled

April

295,532 to 306,914

Ford Service Bulletin

No. 6

Vol. 4

June, 1923

Page 41

JUL 27 1923

The Lincoln Carburetor

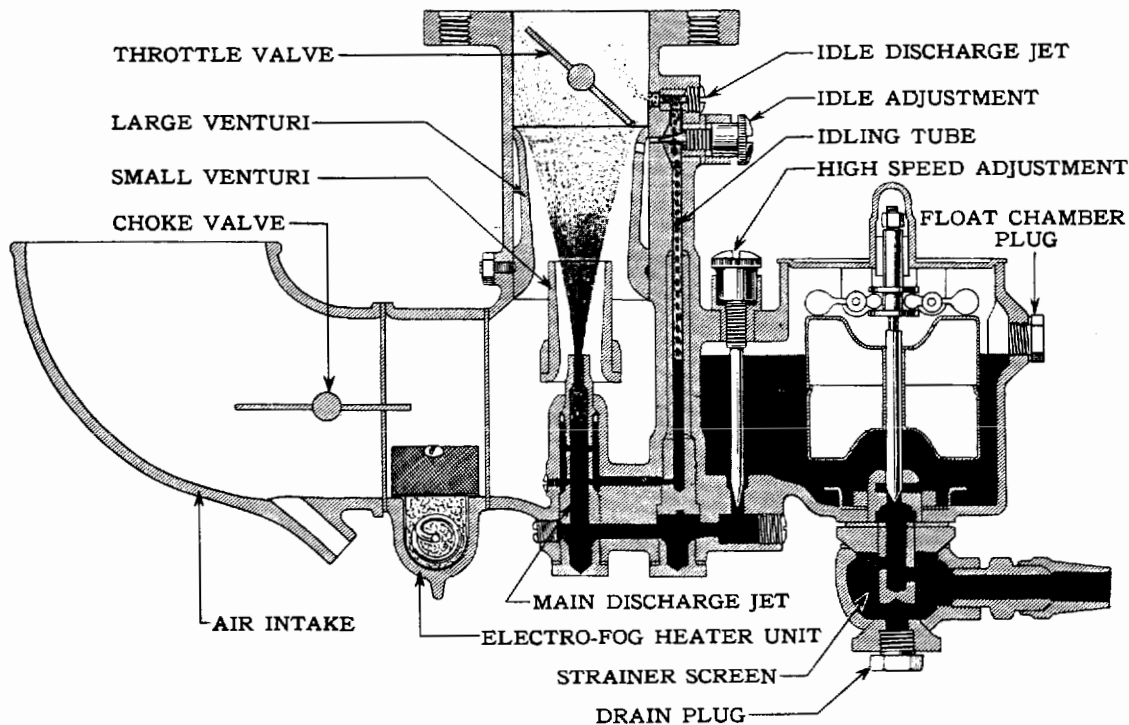


Fig. 67

The carburetor used on the Lincoln is one of the newest forms of the plain tube type, so-called, because having no air valves or metering needles, both the air passage and gasoline jet are of fixed size for all engine speeds.

The special features of this carburetor, which has been developed for the use of present day low grade fuels are:—

An idling adjustment incorporating a gasoline feed above the throttle.

An "accelerating well" which gives an extra supply of fuel just for a moment as the throttle is opened.

An "economizer" valve which permits the carburetor to operate on a very lean mixture at the partially closed throttle positions of average driving.

The Idling Jet

Earlier types of carburetors usually carried a mixing chamber in which the gasoline after its discharge from the nozzle was supposed to mix with the air and evaporate.

As the fuel used became heavier and heavier its limit of evaporation was reached and passed, with the result that at low speeds these mixing chambers became collectors of gasoline causing "loading" and "choking."

In the Lincoln carburetor the gasoline, during idle and low speed running, is carried up to the lip of the throttle, when it is discharged directly into the intake manifold in an extremely fine spray. See Fig. 67. In this way any collection of gasoline in the carburetor is prevented.

The idling feed is taken from the main jet so that the fuel is given alternative paths,

taking always the one leading to the greater suction. When the throttle is closed there is a very high vacuum above the throttle and practically none below it, therefore, the main jet goes out of action and the idling jet above the throttle supplies the necessary fuel. As the throttle is opened the vacuum above the throttle drops and that below the throttle increases. Thus the idle jet gradually ceases to function as the throttle is opened and the main jet supplies the mixture.

The Accelerating Well

It is a well known fact that with an economical and efficient mixture setting the engine always seems to lag in response to the opening of the throttle, even with a well heated intake manifold while adjustments that give the desired flexibility show a considerable increase in gasoline consumption. This is due to a relative lag of the heavy gasoline particles passing through the intake manifold to the cylinders, causing a temporary excess of air and deficiency of gasoline just after the throttle is opened.

Good acceleration with an economical carburetor setting therefore demands a temporarily richer mixture. Syringes, dash-pots and similar devices have been used for this purpose, but in this carburetor these have been dispensed with and the "Accelerating Well" principle is employed instead. By means of this device the extra gasoline discharge is

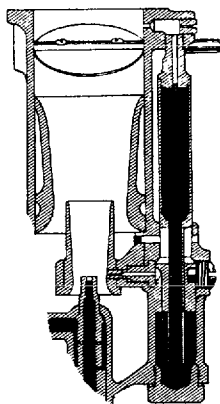


Fig. 68

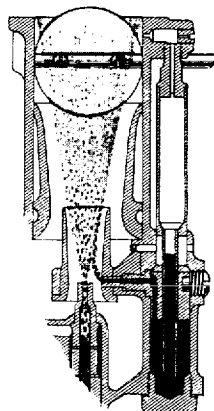


Fig. 69

automatically governed by the suction of the engine, thus giving a lively response to the throttle and the prompt, powerful acceleration which motorists so much desire.

The accelerating well action is illustrated in Figs. 68 and 69. With closed throttle the high vacuum in the intake manifold draws up a

column of fuel in the tube through the suction hole above the throttle.

When the throttle is opened the vacuum in the manifold drops and the column of fuel in the accelerating well tube discharges by gravity into the main jet, giving the temporarily rich mixture essential for good acceleration.

The Economizer Valve

It has been proven by actual driving tests and scientific research that a richer mixture proportion is necessary for full power at wide open throttle than for best economy at partly closed throttle.

With a carburetor giving a single mixture proportion under all conditions the best pull-

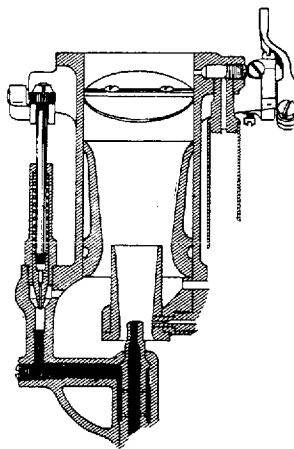


Fig. 70

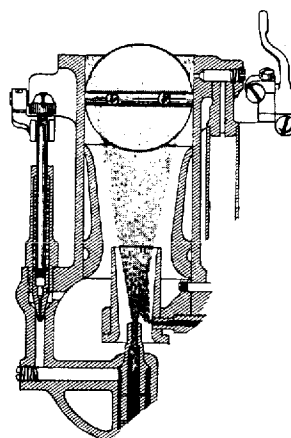


Fig. 71

ing power can be obtained only with a considerable waste of fuel during ordinary closed throttle driving. An engine operating at wide open throttle is very much more sensitive to low temperatures than at closed throttle and the average driver, not wishing to waste any time while the engine warms up, sets the mixture unduly rich.

To overcome these difficulties this carburetor is equipped with an "economizer" device which graduates the gasoline adjustment automatically and to the point of highest efficiency for each throttle position.

This device is illustrated in Fig. 70 and 71. Its action is based upon the fact that enlargement of the air opening into the jet reduces the effective suction in the discharge jet and gives a lower fuel consumption for a given size fuel metering orifice. A taper pointed valve is operated by the throttle in such a way that at the partly closed throttle positions of average driving when fuel economy is desired rather than full power of the en-

gine, a comparatively large air passage is opened into the main jet. As the throttle is opened the taper needle closes the opening restricting the added air inlet size to that of the small hole drilled thru the needle point; this raises the suction in the main jet and gives a richer and if properly adjusted, more powerful mixture than before.

Care and Adjustment

Never attempt to make any adjustments on the carburetor until the water in the cooling system is warm enough to cause the radiator shutters to open fully.

CAUTION:—Do not run the engine and make carburetor adjustments in a small unventilated room. Carbon monoxide is a product of combustion produced by all gasoline engines and is a deadly insidious poison to inhale.

If the engine should cease to perform properly first examine the fuel supply and see that there is fuel in the vacuum tank and carburetor; make sure that the strainer in the fuel line is not clogged. Disconnect the fuel line to carburetor at (9) Fig. 72. Remove screw (8) and the strainer body (9) may be removed and the strainer cleaned. Each time the valves in the engine are ground or carbon removed, the strainer should be cleaned. Also remove the idling jet tube Fig. 67 and clean. Also see that the breaker points are properly adjusted and the distributor clean. **Never** change the carburetor adjustment until all other possible sources of trouble have been investigated. Slight carburetor adjustment may occasionally be necessitated by seasonal changes in temperature or by a change in the grade of fuel.

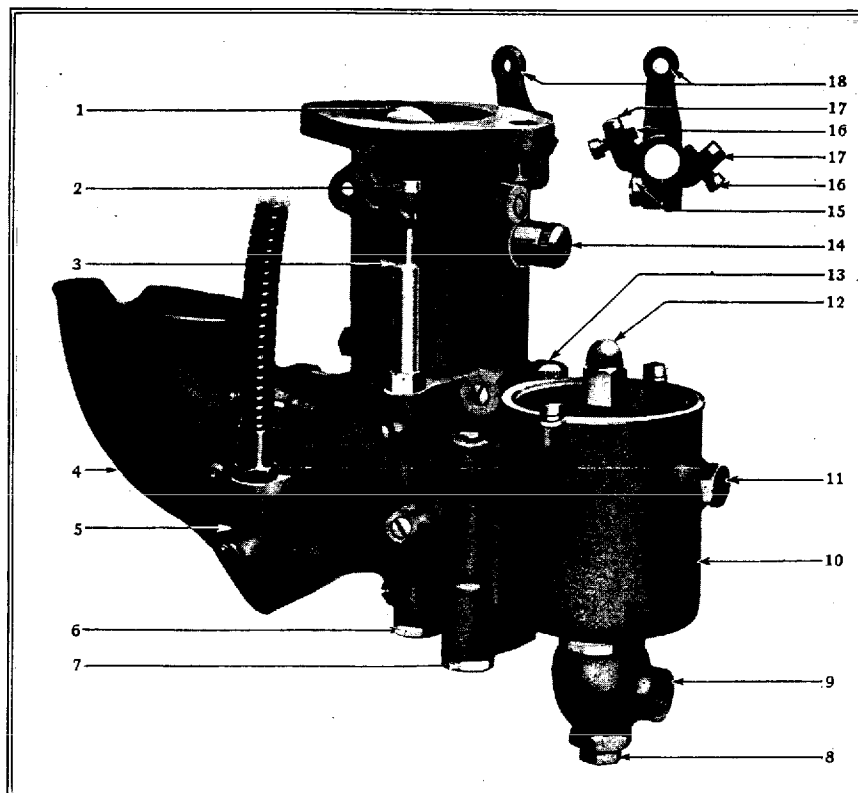


Fig. 72

- | | |
|--|--|
| 1. Throttle valve. | 10. Float chamber body. |
| 2. Economizer needle. | 11. Float chamber fuel level plug. |
| 3. Economizer valve guide. | 12. Float needle valve cap. |
| 4. Carburetor air intake. | 13. High speed adjustment screw. |
| 5. Electro fog generator heating unit. | 14. Idling adjustment screw. |
| 6. Accelerating well drain plug. | 15. Throttle lever clamp screw. |
| 7. Float chamber body. | 16. Throttle valve adjusting screw. |
| 8. Float chamber drain plug. | 17. Throttle valve adjusting screw lock. |
| 9. Strainer body and fuel inlet. | 18. Throttle lever. |

A large percentage of all supposed carburetor trouble is due to fouled spark plugs, breaker points improperly set, manifold leaks, lack of compression in the cylinders, or from valves not seating properly.

To determine if fuel is flowing to the carburetor remove the needle valve cap (12) Fig. 72 and be sure the plunger needle inside is all the way down. Fuel is not reaching the float chamber if the plunger can be pushed down.

The Idling Adjustment

Both the idling mixture and low speed or closed throttle running, up to about 8 miles per hour, are controlled by the idling adjustment screw (14) Fig. 72. This controls the inlet of air. See Fig. 67. Turning this screw clockwise gives a richer, counter-clockwise a leaner mixture.

The idling speed setting will be approximately 8 to 12 notches open from its fully closed position.

If after adjusting the idling mixture needle the engine idles too fast with the throttle closed turn the small throttle stop screw (16) to the left or counter-clockwise, until the proper idling speed is reached. This should be about 300 R. P. M.

When the engine is operating properly there should be a steady hiss in the carburetor. If there is poor compression in any cylinder or a manifold leak this hiss will be uneven.

The High Speed or Driving Mixture

The amount of fuel for the high speed or normal driving adjustment is regulated by the high speed adjusting screw (13) Fig. 72. Turning this screw down or clockwise closes the valve and admits less fuel, up or counter-clockwise, admits more.

To obtain the proper adjustment proceed as outlined below:

Run the engine until the radiator shutters are fully open. Place the spark lever in the normal driving position and set the hand throttle to a position that will give about 25 miles per hour on a smooth road.

Adjust the high speed adjusting screw (13) to the minimum opening that will give smooth running. This will be found to be approximately 21 to 23 notches from its fully closed position.

Several notches less may give better economy for continuous runs and a few notches more may be desirable for short runs in cold weather when the engine does not reach its normal temperature.

Furnish Car Number when Ordering Lincoln Service Parts

To secure prompt, accurate service on shipments of Lincoln parts it is absolutely necessary that the number of the car for which the parts are intended be furnished.

This applies especially to body fittings, interior hardware, etc., where a number of different designs and finishes have been used. When ordering top material, body trim, cushions, or upholstery specify pebble grain or long grain, bright or dull finish. When ordering Spanish leather for Phaetons and Roadsters specify blue, brown, or gray.

The car number is stamped on a plate on the front of the dash under the hood on the right hand side. The motor number is stamped on the left side of the crankcase between the first and second cylinders.

Previous to car number 6585 the car and motor numbers were different and much unnecessary delay and confusion has resulted from dealer's carelessness in ordering parts for these cars and giving the motor number as the car number.

We ask your cooperation in this respect that we may give better and quicker service.

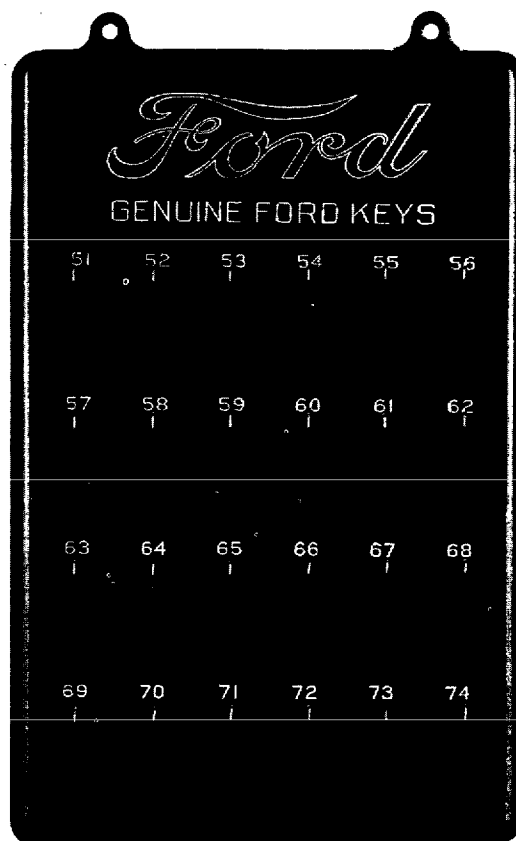


Fig. 73

Switch Key Racks

Figure 73 is an illustration of the Ford ignition switch key rack which branches are now in position to supply to dealers and garages at 40c net each.

This key rack which is designed to carry switch keys in series 51 to 74 inclusive is furnished in black enamel with white letters and is equipped with hangers so that it may be conveniently hung in dealers stock rooms.

The use of these key racks not only provides a convenient and attractive means of displaying switch keys but will also enable the dealer to dispense with the make-shift unattractive racks now in use in many places.

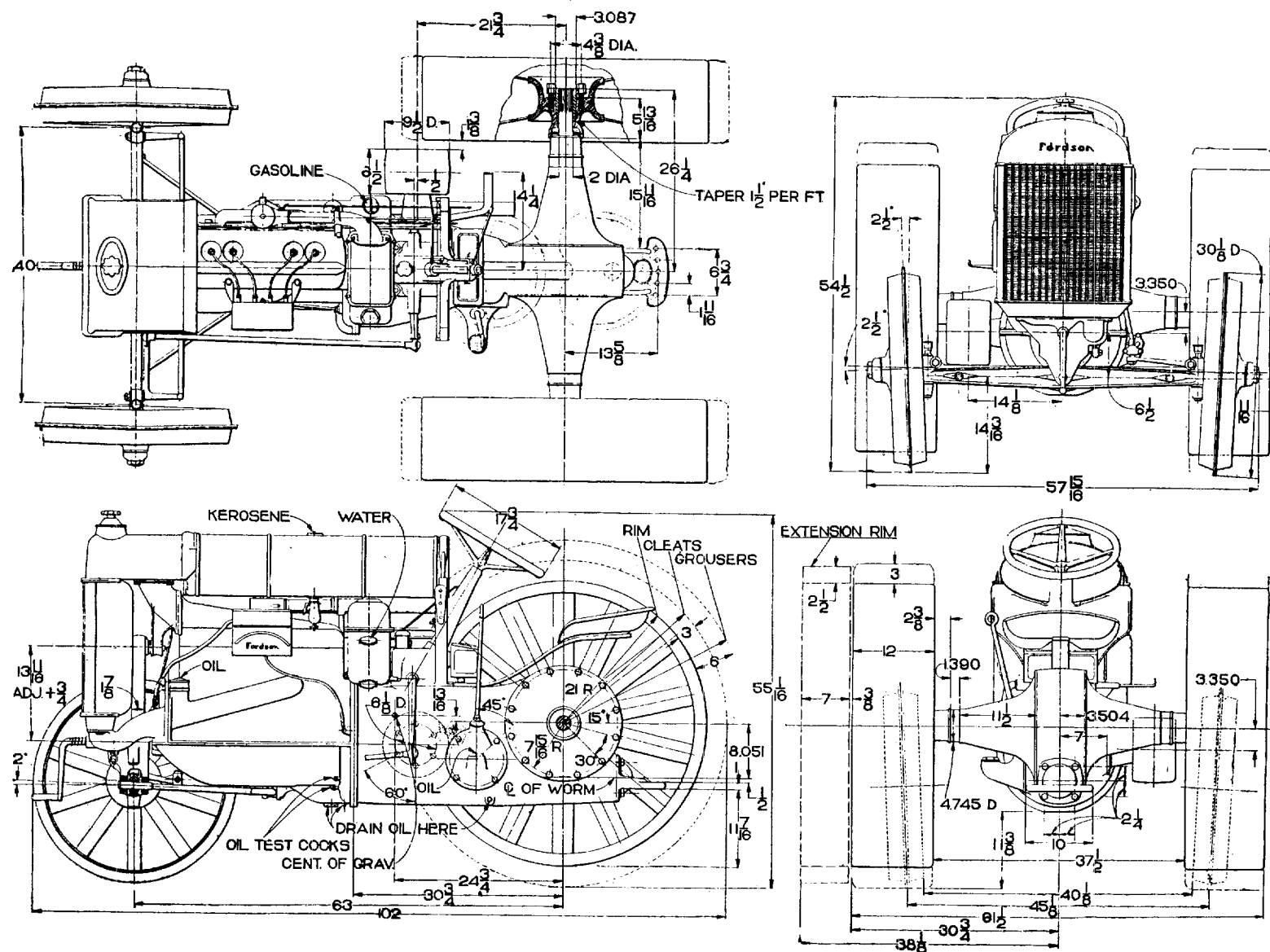


Fig. 74
Diagram of Fordson Tractor showing principal dimensions for attaching implements and accessories.

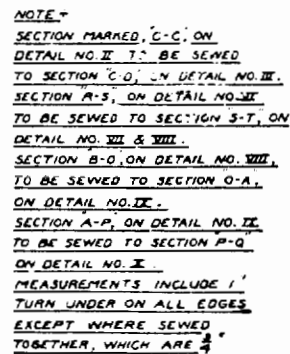


Fig. 75

Covers for Four-Door Sedan Upholstery

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

Upholstery that has been soiled during the course of repairs not only offsets the work of the dealer, regardless of how efficiently the repairs may have been performed, but invariably results in dissatisfaction on the part of the customer.

On pages 54 and 55 of the July, 1922, Service Bulletin, dimensions were printed of covers for the upholstery of the 2-door Sedan and Coupe.

In Figure 75 sketches and dimensions are shown of covers for the seats and insides of the doors of the 4-door Sedan.

