Ford
SERVICE BULLETIN

Vol. 13 June 1932 No. 1

# Preliminary Service Instructions

FOR THE

# FORD V-8

## and Improved 4-Cylinder Cars and Trucks

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This issue of the "Ford Service Bulletin" contains information necessary for the correct servicing of the Ford Cars and Trucks—*read it carefully.*

See that all mechanics in your organization understand each of the adjustments and service operations thoroughly.

This issue contains complete information about the following:

Tires soft—under inflated tires are responsible for more complaints of excessive fuel consumption than any other cause. Inflate all tires to the recommended pressure.

## Cleaning

For complete cleaning remove the carburetor and disassemble it by removing the main assembly bolt. Separate the upper and lower halves carefully to avoid damaging the gasket, float, idling jet or power jet tubes. Remove the plug "B" beneath the main jet and rinse the carburetor bowl in gasoline or use air to blow out any dirt which may have lodged in the bottom of the bowl or in the jets. When cleaning one of the carburetor jets, it is always advisable to clean all of the jets and jet tubes; in this way you may avoid the necessity of again disassembling the carburetor.

Make certain that there is gasoline in the tank and a free flow of fuel through the line and that the fuel pump is functioning properly.

On complaint of lack of speed, see that the main jet "C" and the power jet "D" and power jet tube "E" are free from dirt.

A plugged compensator tube "F" (Fig. 13) will result in poor idling and low speed performance.

The idling jet "G" furnishes all the fuel for idling. Consequently the tube and metering or cap jet "H" must be kept clear.

The power jet "D" supplies all of the fuel for the power jet tube "E"

In case of leaks see that all connections and jets are tight. If it is not functioning replace float and float valve assembly.

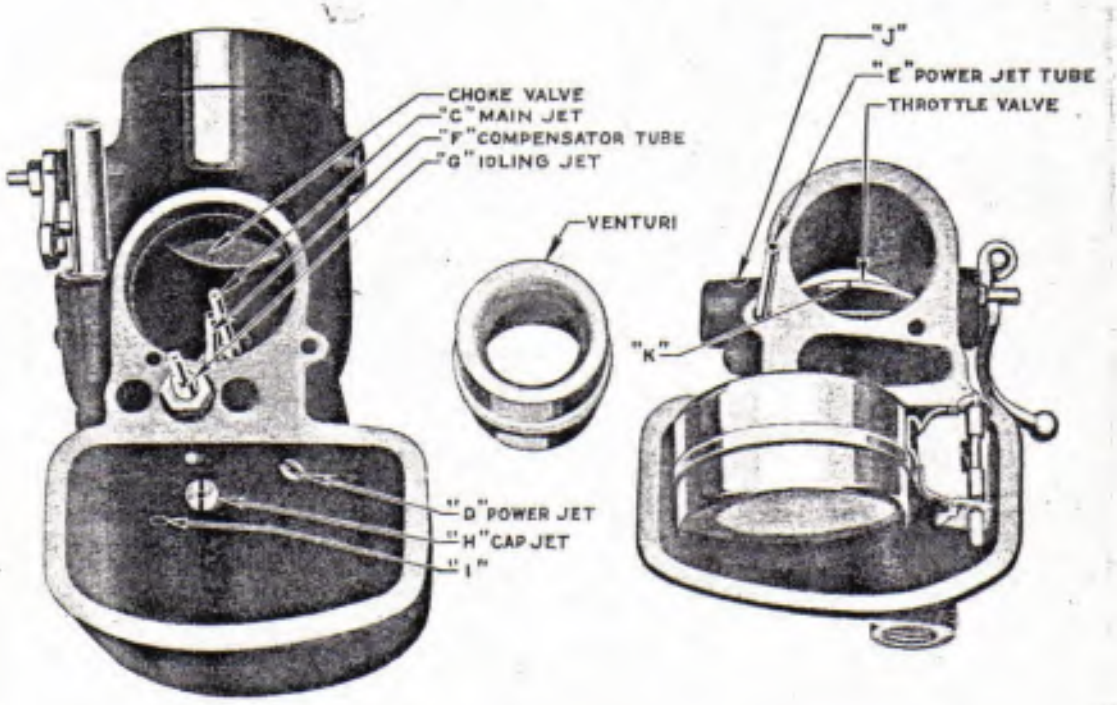
On complaints of poor fuel economy make certain that the owner understands the proper operation of the dash adjustment as covered in the Instruction Book.

## To Set Idle Adjustment

With engine warmed up, push in throttle button on instrument panel. Adjust throttle adjusting screw so that the engine will run sufficiently fast to keep from stalling. Next turn idling air adjustment screw in or out until engine runs evenly without rolling or skipping. (Usually from 1¼ to 1¾ turns open is correct.) Then slowly screw in throttle plate adjusting screw until engine picks up a slight additional speed.

## Regulating Gasoline Mixture

The pulling out of the choke button (located on the instrument panel) closes the

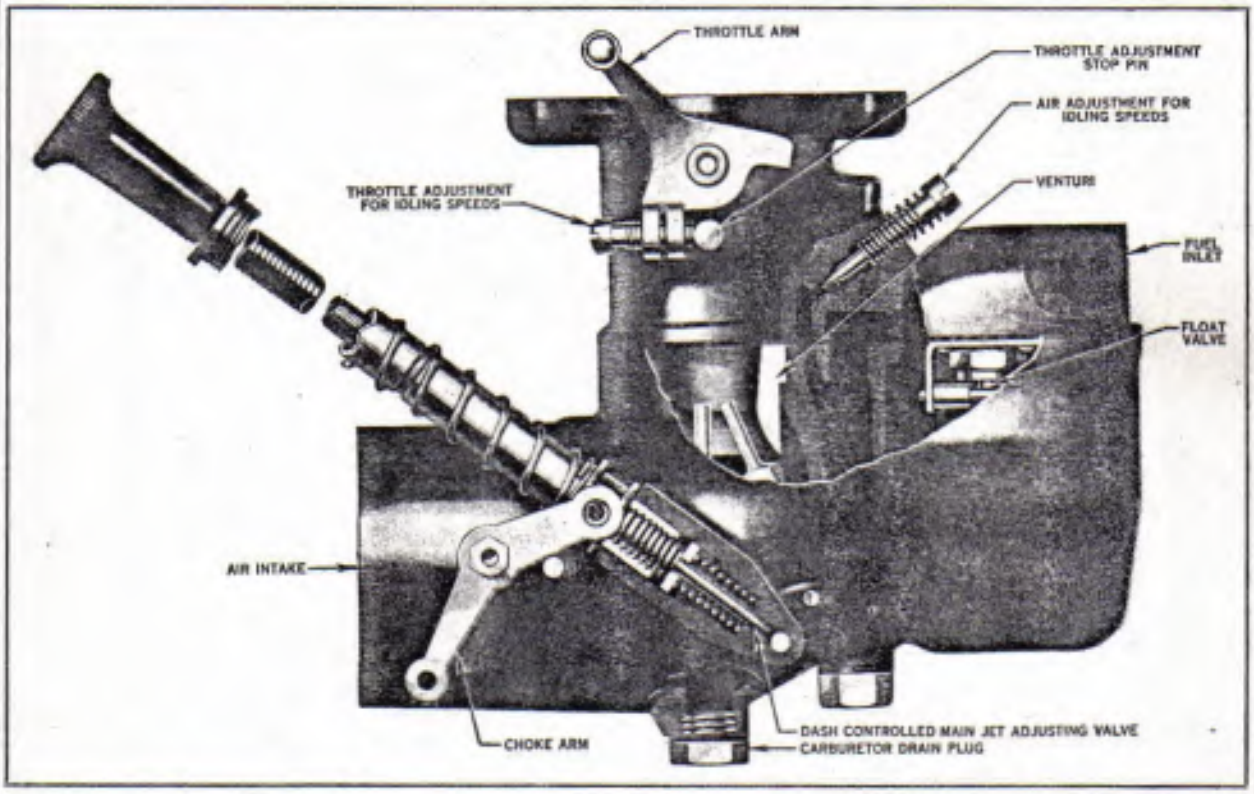



DISASSEMBLED CARBURETOR (4-CYLINDER)
Fig. 13

choke valve in the carburetor, permitting a rich gasoline mixture to be drawn into the cylinders for cold weather starting. When released, this button is returned to normal position by spring action.

This button is also a carburetor needle valve adjustment. Turning the button in a counter clockwise direction enriches the fuel and air mixture. The valve should be turned back (clockwise) as soon as the engine has become warm. **Advise owners the car should never be operated with this adjustment open.**

Turning the carburetor adjustment too far to the left results in a "rich mixture." Such a mixture has too much gasoline and should be used for starting and warming up only.




CARBURETOR (4-CYLINDER)
Fig. 14

# FUEL PUMP

The fuel pumps used on the Ford cars and trucks are operated by an eccentric on the camshaft (see Figs. 15 and 16). On the pump used with 4-cylinder engine, as the shaft rotates the eccentric lifts the rocker arm, pulling the diaphragm downward, creating a vacuum in the pump chamber. With the 8-cylinder engine the same effect is accomplished by means of a push rod.

On the suction stroke of the pump the fuel is drawn from rear tank through the inlet into the sediment chamber and passes through the fine mesh screen and inlet valve into the pump chamber. On the return stroke, spring pressure pushes the diaphragm upward forcing fuel from the pump chamber through the outlet valve and outlet to the carburetor.

When the carburetor bowl becomes filled to the proper level the float in the carburetor will shut off the float valve creating a pressure in the pump chamber. This pressure will hold the diaphragm down against spring pressure where it will remain inoperative in the downward position until the carburetor requires further fuel and the needle valve opens.

The 18-9380 spring on the V-8 fuel pump keeps the push rod against the eccentric on the camshaft and pulls the diaphragm downward.

The B-9380 spring on the 4 cylinder fuel pump is merely for the purpose of keeping the push rod or rocker arm in constant contact with the eccentric on the camshaft. As this spring holds the push rod 18-9400 or the rocker arm B-9376 in constant contact with the eccentric their movement is continuous as long as the motor is running. While the diaphragm moves only when the carburetor requirements permits the diaphragm spring to push the diaphragm assembly upward. In average driving the movement of the diaphragm is confined to but several thousandths of an inch.

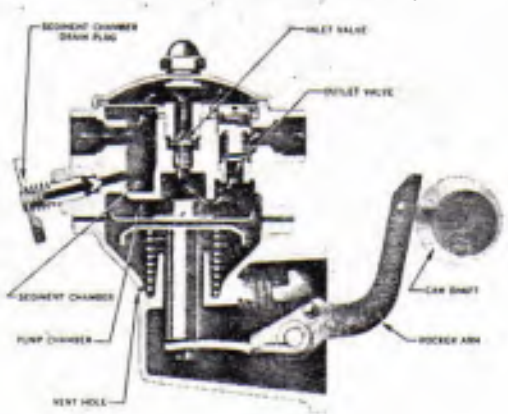
The pumps require no priming and little attention other than the keeping of all the connections tight and the draining of such water and sediment as may collect in the sediment chamber. This should be done at each 1000 mile lubrication and maintenance service. When an excessive amount of water or sediment is found in the sediment chamber of the pump it is advisable to also run off such water or sediment as has accumulated in the fuel tank.

## Fuel Pump Troubles

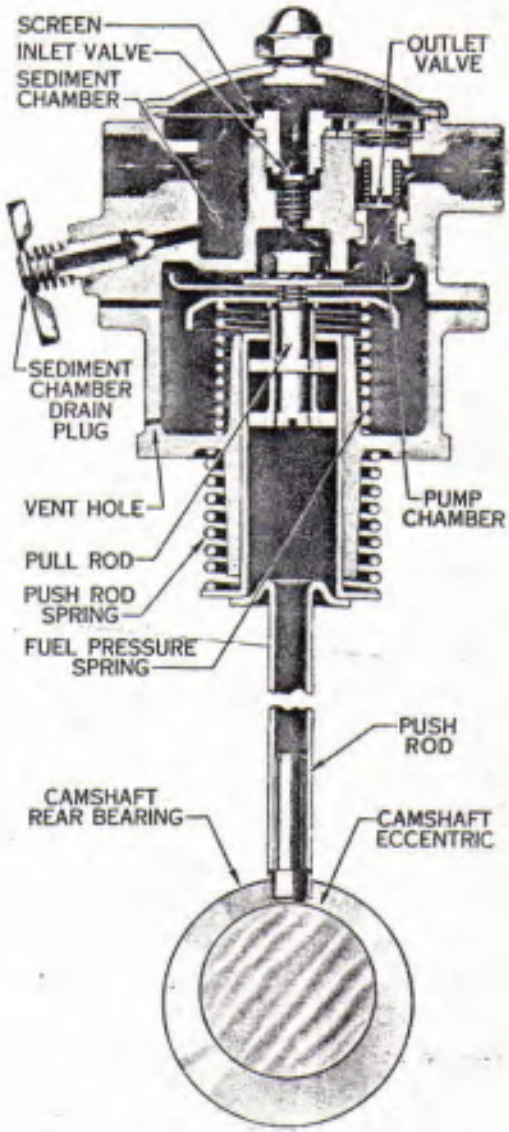
When the carburetor does not receive sufficient fuel one of the following is likely to be the cause:

Fuel tank empty.

B-9365 screen has become clogged with sediment.



FUEL PUMP (4-CYLINDER ENGINE)
Fig. 15




FUEL PUMP (V-8)
Fig. 16

Sediment has blocked fuel line (disconnect line at pump and blow into line).

Leak in fuel line, in which case the pump will pump air instead of fuel.

Mechanical bind of push rod or operating sleeve.

## Repairs Made Without Disturbing the Pump Installation

It is possible for a few adjustments to be made on the fuel pump to correct certain

troubles without removing the pump from the motor. These troubles and remedies are as follows:

**1. Loose pipe fittings.**

Tighten all pipe connections at gasoline tank and at the pump.

**2. Dirty screen.**

Remove cover plate and clean screen, observing that cork gasket is in good condition and properly seated when reassembling cover plate.

**3. Leakage around edge of cover plate.**

Tighten cover plate nut, making certain that both the cover nut gasket and the cork gasket are unbroken and in good condition.

**4. Loose valve plugs.**

Remove cover plate and screen, tightening both inlet and outlet valve plugs securely, replacing valve plug gaskets if necessary.

# FUEL GAUGE

## Operation

The hydrostatic type fuel gauge now used on all Ford cars and trucks consists of three units—the head, tank unit and the air line. In operating condition the air tube and air chamber of the tank unit and the air line connecting the tank unit to the head are filled with air (see Fig. 17). The gasoline tries to rise to the same level in the tank unit as it is in the tank. This is not possible because of the air trapped between the bottom of the tank unit and the liquid in the head. However, the effort of the gasoline to get into the air chamber presses on the trapped air. This pressure is communicated through the air tube and air line to the head on the instrument board, where it is recorded by the rise of the red liquid in the glass tube.

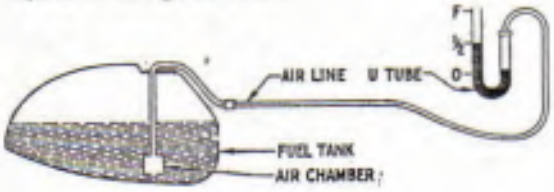
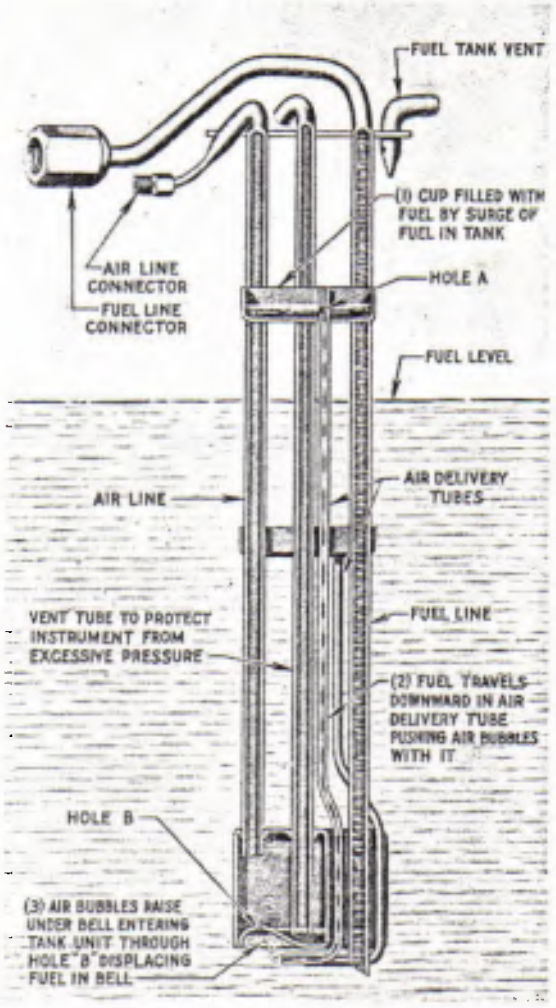



Fig. 17

Fig. 17 shows a simple hydrostatic gauge. The air cups, and air delivery tubes (shown in Fig. 18) have been omitted as they take no part in the reading of the gauge. They are simply used as a means of supplying air to the air chamber to overcome any loss by absorption or leakage.

If one of the connections is opened while the tank contains gasoline, the trapped air will escape and gasoline will rise in the tank unit to the same level as in the tank. Similarly the liquid in the U-tube will fall until the same level has been reached in both sides, which should be at the "Empty" mark. Now, if the connection is again made the gauge will still read "Empty" until the air chamber and air tube are cleared of gasoline and again filled with air.




CROSS SECTIONAL VIEW FUEL GAUGE TANK UNIT

Fig. 18

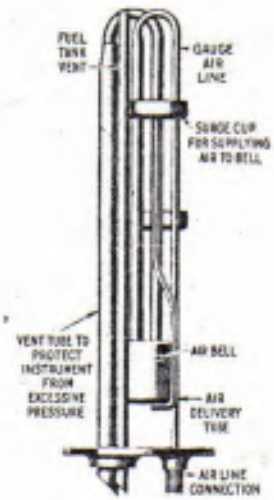
## Tank Unit

The tank unit (Fig. 18) shows the air tube and air chamber which must always be filled with air. The gasoline tries to enter through hole "B" and thus presses on the trapped air. This is the only part of the tank unit that has anything to do with the reading of the gauge.

The vent tube (see Fig. 18), open at the top, is merely a safety device which protects the gauge against high pressure. It does not enter into the operation of the gauge in any way.

The remainder of the tank unit, that is, the air cups and air delivery tubes (see Fig. 18), act only as a means of supplying fresh air to the air chamber. This is to overcome the loss of air due to absorption in the gasoline and contraction of the air due to a sudden drop of temperature.

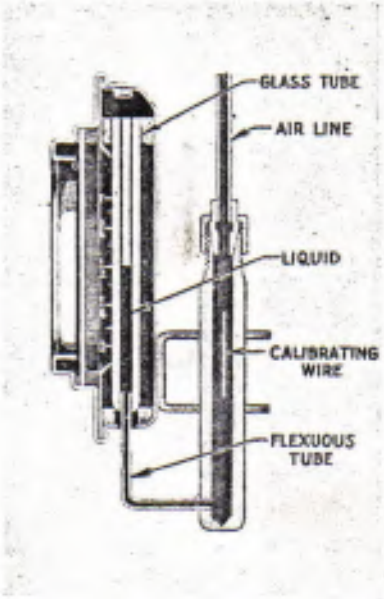
The air supply mentioned above is obtained by utilizing the movement of gasoline in the tank. When the air cup is above the level of the gasoline it is constantly being filled by the surge and splash when the car is in motion. This gasoline runs down the air delivery tube through the drain hole "D" and in so doing draws with it a few bubbles of air. At the bottom of the tube the air bubbles out and rises under the air chamber. It enters the air chamber through hole "B" and replaces any gasoline which may be there. When the air chamber is full of air, these bubbles simply pass off.




FUEL GAUGE TANK UNIT (TRUCK)
Fig. 19

## Head Unit

The head (shown in Fig. 20) is mounted on the instrument board. It is simply a U-tube containing a special heavy red liquid. The front half of the U-tube is a glass tube open at the top. The back half is a brass tube. A U-tube containing liquid is the most accurate instrument known for measuring pressure.




CROSS SECTIONAL VIEW FUEL GAUGE HEAD UNIT
Fig. 20

## Air Line

The air line, coming from the tank unit, is connected at the top of the brass tube. Any pressure which comes through the air line will press the liquid downward in the brass tube and upward in the glass tube. In fact, the difference in levels of the liquid in the two tubes is an exact measurement of the pressure coming through the air line and hence records the depth of gasoline in the tank.

**To have the gauge read correctly,** three things are necessary.

1. The head must hold liquid and read zero when disconnected.

2. The air system must be free from leaks or obstructions. The most common obstruction is gasoline, or water which has condensed in the line, and being a movable obstruction, will cause a very erratic reading of the gauge, particularly on acceleration or sudden stops.

3. The tank unit must supply air by the surging of the gasoline as described above.

When you have these three conditions and the gauge is reconnected the liquid in the head will start to rise after the car has been driven and will continue to rise until it records the true contents of the tank.

Stopping, starting and turning of corners will hasten this action. After this the gauge will not again lose its reading unless disconnected.

A quick method of correcting the reading on the car is to disconnect the fuel line at the fuel pump and blow into it with the mouth—**not compressed air**—to replace the air in the tank unit.

Due to the different arrangement of the fuel feed line for tanks mounted under the seat this method of replacing the air in the tank unit is not possible with this installation. On the truck it will be necessary to drain the tank or drive the truck or in some manner surge the fuel in the tank to correct the reading. Fig. 19 illustrates the tank unit used with tanks mounted under the seat.

Normally the reading should be corrected before the car is returned to the owner. The reading, however, will correct itself in time.

## Correcting Faulty Gauge

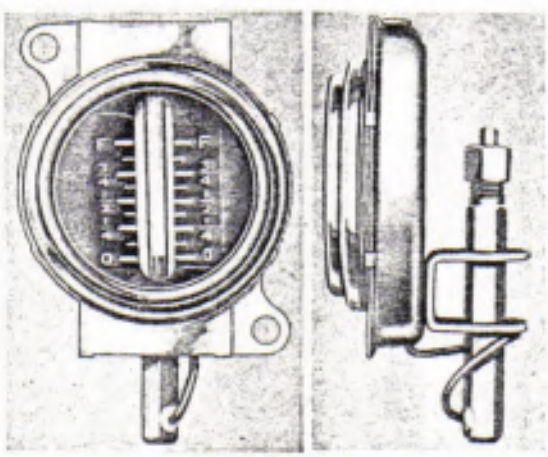
Correction of a faulty gasoline gauge is very simple. **This is assuming that you will follow the directions below exactly.**

Do not remove the gauge from the instrument board or start installing new units until these instructions have been followed.

### Head Unit

Disconnect gauge line (air line) at gauge head and set gauge reading exactly at bottom line (zero). Liquid can be added or removed at the top of the brass tube where the air line comes off. To fill, use a medicine dropper, being careful not to over-fill. To remove liquid, use a toothpick or a match to absorb some of the liquid from the brass tube.

The red liquid, M-1128, used in the gauge head unit is supplied in one ounce bottles by the Ford Motor Company. As the accuracy of the gauge is dependent on the specific gravity of the fluid, it is of extreme importance that only the genuine fluid be used.