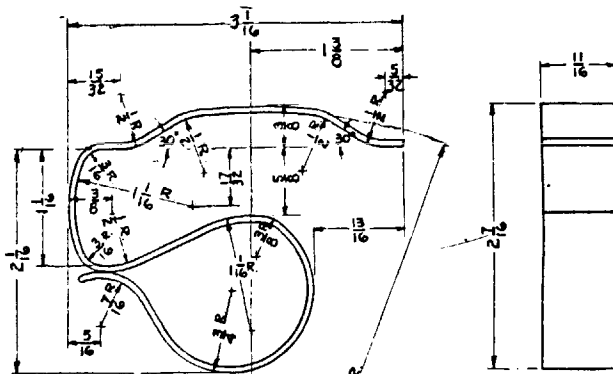
These covers should be made from eight ounce duck which is heavy enough to prevent grease spots or oil stains reaching the upholstery. Dealers should arrange to have as many sets of these slip-covers made up as is necessary to take care of their service requirements.

The cost of the covers cannot be compared with the results obtained from the standpoint of efficient service and satisfied customers.

Placing covers over the upholstery before under-

taking repairs shows above everything else that the dealer has the customers' interest at heart and desires to protect their property.

The clamps shown in Figure 76 are used for holding the covers on the panels. These clamps are installed by hooking them into the runway for the windows. The clamps shown in Figure 77 may be used for holding the covers on the seat backs.



DET-1- PANEL COVER CLAMP⁶ Fig. 76
 SPRING STEEL /
 STK. 1/2" THICK WGT. 12 LB.
 HEAT TREATMENT "SP"
 DEVELOPED LENGTH - 10"

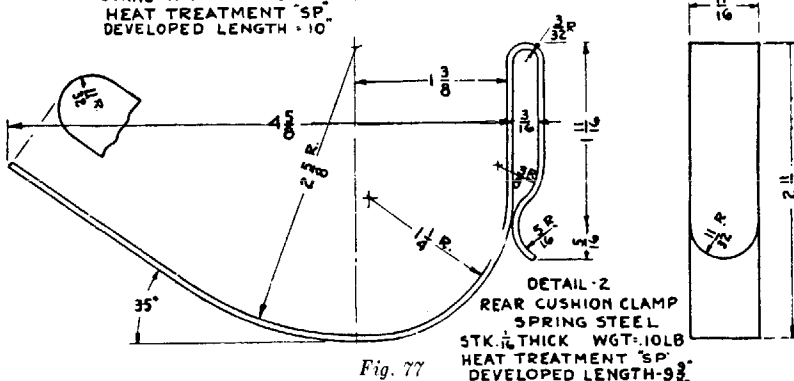


Fig. 77

Battery Sealing Nut Wrench

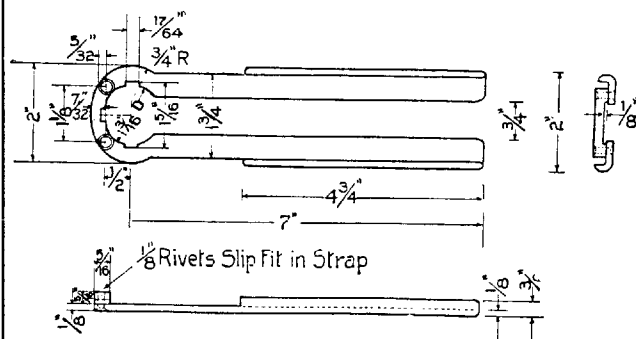


Fig. 78

Care must be exercised when removing the battery sealing nuts to prevent this part being injured, as both the sealing nuts and the threads on the cell terminal posts are made of lead and are easily marred, unless the proper type of wrench is used.

A special wrench for removing sealing nuts is shown in Figure 78. This wrench can be made locally at very little expense and will soon repay the dealer for the small amount involved. Under no circumstances should gas pliers or ordinary shop wrenches be used for removing the sealing nuts as their use is likely to injure the soft metal.

Tractor Transmission Housing Plate and Transmission Shaft

The latest type transmission housing plate, S-327B—F-1678B, and transmission drive shaft, S-335B, F-1548B, cannot be installed in Tractors not originally equipped with a brake, unless the transmission brake is installed at the same time.

Battery Sealing Compound

The use of a high-grade sealing compound is essential in any battery repair department.

Dealers can be certain of obtaining sealing compound that will give satisfactory service by placing orders for this material with our branches.

Battery sealing compound is furnished to dealers in seven and ten pound packages at a list price of 15c per pound.

In ordering specify M-6022, Sealing Compound.

Lincoln Service Hints

When lubricating the car do not overlook the lubricator connection on the end of the starter shaft. This is made easily accessible by removing the front floor board. One quarter turn of the lubricator gun handle every 250 miles will keep this point properly lubricated.

Failure to lubricate the starter shaft may result in the starter gears sticking which will cause difficulty in meshing the gears with the teeth in the flywheel rim or if the operator does succeed in meshing them they may not release properly with possible damage to the gears and starter mechanism.

Should the distributor breaker points seem to require frequent attention and the surface of the points becomes pitted or blackened after short periods of service, remove the inspection hole cover and make certain that the manual advance mechanism is well packed with grease. If such is not the case the oil vapor from the crankcase is liable to pass up through the distributor housing into the distributor head where it will be deposited on the breaker mechanism and burned and sooted

breaker points will result. This condition will also result from an excess of oil being placed in the oil cup on the side of the distributor head. This may be detected by observing the excess oil in the small trough on the top of the plate which carries the breaker mechanism.

When adjusting breaker points sufficient time should be taken to see that they are stoned so as to meet exactly square and parallel. Do not attempt to file breaker points, use an oil stone.

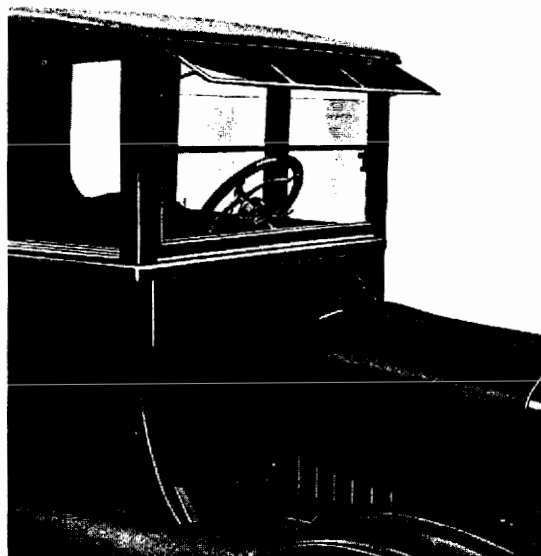


Fig. 79

Sell Visors For Two-Door Sedans and Coupes

The T-18150, visor and bracket assembly, which is regular equipment on the Four-Door Sedan can be easily and satisfactorily installed on the Two-Door Sedan and Coupe.

Dealers should call this to the attention of their parts salesmen so that owners of these types of Cars can be solicited to purchase Ford visors for their Cars.

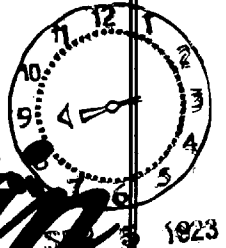
At the price of \$3.75 each, there should be a ready sale for these visors.

**Cars bearing Motor Numbers 7,564,112 to 7,738,372
were shipped during May**

Serial Numbers of Tractors Assembled

May

306,915 to 318,010



The Lincoln Motor-Generator

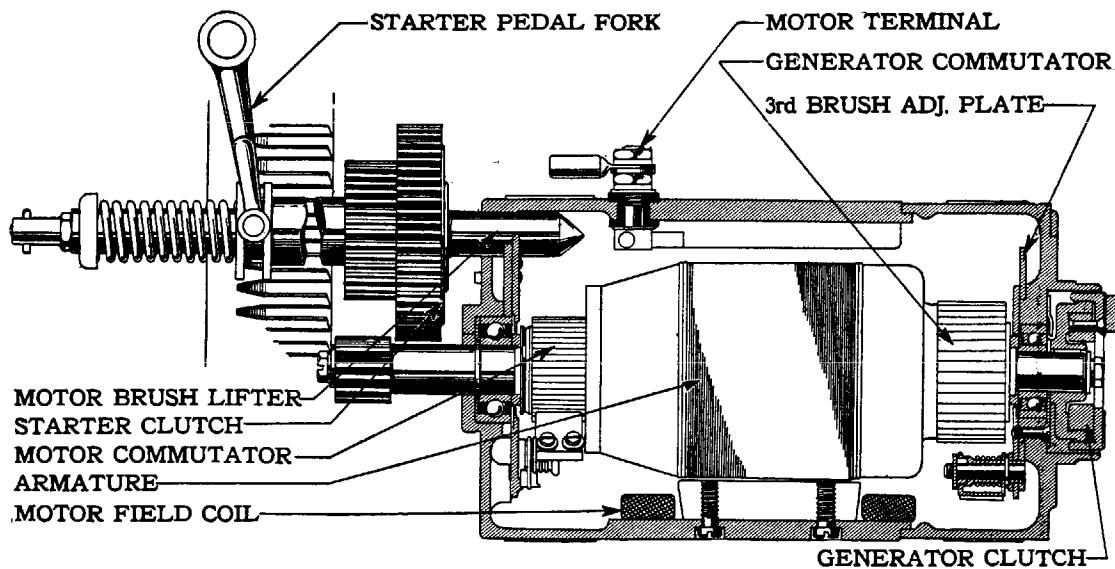


Fig. 80

The motor-generator supplies electrical energy for charging the storage battery, for supplying the lights, horn and ignition; and in addition, the same piece of apparatus operates as a motor to perform the cranking operation.

There are two sets of windings in both the field coil assembly and in the armature, one set for operation as a generator and one set for operation as a motor to crank the engine. The generator armature winding together with the generator winding in the field coil are connected in the circuit when the ignition switch is "ON" at all times, except when the starting pedal is depressed.

There is no electrical connection between the motor and generator windings on the armature, or between the series and shunt field coil windings.

When the engine is operating at slow speeds the generator voltage is not sufficient to

provide current for lighting and ignition. The storage battery is then the source of ignition and lighting current. At low engine speeds also, current may flow from the battery through the generator windings and cause the armature to revolve faster than the engine drives it. Under this condition the over-running generator clutch at the forward end of the motor generator permits the armature to revolve faster than the driving shaft.

When cranking the engine the motor generator drives the flywheel through a pair of sliding gears which are at the rear of the motor-generator, and controlled by the starting pedal, see Fig. 80. An over-running clutch, called the starting clutch, is built within the hub of the larger of these gears to prevent the flywheel driving the generator armature at high speed through the starter gears after the engine starts running under its own power and before the starting pedal is released.

The driver should make a practice of releasing the starting pedal as soon as possible after the engine starts, to insure long life of the lubricant within the starting clutch. The lubricator connection on the end of the starting shaft, see Fig. 80, should be lubricated every 250 miles giving it $\frac{1}{4}$ turn of the lubricator gun. Failure to keep the starting clutch properly lubricated and failure of the driver to refrain from the practice of keeping the foot on the starting pedal longer than necessary after the engine has started running under its own power, may result in sticking of the clutch. This condition may cause the armature to be driven at a dangerous speed, due to the gear ratio between the armature and the flywheel and the windings may be thrown from the armature. In cranking the engine the following events occur in the order given:

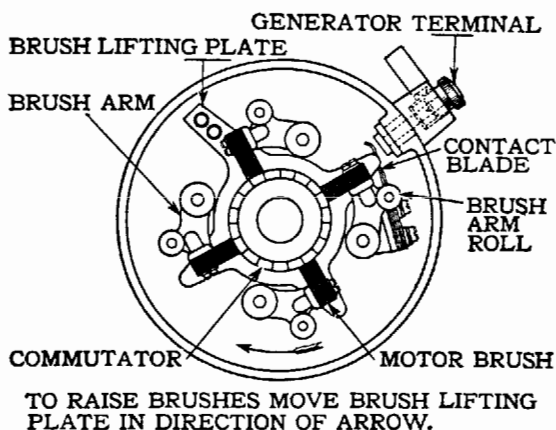


Fig. 81

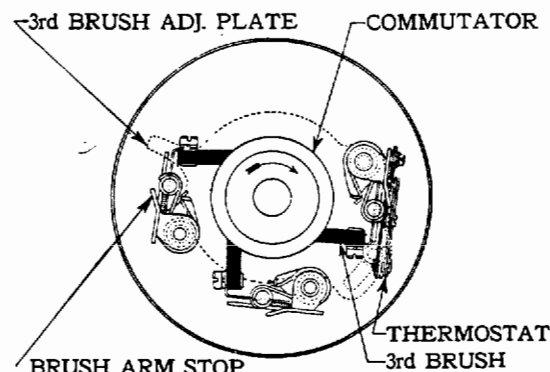
(a) When the ignition switch is turned "ON" current flows through the generator windings "motoring" (causing the armature to revolve) the generator so that the starting gears can be easily brought into mesh when the starting pedal is pushed down. Failure of the generator to "motor over" may be due to poor brush contact on a dirty commutator; to a loose connection in the shunt field or charging circuit; to a slightly sticking generator clutch resulting from lack of lubrication; to a weak battery or to mechanical friction of parts within the motor-generator.

(b) Meshing the gears: The first part of the movement of the starting pedal shifts the starting gears into mesh between the flywheel and armature shaft pinion. In meshing these gears, do not try to force them if they should not mesh easily but simply release the starting pedal thus giving the gears a chance to change their relative position. Then depress the starting pedal again.

(c) Generator Switch: Further movement of the starting pedal operates the generator switch which breaks the circuit between the battery and generator windings, thus preventing the motor and generator windings from opposing each other, a condition which would cause a very slow cranking speed. The switch blade makes contact with the underside of the generator armature terminal post of the motor generator while unit is generating but must break contact during cranking. See Fig. 81.

(d) Cranking: The last part of the movement of the starting pedal operates the motor brushes dropping them into contact with the motor commutator and completing the circuit between the motor windings and the battery. The engine is then cranked. This requires a heavy discharge from the battery. There must be no loose or corroded connections, in this circuit, which includes the battery terminal connections, grounded lead from the battery to the frame of the car, motor connections and contact of the motor brushes.

Upon releasing the starting pedal the above operations are reversed leaving the generator windings in circuit for the generation of current.



Thermostatic Control:

This device operates in the case of an excessive charging rate to protect the generator from overheating and the storage battery from overcharging. The thermostat is mounted on the third brush arm in position readily influenced by radiated generator heat. See Fig. 82.

The thermostat consists essentially of a coil of resistance wire and a set of contacts. The blade holding one of the contact points is made from a piece of bi-metal consisting of a strip of brass welded to a strip of nickel steel. This combination warps at its free end when heated, due to the greater expansion of the brass side. The contacts, normally closed, are caused to separate at a temperature of

195 to 205 degrees F. within the generator. When the contact is broken, the field current, which previously passed through the contacts is shunted through a resistance. The direct field circuit is restored as soon as the temperature has again become normal. No attention is required by the thermostat and its operation which is accompanied by a sudden drop of 45-50 per cent in the ammeter reading, should cause no concern.

Regular inspection of the Motor Generator.

(a) All brushes should be of sufficient length and the brush spring tension adequate. All brush arms should be free on the pivot posts. Brushes should not be chipped, cracked, or loose on the brush arms.

(b) Both motor and generator commutators should be free from excess oil. Whip off excess oil and grease. The overflow of oil from the bearings may foul the commutator if the bearings have been excessively or carelessly lubricated. **AVOID THIS.**

(c) Commutator should not be excessively worn or burnt. The mica on the commutators should be undercut approximately $\frac{1}{16}$ inch. Remember that commutators should be round and concentric with the bearing seats.

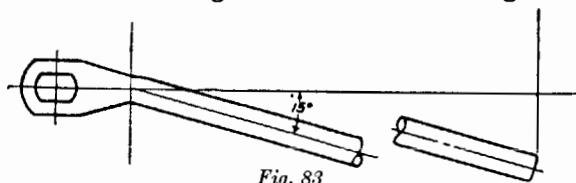
(e) Both the motor and generator clutches should be packed with grease of a grade similar to vaseline.

(f) All terminal nuts and screws should be tight.

(g) Squeaking brushes can be easily eliminated in the majority of cases by carefully fitting their seats to the commutator by the use of a strip of sand paper or sand cloth. Never use emery cloth for this purpose. The squeak may be due either to a poorly seated brush, improper brush spring tension, or to a hard spot in the surface of the brush.

Wrench for Special Screw in Steering Sector Arm on Lincoln

Tool No. 15Z-6495 Wrench for Steering Arm Nut may be greatly improved by bending the handle at an angle of 15° as shown in Fig. 83.



The wrench bent in this way may be used for removing or assembling the screw, with the fenders and dust shields in place, which is not the case when the handle is left straight.

Wrench for Lincoln Fuel Gauge Glass Retainer

The retainer which holds the fuel gauge glass in position is often difficult to tighten sufficiently to hold the gaskets under and above the glass in position. When they become wet, from rain or washing the car, they frequently shrink and pull away from under the retaining cap, causing a leak at this point.

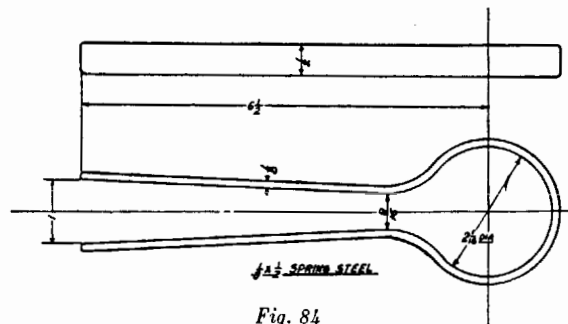


Fig. 84 illustrates a simple wrench for tightening these caps which can be made locally and at little expense. Make certain that the inside of the clamping surface is smooth to avoid marring the nickel finish on the cap.

Fitting of Ford Pistons and Rings

Ford pistons are fitted in the cylinder bore tight on .004" and free on .002". To determine the proper clearance between piston and cylinder wall it is necessary to use feelers. Because of the possibility of piston being out of round the feelers should be tried at several points around the bore of the cylinder.

Ford piston rings are cut .002" taper and are stamped "Ford" on the small diameter. Piston rings should be fitted to pistons with this marking up or toward the top of the 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 should fit in groove with .002" to .004" end play.

The ring gap clearance is now .008" to .015" for the top and middle rings and .004" to .008" for the lower ring.

As the top piston ring has been lowered $\frac{1}{16}$ ", the top rings therefore will not travel the full length of the cylinder bores, and in view of this fact, it will be 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.

Service that Builds Good Will

The delivery of a Lincoln Car is but the beginning of the dealer's relationship with the purchaser. If this relationship is to be mutually satisfactory the dealer must see that the new owner is properly instructed in the care and operation of his car, so that he will obtain the maximum efficiency and satisfaction from its use.

Dealers should call new owners' attention to the importance of systematic lubrication and to the necessity of changing the engine oil regularly.

In addition to calling the attention of owners of new cars to the importance of

Fig. 86. The speedometer reading is taken, 400 miles added and this total filled in, with pencil, in the blank space on the card. This is the mileage at which the first general inspection and change of oil is due. When the car comes in for this inspection erase these figures and add 750 miles to the speedometer reading and fill in these figures on the card. This procedure should be repeated every 750 miles thereafter except during cold weather when the oil should be changed every 400 miles because of the greater tendency to crank-case dilution.

This is not an expensive thing to do and the returns in the way of good will and the appreciation of your owners more than repays the dealer for the small expense involved. It also affords an excellent opportunity to explain the Lincoln Four Months Service Policy to the owner and gives concrete evidence of the dealer's desire to assist the purchaser in getting the maximum service



Fig. 85

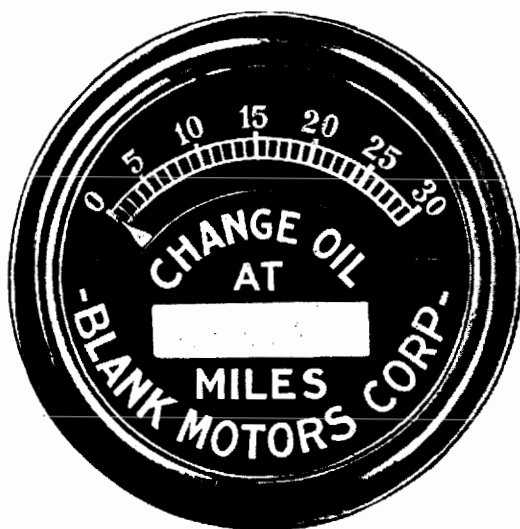


Fig. 86

this matter, several dealers have adopted the following plan to insure owners having the work taken care of at the proper time:

Upon delivering a new Lincoln, a card, Fig. 85 is placed on the oil pressure gauge between the bezel and the glass as shown in

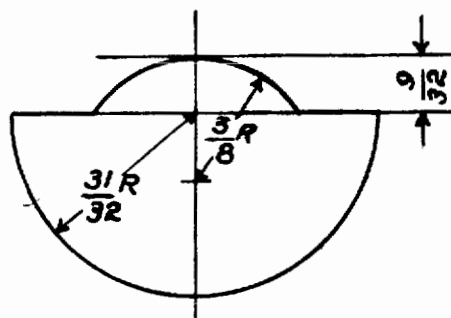


Fig. 87

from his car. The driver is also constantly reminded of the importance of changing the engine oil and when this should be done.