HEAD UNIT
Fig. 21

Inspect the head unit for dirt or flaws on the cone seat, or liquid leaks at the flex tube (small connecting tube).

Pump the liquid up in the head unit to any point on the dial above the bottom line.

**Method:** Move the thumb rapidly up and down against the top end of the brass tube at the back of the head unit. (This action will supply air pressure to the liquid, causing it to rise in the glass tube.) Entrap the air by holding the thumb against the top of the tube. If the liquid holds at a given point, the head unit is O. K. If the liquid will not rise, there is an air leak, liquid leak, or the tube is plugged. Change the unit.

### Air Line

When a line is blown out, a hand tire pump should be used—positively not a compressed air line—as compressed air lines generally contain water or moisture at least (moisture in gauge air line will cause erratic reading of the gauge).

Install tire pump connection on front end of gauge line (see V-27 Fig. 22).

PUMP CONNECTION V-27 PLUG V-26
Fig. 22

Connect tire pump and give at least 50 continuous full strokes. Close one end of the air line with plug (see V-26, Fig. 22) and suck on the other. If the suction created will hold the tongue for one minute, the air line is O. K. This equipment available through K. R. Wilson Co.

If the air line shows a leak or is plugged, change it.

Reconnect air line, being sure that connection is tight. Before you connect, verify that gauge holds its zero reading and therefore does not leak. Try tank unit connection to be sure it is tight.

Now check to see if the trouble is in the unit or a faulty installation which you have corrected by the above adjustments.

### Test

Determine whether the gauge can be brought up to proper reading by supplying air to the tank unit.

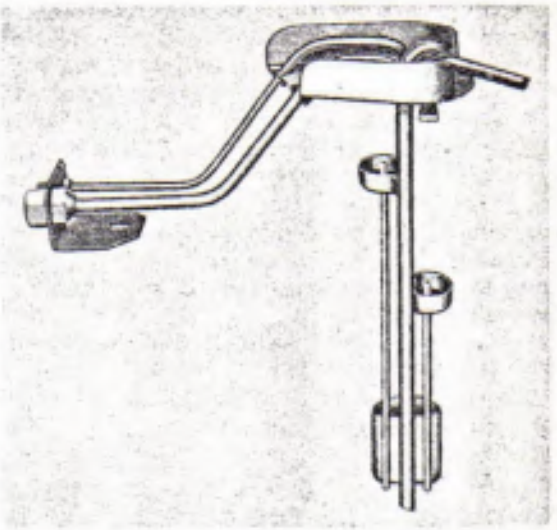
On the 4-cylinder or 8-cylinder car this is accomplished by blowing in the fuel feed line as previously described.

On the truck this is accomplished by draining and refilling the tank or by driving the truck until the surge of the gasoline replenishes the air supply in the tank unit.

If the reading stays set with the car standing, the gauge will function correctly. If, however, a reading is obtained but it will not hold inspect connections for dirt and flaws.

If the air line, head unit and connections check O. K. the trouble is in the tank unit which should be changed.

Caution: Faulty tank units are very rare; therefore, inspect carefully the head unit, air line and connections, as the trouble is more likely to be in one of these places than in the tank unit.



FUEL GAUGE TANK UNIT (CAR)
Fig. 23

# ELECTRICAL SYSTEM

Figs. 24 and 26 illustrate the electrical systems of the Ford cars and trucks.

Figs. 25 and 27 are wiring diagrams.

### The Generator

**Increasing or Decreasing Generator Charging Rate**—To increase or decrease the generator charging rate, remove generator cover and shift the third brush. To increase the charging rate, shift the third brush in the direction of rotation; to reduce the rate, shift the brush in the opposite direction. The procedure for determining the correct charging rate is as follows. Read it carefully.

### Adjusting Charging Rate

Many battery failures are due directly to charging at an excessive rate, either in the car (or on the battery charger). The ideal setting for the charging rate of the generator is the lowest rate which will maintain full charge. The generator charging rate should be set **below** the estimated requirements of the individual owner, and raised as required. A check of the specified gravity of the battery after 300 miles will indicate the amount the charging rate should be increased.

### Spark Plugs

Spark plug gaps have a pronounced effect on engine performance. The following gap sizes are recommended:

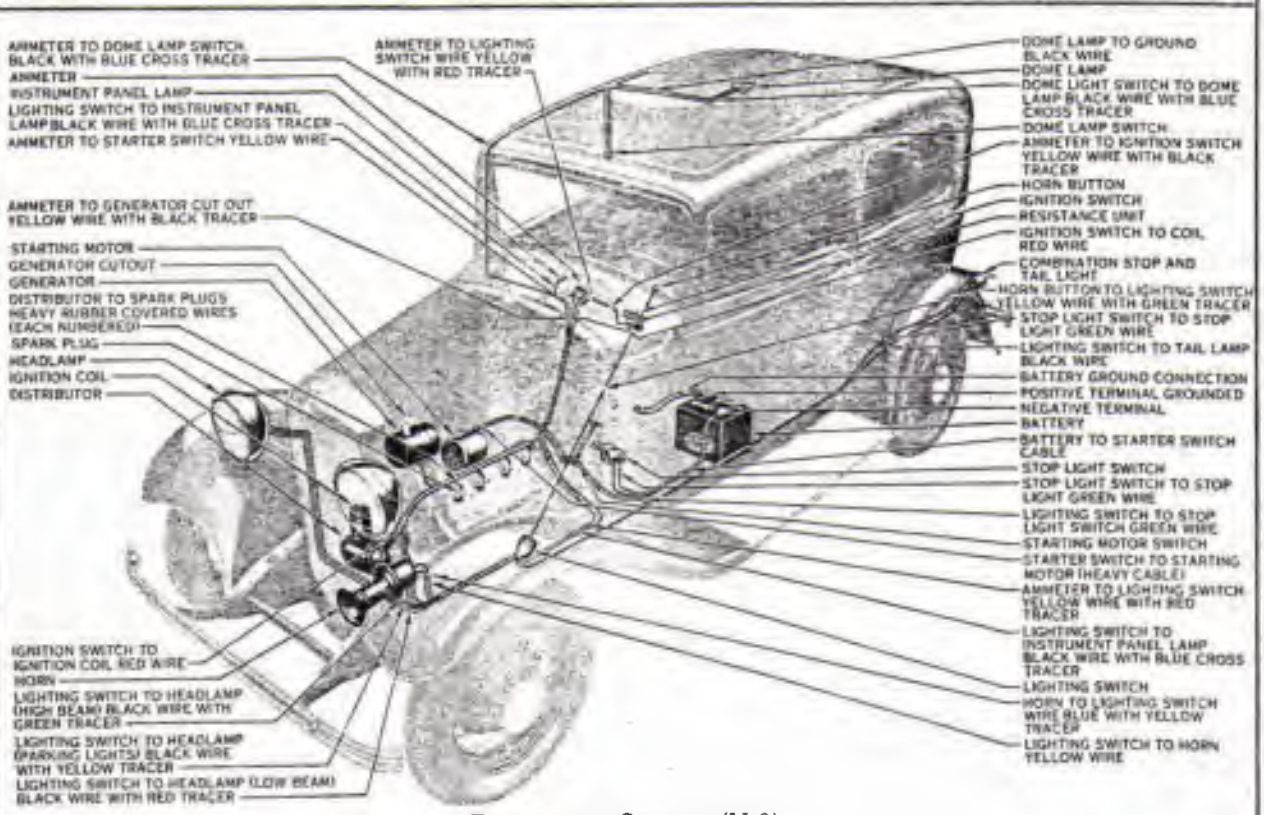
| | |
|---|---|
| New 4-Cylinder | .030″ |
| V-8 | .025″ |
| Model A | .035″ |
| Model A (with A-6050-B head) | .025″ |

# DISTRIBUTOR V-8

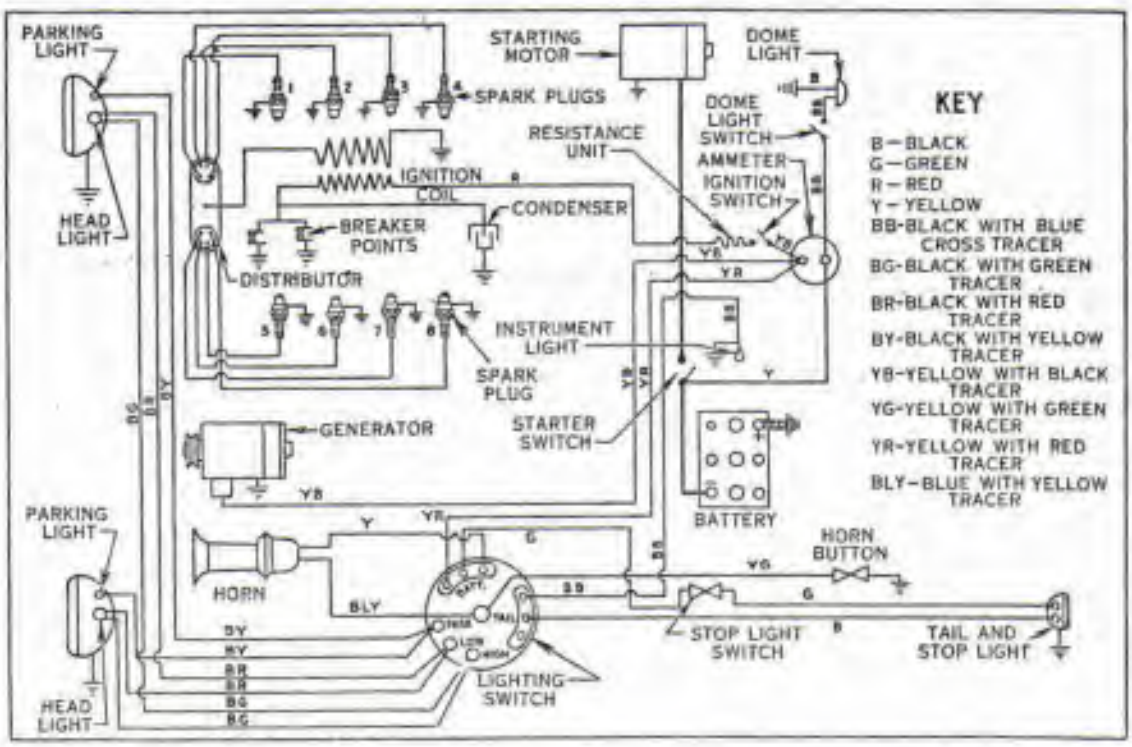
The distributor used on the Ford V-8 is located at the front of the engine and is driven direct by the camshaft, thus eliminating many parts and the consequent back lash, etc.

The spark timing is automatically advanced or retarded by the centrifugal governor weights or springs. The vacuum brake automatically retards the spark timing in direct proportion to the load.

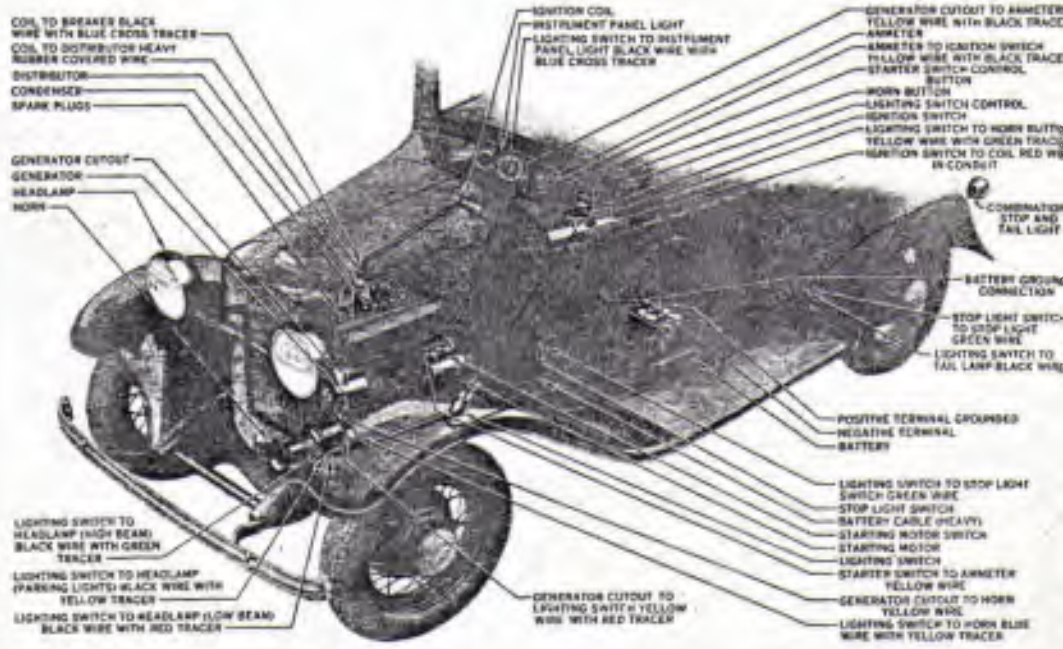
The current for igniting the gas mixture in the cylinders is provided by the storage battery. The ignition coil transforms the low tension current to a high tension current of sufficient voltage to bridge the gap between the points of the spark plugs. The circuit



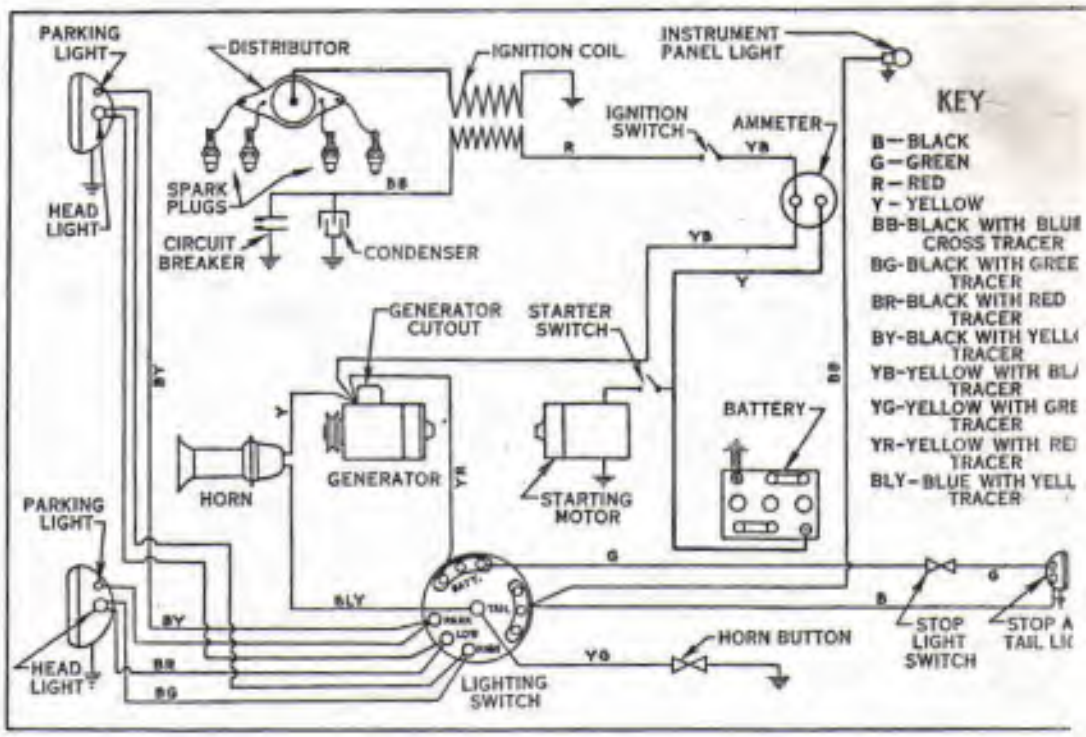

ELECTRICAL SYSTEM (V-8)
Fig. 24




WIRING DIAGRAM (V-8)
Fig. 25




ELECTRICAL SYSTEM (4-CYLINDER)
Fig. 26




WIRING DIAGRAM (4-CYLINDER)
Fig. 27

breaker points interrupt the flow of low tension current at regular intervals, while the distributor rotor distributes the high tension current to each spark plug in proper firing order.

## Circuit Breaker

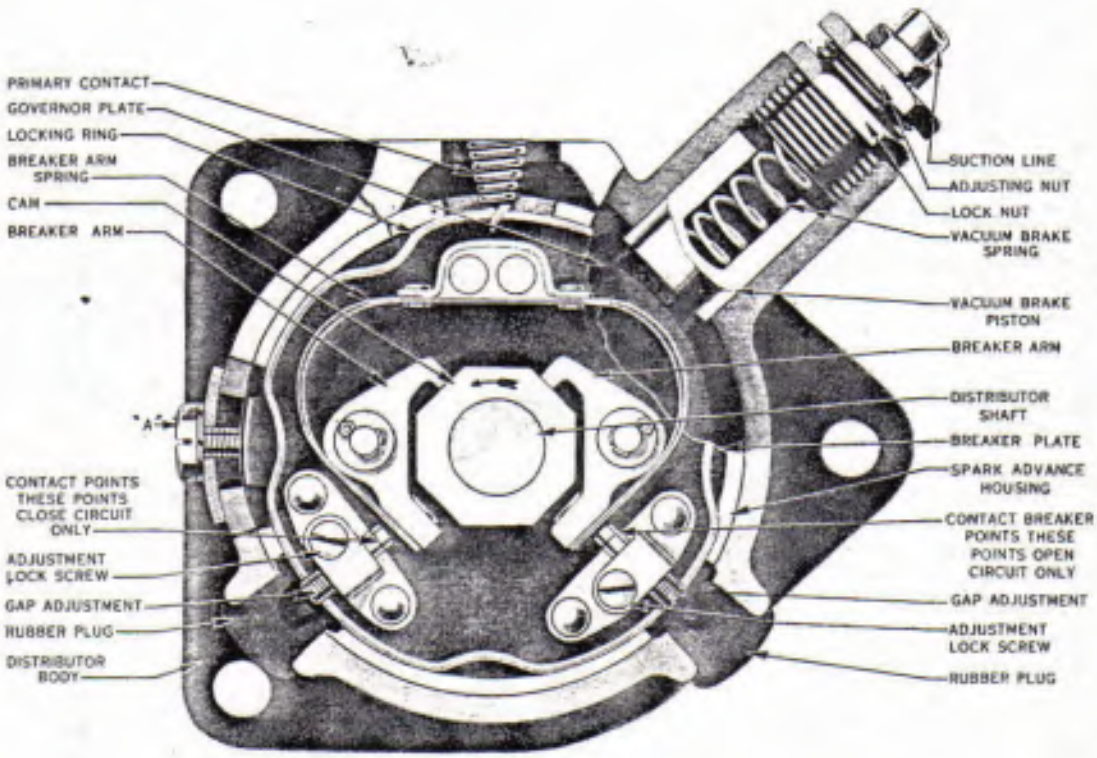
While the circuit is closed the coil builds up a high tension charge and a spark is produced as soon as the circuit is broken. The longer the circuit is closed the "hotter" the spark will be. This is commonly referred to as the "dwell." The circuit breaker used on the Ford V-8 differs from the conventional in that the cam used has 8 lobes and that one set of contact points open the circuit whereas the other merely closes the circuit (see Fig. 28). By this arrangement an exceptionally long "dwell" is obtained and the necessity of synchronizing the timing of the spark for the two banks of cylinders is removed.

If the breaker points are worn, pitted, burned or incorrectly spaced, dress them smooth with an oil stone. **Never use a file.** Remove rubber plugs (Fig. 28) and adjust the point gaps to .014 to .015 inch **with the fiber breaker arm on the high point of the cam.** (Badly burned breaker points are usually an indication of a faulty condensor or poor battery connection.)

## Vacuum Brake

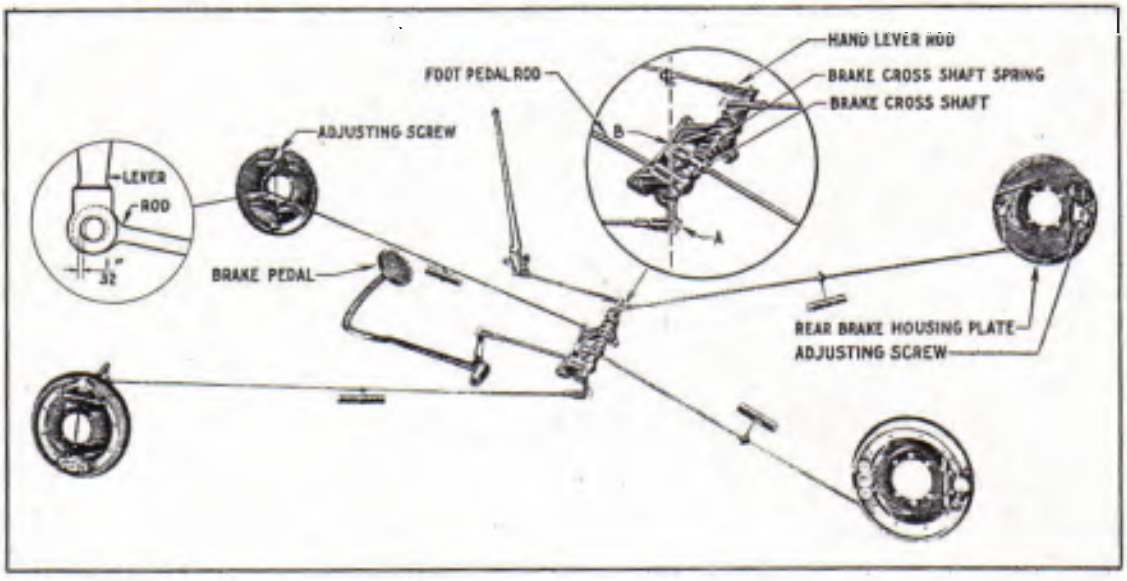
The vacuum brake consists of a plunger or piston which is held against the braking surface of the governor plate by a spring of adjustable tension. As the rapidity of combustion is dependent on the degree of compression, the need of a retarded spark for quick acceleration or power is not dependent entirely on engine speed.

**Operation of the Vacuum Brake**—The requirements for retarded spark at any speed are when the vacuum in the carburetor throat is extremely low. As an example: should the car be travelling at a speed of 20 to 25 miles an hour, the throttle valve would be but partially open and would restrict the passage of air into the manifold which would result in a comparatively high vacuum in the intake manifold causing the air in the distributor suction line to be drawn into the manifold.




CIRCUIT BREAKER (V-8)
Fig. 28

# BRAKES




BRAKE SYSTEM (CAR)
Fig. 1

## Adjusting Brakes

In adjusting the brakes on Ford cars, the adjusting screw B-2041 should be turned in until the brake shoe starts to drag on the drum and then backed off one or two notches until the wheel turns freely. **The brakes must be cold when these adjustments are made** as when the brakes are adjusted while the drum is hot they will not be free when the drums have cooled off. A road test is the best method of checking brake adjustments, an ideal setting being when all four tires start to skid at the same time when the brakes are applied while car is traveling at a speed of approximately 25 miles per hour on dry pavement.