The card should be cut to the dimensions given in Fig. 87 and printed on a good grade of bristol stock, preferably in white on a black back ground. Black letters on a white back ground are satisfactory but will soil much easier and not harmonize with the finish of the instruments.

The nuts on the back of the instrument board which hold the oil gauge in position should be loosened sufficiently to allow the gauge to be pulled out far enough to remove the bezel and glass.

When reassembling, first put in the gasket, then the glass and next the card, then replace the bezel and screw down tightly. Tighten gauge to dash.

Equipment and Instructions for Unloading Ford Bodies

Investigation shows that dealers' men frequently damage and mar Ford bodies in removing them from freight cars. This is accounted for by the fact that many dealers do not have proper equipment for handling bodies.

Body handling tools can be easily made up from the following sketches:

Detail 1 is a lifting handle made from round machine steel. Two of these handles are required for carrying the rear of the body.

Detail 2 is a lifting handle for front of body. This is made from straight grain ash or oak.

Bodies are either loaded on end and bolted to side of freight car or laid in normal position and bolted to floor.

To unload bodies bolted to sides of car it is first necessary to saw the shipping boards in two on both sides of body and let body down in normal position.

When bodies are bolted to floor remove lag screws holding shipping boards to floor and slide rear end of body out of car door. When part way out remove bolts which hold body at rear to shipping boards. Next insert round steel lifting handles in rear frame lug bolt holes as shown in Fig. 89. Then with these handles pull body of car far enough to permit removal of front shipping boards.

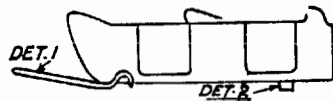


Fig. 89

Next pull body out still further so that the wooden lifting handle can be placed under the front of the body as shown in Fig. 90.

The body can now be lifted clear of the freight car and placed on chassis, horse benches, or other supports. It will be noted that the front lifting handle is long enough to permit carriers to straddle chassis when setting body in position.

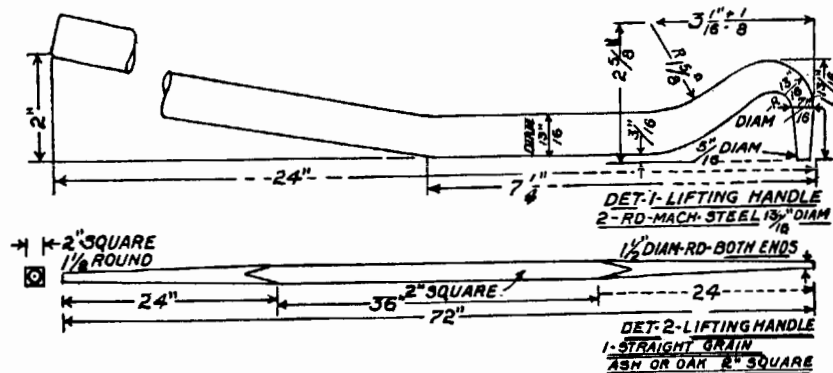


Fig. 88

Next remove lifting handles and bolt body to chassis.

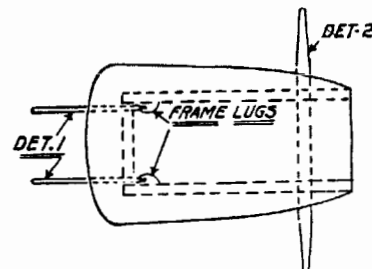


Fig. 90

These handles which can be used on closed as well as open bodies should be a part of the equipment of every dealer who receives freight shipments of Cars. Their use not only facilitates the unloading of cars, but also enables the workmen to get the bodies out without damaging and marring them.

Orders for Ford Upholstery Cloth

Due to the number of different kinds of upholstery cloth which have been used in Ford Closed Bodies, dealers should accompany all orders for upholstery or upholstered parts, such as doors, with a sample of the cloth desired.

Do not overlook this as otherwise your orders can not be given prompt attention.

Tractor Pulley

In Fig. 91 is shown a cross section of the Tractor Pulley.

It will be noted that the S-906 — F-3127, drive pulley felt retainer should be a press fit in the housing.

Also it is necessary to occasionally replace the S-905 — F-3138, drive pulley felt washer in order to prevent oil leaking from the pulley. If it is found that one felt washer does not exert enough pressure to retain the oil, one and one-half felts should be used.

In order to prevent looseness in splines and undue wear on the drive pulley bushing, S-904—F-3131, it is necessary to keep the nut on the tapered end of the pulley shaft tight at all times. Dealers should instruct owners to inspect and tighten this nut occasionally.

Tractor Two Lead Worm Discontinued for Service

We have discontinued supplying S-21—F-1528, worm, two lead type. Whenever dealers have occasion to replace a worm of this type in an old Tractor, it will be necessary to install either S-21B or S-21C, three lead worm, and S-20B—51 tooth worm wheel.

Until further notice dealers may continue to supply the present type parts in exchange for two lead worm and 35 tooth worm wheel at one-half list price, returning the old parts to the branch in the regular way. It is understood that this exchange is only in order when it is necessary to replace S-21, worm, two lead type, through failure of that part and does not mean that old style parts that are giving satisfactory service are to be replaced.

In handling replacements of this kind it will be necessary to bear in mind that while either S-21B or S-21C worm can be used with S-343, transmission gear large (shallow splined), it will be necessary in any Tractors constructed with S-343B, transmission gear large (deep splined) to use only the S-21C, worm, which is designed with deep splines.

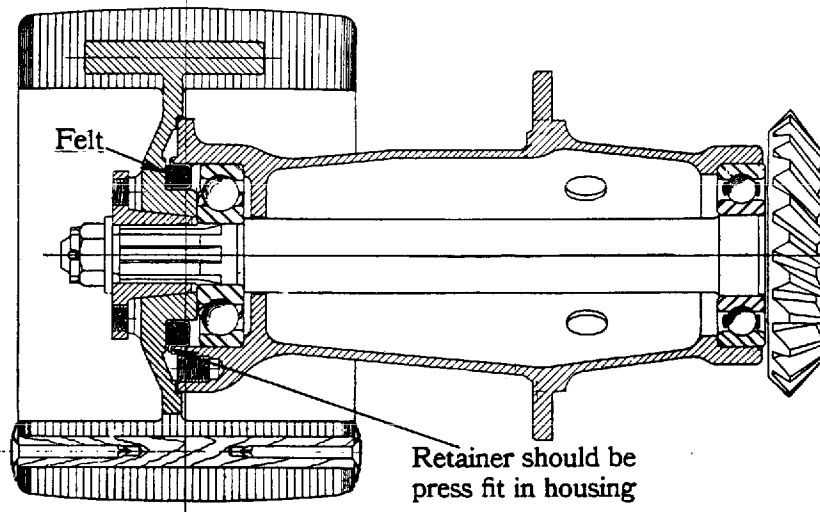


Fig. 91

Novel Window Display

The Schoeb Motor Company, Ford Dealers of Augusta, Kansas, have attracted considerable attention to their place of business by displaying in their showroom window, a miniature aeroplane Fig. 92, which, with the exception of the small electric motor for revolving the fan, is constructed entirely from Ford parts.

A novel or attractive window display is an efficient and yet inexpensive method of advertising and dealers should not overlook the opportunities it presents.

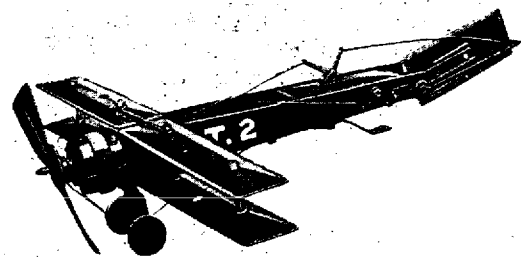


Fig. 92

Ordering Lincoln Body Parts

When ordering finished wooden parts for closed bodies, such as finish moulding around the windows and vanity cases, etc., be sure to specify whether mahogany or walnut is wanted. This will save much unnecessary delay in procuring these parts, as we have no record whereby we can tell from the motor number whether the car was finished in mahogany or walnut.

Replacement Policy on "T" Connecting Rods, Transmission Bands, Magnets, Magneto Coil to Dealers, Garages and Owners

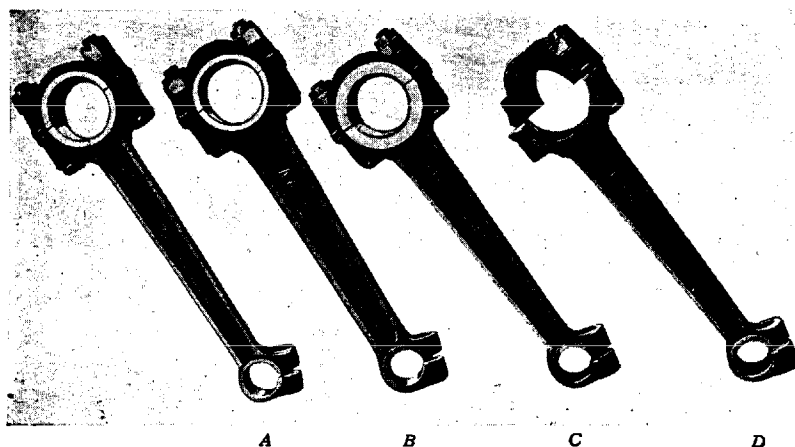


Fig. 93

Connecting Rods

Branches will exchange Model "T" connecting rods bearing genuine Ford Forging trade marks with Dealers, Service Dealers and Garages at 30 cents net, each; with owners at 60 cents net, each. In order to take advantage of this special price, garages must return connecting rods in need of re-babbitting direct to the branch. If garages prefer to handle this exchange with the dealer, the latter will make the exchange with the garage at 40c net, each, thus allowing the dealer a margin of 10c to cover cost of handling.

Connecting rods returned less caps will be replaced with new rods complete to Dealers and Garages at 45 cents net, each; with customers at 75 cents net, each.

Fig. 93 shows the three different types of Ford Connecting Rods. The rod designated as "A" is the present type light rod used since the latter part of 1920. Between 1915 and 1920 the heavier type rod listed as "B" was used. Both of these rods have a forging bore of $1\frac{3}{8}$ " and are babbitted $\frac{1}{16}$ " thick.

"A" and "B" rods can both be exchanged on the basis outlined above.

The old style heavy rod used prior to 1915 designated as "C" had a forging bore of $1\frac{1}{2}$ " and was babbitted $\frac{1}{8}$ " thick. There is no exchange on this rod and Dealers should sell the latest type connecting rods when the old style parts are presented for adjustment. "D" shows the same rod without the babbitt. Note that the cap bolt holes cut into the babbitt.

Transmission Bands

Transmission Bands may be exchanged with dealers and garages at 25 cents net, each; with customers at 45 cents net, each. If the garage prefers to make this exchange with the dealer the cost, in that case, will be 35c net, each, which allows the dealer 10c net, each, to cover his cost of handling.

Magnets

Within three months the present type $\frac{3}{4}$ " magnets which have become demagnetized may be replaced gratis, beyond three months magnets may be exchanged with dealers at \$1.25 net, per set; with garages and customers at \$1.75 net, per set.

Magneto Coils

Within three months $\frac{3}{4}$ " magneto coil assemblies of the present type may be replaced gratis; beyond three months and up to one year coil assemblies may be exchanged at \$1.50 to dealers and \$2.00 net, each, to garages and customers.

The Battery Filling Plugs must be kept tight, so as to avoid spraying out the solution.

Keep the battery clean. Dampness or dirt on the battery permits the electric current to leak away and attracts and holds small quantities of battery solution which in time accumulates sufficiently to corrode terminals and rot the wood case.

If the battery has become wet, before drying it go over it with a rag dampened with ammonia or soda solutions. This will counteract the effects of the battery solution.

New Price on Ford Battery

Dealers report that the recent reduction in the price of the Ford battery to \$18.00 has greatly stimulated battery sales.

Surely this new price will remove any sales resistance that may have existed on the part of those purchasers who are influenced more by the matter of price than they are by the quality of the article they are buying.

Comparing the Ford battery with competing batteries ought to be sufficient to convince any buyer of its superiority. First of all, the Ford battery is a 13 plate battery, constructed from the highest grade of materials obtainable. It is superior in starting ability and life to competing batteries having, as a rule, only 11 plates. In addition, it is backed by the service facilities of the greatest dealers organization in the world and guaranteed against defects by the Ford Motor Company. Your customers appreciate what this means.

The new price makes the Ford battery the lowest priced quality battery on the market, and should place it within the reach of those owners who heretofore, because of price, have purchased inferior batteries.

The selling arguments are all in favor of the Ford battery and dealers should not be satisfied with less than 100 per cent of the battery replacement business.

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 first style rings were punch marked and installed with side having marking towards top of piston.

For some time we have been using rings having a small groove around the outside diameter of the ring near one edge; this edge should be fitted towards the top of the 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.

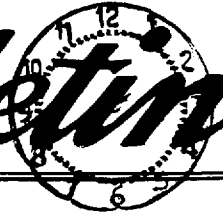
In order to maintain the balance of the motor, it is necessary when replacing pistons to make sure that the new pistons are of equal weight; this can be determined by weighing the various pistons with connecting rods assembled.

**Cars bearing Motor Numbers 7,738,373 to 7,927,374
were shipped during June**

**Serial Numbers of Tractors Assembled during
June 318,011 to 327,011**

Ford Service Bulletin

FOR CO
DEARBORN



No. 8

Vol. 4

August, 1923

Page 57

OCT 8 1923

The Lincoln Clutch

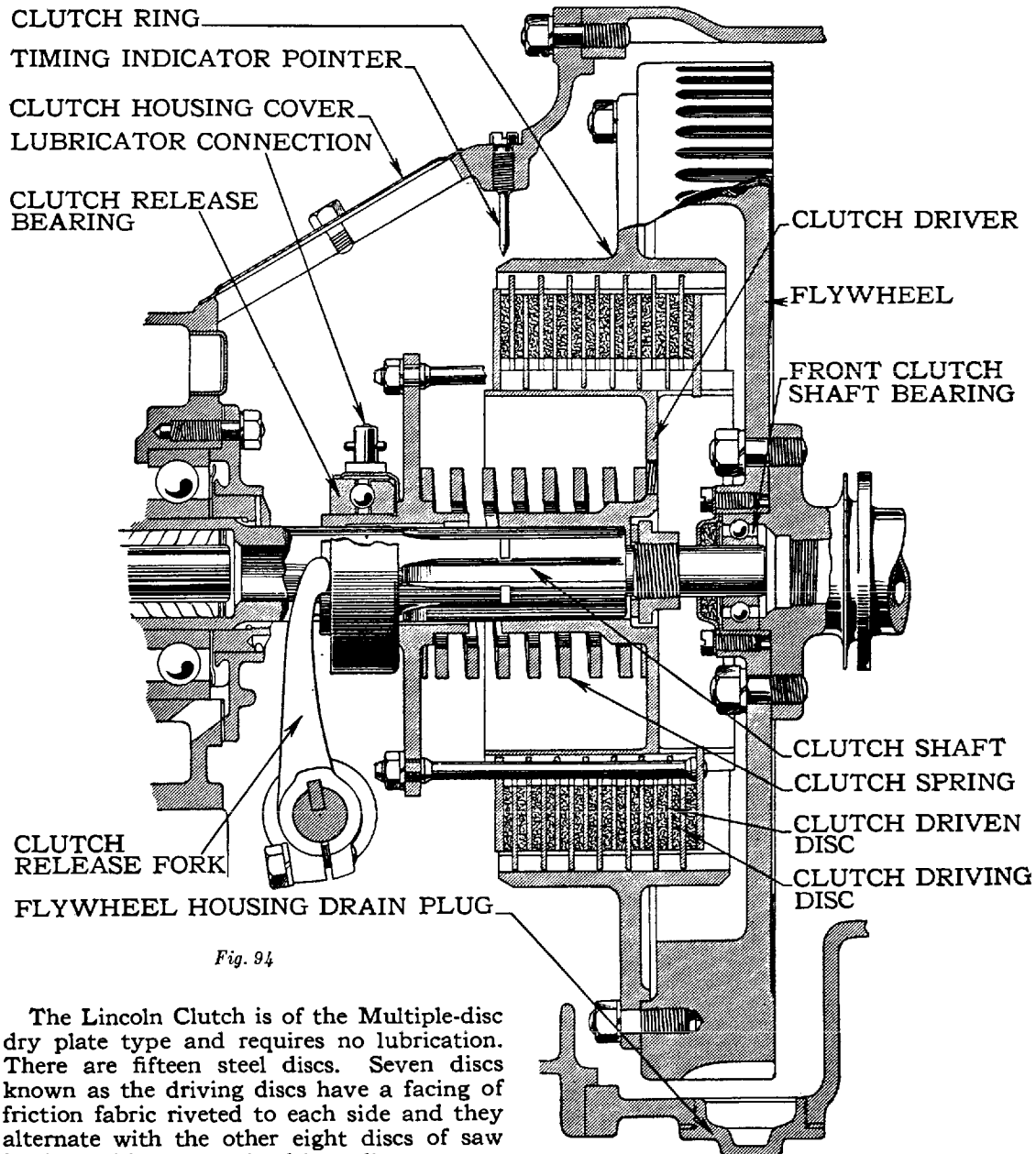


Fig. 94

The Lincoln Clutch is of the Multiple-disc dry plate type and requires no lubrication. There are fifteen steel discs. Seven discs known as the driving discs have a facing of friction fabric riveted to each side and they alternate with the other eight discs of saw blade steel known as the driven discs.

The driving discs have teeth in the outer diameter meshing with, and sliding in, the internal teeth in the clutch driving ring which is bolted to the flywheel.

The driven discs have teeth on the inner diameter, meshing with and sliding on corresponding teeth on the clutch shaft driver. When the clutch is engaged a heavy coil spring firmly compresses the two sets of discs together so that the power from the engine is carried through into the transmission. The pressure which the spring exerts on the two sets of discs is released when the clutch pedal is pushed down, the clutch release fork compressing the spring through the clutch release bearing, and the driving discs continue to revolve with the flywheel. The driven discs, which are in effect integral with the transmission gearing, become stationary when the clutch pedal is depressed.

Do not habitually rest the foot on the clutch pedal while driving. Although unnoticed, this may release the spring pressure just enough to cause the clutch to slip thus causing

needless wear on the facing on the discs. Continual slipping of the clutch is liable to result in buckled or warped clutch plates. The clutch pedal is adjusted when the car leaves the factory and should need no further attention until the facing on the discs has worn so that although the pedal will return to its normal position the discs are prevented from fully engaging by the set screw stop (3) Fig. 95. This condition causes slipping and rapid wear. To determine if the pedal is correctly adjusted, press down on the pedal pad. There should be approximately 1 inch free travel before the pressure of the clutch spring can be felt and the clutch starts to disengage.

The point at which the clutch starts to disengage can be determined by removing the clutch housing cover on top of the transmission case and noting when the clutch release fork engages the clutch release bearing at the rear of the clutch spring spider. See Fig. 94. If no free motion exists at this point or if the clutch release fork rests against the clutch release bearing adjustment is necessary and should be made.

Turn the nut (5) Fig. 95 anti-clockwise or upward one half revolution at a time, until the clutch pedal will move forward approximately one inch (measured at the foot pad) before commencing to release the clutch.

Care of the Clutch

The clutch itself requires no lubrication. Every 750 miles when the car comes in for general inspection remove the flywheel housing drain plug and drain out any lubricant which may have worked into the clutch housing from the transmission. Occasionally the friction facing with which the driving discs are faced acquires a gummy coating and becomes glazed causing the clutch to slip and making gear shifting difficult. The clutch should then be washed out. Remove the clutch housing top cover and pour a gallon of high test gasoline into the clutch housing. Then start the engine and alternately engage and release the clutch for several minutes to allow the gasoline to work in between the plates. Then drain the housing. Thoroughly lubricate the rear starter generator bearing and the clutch release bearing after this operation as the oil will be washed out of these bearings when flushing the clutch housing.

When the clutch plates become badly glazed from continued slipping, the clutch should be disassembled for repair. Tack a large sheet of sandpaper on the workbench or flat surface and rub the driving discs back and forth on this until the glaze is removed and a new

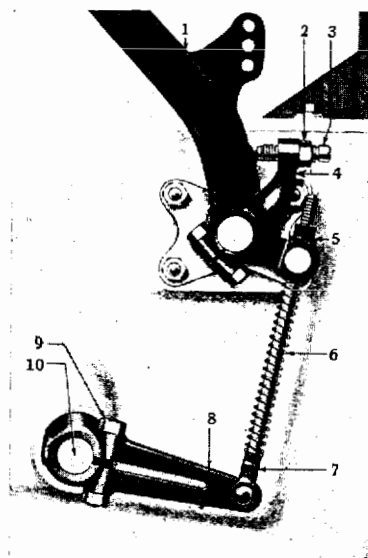


Fig. 95

Clutch Pedal Adjustment

Reference No.	Part Name
1.	Clutch pedal.
2.	Lock nut for pedal adjusting screw.
3.	Clutch pedal release stop arm adjusting screw.
4.	Clutch pedal release stop arm.
5.	Clutch pedal adjusting nut.
6.	Clutch pedal release rod spring.
7.	Clutch pedal release rod.
8.	Clutch release shaft arm.
9.	Clutch release shaft arm clamp bolt.
10.	Clutch release fork shaft.

surface is presented. Warped or buckled plates should be replaced as they will not allow the clutch to release fully causing difficulty in gear shifting.