**IMPORTANT: Air pressure in the tires should be equal on all wheels.**

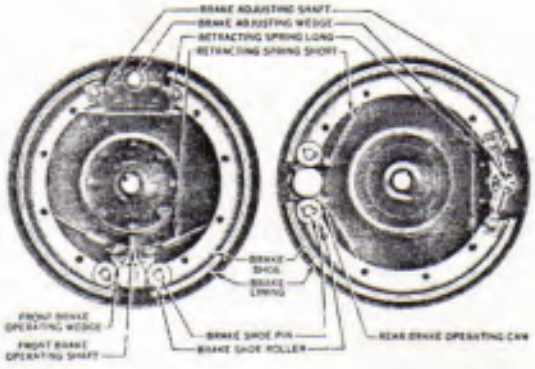
As the pressure applied to the brake is distributed equally to all four wheels, any difference in the co-efficient of friction of the brake lining in the various brake drums reflects in the performance of the brake. For this reason it is important that the same type of lining be used on all wheels.

Genuine Ford linings are made to exacting specifications and are very uniform with regard to the co-efficient of friction.

It is also of extreme importance that these linings be free from grease and oil. The use of the correct front wheel lubricant and the periodic removal of any surplus lubricant from the differential as well as the replacing of grease retainers when leakage is indicated will prove particularly valuable in maintaining brake efficiency.

On the system of brake linkage used on all Ford cars (see Figs. 1 and 3) the rod adjustment must be maintained for each wheel individually.

**To adjust the rods,** proceed as follows. Disconnect the rods from the brake levers at all four wheels and from the brake pedal:



BRAKE HOUSING PLATES (CAR)
Fig. 2

This suction draws the vacuum brake piston upward compressing the vacuum brake operating spring. When the brake piston is in this position, the brake is inoperative and the timing is automatically advanced by the centrifugal governor weights (see Figs. 28 to 30).

However, should the throttle valve be fully opened suddenly, the restriction to the air entering through the carburetor throat would be removed and the vacuum in the intake manifold would immediately drop. The operating spring then pushes the piston downward against the governor plate retarding the spark.

As the engine speed increases to the speed required by the throttle valve position, its increased demand for air again causes a partial vacuum to be formed; the air is then again drawn from the suction line and the vacuum brake is again inoperative.

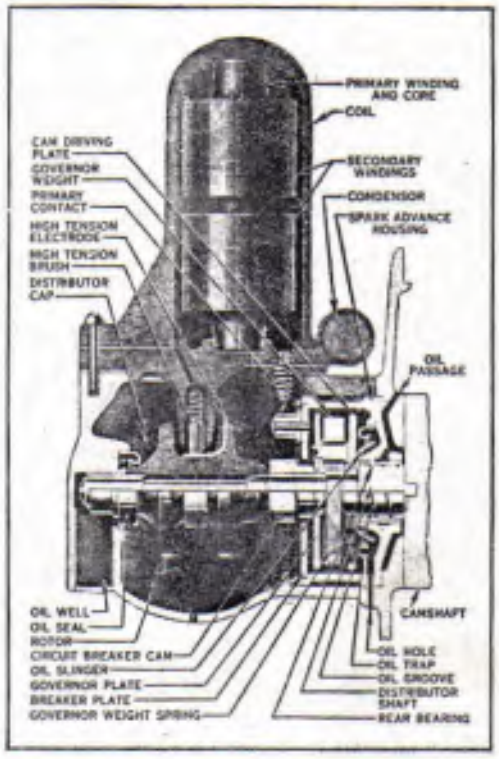
For adjustment see instructions under timing.

## Timing the Spark

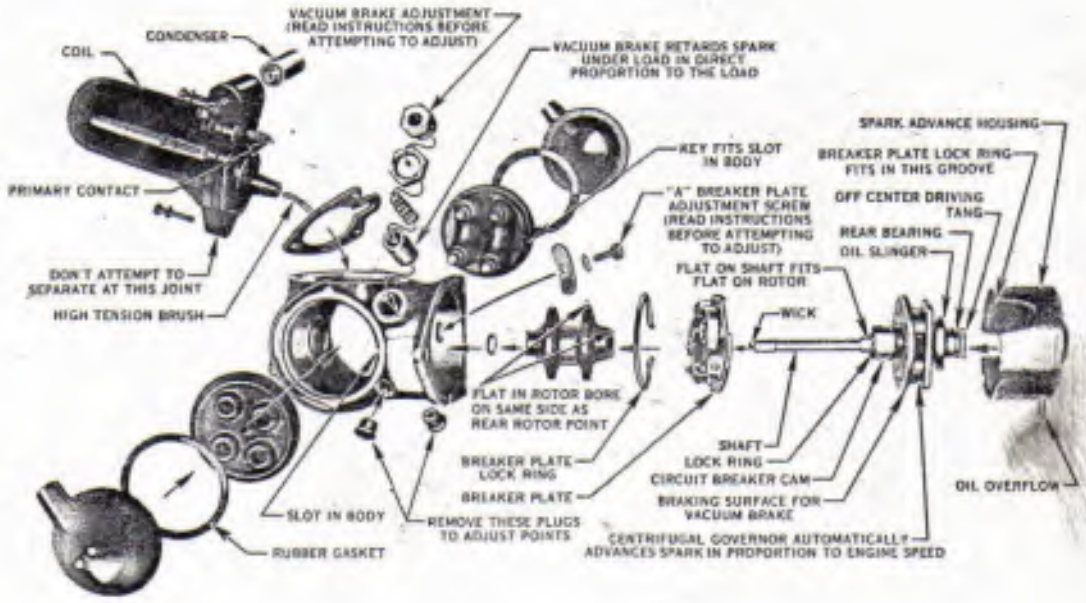
Adjust the breaker points as described above; be sure that the fibre breaker arm is on high point of cam when setting the gap (the two breaker arms are never on the high point of cam at same time).

Remove vacuum line and adjusting nut.

Inspect vacuum brake piston for any in-




SECTIONAL VIEW DISTRIBUTOR (V-8)
Fig. 29




DISASSEMBLED DISTRIBUTOR (V-8)
Fig. 30

dication of its binding in the distributor body (the vacuum brake must work freely with no bind). Apply a few drops of engine oil to the piston.

Install the vacuum brake spring and adjusting nut (to which the lock nut has been added), screwing the adjusting nut down not more than 2 or 3 turns. Locking it in this position so as to prevent the spring from holding the piston down.

Set breaker plate adjustment screw ("A," Fig. 28) at center of slot in distributor body locking it in this position.

Test the motor on acceleration (a distinct ping should be heard when engine speed is accelerated.

Next adjust tension on vacuum brake spring by means of the adjusting nut until ping on acceleration is removed. Avoid screwing the vacuum brake adjusting nut down more than is actually required to remove the ping or the spark will not advance correctly for less rapid acceleration.

It is essential that a good grade of fuel be used.

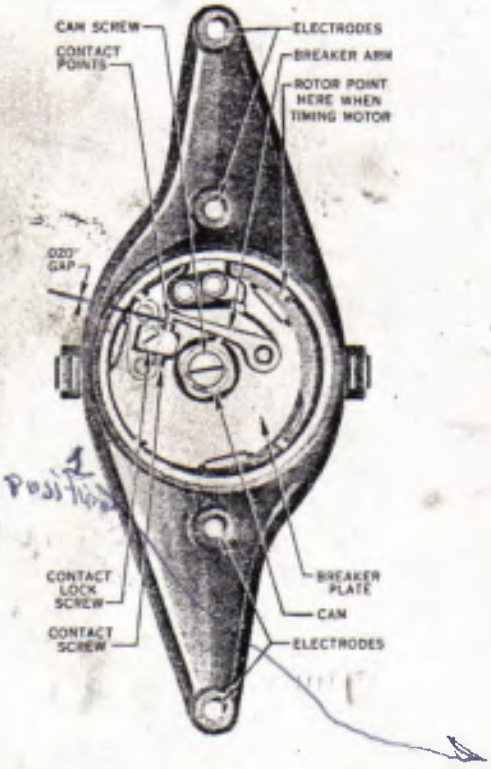
# DISTRIBUTOR (4-CYLINDER)

With the distributor used on the 4-cylinder engine the spark is automatically retarded by the centrifugal governor weight springs for starting. By means of this centrifugal governor the spark is automatically advanced at increased engine speeds in direct proportion to the speed.

## Circuit Breaker

If the points are worn, pitted, burned, or incorrectly spaced, dress them smooth with an oil stone. **Never use a file.**

Adjust gap to from .018" to .022" with fiber breaker arm on the high point of cam (see Fig. 31). Badly burned breaker points are usually an indication of a faulty condenser or a poor battery connection.




CIRCUIT BREAKER (4-CYLINDER)
Fig. 31

## Ignition Timing (4-Cylinder Engine)

As the spark must occur at the end of the compression stroke, the timing must be checked from that point. To find the compression stroke and time the spark proceed as follows:

1. Loosen the lock screw holding the distributor arm and place the arm exactly central with the groove in the distributor body, as shown at "A" Fig. 32, and retighten the screw, holding the arm in this position. **It is important that the arm be in this position when the timing is adjusted.**

2. Check gap between breaker contact points and, if necessary, adjust as previously described.

3. Screw out timing pin located in timing gear cover and insert opposite end of pin into the opening.

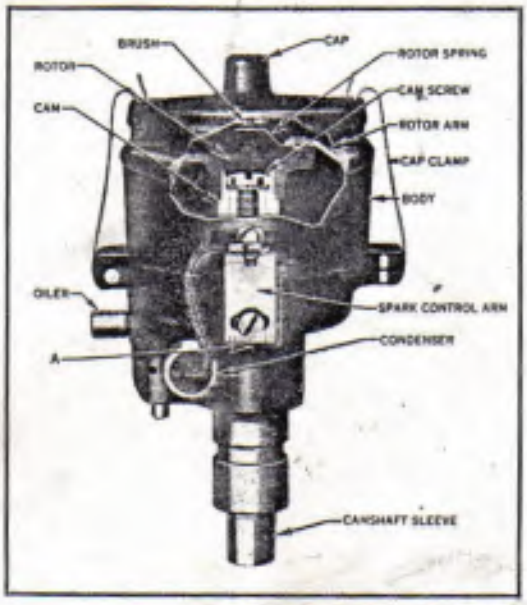
4. With the starting crank turn the engine over slowly, at the same time pressing in firmly on the timing pin. When the piston reaches the end of the stroke, the timing pin will slip into a small recess in the camshaft gear.

5. With the pin in place, remove the distributor cover and lift off rotor and distributor body.

6. Loosen cam locking screw until cam can be turned.

7. Replace rotor and turn it until the rotor arm is opposite No. 1 contact point in the distributor body.

8. Withdraw rotor from cam and slightly turn the cam in a counter-clockwise direction until the breaker points are fully open, then slowly turn the cam back in a clockwise direction until the points just close. Next lock the cam by securely tightening the cam locking screw. This method prevents any back lash in the distributor shaft from affecting the timing.




DISTRIBUTOR (4-CYLINDER)
Fig. 32

Before replacing the rotor and distributor cover, the timing should now be carefully checked. This can be done as follows:

Withdraw timing pin from recess in timing gear. Turn on ignition switch. Again insert the timing pin into the opening in the timing gear cover; while turning the engine over with the crank press in on the timing pin. If properly timed, just as the pin seats in the recess in the time gear, the spark will occur between the breaker points. If a spark does not occur some error has been made and it will be necessary to recheck your work until a spark occurs between the breaker points as previously described.

When ignition is correctly timed, turn off ignition switch and replace rotor and distributor cover, withdraw timing pin from recess in camshaft gear and screw it back tightly into the gear cover.

**To compensate for the difference in fuels and operating conditions,** an additional adjustment can be made by moving of the distributor arm.

To advance the timing of the spark, loosen the set screw holding the distributor arm, the arm is then moved in a clockwise direction and locked in the position required. To retard the spark, the arm is moved in a counter-clockwise direction and locked in position.

Governor or governor springs should never be tampered with.