The shaft which carries the clutch is supported on annular bearings. The rear, in the transmission, and the front, in the flywheel. The rear bearing is lubricated from the transmission and the front bearing is packed with lubricant when assembled and the lubricant is retained by means of the felt washer and cap. This bearing should be cleaned and repacked whenever the clutch is removed.

The release bearing has a lubricator connection attached and should be lubricated with the pressure gun every 2,000 miles, using gear lubricant.

When the clutch is torn down care should be taken that the plates are assembled correctly. The rear disc is a tight fit on the clutch driver hub. This disc is easily identified as it is approximately twice as thick as the other plates. The rear driving disc is a close fit in the driving ring and can be identified by the saw slot in one tooth and the word "Rear" which is stamped on the lining.

On cars of earlier production this rear disc had a number of teeth slotted and sprung outward slightly to take up any existing play. These slots have now been removed except the one small one left for identification purposes and the teeth now fit with only .002 to .006 backlash.

Air Vent in Lincoln Fuel Tank

When fuel is drawn from the main tank into the vacuum tank a corresponding amount of air must be admitted to the tank to relieve the vacuum created. For this purpose a small hole was drilled in the front of the con-

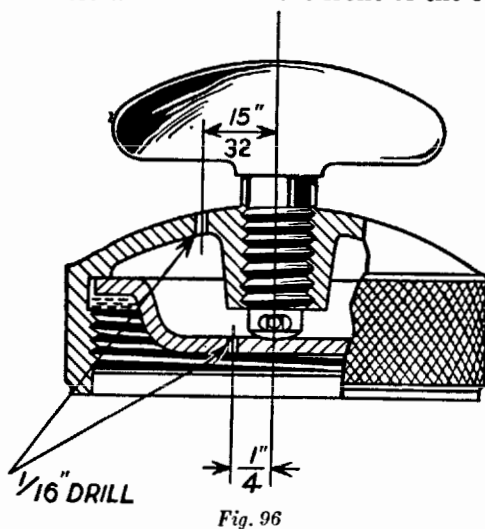


Fig. 96

trol valve on the main tank. This has now been omitted and the vent is now through the fuel tank filler cap. This location eliminates the splashing of fuel on the top of the tank when it is completely filled.

All filler caps in stock should be drilled to eliminate any chance of confusion resulting from installing a cap without the vent hole on a car which has no vent in the valve.

A $\frac{1}{16}$ " hole should be drilled through the filler cap $\frac{3}{8}$ " from the center and through the brass cup inside the filler cap at a distance of $\frac{1}{4}$ " from the center. See Fig. 96. This will eliminate any chance of error and if one of these drilled caps is installed on a car with a vent in the valve, the double vent will do no harm.

Lincoln Fan Belt

We have received several reports of Lincoln Fan Belts being installed incorrectly, that is, so that the belt ran in the wrong direction. On account of the construction of the belt this greatly shortens its life.

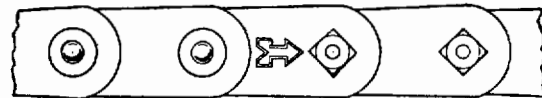


Fig. 97

The belt is stamped with an arrow showing the direction of rotation, on the outer face of the link next the bolt which fastens the

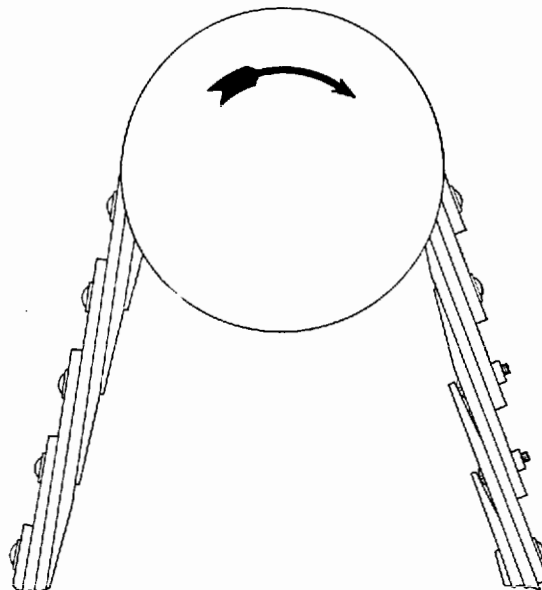


Fig. 98

ends of the belt together. See Fig. 97. In case that this marking is obliterated install the belt so that it will run as shown in Fig. 98.

Bendix Service Sleeve

Branches can now supply T-2008AR, Bendix service sleeve, illustrated in Figure 99, for repairing the bendix drive.

To install the sleeve place it over the shaft until it strikes the shoulder. Use a blunt

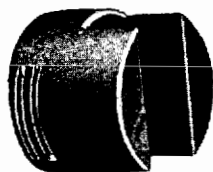


Fig. 99

chisel and hammer, hitting lightly the divided portions above and below, until they fit nicely into the groove of the shaft. Do not strike heavy enough to swedge the metal. See that the sleeve is securely fastened, yet is free to turn easily on the shaft, this is particularly important.

The bendix service sleeve sells for \$.40 each, subject to dealers usual discount.

Drain Plug for Lincoln Transmission and Flywheel Housing

Three of Part No. 2072 Drain Plug are used on the car, one in the flywheel housing of the crank case, one in the clutch compartment in the transmission case and one in the transmission case bottom cover.

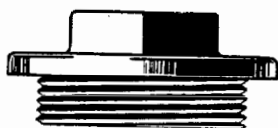
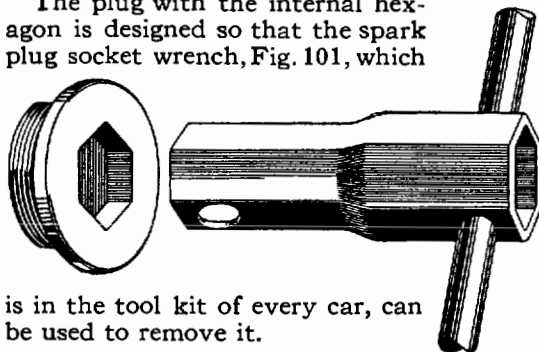


Fig. 100

This plug, Fig. 100, has now been changed from an external square shank to an internal hexagon to avoid any possibility of knocking this part off on bad roads, as the plug in the flywheel housing is the low point on the car with regard to road clearance.

The plug with the internal hexagon is designed so that the spark plug socket wrench, Fig. 101, which



is in the tool kit of every car, can be used to remove it.

Fig. 101

Replacement of Ford Closed Body Glass

Heretofore the replacement of door and window glass in Ford closed bodies has been a source of considerable trouble to dealers, chiefly because of the lack of proper materials and equipment for handling the work.

Branches are now able to supply dealers with window channel cement adaptable for setting glass. This cement, carried under number T 10213, is furnished in pint cans which sell for \$.30 net, to dealers and garages.

We have discontinued the use of cork window glass retaining strips and are now supplying treated fibre retaining strips as illustrated in Fig. 102. It will be noted from



Fig. 102

this photograph that the retaining strip is made with two creases or score marks $\frac{1}{4}$ " apart, which removes the tendency for slippage when setting the glass in the channels. The fibre packing is furnished in two thicknesses; $\frac{1}{32}$ " and $\frac{1}{16}$ ", to take care of the variation in the thickness of glass. (See table).

The principal equipment for installing door and window glass is a fixture for holding glass when installing channels, a rubber mallet, a small brush for applying the cement and a sharp knife for trimming the retaining strip after the channel is in position.



Fig. 103

In Fig. 104 is shown a sketch with dimensions for making the fixture that is used for holding the glass while assembling it in the channel. This fixture consists of a box constructed with a layer of heavy felt in the bottom so as to prevent the glass from breaking. The completed fixture can then be fastened to the work bench.

The procedure followed in the fitting of glass in the channels is to place the glass in

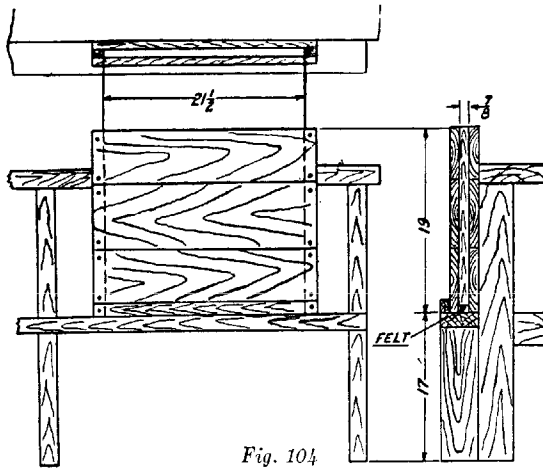


Fig. 104

the fixture after which a fibre retaining strip of proper thickness is selected; this is next coated with the channel cement, after which it is laid on the glass as illustrated in

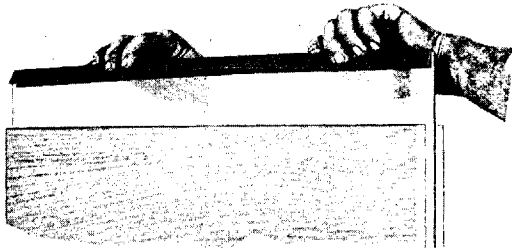


Fig. 105

Fig. 105; the channel illustrated in Fig. 103 is then placed over the glass and the packing and driven on with a rubber mallet, as illustrated in Fig. 106.

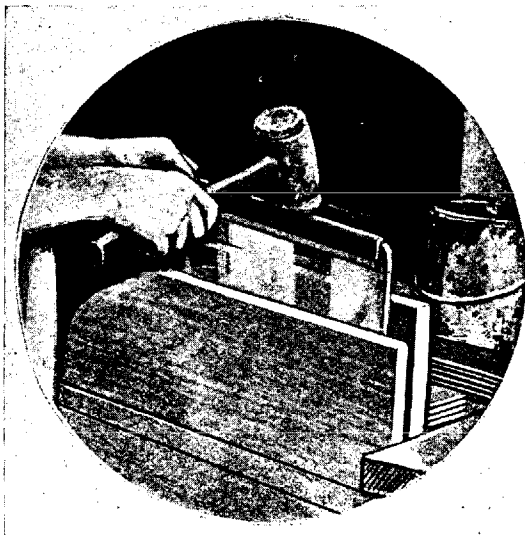


Fig. 106

The glass with the channel assembly is next removed from the holding box and the superfluous retaining strip trimmed, as illustrated in Fig. 107.



Fig. 107

The glass is next washed in gasoline to remove any traces of the cement, allowed to stand for approximately 20 minutes after which it is ready for installation in the car.

Tests have shown that at least 400 pounds pressure is required to pull glass out of channels that are assembled in this manner. It is necessary that the channels have an even bearing on the glass. The removal of broken glass from channels usually results in the channel being sprung out of line. The cost of attempting to straighten such channels is out of proportion to the price of a new channel, therefore, it is recommended that dealers discard the old channels and replace them with new ones whenever it is necessary to replace broken glass.

We will supply the treated fibre retaining strips as follows:

T-10236-A Thin	T-10236-B Thick	Door window, 2-door Sedan
		Front quarter window, 2-door Sedan
		Quarter window, 4-door Sedan
T-10240-A Thin	T-10240-B Thick	Rear quarter window, 2-door Sedan
		Door window, 4-door Sedan
T-18244-A Thin	T-18244-B Thick	Coupe (new type)
		Quarter window, Coupe

In some instances it may be necessary to trim the ends of the strips.

Useful Service Tools

The tool sets illustrated on this page will be found invaluable to dealers and garages in servicing Ford Cars.

Fig. No. 108 shows the Ford Curtain Fastener and Carpet Catch Riveting Set used in making repairs on model "T" Touring Car and Roadster curtains and for installing the fasteners on the two and four door Sedan and Coupe floors and carpets.

The following list shows the parts required in repairing curtains and carpets and also the particular tools used in their installation:

Tool No.	
1, 7 & 8	T-6903X Glove fastener eyelet
	T-6905X Glove fastener washer
3	T-6904X Glove fastener
	T-3513X Glove fastener cap
5, 6, 10 & 11	T-3514X Glove fastener socket
4, 5 & 11	T-3518X Glove fastener stud
4, 5 & 11	T-3515X Glove fastener post
4, 5 & 11	T-6902X Glove fastener button

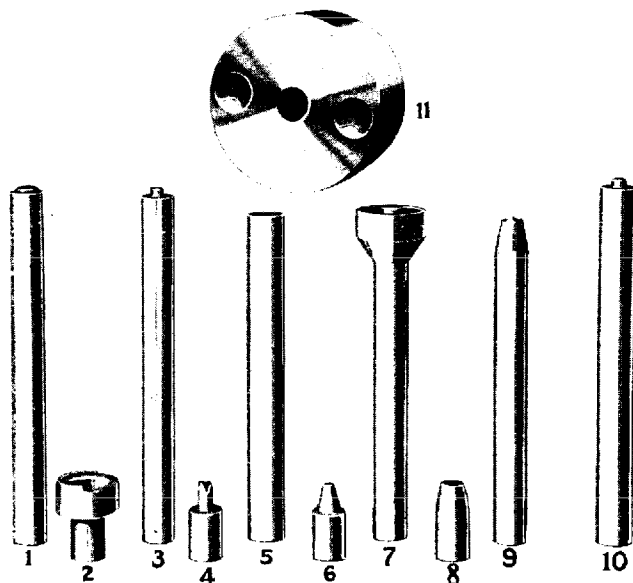


Fig. 108

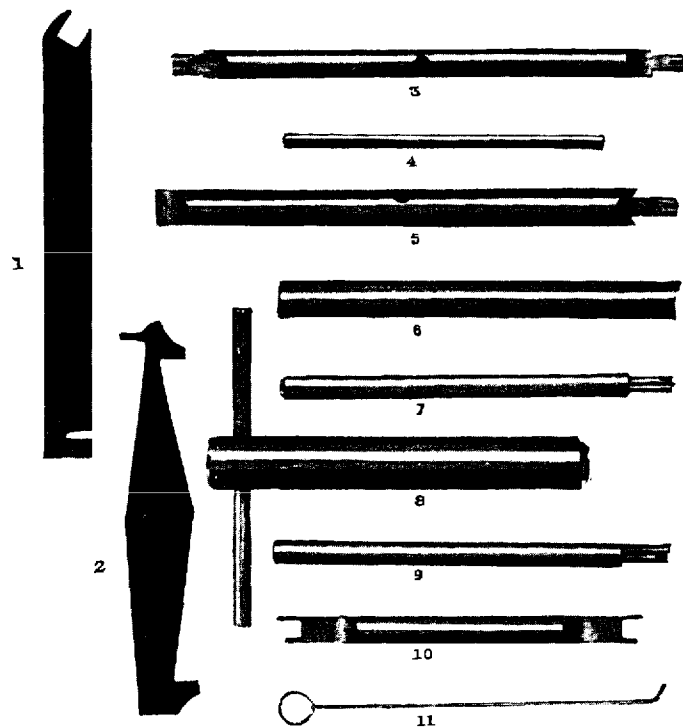


Fig. 109

Tool No.	
2 & 7	T-10415X Carpet fastener clamp
	T-10419X Carpet fastener upper
9	Tubular rivet for curtain hooks

Fig. 109 shows a combination carburetor tool set which has been worked out to assist dealers in repairing Holley model "G", Holley model "N-H" and Ford, Kingston "L-2" and Kingston "L-4" carburetors.

The following list shows which tool to use when making repairs or adjustments on carburetors.

Tool No.	
1	Tightening or adjusting low speed nut on model "G" Carburetor, also for adjusting float on model "G" carburetor.
2	Float adjusting tool for Holley and Kingston Carburetors.
3	Tool for seating inlet seat on Kingston "L-4" "N-H" and "F" Carburetors.
4	Handle for inserting in tools No. 3 and 5 in order to secure additional leverage.

- 5 Tool for seating spray nozzle in "N-H" and "F" carburetors also for seating inlet seat on model "G" carburetor.
- 6 Tool for adjusting low speed tube on model "G" Carburetor.
- 7 Tool for seating inlet needle on Kingston "L-4" carburetor.
- 8 Tool for seating spray nozzle in mixing chamber of model "G" Carburetor.
- 9 Tool for seating inlet needle on model "G", Kingston "L-2" also "N-H" and "F" Carburetors.
- 10 Tool for testing height of fuel in spray nozzle of model "G" Carburetor.
- 11 Clearance gauge for low speed tube.

The Ford Curtain Fastener and Carpet Catch Riveting Set sells for \$10.00, net, and the Combination Carburetor Tool Set sells for \$6.50, net.

Dealers desiring either or both of these outfits should place their orders with their respective branches.

Model T Coupe Doors

We have a limited supply of coupe doors T-10700B and T-10701B of the 1921 type which we are offering at a price of \$20.00 each subject to 25% to Dealers. This presents an opportunity to owners who have coupes with damaged doors to repair the car at an exceptionally low figure.

A Hand Book for Dealers' Service Men

The Sales Equipment Company, Detroit, publishers of "Fordex," have just completed "Fordex Service Information," a book containing

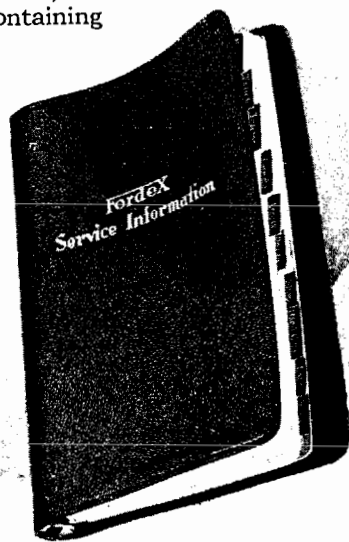


Fig. 110

invaluable information pertaining to the servicing of our products.

This manual is identical in size, quality, etc., as the "Fordex" book prepared by the above company for Ford retail salesmen, is conveniently indexed for ready reference, and inasmuch as its contents cover all the more important information that a dealer's service men should be familiar with, such as a complete compilation of every repair operation performed on the car, truck, tractor and Lincoln, and time studies on each, it should be of valuable assistance to the dealer and his service organization, thereby enabling them to give more prompt and satisfactory service to owners of Ford products.

This information is equally valuable to service dealers and garages doing repair work on Ford cars to any extent, and descriptive circulars will be mailed upon application to the nearest Branch House.

Copies of this new book can be obtained direct from the Sales Equipment Company, at a price of \$3.50 each.

Improved Tractor Brake

The Tractor Brake has been improved, giving increased braking surface and greater braking power.

In the original design two brake plates were used, whereas three stationary plates, two rotating plates and a brake hub are used in the present design. Three of these brake plates (one rotating plate between two stationary plates) are installed in front of the idler gear, and two plates and the brake hub (a rotating plate between a stationary plate and the hub) are installed back of the idler gear, the stationary plate being placed next to the gear.

Fordson Drawbar Cap Extension

In order that Tractor implements may be used to better advantage with fender equipped Tractors, we are now prepared to furnish a drawbar cap extension, F-1537.

The use of this extension places the hitch far enough back so that in turning, the implements do not strike the fenders.

Dealers may obtain these drawbar cap extensions together with necessary parts for attaching, viz:

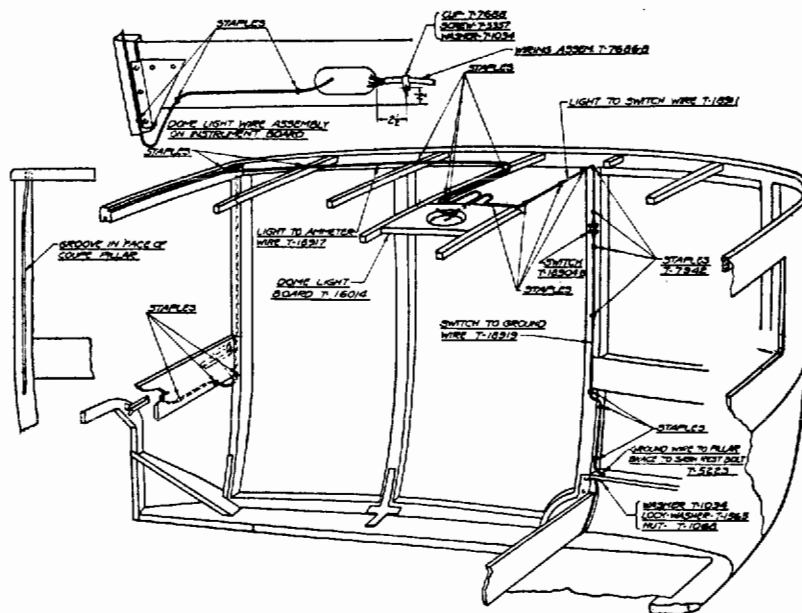
- 2 F 1337 Drawbar cap extension bolt
- 2 T 124 Drawbar cap extension nut
- 2 F 1834 Drawbar cap extension cotter

from our Branches. These parts are now included in all shipments of fender equipped tractors and will be supplied without charge to take care of fender equipped tractors which were shipped less these parts.

Wiring Arrangement of Four-Door Sedan Dome-Light

The accompanying diagram shows the wiring arrangement for the dome light in the 4-door Sedan body prior to Aug. 1st, 1923. A few of the earlier bodies of this type were wired differently in that the wires were on the right hand sill of the body and were visible nearly to the switch located on the pillar. Because of the fact that the wiring was practically all visible in the earlier type jobs a diagram is not considered necessary.

Repairmen will find that this diagram is particularly valuable as it shows the location of the wires, most of which are concealed in the construction of the present type body.



WIRING ON FOUR DOOR SEDAN BODY

Fig. 111

Lincoln Pedal Pads

The September, 1922 issue of the Service Bulletin contained an article, on page 67, covering the exchange of standard and special length pedal pads.

In this article the standard pad is referred to as L-2122-A and the long pad as L-2122-B. This is incorrect and should agree with the Lincoln Parts Price List i.e., the standard pedal pad is L-2122-B and the long pad ($1\frac{1}{4}$ " longer than standard) is L-2122-A.

Lincoln Production Data

Car No.	Date
12000.....	6-25-23
12500.....	7-16-23
13000.....	8- 1-23
13500.....	8-18-23
14000.....	9- 5-23

**Cars bearing Motor Numbers 7,927,375 to 8,122,674
were shipped during July**

**Serial Numbers of Tractors Assembled during
July 327,012 to 333,681**

Ford Service Bulletin

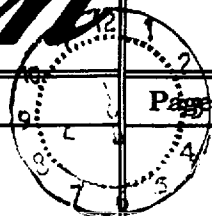
FORD MOTOR CO.
DEARBORN

No. 9

Vol. 4

September, 1923

Page 65



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Finishing Lincoln Cylinders

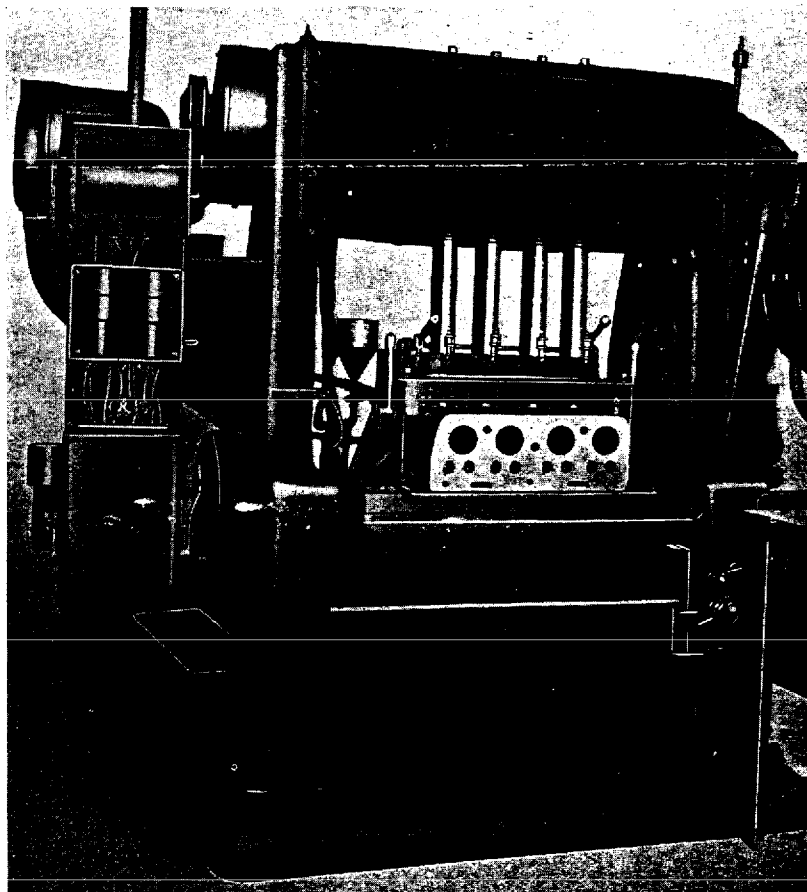


Fig. 112

THE cylinder blocks and heads on the Lincoln engine are cast of a close-grained hard gray iron of special analysis designed to give a maximum of service with a minimum of wear.

The cylinder blocks and heads are designed so that they are inter-changeable, that is, one cylinder block or head will fit on either the right or left hand side of the engine. This is a great convenience to both the dealer and the owner as it reduces the amount of

these parts necessary to carry for service by one-half and makes for quick service when blocks or heads are needed.

Particular attention has been given these parts to obtain uniform cooling of the cylinder walls and valve seats, thus avoiding uneven expansion and consequent distortion of these parts when heated under operating conditions. Generous water passages are supplied which completely surround each cylinder barrel and the valve passages. The bottom flange of the

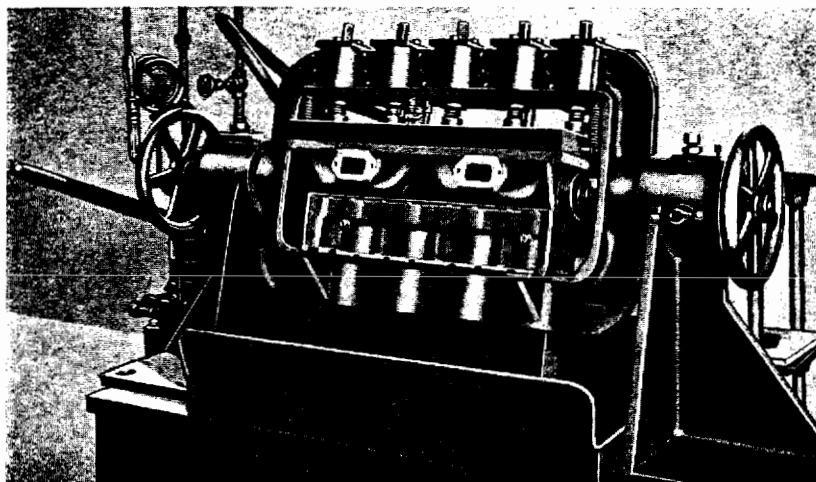


Fig. 113

cylinder block, which bolts to the crankcase is of exceptional thickness, which eliminates warping and adds to the rigidity of the casting.

Great care is exercised in machining the cylinder block and cylinder head for upon the accuracy of these parts, to a great extent, depends the power, stamina and trouble-free operation which characterizes the Lincoln engine.

The first operation in finishing the bores is the rough boring which is done on the special machine shown in Fig. 112. The cylinder block is shown tipped forward out of the fixture which holds it in position in order to show the cylinder bores. The spindles on this machine are set at the exact center distance between the bores and the four holes are machined at the same time. The block then goes to another machine of the same type and the holes are finish bored, then to a third machine for reaming.

After the blocks are reamed they are put on the water test machine shown in Fig. 113. The water jackets are filled with water and subjected to a pressure of 120 lbs. per square inch, to show up any leaks caused by sand holes,

porous spots, or cracks in the casting.

After testing the blocks go on to the internal grinding machines where the bores are ground perfectly round and true.

In the early days of the automobile industry it was customary to finish cylinder bores in a lathe, four or five successive cuts being taken, the last with a very broad nosed tool which gave a comparatively smooth finish. The objection to this method was that if the cast iron of

the cylinder was not of exactly uniform hardness. There would be hard spots or soft spots in the iron and since the cylinder wall is thin, when the tool encountered a hard spot either the cylinder wall or the cutting tool would spring slightly and a high spot result. In an engine cylinder what is required is an absolutely cylindrical bore in order to insure a gas tight fit of the piston rings. To improve upon the original method the lapping process was introduced which consists in working a dummy

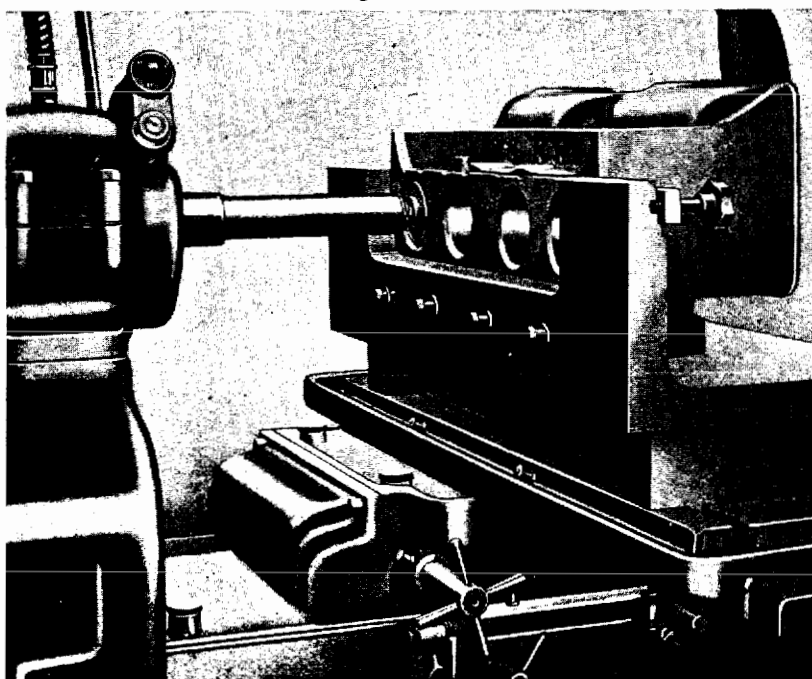


Fig. 114

piston back and forth in the bore of the cylinder with some abrasive material such as ground glass mixed with oil. The objection to this method is that there is danger of some of the abrasive being forced into the metal of the cylinder wall and starting cutting of the wall and the piston when the cylinder is in service. The grinding process of finishing cylinder bores overcomes the objections to both the foregoing methods.

The cylinder block is clamped to the carriage of the grinder, Fig. 114, which has a longitudinal feed and cross adjustment. The spindle which carries the grinding wheel is mounted eccentrically in the main spindle which revolves in large ample bearings and means is provided so that the wheel can be fed

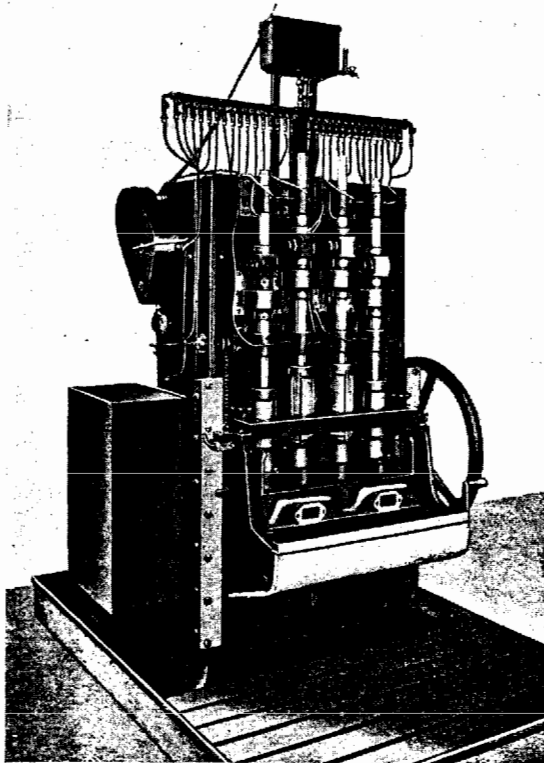


Fig. 115

against the work and set for bores of different diameter. One bore is ground and then the block is moved endwise by means of the movable carriage to bring the second bore in line with the head of the grinder which can be accurately done by means of the micrometer adjustment. See Fig. 114. The metal dust and abrasive is carried away by air suction as fast as they are formed.

The cylinder bores are first rough ground leaving only .001 on the diameter for the finish grinding operation. When the blocks are finish ground the removal of only .0005 per side gives a much finer finish to the bores than would be obtained by taking a heavier cut and it also eliminates any chance of distortion from the heat which would be generated by the removal of a greater amount of metal.

The blocks then go to the honing machine shown in Fig. 115. This is a special machine designed by us; it carries four hones, one for each bore. Each hone consists of several fine oil stones mounted in a holder which is inserted in the cylinder bore. The stones are held against the cylinder wall by spring pressure.

When the machine is started the hones move up and down in the bores revolving slightly at the bottom of each stroke so as not to travel in the same path each time. The cylinders are honed for approximately two minutes and receive a perfectly smooth bearing surface from which practically all the minute radial wheel marks, left by grinding, have been removed. Such a condition, without honing, is only arrived at in the engine after many miles of driving and at the expense of considerable wear on the cylinder walls, pistons and rings due to the comparative roughness of the surfaces in contact.

All the holes for studs, valves, etc., in each face of the block are drilled at one time by multiple spindle drilling machines, thus insuring correct alignment and absolute interchangeability.

Another unusual feature in the machining of the Lincoln blocks is the fact that both the bottom face which bolts to the crankcase and the top face to which the cylinder head is bolted, are ground, giving a better fit between the joined parts. This is especially important on the top face as the gasket at this point receives the entire force of the explosion and a tight even joint is necessary to prevent the gasket leaking.

The cylinder heads which bolt to the cylinders also have the joint face ground.

The entire surface of each combustion chamber is machined thus making certain that the volume of each compression space in the engine is identical thus giving even compression and smooth running.

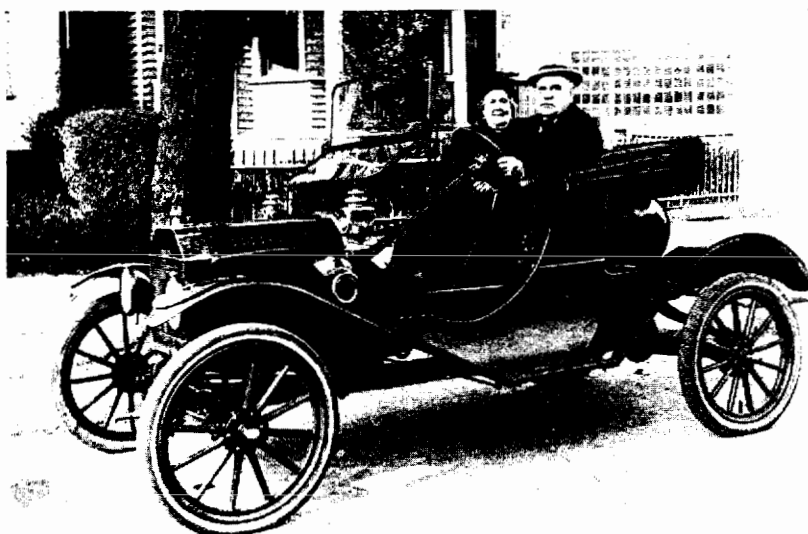


Fig. 116

Twelve Years of Faithful Service

Mr. George Ford of Bayonne, N. J., recently sent us the above photograph showing himself and wife seated in their Ford Model T Open Runabout, purchased in 1911.

The photograph so clearly illustrates the design of cars we were manufacturing twelve years ago that we believe it will prove interesting to dealers in comparing it with our present models and noting the changes that have been made.

While it is not at all infrequent that instances are brought to our attention of Ford cars that have been in service for a considerably longer period than Mr. Ford's car, when the excellent condition of this car is taken into consideration coupled with its performance of twelve years continuous service, we believe the result is fairly representative of the quality of workmanship and materials entering into our product. It is also an assurance to prospective purchasers of Ford cars that they are obtaining a car whose dependability has been proven by years of satisfactory performance.

Parts Discounts to Commercial Users

It has been our policy to allow the large commercial users of Ford cars a discount of twenty-five per cent on parts at any given points where they operate a fleet of five or more Ford cars and are doing their own repair work. In other words, a commercial firm operating its own repair shop is equally as

much entitled to the discount as the small garage. This arrangement does not, however, apply to individuals even though they are connected with a commercial concern operating the required number of Ford cars, nor does it apply to travelling representatives who have occasion to buy parts while covering their territory. While dealers may consider it advisable to offer representatives of national users of Ford cars a discount, the matter lies entirely within their own discretion.

New Type Model "T" Bodies

The recent changes in design of Ford Cars have obsoleted all previous type bodies, and it will be necessary when supplying the new bodies in replacement to include the new type radiator, radiator apron, radiator rod, hood, hood blocks, hood block supports and dash. This additional material will be furnished at regular parts prices.

The following bodies of the latest design will hereafter be furnished when required for service, at the following prices:

Sedan Body, Fore-door	\$390.00 f.o.b. Detroit
Coupe Body	235.00 f.o.b. Detroit
Touring Car Body	80.00 f.o.b. Detroit
Roadster Body	60.00 f.o.b. Detroit

An additional charge for crating will be made as follows:

Touring Car or Runabout Body	\$10.00
Sedan or Coupe Body	20.00

Orders will be filled from the nearest assembly plant and an extra charge will be made to cover freight from factory to assembly plant filling the order.

When installing a new type body on a chassis not equipped with the present type running board shields, it is necessary to drill a hole in the running board shield for the hood clip.

When replacing both front fenders of the previous type, fenders of the latest type should always be supplied. We will, however, continue to supply the previous type front fenders for repairs on cars where but one of the front fenders is required. If desired, the radiator apron can be used on old cars when the new type front fenders are installed.

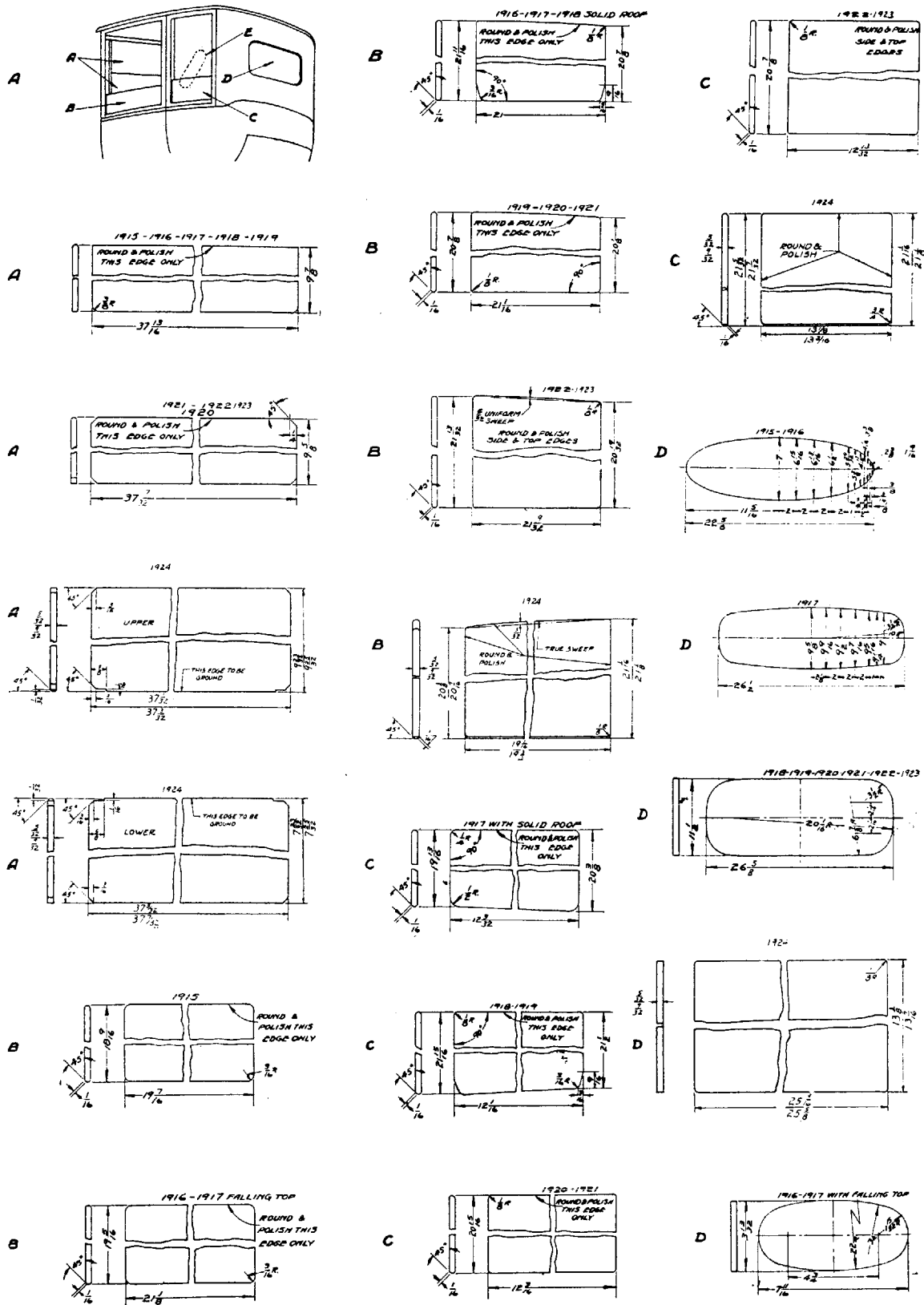


Fig. 117

Model "T" Coupe Glass

Fig. 117 gives the dimensions for door, window and windshield glass for all Model "T" coupe bodies, including the new design now in production.