# 4-CYLINDER ENGINE MOUNTING

## To Remove Engine From Chassis

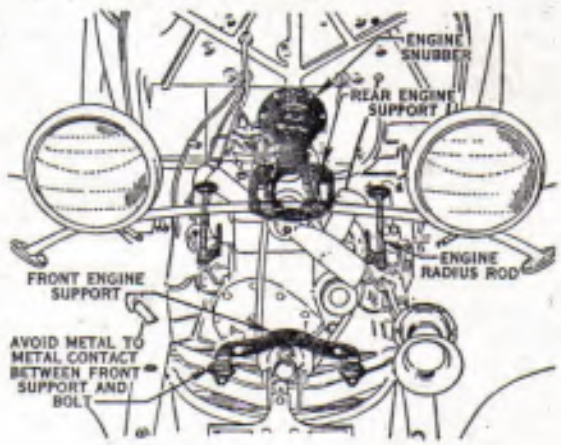
When removing four-cylinder engine from the chassis, disconnect at the clutch housing. If transmission is also to be removed, disconnect rear support from frame cross member and remove assembly with rear support still attached to transmission. Be sure transmission is in neutral and gear shift lever is removed before rear support is disconnected from the transmission.

## Caution

If the rear support is removed while the gear shift lever is in position, any movement of the lever may result in the transmission mainshaft moving to the rear permitting the synchronizer hub to slip out of its sleeve.

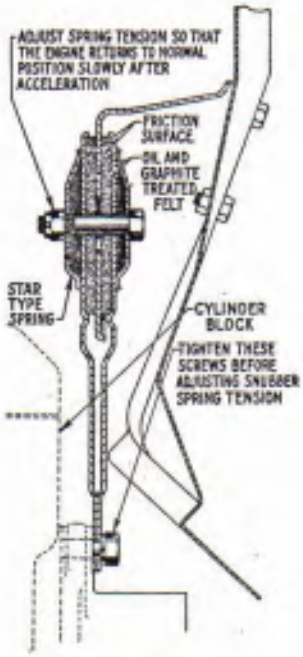
## Engine Mounting 4-Cylinder Car

On acceleration or deceleration the torque is absorbed by flexible engine mountings (see




4 CYLINDER ENGINE MOUNTING
Fig. 33

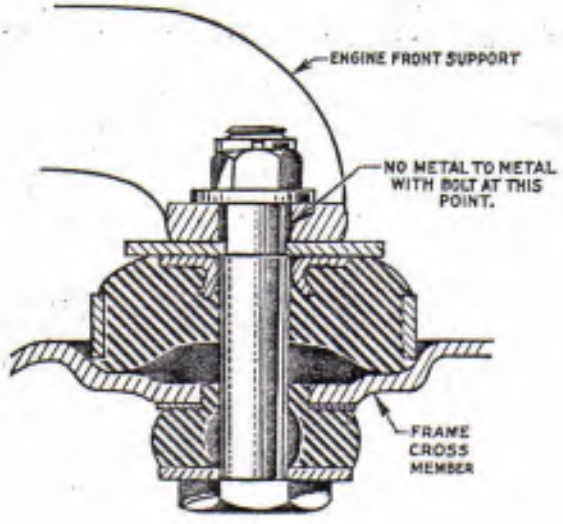
Fig. 33). The return to normal position is effected without oscillation by means of a snubber mounted on the dash (see Fig. 34). This snubber consists of a felt cushioned friction surface with adjustable spring tension. Too tight an adjustment will result in the oscillations being transmitted to the body. Too loose an adjustment will result in undue flexing of the motor supports as indicated by oscillatory movement of the gear shift lever.




ENGINE SNUBBER
Fig. 34

Forward longitudinal movement of the engine by the flexing of the motor mountings on deceleration is restricted by means of two engine radius rods running from the flywheel housing to the frame cross member.

Fig. 33 shows the engine mounting, front and rear, engine snubber, and engine radius rods. Fig. 34 is a cross sectional view of the snubber.



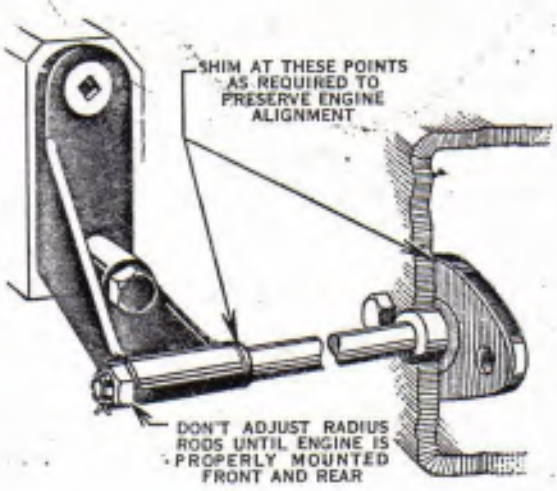

ENGINE FRONT SUPPORT
Fig. 35

## To Install Engine in Chassis

When installing engine, proceed as follows:

If rear support has been disconnected, secure rear support to frame crossmember, tightening the nuts alternately rather than proceeding around the cricle. (Front supports, snubber, and engine radius rods must be free when securing rear support.)

The next operation will be to assemble the motor supports to the front cross member. **The front end of the motor must be lined up so that the B-6047 bolt does not touch the B-6030-C motor support, at any point.** When front end of motor is properly lined up, tighten nuts so that the washer immediately under the B-6030-C, motor support, is drawn down tightly on the shoulder of the bolt. When this washer is drawn against the shoulder of the bolt the proper tension is placed on the rubbers.




ENGINE RADIUS RODS
Fig. 36

When engine is properly mounted, front and rear, assemble the engine radius rods, **being absolutely sure not to disturb the alignment of the engine, when the radius rods are placed in position. If there is any space between the cross member and the flange of the rod or between the bracket on flywheel housing and the shoulder on the rod you must install shims before nuts are tightened** (see Fig. 36). Shims, for use between flange of radius rod and frame cross-member, are available in two sizes as follows: B-6045-A, $\frac{1}{32}$" thick; and B-6045-B, $\frac{1}{16}$" thick. Any space between shoulder of radius rod and cylinder block bracket should be filled

# LUBRICATION AND MAINTENANCE FORD V-8



## 300 MILES, 1000 MILES AND EACH 1000 MILES THEREAFTER

(A) PRESSURE GUN LUBRICANT

(B) ONE GREASE CUP FULL PRESSURE GUN LUBRICANT

(C) ENGINE OIL (DISTRIBUTOR SHAFT, SPRING TIE BOLT, GENERATOR, DOOR HINGES, HOOD FASTENERS, AND ACCELERATOR CROSS SHAFT)

(D) ADD GEAR LUBRICANT TO LEVEL OF FILL PLUG (NEVER USE GREASE) S. A. E. VISCOSITY No. 250 ALL SEASONS

(E) ADD GEAR LUBRICANT TO LEVEL OF FILLER PLUG
S. A. E. VISCOSITY No. 110 WINTER
S. A. E. VISCOSITY No. 250 SUMMER

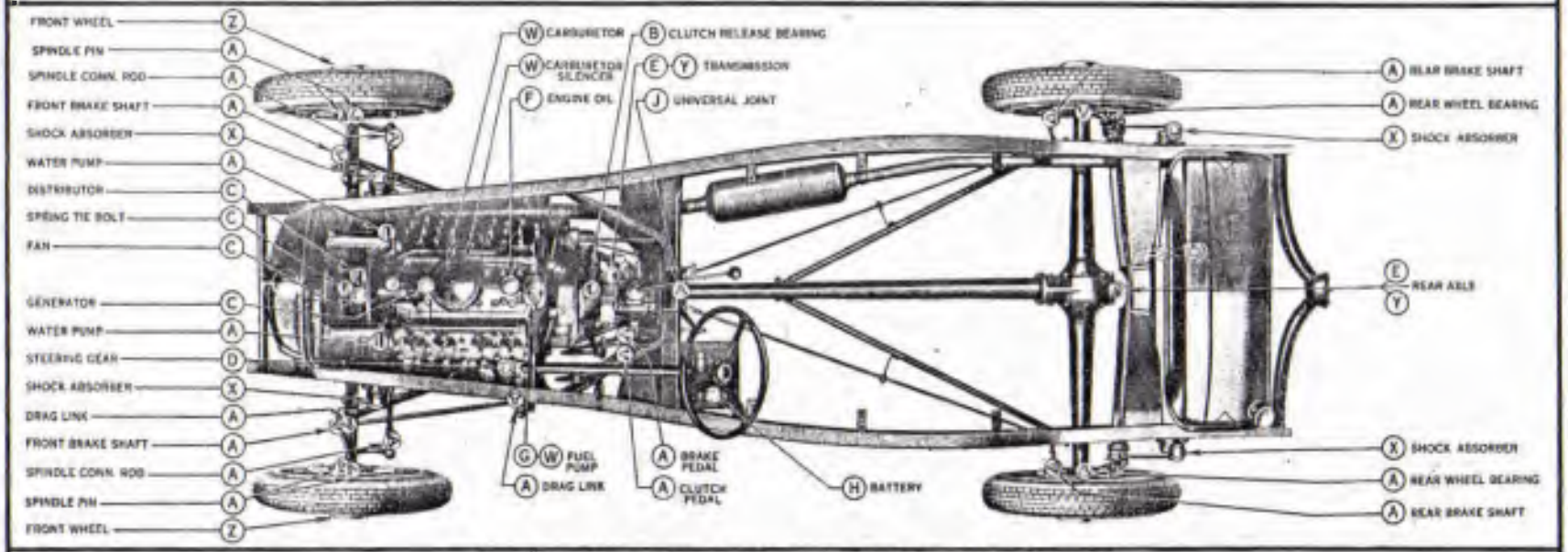
(F) DRAIN AND REFILL WITH GOOD QUALITY ENGINE OIL—USE S. A. E. VISCOSITY No. 20 WHEN BELOW FREEZING TEMPERATURES PREVAIL (WINTER OIL MUST HAVE LOW COLD TEST) USE S. A. E. VISCOSITY No. 40 FOR TEMPERATURES ABOVE FREEZING

(G) DRAIN SEDIMENT

(H) ADD DISTILLED WATER

(J) UNIVERSAL JOINT GREASE (CYLINDER OIL—SODA SOAP GREASE)

(L) SPRAY SPRINGS (PENETRATING OIL)




## TWICE YEARLY (PREFERABLY EACH FALL AND SPRING) OR EVERY 5000 MILES (WHICHEVER OCCURS FIRST)

(Z) PACK WITH SHORT FIBER SODIUM SOAP GREASE HAVING HIGH MELTING POINT

(Y) DRAIN, FLUSH, AND REFILL WITH GEAR LUBRICANT—USE S. A. E. VISCOSITY No. 110 (LOW COLD TEST) IN WINTER USE S. A. E. VISCOSITY No. 250 IN SUMMER

(X) ADD FORD SHOCK ABSORBER FLUID TO LEVEL OF FILLER PLUG

(W) REMOVE AND CLEAN SCREEN (CARBURETOR SILENCER SCREEN MAY BE DIPPED IN LIGHT OIL)

Fig. 37

with $\frac{7}{16}$" round washers as required. A-22310 washer is suitable for this purpose.

Next bolt the arms of the B-6800 engine snubber to the flywheel housing, being careful to see that there is **no tension on the springs until the arms have been bolted.** After the arms are secured, adjust the snubber spring tension so that the engine's return to normal position after acceleration requires approximately 5 times as long as the original movement (see Fig. 34).

Always remove all tension from the snubbing unit springs if the engine mounting or engine radius rods are being disturbed in any way.

# LUBRICATION AND MAINTENANCE

The importance of proper lubrication and periodic inspection and adjustments cannot be over-emphasized. The lubrication and maintenance work on the Ford **cars** and **trucks** can be divided into two groups: first, points requiring attention every 1000 miles; second, points requiring attention twice yearly or every 5000 miles (whichever occurs first).