Display Ford Wrenches

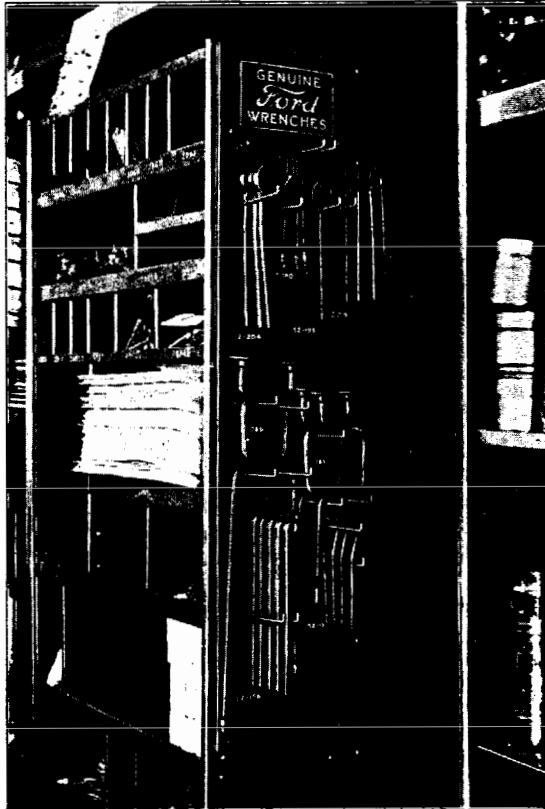


Fig. 118

Above is a photograph of a display board designed to carry an assortment of Ford wrenches.

This board which is constructed of metal is made to harmonize with the metal bin systems, which are now widely used in Ford Service Stations.

A proper display of genuine Ford wrenches will enable dealers to materially increase wrench sales. Unquestionably parts department customers will appreciate the opportunity of obtaining genuine Ford wrenches of dependable quality.

This wrench board should be a part of every dealer's equipment. Orders for it can be placed with your branch. The price is \$4.50 net, f.o.b., Philadelphia.

Shipping Weights of Lincoln Cars

Type	Body	Pass.	Weight
124	Touring	7	4290
123	Phaeton	4	4215
130	Roadster	2	4050
126	Coupe	5	4380
125	Sedan	4	4375
127	Sedan	4	4375
129	Sedan	5	4600
117	Sedan	7	4660
118	Limousine	7	4720
122	Chassis		3205

—CUSTOM JOBS—

Type	Body	Pass.	Wt.
702	Coupe (Judkins)	2	4200
128	Berline (Judkins)	4	4510
120	Town Car (Brunn)	7	4475
121	Open Drive Limousine (Brunn)	7	4475
131	Cabriolet (Brunn)	7	4655
2451	Cabriolet (Fleetwood)	7	4630
2473	Town Car (Fleetwood)	7	4630
119	Limousine (Fleetwood)	7	4690

Service Policy on Delco Equipment

In handling service on Lincoln Delco equipment the United Motors Service Stations follow the practice of repairing rather than replacing complete units. For instance, if a dealer has occasion to send a motor generator to the United Motors Service the unit will be promptly repaired and returned, in the same manner that an engine overhaul would be handled by our organization. This explanation of the Delco policy is given so that dealers will know what to expect along this line.

In view of the fact that this Company has established a general policy of replacing defective material on Lincoln cars for a period of one year we cannot consistently except such equipment as Delco ignition apparatus, although the manufacturer's warranty is limited to a period of three months. Under the circumstances, we recommend that no charge be made against Lincoln owners for replacement of defective ignition material during a period of one year.

Use Proper Gaskets Between Transmission Cover and Cylinder Block

In assembling the model "T" motor, the only gaskets that are used between the transmission cover and the cylinder assembly are the T-3363—872B, transmission cover gasket—front, and T-3363B—4358, transmission cover gasket—short.

Investigation shows that in addition to the regular gaskets mentioned above, many dealers make a practice of using T-3654—8769, dash to body gasket between the transmission cover and the cylinder.

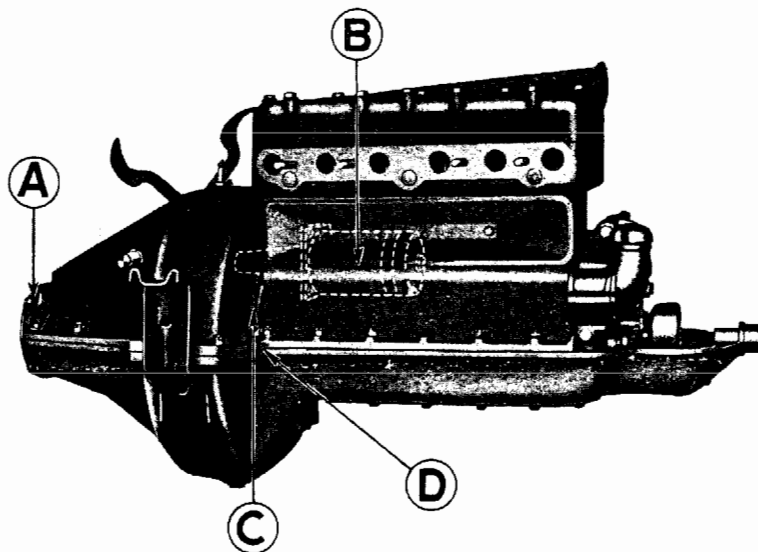


Fig. 122

T-3654—8769 Dash to Body Gasket.

Fig. 119

T-3363—872B Transmission Cover Gasket—Front

Fig. 120

T-3363-B—4358 Transmission Cover Gasket—Short.

Fig. 121

The dash to body gasket which is $\frac{1}{8}$ " thick should not be used at this point, particularly if the regular gaskets are installed. The result of its installation are obvious, as the crankcase and transmission cover are bound to be forced out of alignment at several points, as indicated by "A," "B," "C" and "D" of figure 122.

In figure A-(123) is an illustration of the rear of an engine showing the universal ball cap. This engine was assembled with the dash to body gasket between the transmission cover and cylinder block. It will be observed that three of the holes in the ball cap do not line up properly with the holes in the transmission cover and the crankcase, and in order to assemble these parts it is necessary to force the ball cap. Burning out of the ball cap is the result of assembling the parts in this manner. Furthermore, in such cases the

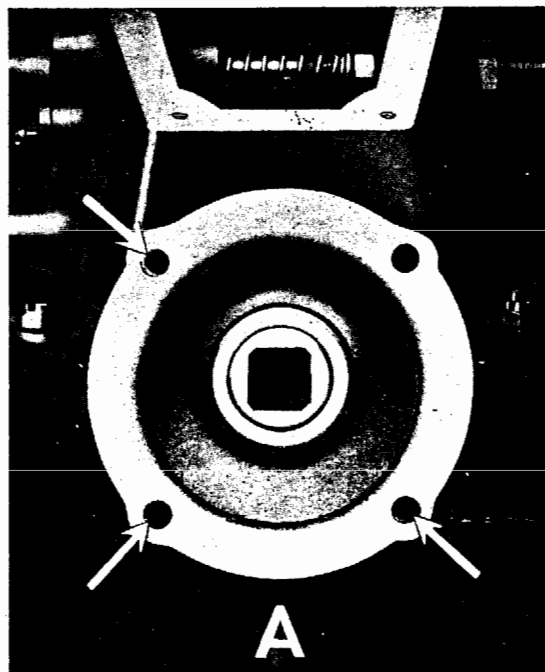
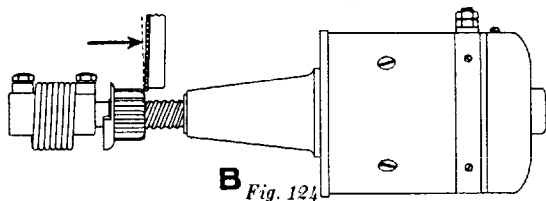


Fig. 123

transmission assembly will not be properly lined up with the crankshaft and the drive-shaft.

The incorrect use of gaskets between the transmission cover and cylinder effects the alignment of the bendix shaft with the armature shaft of the starting motor and the meshing of the bendix gear with the flywheel ring gear.

With the transmission cover forced out of alignment because too many or too thick gaskets are applied between the transmission cover and the cylinder block the bendix gear will not mesh properly with the flywheel ring gear as illustrated in Figure B-(124). This naturally throws the bendix shaft out of alignment and that in turn effects the armature shaft of the starting motor, causing undue wear of that assembly.

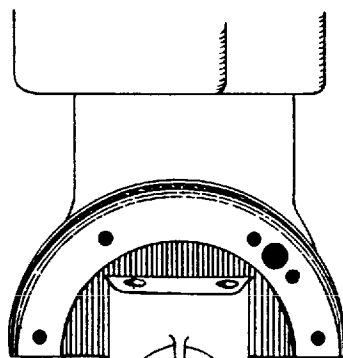


B Fig. 124

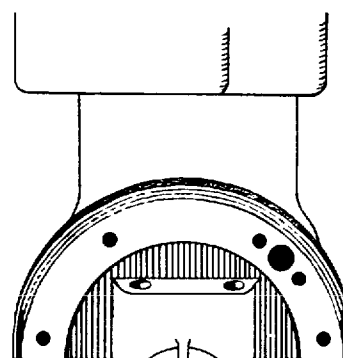
Figure "C" (125) shows the correct and incorrect use of gaskets between the transmission cover and the crankcase. Figure "D" (126) is a view of a section of a crankcase removed from an engine which had been built up with a dash to body gasket installed between the transmission cover and the cylinder block in addition to the regular gaskets designed for use between those points. It will be observed from this photograph that the crankcase is distorted where it is assembled to the base of the cylinder block at the flywheel housing of the transmission cover. The results of this distortion are further illustrated in Figure 127.

The alignment of the crankcase and transmission cover with the cylinder assembly is a matter that should not be overlooked and dealers should check up their Service Superintendents to make sure that the proper gaskets are being used at these points.

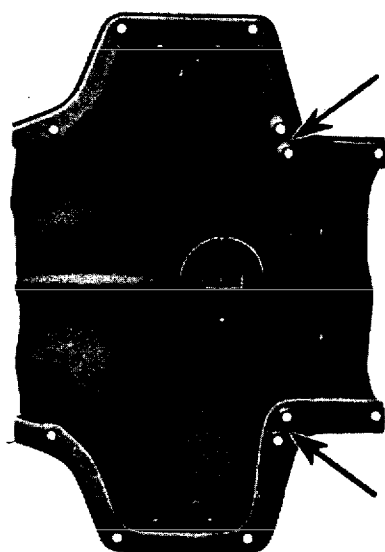
When the crankcase and transmission covers are out of alignment a severe strain is put upon the crankshaft which results in excessive vibration and undue wear of bearings and in many cases breakage of the crankshaft itself.



Correct



Incorrect

C
Fig. 125

D

Fig. 126

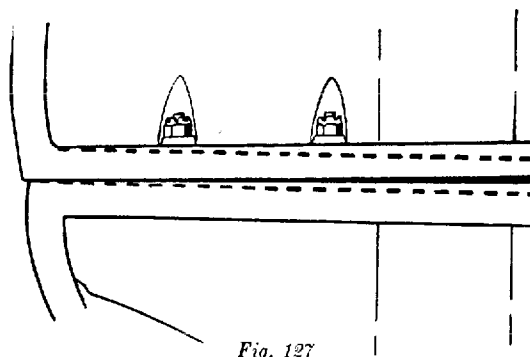


Fig. 127

Cars bearing Motor Numbers 8,122,675 to 8,311,581 were shipped during August

Serial Numbers of Tractors Assembled during

August

333,682 to 342,099

Ford Service Bulletin

No. 10

Vol. 4

October, 1923

Page 73

Building Erected by Schwartz-Clifford & Scott, Ford Dealers at Louisville, Kentucky, for Lincoln Sales and Service

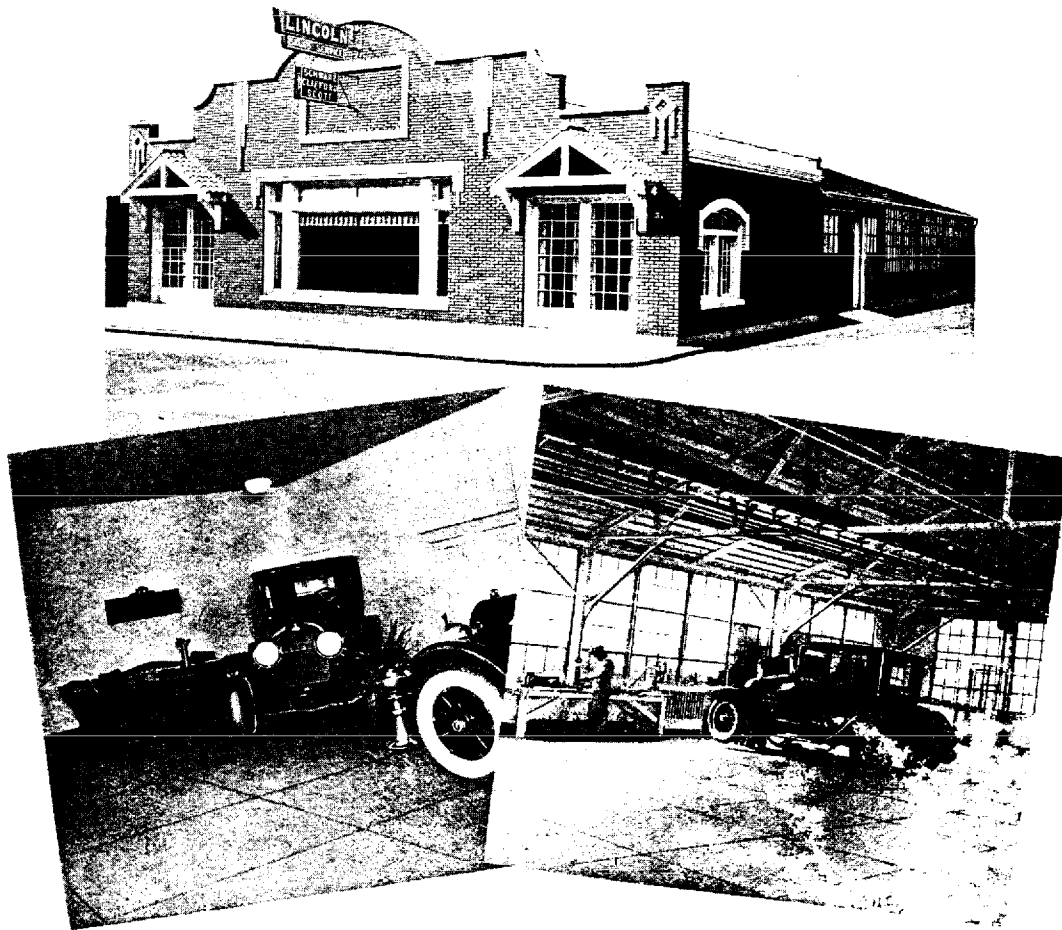


Fig. 128

THIS attractive building with its spacious showroom, and well equipped shop, furnishes an environment which strongly appeals to both prospective purchasers and owners of Lincoln Cars.

Favorable comments from owners and the increasing sale of Lincoln Cars in Louisville shows how well our dealers efforts are being received by discriminating automobile buyers.

Ford Form No. 1544

ORIGINAL

Dealers should use this form in making Lincoln service inspections.
The original copy being mailed to the branch at the conclusion of each inspection, and the carbon copy retained by dealer.

DEALER'S LINCOLN SERVICE INSPECTION REPORT

Dealer..... Date.....
Owner..... Address.....
Engine No..... Address.....
Mileage..... Car Delivery Date.....
Last Inspection Date.....

Inspected and necessary Work
performed by

- 1 Change oil in motor at end of first 400 miles and each 750 miles thereafter, except in cold weather when oil should be changed every 400 miles.
- 2 Drop and clean oil pan every month during cold weather.
- 3 Oil and grease car (including all lubricator connections, oil cups, etc.).
- 4 Check lubricant level in transmission and rear axle.
- 5 Check oil pressure at idling and maximum engine speeds.
- 6 Does oil indicator level register correctly?
- 7 Is gasoline fuel strainer clean?
- 8 Gasoline gauge on tank—check for accuracy.
- 9 Battery—Check water, gravity and connections.
- 10 Generator—check oiling, brushes, commutator and charging rate. Lubricate overrunning clutch.
- 11 Starting Motor—Check oiling, brushes and commutator.
- 12 Distributor—check points and gap, timing and synchronism.
- 13 Spark plugs—clean and check gaps.
- 14 Check condition of lights.
- 15 Brakes—check adjustments, both internal and external.
- 16 Front wheels—check alignment and bearing adjustment.
- 17 Wheel rims—check for true running.
- 18 Springs—Oil and tighten clips.
- 19 Carburetor—check all adjustments.
- 20 Radiator—Do thermostat and shutters function properly? Is radiator cap gasket tight? In cold weather check anti-freeze with hydrometer.
- 21 Timing chain—check adjustment.
- 22 Clutch—see that clutch pedal adjustment is correct.
- 23 Clean radiator if necessary.
- 24 Tighten body bolts.
- 25 Drain flywheel housing.
- 26 Hood Dye shock absorbers—Check for glycoline.
- 27 Tires—Check for inflation.

For a period of four months from date of delivery every Lincoln Car should be brought in to the dealer's service station for free inspection service at intervals of 750 miles.

Dealers are to see that oil changes are made as specified in Operation No. 1.

No charge is to be rendered for materials or labor incidental to this inspection service.

This includes oil and grease which are to be supplied without cost by the dealer during the four months free inspection service.

Free inspection is not expected to cover repairs or labor occasioned by accident, misuse or neglect.

Lincoln Service
Inspection Report

The Lincoln Car is a greater and better automobile and we are determined that the service that goes with it shall match the car itself, in every respect.

The efficiency and life of any car depends largely upon the care it receives during the first few months after delivery and to make doubly certain that each and every Lincoln Car shall deliver its maximum of service and comfort we are making every effort to see that each car receives the care which any fine piece of mechanism deserves.

A Lincoln owner is entitled to free inspection service for a period of four months from date of delivery. This inspection includes all the operations listed on the form reproduced on this page and no charge is to be made either for materials or labor.

The form illustrated in Fig. 129 is being distributed to dealers by their Branches together with full instructions for its use. Needless to say, we expect every dealer servicing Lincoln Cars to follow up this matter conscientiously.

The matter of cost should not be allowed in any way to interfere with the performance of this service as it is something which is a part of every Lincoln that is sold.

On the following pages we are going over the various operations in detail with suggestions which will prove helpful in carrying out this work in an efficient, workmanlike manner.

Dealer's Signature

Fig. 129

Dealer's Lincoln Service Inspection

1. **CHANGE OIL IN ENGINE AT END OF FIRST 400 MILES AND EACH 750 MILES THEREAFTER EXCEPT IN COLD WEATHER WHEN OIL SHOULD BE CHANGED EVERY 400 MILES**—The correct oil for use in Lincoln engines is an oil which conforms to the following specifications:

Viscosity 59" Min. at 210°F.
 500" Max. at 100°F.
 Flash 410° Min.
 Fire 460° Min.
 Cold 34° F.
 Gravity 22° Max.

The capacity of the oil pan is 10 quarts.

The engine should be warmed up sufficiently to open the shutters before the oil is drained. Particular attention is called to the fact that the oil should be drained every 400 miles in cold weather on account of the greater tendency toward crankcase dilution with a cold engine, frequent use of the carburetor choke control. Do not flush the crankcase with kerosene after draining the oil.

2. **DROP AND CLEAN OIL PAN ONCE A MONTH DURING COLD WEATHER**

—Under extreme cold weather conditions a heavy emulsion often forms in the bottom of the oil pan as a result of condensation, etc., all of which will not drain off with the oil. Therefore, the oil pan and the screen should be thoroughly cleaned to insure correct functioning of the lubricating system.

3. **OIL AND GREASE CAR, INCLUDING ALL LUBRICATOR CONNECTIONS, OIL CUPS, ETC.**—Use a gear lubricant of the consistency of 600-W for all parts of the chassis which are lubricated with the pressure gun through the lubricator connections provided.

Particular attention is called to the following points when lubricating the car:

The connection on the fan bracket should not be over lubricated as the excess lubricant will be thrown off by the action of the fan and result in a dirty, greasy engine. One turn of the pressure gun handle is plenty.

Do not overlook the starter shaft under the front floor boards. Failure to lubricate at this point will result in sticking of the starter gears on the shaft and possible injury to these parts.

Another important point is the clutch release bearing inside the clutch housing.

Oil cups should receive attention as follows:

The oil cup on the distributor housing should not get over 3 or 4 drops. Excess oil

at this point is liable to be thrown off by the cam onto the breaker points.

Two oil cups on the starter generator—the front one should be filled and the rear one a few drops. The oilers for the rear engine support on each side of the frame should be liberally oiled.

All brake rods, clevis pins, etc., should be lubricated with engine oil. Particular attention should be paid to the brake band lever clevis pins.

4. **CHECK LUBRICANT LEVEL IN TRANSMISSION AND REAR AXLE**—Remove the filler plug on the right side of the transmission case and fill until lubricant is level with the opening. The capacity of the transmission is 3½ pints.

Remove the filler plug in the rear axle housing cover and see that the lubricant level is up to the opening. The capacity of the rear axle is 6½ pints.

Use a high grade gear lubricant in both the transmission and rear axle.

In cold weather, if difficulty is experienced in shifting gears with a cold engine the transmission lubricant should be thinned with about 50% engine oil. This also applies to the rear axle as the pinion bearings will not receive proper lubrication when the lubricant solidifies due to extreme low temperatures.

5. **CHECK OIL PRESSURE AT IDLING AND MAXIMUM ENGINE SPEEDS**—

First run the engine until it is warmed up sufficiently to open the radiator shutters. At idling speed the gauge needle should just pull away from the stop on the gauge or show a pressure of approximately 1 to 2 lbs. The oil pressure should not show over 20 lbs. maximum. For making adjustments on the oil pressure relief valve see the Service Bulletin for June 1922, page 44.