The lubrication charts, Figs. 37, 38 and 39, give information for the complete lubrication of the cars and trucks. Proper lubrication has a vital effect on the life of any machine, consequently you should follow these instructions very carefully.

## Group 1

AT 300 MILES, 1000 MILES AND EACH 1000 MILES THEREAFTER.

### Engine

Drain off the old oil when the new car has been driven 300 miles, and again when a total mileage of 1000 miles has been reached and at each 1000 miles thereafter. The oil will drain out more completely if warm, and should be replaced with 5 quarts of engine oil of the proper viscosity and quality. In general, an oil having the body of S. A. E. viscosity No. 40 will prove satisfactory for summer use. For winter use, oil having the specifications of S. A. E. viscosity No. 20 should be used. It is essential, however, that this winter oil have a low cold test. It must be understood that these classifications are of "body" only and not of quality. It is also essential that the oil be otherwise properly refined.

Advise owners that oil level should be checked periodically between changes.

### Chassis

The chassis should be lubricated at 1000 miles and after each 1000 miles of operation thereafter. Suggest that the lubrication of the chassis and the changing of engine oil be performed at the same time.

### Clutch Release Bearing

The clutch release bearing is lubricated by means of a grease cup, located on the top of the clutch housing (on the earlier V-8 cars this grease cup is located on right side of clutch housing). The cup should be screwed in as far as it will go, then backed off and repacked with a good grade of pressure gun lubricant and replaced, screwing it in 2½ to 3 turns.

### Steering Gear

Remove the plug on the steering gear housing and add gear lubricant until it reaches the level of the filler plug hole. Use gear lubricant only, never use greases in the steering gear.

### Generator

The bearings in the generator are lubricated through a small oil hole, located at both ends of the generator. Fill with engine oil.

### Distributor

Fill the oil cup at the side of the distributor with engine oil. A light film of vaseline should be applied to the cam.

### Transmission and Rear Axle

Sufficient gear lubricant should be added to bring it level with the filler hole.

### Universal Joint

The universal joint housing should be filled with a universal joint lubricant composed of cylinder oil, thickened with sodium tallow soap. Pressure gun lubricator fittings are provided. (3 fittings on truck, see Chart.)

### Pressure Gun Fittings

Force pressure gun lubricant to all parts equipped with the conical shaped lubricator fittings (except universal joints). (See Charts for locations.)

### Clutch and Brake Pedals

On the earlier cars and trucks the pedal shaft was provided with a pressure gun fitting. A fitting is now provided on each pedal.

### Fan

The fan on the V-8 operates on the generator shaft (see Generator). The fan on 4-cylinder engine is provided with a pressure gun fitting.

# LUBRICATION AND MAINTENANCE FORD 4-CYLINDER CAR



## 300 MILES, 1000 MILES AND EACH 1000 MILES THEREAFTER

(A) PRESSURE GUN LUBRICANT

(B) ONE GREASE CUP FULL PRESSURE GUN LUBRICANT

(C) ENGINE OIL (DISTRIBUTOR SHAFT, SPRING TIE BOLT, GENERATOR, DOOR HINGES, HOOD FASTENERS, AND ACCELERATOR CROSS SHAFT.)

(E) ADD GEAR LUBRICANT TO LEVEL OF FILLER PLUG
S. A. E. VISCOSITY No. 110 WINTER
S. A. E. VISCOSITY No. 250 SUMMER

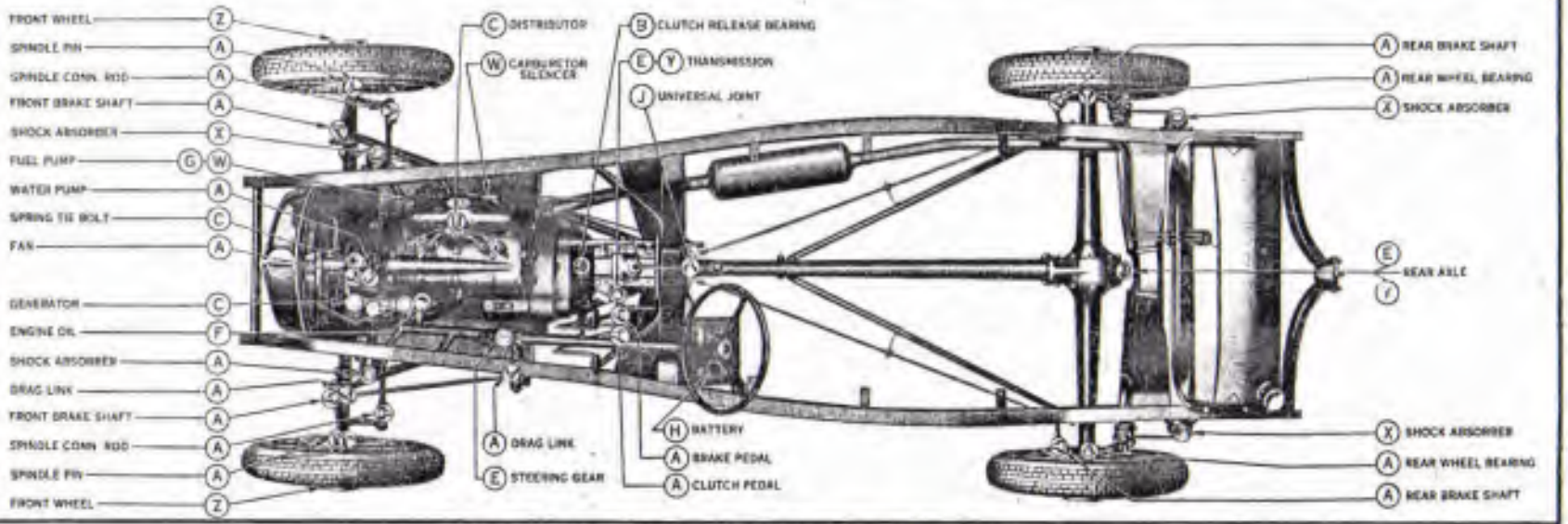
(F) DRAIN AND REFILL WITH GOOD QUALITY ENGINE OIL—USE S. A. E. VISCOSITY No. 20 WHEN BELOW FREEZING TEMPERATURES PREVAIL (WINTER OIL MUST HAVE LOW COLD TEST) USE S. A. E. VISCOSITY No. 40 FOR TEMPERATURES ABOVE FREEZING

(G) DRAIN SEDIMENT

(H) ADD DISTILLED WATER

(J) UNIVERSAL JOINT GREASE (CYLINDER OIL—SODA SOAP GREASE)

(L) SPRAY SPRINGS (PENETRATING OIL)




## TWICE YEARLY (PREFERABLY EACH FALL AND SPRING) OR EVERY 5000 MILES (WHICHEVER OCCURS FIRST)

(Z) PACK WITH SHORT FIBER SODIUM SOAP GREASE HAVING HIGH MELTING POINT

(Y) DRAIN, FLUSH, AND REFILL WITH GEAR LUBRICANT—USE S. A. E. VISCOSITY No. 110 (LOW COLD TEST) IN WINTER USE S. A. E. VISCOSITY No. 250 IN SUMMER

(X) ADD FORD SHOCK ABSORBER FLUID TO LEVEL OF FILLER PLUG

(W) REMOVE AND CLEAN SCREEN (CARBURETOR SILENCER SCREEN MAY BE DIPPED IN LIGHT OIL)

Fig. 38

### Springs

The springs should be sprayed with a penetrating oil. (Avoid oiling rubber insulators.)

### Fuel Pump

Drain sediment from fuel pump by means of drain plug.

### Apply a Few Drops of Oil

Door hinges, hood fasteners, spring tie bolt, and accelerator cross shaft.

### Tires

Air pressure in tires should be checked and sufficient air added to bring the pressure to the recommended amount. Unequal tire pressure results in uneven braking action and hard steering.

### Radiator

Water in the cooling system should be checked and replenished if required. (Radiator should be flushed at least twice yearly.) In winter anti-freeze solution should be checked for strength.

### Battery

Inspect the battery and add sufficient distilled water to bring the electrolyte to the bottom of filling tubes. A rapid loss of water in the battery usually is an indication of an excessive charging rate, which should be corrected. (See Page 16.)

### Axle Shaft and Wheel Nuts

Truck axle shaft and wheel nuts should be tightened after the first 50 miles of operation.

### Cylinder Head Nuts

After the first 300 miles of operation, the cylinder head nuts should be tightened. After this tightening, they will require no further attention unless head is removed.

### Carburetor

After the first 300 miles of operation adjust carburetor (see pages 5 and 8).

## Group II

TWICE EACH YEAR, PREFERABLY IN THE FALL AND SPRING OR EVERY 5000 MILES (WHICHEVER OCCURS FIRST).

In addition to all the lubrication and maintenance operations in Group I, the following operations are required:

### Rear Axle and Transmission

The lubricant should be drained and the housing flushed with kerosene. New lubricant should then be added until it reaches the level of the oil filler hole in the housing. Use the correct grade of lubricant to suit climatic conditions (see charts).

### Front Wheels

Twice yearly or every 5000 miles (whichever occurs first), or at any time when the car or truck has been operated with the front wheel hub cap missing, the front hubs should be removed and the bearings and the inside of the hub washed clean with kerosene and repacked with a short fibre sodium soap grease having a melting point of not less than 350°

### Shock Absorbers

The level of the fluid in shock absorbers should be checked and sufficient fluid (M-1046-C) added until it reaches the level of the filler plug. Only genuine Ford shock absorber fluid should be used (shock absorber arms must be tight on the wing shaft at all times).

### Ignition

Inspect the gaps between the breaker points as well as the spark plug gaps and adjust as required.

### Battery

Inspect battery connections and clean if corroded.

### Body Bolts

Inspect body bolts. If loose, they should be tightened.

### Clutch

Check the amount of free travel of the clutch pedal and adjust if required.

### Brakes

Check the movement of the brake pedal, readjusting the brakes if the pedal travels to within two inches of the floor board when the brakes are applied. (See Page 2.)

### Fuel Pump

Clean the fuel pump screen.

### Silencer

Remove and clean screen with gasoline. Dry with compressed air. Dip in engine oil and reinstall.

### Generator

Adjust charging rate to conform with owner's requirements for the approaching season.

### Body

Suggest to owners that a twice yearly application of Lincoln polishing wax will enhance and preserve the luster and beauty of the body and fenders.