6. **DOES OIL LEVEL INDICATOR REGISTER CORRECTLY?**—The oil level indicator should show "Full" on the scale when the 10 quarts of oil are in the pan. If it shows lower than this the float is defective or the stem sticking.

7. **IS FUEL STRAINER CLEAN?**—The fuel strainer is located under the front floor boards on the left hand side member of the frame. Remove same and clean thoroughly.

Inspect and clean the screen in top of the vacuum tank.

The screen in the carburetor may be checked as follows:

Shut off the fuel line at the dash. Remove the cover and float from the carburetor float chamber. Then, have shut-off valve opened and see that the gasoline flows freely into the float chamber. If it does not, remove the carburetor and clean the screen in the bottom of the float chamber.

8. GASOLINE GAUGE ON TANK—CHECK FOR ACCURACY—The gauge is usually O. K. unless the pointer is sticking. This may be determined by rocking the car vigorously. If the pointer oscillates freely the gauge is all right.

9. BATTERY—CHECK WATER, GRAVITY AND CONNECTIONS—See that the electrolyte stands above the plates in each cell. If necessary refill until it stands approximately $\frac{1}{2}$ inch above the top of the plates.

The specific gravity measured with a hydrometer should not be less than 1.250.

See that the cable connections are clean, tight and kept coated with vaseline, also that the battery hold-down clamps are tight

10. GENERATOR — CHECK OILING, BRUSHES, COMMUTATOR AND CHARGING RATE. LUBRICATE OVER-RUNNING CLUTCH—See that the commutator is clean and not worn or burned. If necessary to clean the commutator, remove the generator end cover screw which passes thru the inspection hole, and a narrow strip of fine sandpaper (not emery) may be inserted in the inspection hole and held against the commutator with a slight pressure of the finger with the commutator rotating.

See that the generator is charging properly.

To lubricate the over-running clutch turn the ignition switch "ON" and feed engine oil into the front generator oiler until approximately a tablespoonful has been fed in. If the clutch shows evidence of sticking or is noisy keep on feeding in oil until it again sounds normal. Excess oil at this point, fed in with the armature rotating does no harm as it flows down into the over-running clutch and then out thru the overflow hole in the water pump housing.

11. STARTING MOTOR—CHECK OILING BRUSHES AND COMMUTATOR—Care should be taken in oiling the starter end of the starter-generator unit. 3 to 4 drops is sufficient.

See that the commutator is clean and not worn or burned. If necessary to clean the commutator remove the engine pan on that side and clean the commutator as described under Operation 10.

12. DISTRIBUTOR — CHECK POINTS AND GAP, TIMING AND SYNCHRONISM

—The gap at the breaker points should be exactly the same on both sides, i. e. (.020) and the points must be clean, smooth and meet squarely. A point which is in good condition has a dull frosted appearance. Whenever it is necessary to clean the points use a fine oil stone, never a file.

Generally speaking, all that is necessary is to check the condition of the breaker points and set the gaps exactly alike which will bring back the timing to its original setting.

If the engine is running smoothly and satisfactorily and generating its normal power, it will not be necessary to check the timing as the only change which takes place thru wear is in the setting of the breaker points. If it should be found necessary to check the timing proceed as outlined in the June 1922 Service Bulletin.

The only time it is necessary to check synchronizing is when the plate carrying the breaker points has been removed. When checking synchronizing see Page 81, November 1922 Service Bulletin.

13. SPARK PLUGS — CLEAN AND CHECK GAPS—Set gaps with gauge to .025". In cold weather the gaps may be set as close as .020" to facilitate starting.

14. CHECK CONDITION OF LIGHTS

—See that bulbs and reflectors are in good condition and that headlamps are properly focused. Also see that tilting device operates properly.

15. BRAKES—CHECK ADJUSTMENTS BOTH INTERNAL AND EXTERNAL—For complete procedure for adjusting brakes see Sept. 1922 Service Bulletin.

Never adjust brakes without first jacking up the wheel. Adjust the back and bottom of the band first. Wheels should turn perfectly free. The emergency brake will need adjustment at very infrequent intervals. Brake rods should never be adjusted as this changes the brake leverage.

16. FRONT WHEELS—CHECK ALIGNMENT AND BEARING ADJUSTMENT

—Do not adjust front wheel bearings too tightly. Bearings should be adjusted so that a slight shake is perceptible when the wheel is grasped by the spokes. The wheel should turn freely and the weight of the tire valve should be sufficient to revolve the wheel.

Make certain that toe-in of the front wheels is correct. See the Service Bulletin for April 1923.

17. WHEEL RIMS—CHECK FOR TRUE RUNNING—This may be done at the same time the front wheels are checked for alignment and the rear wheels are jacked up for brake adjustment. If the tire does not run true, loosen the rim bolts and tighten gradually one at a time. Do not take any one nut up tightly before the rest.

18. SPRINGS—OIL, TIGHTEN CLIPS—Spring clip nuts should be tightened securely. Cases of spring breakage, when the break occurs in the center of the spring, are always caused by loose spring clips. The sides of the springs should be painted with engine oil, that drained from the oil pan can be used to good advantage for this purpose.

The use of spring covers is not recommended.

19. CARBURETOR—CHECK ALL ADJUSTMENTS—See Service Bulletin for June 1923.

20. RADIATOR—DO THERMOSTAT AND SHUTTERS FUNCTION PROPERLY? IS RADIATOR CAP GASKET TIGHT? IN COLD WEATHER CHECK ANTI-FREEZE WITH HYDROMETER.

The screen in the lower water connection to the radiator, which may be removed by unscrewing the plug in the bottom should be removed and thoroughly cleaned.

Run the engine until the shutters open which should occur at a temperature of approximately 160°.

The operating clevis which is attached to the third shutter and the hinge pins on the ends of each shutter should be oiled. Inspect the radiator cap gasket to see that it is in good condition and does not leak.

On cars where motometers and radiator ornaments are installed see that they fit tightly as an air leak at this point will prevent the condenser tank from operating.

The only accurate method of testing an anti-freeze solution is with a hydrometer. The following table gives the freezing points of various hydrometer readings when an alcohol solution is used.

.974.....	13° above
.964.....	3° above
.953.....	20° below
.936.....	34° below

21. TIMING CHAIN—CHECK ADJUSTMENT—Remove the inspection plug in the engine front end cover and test the chain for slackness. A chain that is adjusted too tightly will cause a whining noise and give use to excessive wear of the chain and sprockets. The total slack in the chain

should not be more than $\frac{3}{4}$ ". The best adjustment is usually found to be between $\frac{1}{2}$ " to $\frac{3}{4}$ ".

22. CLUTCH — SEE THAT CLUTCH PEDAL ADJUSTMENT IS CORRECT—

The clutch pedal should have approximately 1 inch free motion before starting to disengage the clutch. Adjustment is made by means of the adjusting nut on the clutch release rod. See Fig. 95, Service Bulletin for August 1923.

23. REMOVE CARBON IF NECESSARY—When cleaning carbon the following precautions should be observed.

A wire brush should not be used for cleaning the piston heads as particles of carbon are liable to be forced between the piston and cylinder wall with possibilities of scoring. Before reassembling cylinder heads pour at least a tablespoonful of engine oil on each piston to insure sufficient lubrication when the engine is started. With the engine thoroughly warmed up it will be found that the cylinder head nuts may be taken up slightly. Attention to this detail may prevent the gasket blowing out.

24. TIGHTEN BODY BOLTS—Due to the settling of the body and compression of the anti-squeak material used between the body and the frame side members, the body bolts may be taken up considerably during the first few months of service.

Attention to this detail will be a means of preventing numerous squeaks and rattles.

25. DRAIN FLYWHEEL HOUSING—

The clutch is designed to operate perfectly dry but occasionally a small amount of oil leaks thru the bearings and the oil vapor from the engine condenses in the housing. This may be drained off by removing the plug in the bottom of the housing.

26. HOO-DYE SHOCK ABSORBERS—CHECK FOR GLYCERINE—

Remove the filler plugs and see that the reservoir is full of glycerine. Also that the ball joints are lubricated and that all attaching bolts are tight.

In cold weather it is usually desirable to turn the adjustment back slightly about one division to compensate for the increased viscosity of the glycerine at low temperatures.

27. TIRES—CHECK FOR INFLATION—

Check inflation with pressure gauge and see that they are up to the manufacturer's recommended pressures.

What Correct Lubrication Really Means To You

Dealers should not overlook the importance of using and selling only high-grade oils at all times, as no single factor will do more to aid you in your efforts to eliminate service complaints, and help you to build up good-will among your customers than the matter of correct lubrication.

Correct lubrication means more than just the use of a high grade oil of the proper body and character. It is equally as important that the oil supply be kept in first-class condition by frequent inspection to maintain the oil level at the proper height, and by draining of the crankcase after the first 400 miles in a new car and every 750 miles thereafter.

It is far more economical to purchase high-grade oils on the basis of the cost of consumption than inferior oils on the basis of the cost per gallon.

For instance, a saving of even as much as fifty percent in the initial price of the oil will not determine its actual cost from the standpoint of service rendered.

On the basis of the cost of consumption per mile, the use of an oil of the highest quality will result in a considerable saving in the amount of oil purchased.

Nor is this all—the use of inferior quality oils generally leads to increased trouble and large repair bills.

The possibility of excessive repairs, the risk of your customer losing the service of the car when it may be needed most, may react unfavorably and is not worth chancing for the sake of trying to economize on the oil bill.

It is to your advantage to impress upon your customers the necessity of using only the high-grade oils marketed by refiners of established reputation.

In the Ford engine a high-grade oil closely approximating the following specifications has been found to give the best results:

Flash.....370° F. Min.
 Fire.....420° F. Min.
 Viscosity at 100° F.—350 Max.
 Viscosity at 210° F.—50 Min.
 Cold.....30° F. Max.

Charging Batteries

It is very important when charging batteries to see that the positive wire of the charging outfit is connected to the positive (+) terminal of the battery, and the negative wire is connected to the negative (—) terminal of the battery. See Fig. 130.

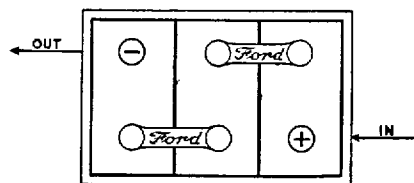


Fig. 130

Care should also be exercised to make sure that the wires on the charging outfit are properly connected to the battery, otherwise the reversed polarity will result in injury to the plates.

Passenger and Drivers Seat Backs

In order to eliminate confusion which has existed heretofore in the ordering of passenger and drivers seat backs with and without upholstery, we give below a complete list of these parts:

COMPLETE WITH UPHOLSTERING

- 9679ARX Pass. seat back—black and white cloth, malleable, with supports, 1916-21.
- 9681ARX Driver's seat back—black and white cloth, malleable, with supports, 1916-21.
- 9679BRX Pass. & Driver's seat back—black and white cloth, pressed steel, less supports, 1921.
- 9681BRX Pass. & Driver's seat back—black and white cloth, pressed steel, with supports, 1921.
- 9679DRX Pass. seat back—Two-door cloth, malleable, less supports, 1922.
- 9681DRX Driver's seat back—Two-door cloth, malleable, with supports, 1922.
- 9679CRX Pass. seat back—Two-door cloth, pressed steel, less supports, 1922-23.
- 9681CRX Driver's seat back—Two-door cloth, pressed steel, with supports, 1922-23.
- 9679ERX Pass. seat back—Four-door cloth, pressed steel, less supports, 1923.
- 9681ERX Driver's seat back—Four-door cloth, pressed steel, with supports, 1923.

METAL ONLY

9668ARX Pass. seat back with supports, malleable, 1916-21.

9618ARX Driver's seat back with supports, malleable, 1916-22.

9668BRX Pass. and Driver's seat back with supports, pressed steel, 1921.

9667ARX Pass. seat back, less supports, malleable, 1922.

9667BRX Pass. seat back—less supports, pressed steel, 1922-23.

9618BRX Driver's seat back with supports—pressed steel, 1922-23.

Due to the construction of the passenger's seat, passenger's seat backs for cars built up to and including 1921, include the supports; whereas those for cars built since 1921 do not include supports. If supports are desired for the later cars they must be ordered separately.

Window Regulators

Three different types of window regulators have been used on current Ford enclosed cars: namely:

17200A and 17201A—Gear type.

17200B and 17201B—Diag. Screw Type.

17200C and 17201C—Vert. Screw Type.

There were three different types of window channels used with these regulators, but the "B" type channel used with the diagonal type regulator can also be used for repairs with either of the other type regulators.

When ordering regulators be sure to specify the type desired and when ordering channels for use with these regulators always order the "B" Type.

Schedule of Repair Charges

A suggested schedule of Repair Charges for Ford Cars and Trucks, is being distributed to dealers, service dealers, and garages.

The use of this schedule will assist materially in placing the repair shop on a flat rate basis of charging for work that is fair to both dealer and owner. This method of determining charges enables the dealer to check the efficiency of his shop and places the responsibility for turning out repair jobs within the

time scheduled for each job directly on the foreman.

If you have not received your copy of this schedule you should communicate with your branch.

Special Prices on Service Parts

Subject to prior sale, we can offer a limited quantity of the following material at exceedingly low prices:

T-6572DX Tulite frosted bulbs at .10 net each.

T-9886X Coupe door, less window, R. 1918-19, at \$8.00 net each.

T-9887X Coupe door, less window, L. 1918-19, at \$8.00 net each.

T-9560AX Sedan door, less window, R. 1915-18, at \$8.00 net each.

T-9561AX Sedan door, less window, L. 1915-18, at \$8.00 net each.

T-9682X Rear seat cushion assembly, Sedan, at \$4.00 net each.

T-9955X Coupe roof assembly at \$5.00 net each.

T-4955AX Top Visor, Torpedo, at .20 net each.

This presents an opportunity to owners in need of these parts for repairing damaged cars to secure them at a very low price. It is also possible that dealers may have use for this material to repair used cars.

Piston and Pin Assemblies

In order to insure more perfect fitting of piston pins, model "T" pistons with pins assembled are now being supplied under the following numbers:

3021F-4473R Piston and pin assembly—Standard.

3021G-4473FR Piston and pin assembly—.0025 O. S.

3021H-4473ER Piston and pin assembly—.031 O. S.

3021J-4473FR Piston and pin assembly—.033 O. S.

3021K-4473R Piston and pin assembly—.005 O. S.

It is not our intention to discontinue supplying pistons, less pins, to take care of owners who require pistons only, and we will, therefore, continue to list pistons only, and pins, in the price lists as formerly.

Dealers will, undoubtedly, desire to order pistons and pins assembled to take care of their own shop work.

Discount on Parts Sales to Government Postal Dept.

The attention of all dealers is again called to the following ruling: All Branches of the Post Office Department are entitled to the garage discount on parts purchased for Ford cars actually owned by the Post Office Department, providing the labor of installing these parts is not performed by the dealer.

Under no circumstances is any discount to be allowed mail carriers or other employees of the Post Office Department, who personally own the Ford cars used in this service.

This same ruling applies to parts purchased for cars owned by travelling salesmen, even though they may represent concerns who are receiving the discount by virtue of their operating five or more cars at a given point.

Removing Distributor Spacer on Lincoln

In the January, 1923 issue of the Service Bulletin, page 3, an illustration of a puller for the distributor spacer was shown as tool No. 15Z-3703. This was incorrect as Tool No. 15Z-3703 is the driver for the lower distributor shaft bushing.

We are not in a position to furnish the puller shown in Fig. 5, of the above Bulletin, and in fact a puller is not required for removing the spacer. First remove the oil filler body and pull out the pin which holds the spacer in position. The spacer may now be easily removed by tapping lightly with a small brass drift through the oil filler opening.

Cars bearing Motor Numbers 8,311,582 to 8,477,681 were shipped during September

Cars bearing Motor Numbers 8,477,682 to 8,664,281 were shipped during October

Serial Number of Tractors Assembled during

September	342,100 to 349,496
October	349,497 to 357,849

Motor Number of Lincolns Assembled During

September	14,068 to 14,850
October	14,851 to 15,774

Ford Service Bulletin

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Page 81

Separate Building for Lincoln Sales and Service

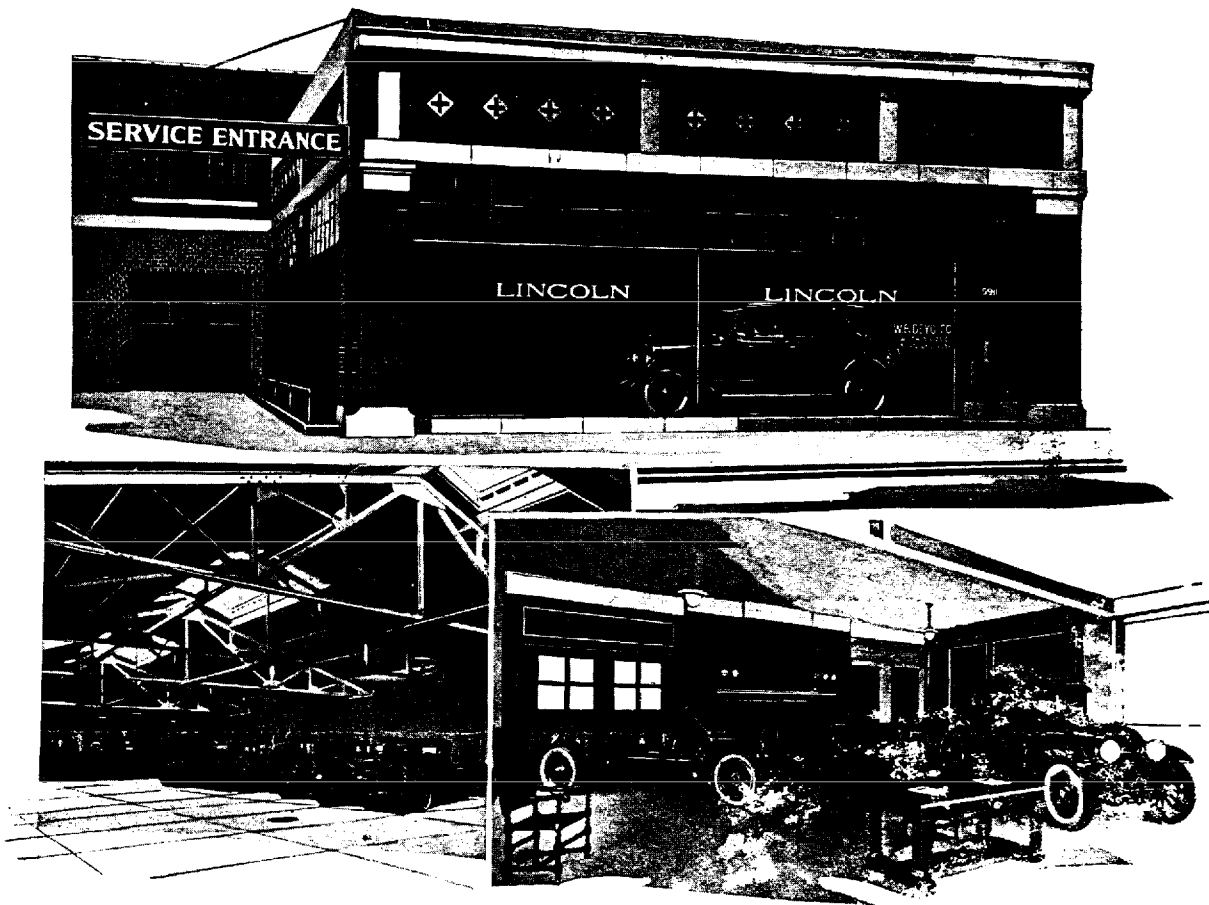


Fig. 131

AN attractive salesroom, tastefully furnished, in which cars have been arranged to display them to the best advantage, creates an atmosphere of refinement in keeping with the character of the Lincoln car.

The building shown in the above illustration is devoted exclusively to Lincoln sales and service by W. B. Deyo, Authorized Ford dealer at Detroit, Michigan.

The results obtained, as shown by increased sales and service business, since segregating the Lincoln departments have more than exceeded Mr. Deyo's expectations.

Winter Care and Operation

THE COOLING SYSTEM

Anti-Freeze Solution

Do not fail to use an anti-freeze solution in cold weather. The driver who does not take this precaution, runs the risk of expensive repairs caused by a frozen radiator, cracked cylinder block or head, and saves but little.

The ideal anti-freeze solution is *first*, one that will prevent freezing of the cooling solution without injuring the engine, radiator, or their various parts; *second*, one that will not lose its non-freezing qualities after continued use; and *third*, one that does not materially change the boiling point of the water with which it is mixed.

Kerosene has a lower freezing point and a higher boiling point than water, but the inflammability of the vapor it gives off when heated, and its high and uncertain boiling point might lead to serious overheating of the engine, and its solvent action on rubber makes it, as an anti-freezing solution, dangerous and injurious.

Most of the anti-freezing solutions which are ready prepared and sold under trade names have a calcium chloride compound which have a corrosive effect upon the metal with which it comes in contact. Tests have shown that calcium chloride will completely remove solder from copper and brass. Another disadvantage experienced with use of calcium chloride is that if small leaks occur in the radiator, and the solution comes into contact with the spark plugs and ignition wire, there is a liability of short circuit.

Alcohol solutions do not exert any greater corrosive action than water alone. Solutions of either denatured or wood alcohol are the most desirable anti-freeze solutions to use. The table below gives the approx point at which different denatured alcohol solutions will freeze. Wood alcohol solutions will give a higher freezing point.

ALCOHOL	FREEZING POINT	SPECIFIC GRAVITY
20%	10° above zero974
30%	20° above zero964
40%	30° below zero956
50%	40° below zero936

A solution composed of 10% water, 10% glycerine, and 80% alcohol is very often used, the freezing point being approximately 8° below zero. Since the alcohol evaporates more quickly than water, the solutions will therefore become deficient, unless more alcohol is added from time to time. This also applies to solutions not using glycerine.

Ford Model "T"

The capacity of the cooling system of the present model T car is 3 gallons and 1 pint. On cars with the lower radiator it is 2 gallons 7½ pints, and on cars with the brass shell radiator 3 gallons and 1¾ pints. From the above figures, the amount of alcohol to be used can be readily determined.

In storing the car for the winter, drain the cooling system, and pour about one quart of alcohol into the radiator, allowing this to run through. This will prevent the freezing of any water that did not drain out because of stopped tubes.

Fordson Tractor

As with the car radiator, it is necessary to put an anti-freeze solution in the radiator of the Tractor. The capacity of the cooling system is 12 gallons.

Due to the rush of cold air through the air washer, it is necessary that this point receive attention during the cold weather. Some Fordson operators run the tractor with the air washer removed or raised, others replace the water with kerosene. Water should be used as late in the season as possible, draining it at night to prevent freezing. If kerosene is used at all, it can only be put in when the temperature is around zero.

Lincoln

The capacity of the cooling system is approx. 7½ gallons. If the water in the pump freezes, the engine will not crank over and forcing it may break the impeller or do other serious damage. If the solution freezes, proceed in the following manner: Remove the radiator cap, thaw and open radiator drain valve. Continue the thawing process at the valve and gradually work along the system. Use a moderate heat such as hot water from a hose, or applied with cloths. Do not use flame, or do not pour boiling water on the pump as it may crack. **CAUTION:** 1 qt., of the same liquid used in filling the radiator should be used in the condenser tank, after the latter has been drained. This may be easily accomplished after the radiator has been filled, by pouring an additional quart of liquid into the radiator. The excess will be conveyed to the condenser tank through the radiator overflow pipe.

In order that the condenser system may function correctly, the radiator and hose connections must be air and water tight, or when the liquid in the radiator cools,

air will be drawn in to relieve the vacuum, instead of the liquid into the condenser tank. Do not remove the filler-cap while the engine is cooling. Care should be taken in installing motometers, and similar devices that they are fitted so as to be air tight. See that radiator cap gasket is in good condition.

In order to make certain that the condenser is working properly, we would recommend the following procedure:

1. Fill the radiator full.
2. Run the engine until it is thoroughly heated up and the shutters open.
3. Stop the engine, remove the radiator filler cap and note the drop in the water level.
4. Replace the radiator cap, and again run the engine for a few moments.
5. Stop the engine and allow it to cool for at least one hour.
6. Remove the cap and see if the water has returned to its normal level.

It is a good practice to clean the cooling system before adding anti-freeze. Open the drain valve, allowing the system to drain, then remove the strainer for cleaning, by unscrewing the plugs at the bottom of the radiator strainer housing. After cleaning, replace, and fill the radiator with clear water, run the engine for a few moments, and again drain the system, repeating the operation until the water runs clear. Should the sediment be extremely heavy, it would be a good idea to uncouple the hose connections from the radiator, and cylinder blocks with water under pressure. The condenser tank is drained by removing the plug at the front end.

Note:—On draining the cooling system, always remove the radiator cap.

Lincoln Rear Axle Ratios

The gear ratio of the standard rear axle of all Lincoln Cars, with the exception of the 2-Passenger Roadster, is 12-55. The gear ratio of the axle on the 2-Passenger Roadster is 13-55. We can also supply Lincoln Cars with 11-54 ratio axle where unusually severe driving conditions, such as hilly country, exceedingly rough roads, etc., make a lower axle ratio more desirable.

If cars having lower ratios are desired, orders placed with the Sales Department should specify 11-54 axles instead of 12-55.

License Data

LINCOLN

Engine

No. of cylinders.....	8
Cylinder bore.....	3 $\frac{3}{8}$ "
Stroke.....	5"
Piston displacement.....	358 cu. in.
Horse Power (S. A. E.).....	36.4

Car Number

A plate carrying the car number is fastened to the front of the dash on the right side under the hood.

The engine number is stamped on the left side of the crankcase between the 1st and 2nd cylinder—Note:—After car No. 6585 the car numbers and motor numbers are identical except on about 25 cars, which have a letter "A" suffixed to the car number.

Serial Numbers

Sept., 1920—Dec. 31, 1920...	1—834
Jan. 1, 1921—Dec. 31, 1921...	835—3151
Jan. 1, 1922—Dec. 31, 1922...	3152—8709
Jan. 1, 1923—Dec. 1, 1923...	8710—16434

Shipping Weights

Type	Body	Pass.	Wheel-base	Shipping Weight
101	Touring.....	7	130	4185
102	Roadster.....	3	130	3950
103	Phaeton.....	5	130	4135
104	Coupe.....	4	130	4140
105	Sedan.....	5	130	4385
106	Limousine.....	7	136	4590
107	Town Brougham.....	7	130	4410
108	Sedan.....	7	136	
109	Town Car.....	7	136	4115
110	Sedan.....	7	136	
111	Roadster.....	2	136	
112	Phaeton.....	4	136	4115
113	Sedan (Judkins).....	4	136	4375
114	Sedan (Judkins).....	7	136	
115	Limousine (Judkins).....	7	136	
116	Sedan (Fleetwood).....	7	136	
117	Sedan.....	7	136	4130
118	Limousine.....	7	136	4130
119	Limousine (Fleetwood).....	7	136	
120	Town Car (Bruno).....	7	136	4175
121	Limousine (Open Drive) (Bruno).....	7	136	
122	Chassis.....		136	4130
123	Phaeton.....	4	136	4130
124	Touring.....	7	136	4280
125	Sedan—2 window.....	7	136	4375
126	Coupe.....	7	136	4380
127	Sedan—3 window.....	4	136	4375
128	Berline (Judkins).....	4	136	4510
129	Sedan.....	5	136	4000
130	Roadster.....	2	136	4050
131	Cabriolet (Bruno).....	6	136	4155
132	Coupe (Judkins).....	7	136	4280

There are a number of custom bodies mounted on Lincoln chasses for which we are unable to supply weights.

Application for license for these cars should be accompanied by a certified weight slip, in those states which require the car weight for computing the license tax.

FORD

Engine

No. of cylinders	4
Cylinder bore	3 $\frac{3}{4}$ "
Stroke	4"
Piston displacement	176 cu. in.
Horse Power (S. A. E.)	22.5

Engine Number

The engine number is on the left hand side of the cylinder block just above the inlet connection elbow.

MODEL "T"

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
	Car No.	150,001 to 332,500
Oct. 1, 1912 to Sept. 30, 1913	Motor	B-1 to B-12,247
	Motor	169,452 to 370,147
Oct. 1, 1913 to July 31, 1914	Car	332,501 to 539,000
	Motor	370,148 to 570,790
Aug. 1, 1914 to April 30, 1915	Car	539,001 to 742,313
	Motor	570,791 to 773,487
May 1, 1915 to July 31, 1915	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 Dec. 31, 1921	Motor	5,114,351 to 5,638,071
Jan. 1, 1922 to June 30, 1922	Motor	5,638,072 to 6,199,796
June 30, 1922 to Dec. 31, 1923	Motor	6,199,797 to 6,953,070
Jan. 1, 1923 to June 30, 1923	Motor	6,953,071 to 7,927,374
July 1, 1923 to Dec. 31, 1923	Motor	7,927,375 to 9,008,381

Shipping Weights

Year	Touring	Runabout	Coupe	Sedan	Tudor	Fordor	Chassis	Truck Chassis
1915	1510	1315	1540	1730			1200	
1916	1500	1380	1540	1730			980	
1917	1480	1385	1580	1745			980	1450
1918	1500	1390	1580	1715			980	1450
1919	1500	1390	1580	1750			1060	1395
1920	1500	1400	1525	1725			1020	1380
1921	1485	1380	*1685	*1875			1070	1430
1922	*1625	*1533	*1729	*1900			*1230	*1520
1923	*1612	*1540	*1772	*1900	*1895	*1950	*1262	*1572

* Weight includes starter and demountable rims.

Starter equipment weighs 95 lbs.

Demountable rim equipment weighs 55 lbs.

Lincoln Rear Axle

Very often complaints of noisy rear axle gears can be traced to the non-skid tread on the tires. The only way to verify this fact to the satisfaction of the owner and the service man is to remove the rear tires and replace them with smooth or rib tread for testing purposes. If upon testing out the car, the noise disappears, it is obvious that it was caused by the tires.

The front tires often cause a noise on smooth pavements, particularly when rounding corners which is often mistaken for rear axle noise. Some makes of tires have a non-skid tread of such design that the vibration caused by the non-skid blocks striking the pavement can be felt on the steering wheel. For this reason it is good practice to change the rear tires and ride the car and if the noise still continues also change the front tires.

REPLACEMENT OF RING GEAR AND PINION

Never replace either the ring gear or the pinion without replacing the mating part. These gears and pinions are always kept in pairs as they are tested together for tooth mesh and quietness.

Lincoln cars now have the following rear axle gear ratios:

12 to 55—Standard.

13 to 55—Roadster.

11 to 54—Special—for mountainous districts.

Formerly these ratios were:

11 to 49—Standard.

12 to 49—Roadster.

10 to 49—Special.

The difference in ratio between these axle ratios and those in use at present is very slight as the number of teeth in both the pinion and ring gear have been increased and the greater number of teeth in mesh adds to the quietness of operation.

Whenever the rear axle gears are replaced with ones of a different ratio, it will be necessary to change the gears at the forward end of the propeller shaft which drive the speedometer in order that the speedometer shaft may be driven at the correct speed for the instrument to register accurately.

The following table gives the correct ratio of speedometer gears for use with the various rear axle gear ratios.

Speed. Gears.	Axle gears.
16 — 6	11-49 and 12-55
17 — 7	12-49 and 13-54
14 — 5	10-49 and 11-54

RIVETING RING GEARS

When disassembling ring gear from differential always cut the rivets on the ring gear side as the ring gear is hardened and the differential case is not. Cutting on the ring gear side will eliminate mutilation of the differential case.

When riveting the new ring gear on the differential case use four $\frac{1}{2}$ inch bolts and bolt the ring gear in position using every other rivet hole. Heat the rivets to a bright cherry and rivet the four holes in which there are no bolts, then remove the four bolts and insert the remaining four rivets.

This riveting is best done with one man holding the differential, another holding a dolly bar on the anvil and under the rivet, while a third does the riveting with a hand rivet set. Do not use a pneumatic riveter for this operation as the differential case flange is liable to be distorted and cause the ring gear to run out of true thus causing a noisy axle.

Removing Battery From New Style Model T Coupe

Some difficulty is experienced when attempting to remove the battery through the rear deck door. A much easier method is to remove the seat cushions and seat back which makes the battery easily accessible from the front compartment.

Remove screw "A" Fig. 132 at each end of the seat back and same may be easily lifted out. When replacing the seat back make certain that the hook in the center at the top is engaged with the slot in the seat back frame.

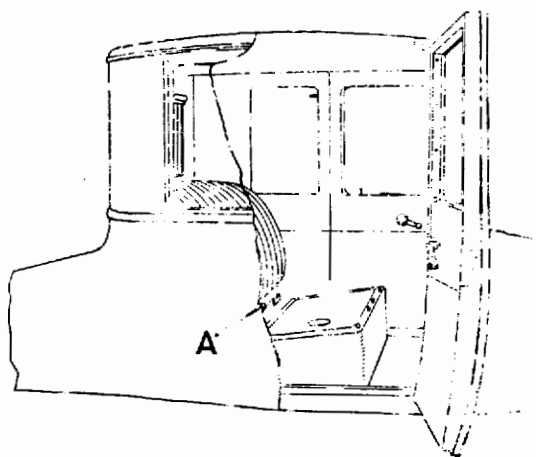


Fig. 132

Lincoln Assembly Changes

Piston Rings

All Lincoln engines after No. 13788 have the new type piston ring L-8325-T installed. The ring does not have the small oil scraper groove on the bottom edge which the former ring L-8325-N had. See Fig. 133.

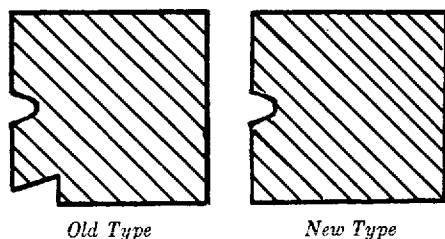


Fig. 133

The elimination of this scraper groove insures an increased oil supply for the cylinder walls, pistons and rings with a resulting reduction in wear on these parts and the heavier oil film on the cylinder wall increases the effectiveness of the compression seal.

Rings of the old style with the oil scraper groove should not be installed on alloy pistons.

Oversize rings are now listed as follows:

.0025 oversize.....	L-8325-UR
.015 oversize.....	L-8325-VR
.030 oversize.....	L-8325-WR

Rubber Fan Belt

All cars after car No. 15700 are equipped with a rubber-fabric vee type fan belt. Our laboratory tests have demonstrated that the slipping with this type of belt is much less than with the leather one. We suggest that in case where complaints of over-heating are encountered that you install one of the rubber belts.

Lubrication for Front End Chain

On all cars after No. 10626—the oil pipe L-4046 which carries the oil supply to the accessory drive shaft, "A" Fig. 134, has a small hole drilled in the bronze fitting on the accessory drive shaft and through this hole a stream of oil is directed upon the timing chain.

When the front end cover is removed on any car previous to car No. 10626 replace the oil pipe with one of the latest design with the oil hole for the chain. The oil hole will supply oil for lubricating the chain and the oil will spray uniformly and thus prolong its life.

All of these oil pipes in dealer's stock which do not have the oil hole should be returned to the branch for exchange.

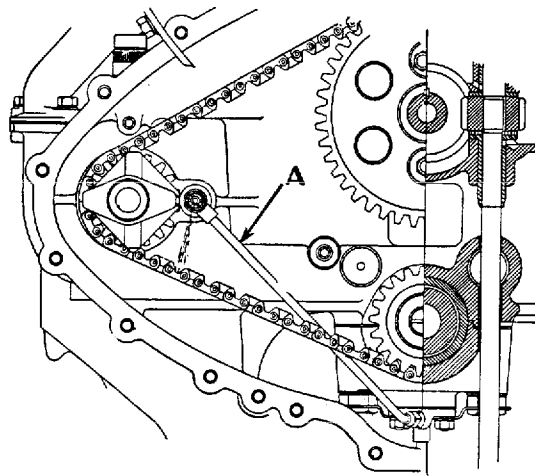


Fig. 134

Oil Trap in Distributor Shaft Spacer

Beginning with Car No. 12143 the Distributor Shaft Spacer and Bushing Assembly Part No. L-4031, "B" Fig. 135, has been changed to provide an oil seal and prevent the engine breathing through the distributor. This prevents the oil-vapor from getting into the distributor head and sooting the breaker points.

Any cars previous to No. 12143 with which any trouble has been experienced with the breaker points in the distributor burning

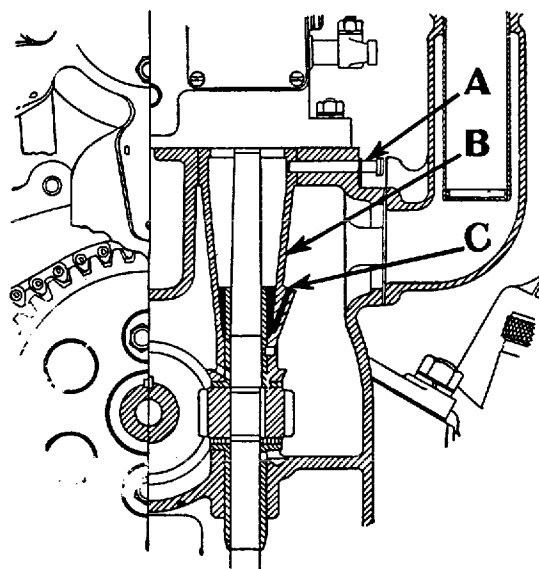


Fig. 135

black, thus causing difficulty in starting, should have the distributor spacer changed for one of the new type.

When installing the new spacer and bushing assembly the following procedure should be carried out:

1. Remove distributor noting which contact the rotor arm is on so that the distributor may be replaced without changing the setting of the distributor cam.

2. Remove the oil filler body and pull out the pin "A" Fig. 135 which holds the spacer in position. The spacer may now be removed by tapping lightly with a small brass drift through the oil filler opening. If the distributor driving shaft is corroded it should be removed and thoroughly cleaned. When the drive shaft is removed it will be necessary to retime the distributor when reassembling. Install the new spacer. It will be necessary to drill the hole for the locating pin "A" in place in order that sufficient clearance may be allowed for the thrust washers on the distributor driven gear. The best way to accomplish this is to take a piece of paper about .005 thick and cut a washer which will fit over the shaft on top of the distributor driven gear, then tap the spacer into position and mark the center of the locating hole by inserting pin "A" into crankcase and tapping with a hammer. This will mark the desired center with a circle about $\frac{1}{8}$ " diameter. Remove spacer and mark the center with a sharp punch and drill with a new $\frac{1}{4}$ " drill. Do not forget to remove the paper washer when reassembling spacer. This will give the desired .005 clearance. Replace spacer locating pin and oil filler. Before assembling distributor to crankcase see that distributor drive shaft is free. If such is not the case the spacer may be turned and another hole drilled for the locating pin.

Inspect lower distributor bearing. If necessary to remove same proceed as follows:

1. Loosen the set screw which locks bearing retaining nut.
2. Remove bearing retaining nut.
3. Remove wire retaining clip and nut at end of distributor shaft.
4. Jar ball bearing from housing by bringing down distributor forcibly and squaring against the top of the work bench or a wooden block.

5. Pay particular notice to the relative position of the washers in order that they may be reassembled properly.

6. If bearing cannot be removed by procedure it will be necessary to disassemble the distributor.

It is advisable that the entire ignition system be carefully checked—distributor points inspected and points which are pitted or burned black should be replaced if they cannot be properly cleaned.

Storing Lincoln Cars

If the car or body is to be stored or taken out of service for any length of time, a few special precautions should be taken for its care.

Method of Storing Car

Thoroughly wash and dry the car, brush the top and curtains, then jack the car up so that the four wheels are clear of the floor. With a brush, paint all unpainted metal parts with vaseline or heavy oil (600W) to prevent rust and corrosion. This can be easily removed with gasoline on putting the car into service again, while rust and corrosion cannot.

Protecting the Finish

Varnish should be carefully cleaned of all dirt or oil. Storing the body in total darkness will cause the varnish to assume a green tint. Washing a car once a month will help to preserve the normal color. Varnish that has turned green from darkness will recover its normal shade after being exposed to the light for some time.

Where to Store the Car

The car should be kept in a dry place, with the heat maintained at an even temperature (approximately 60 degrees). Avoid sudden changes in temperature and the close proximity of steam pipes or other heating apparatus. A subdued light evenly distributed will best preserve the finish. A good plan is to enclose the car completely with a cloth cover. Never store the car in the same building with gasoline or other chemicals.

Draining the Water

Thoroughly drain the water from the cooling system before storing the car. See directions page 83.

Care of Engine

The following precaution will help you to prevent the engine mechanism from rusting during storage. Remove and clean the spark plug, push down the four tabs on the spark plug, push down the four tabs on the spark plug hole and replace the plugs.

Crank the engine with the electric starter (with switch off) for approximately one-half minute, thus coating all interior parts with oil. Release the brakes.

On putting the car into service, repeat the above operations. Turn the ignition switch to "ON" and start the engine. Run slowly for a few minutes.

Storage Battery

Arrange for attention to be given the battery at regular intervals or better still store the battery with an authorized battery service station.

Use Genuine Ford Glass for Service Requirements

Our manufacturing facilities have been increased to such an extent that we are now prepared to supply both windshield and closed body glass of first quality quarter-inch plate, in any quantity desired. Reduced prices have just been put into effect, making it possible for our dealers to purchase this

A-1 grade glass through our Branches, at prices that compare favorably with quotations made by jobbing houses on $\frac{1}{8}$ " plate of inferior quality. On the basis of these new quotations dealers are warranted in giving us their entire business, and furthermore they will be sure of having a dependable source of supply in future.

In addition to the "A" quality glass used for car production as well as service, we offer a second quality glass known as grade "B" which, although having slight imperfections, compares favorably with glass now being supplied through other sources. As this "B" glass can be purchased at extremely low prices, it will no doubt satisfy a demand from owners of older cars, who wish to economize on repairs and will also fill the need of a cheaper grade of glass for use in used cars.

Every dealer will find it to his advantage to carry both grades of glass in stock, so that he can meet the varying demands of his trade.

Cars bearing Motor Numbers 8,664,282 to 8,843,065 were shipped during November

Cars bearing Motor Numbers 8,843,066 to 9,008,381 were shipped during December

Serial Number of Tractors Assembled during

November	357,850 to 365,190
December	365,191 to 370,351

Motor Number of Lincolns Assembled During

November	15,774 to 16,229
December	16,230 to 16,434