# LUBRICATION AND MAINTENANCE FORD 4-CYLINDER TRUCK



## 300 MILES, 1000 MILES AND EACH 1000 MILES THEREAFTER

(A) PRESSURE GUN LUBRICANT

(B) ONE GREASE CUP FULL PRESSURE GUN LUBRICANT

(C) ENGINE OIL (DISTRIBUTOR SHAFT SPRING TIE BOLT, GENERATOR, DOOR HINGES, HOOD FASTENERS, AND ACCELERATOR CROSS SHAFT)

(E) ADD GEAR LUBRICANT TO LEVEL OF FILLER PLUG
S. A. E. VISCOSITY No. 110 WINTER
S. A. E. VISCOSITY No. 250 SUMMER

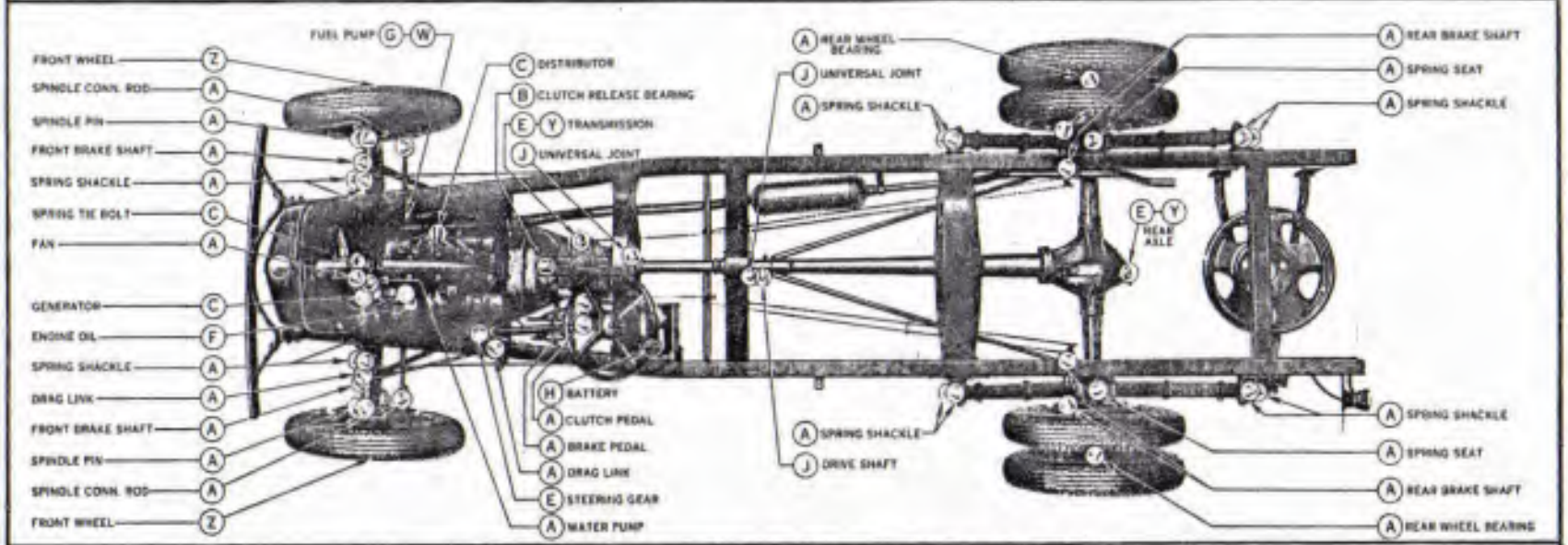
(F) DRAIN AND REFILL WITH GOOD QUALITY ENGINE OIL—USE S. A. E. VISCOSITY No. 20 WHEN BELOW FREEZING TEMPERATURES PREVAIL (WINTER OIL MUST HAVE LOW COLD TEST) USE S. A. E. VISCOSITY No. 40 FOR TEMPERATURES ABOVE FREEZING

(G) DRAIN SEDIMENT

(H) ADD DISTILLED WATER

(J) UNIVERSAL JOINT GREASE (CYLINDER OIL—SODA SOAP GREASED)

(L) SPRAY SPRINGS (PENETRATING OIL)




## TWICE YEARLY (PREFERABLY EACH FALL AND SPRING) OR EVERY 5000 MILES (WHICHEVER OCCURS FIRST)

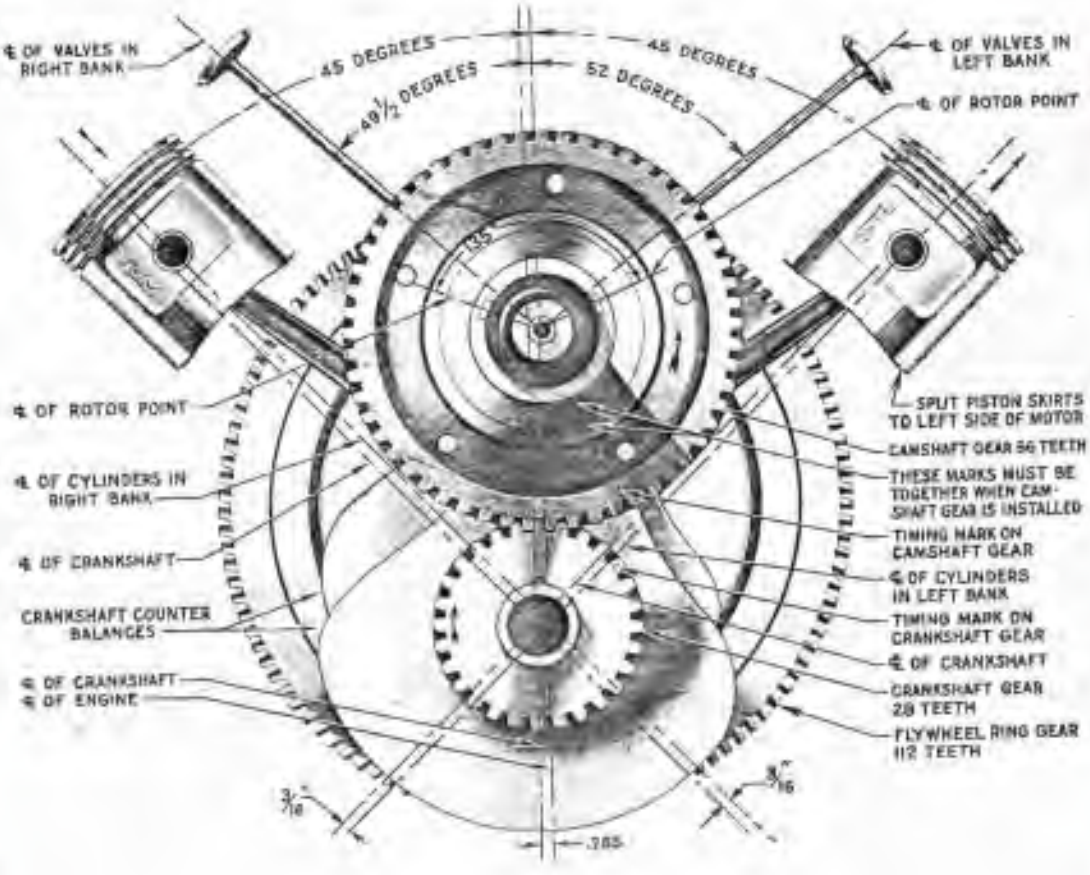
(Z) PACK WITH SHORT FIBER SODIUM SOAP GREASE HAVING HIGH MELTING POINT

(Y) DRAIN, FLUSH, AND REFILL WITH GEAR LUBRICANT—USE S. A. E. VISCOSITY No. 110 (LOW COLD TEST) IN WINTER USE S. A. E. VISCOSITY No. 250 IN SUMMER

(W) REMOVE AND CLEAN SCREEN

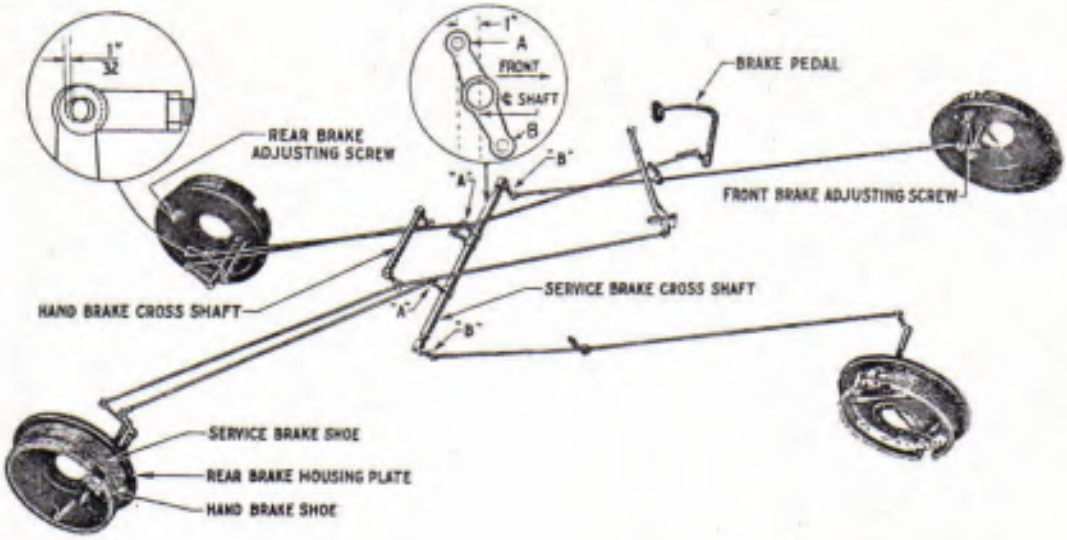
# Ford SERVICE BULLETIN

Vol. 13 July 1932 No. 2




## V-8 ENGINE

Various adjustments affecting the performance of the V-8 engine are covered in this bulletin. Periodically check each member of your organization on these adjustments. Have each man actually make each of the adjustments.




BRAKE SYSTEM (TRUCK)
Fig. 3

move the hand brake lever to the extreme forward or release position; the levers A and B (Fig. 1) on the end of the car cross shaft should now be in an exactly vertical position.

On the truck the upper end of these levers will be to the rear of the true vertical position approximately one inch (see insert, Fig. 3).

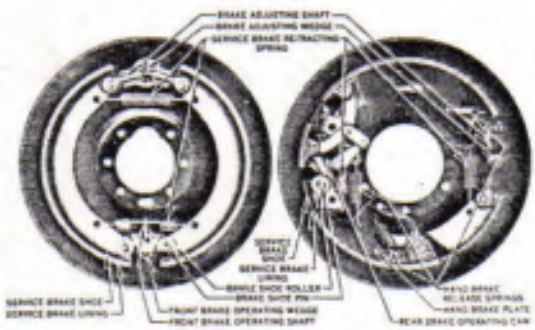
Next, each rod connecting the cross shaft to the brake lever on the housing plate should be pulled toward the wheel enough to take up all play while the lever should be pushed toward the cross shaft enough to take up all play in the cam, etc., in the housing plate.

The length of the rod should now be adjusted so that the pin hole in the rod is $\frac{1}{32}$ inch nearer the cross shaft than the hole in the lever on the brake unit (see insert, Figs. 1 and 3). The pin should then be replaced and a new cotter installed It is always good practice to **bend each side of all cotter pins in opposite directions** as an extra precaution against their dropping out. This $\frac{1}{32}$ inch adjustment gives the maximum brake pedal adjustment and places a slight tension on the entire system. Under no circumstances should more than $\frac{1}{32}$ inch be used in making this adjustment as this would defeat the purpose of the design.

Adjust brake pedal to cross shaft rod so that the pedal is held against the rubber stop on the floor board.

Incorrect brake rod adjustment results in dragging, chattering, squeaking brakes and unequal braking action.

**In road testing the brakes** on the Ford cars and trucks the ideal setting is when with the least possible pedal pressure all four wheels will slide at the same time when the car is traveling at a speed of 25 miles per hour. Due to the difference in the distribution of weight at the different speeds it will be noted that at speeds above 25 miles per hour the rear wheels only will slide at this adjustment, while at the lower speeds it will be noted that in emergency stops where the maximum pressure is placed on the pedal suddenly, only the front wheels will lock. This is the best adjustment possible for maximum braking efficiency at all speeds.



BRAKE HOUSING PLATES (TRUCK)
Fig. 4

# V-8 Engine Performance

One or more incorrect adjustments usually reflects itself in unsatisfactory engine performance. Fig. 40 illustrates the various points which should be checked to restore the engine's operation to the high standard to which it was designed.

Each of the adjustments is lettered for convenience, the lettering however is not an attempt to outline a definite line of procedure. The sequence of the various adjustments is best determined by the performance of each individual car. As an example, the car that idles nicely but misses at high speed should suggest to the mechanic that the spark plug gap may be too great, thus the spark plugs should be checked first or if the fault seems to be a lack of fuel, remove the flexible fuel line to fuel pump connection to see that the passage is not blocked. Blow into balance of line to remove any obstructions. If these do not correct the trouble the next most likely cause of the trouble should be examined and so on until performance is correct.

Sluggish performance in low speeds, if motor does not "miss" and no "ping" is noted under load at low speeds, should suggest that the vacuum brake adjustment is too tight or the vacuum brake piston is binding in the distributor body.

If the motor stalls at sudden stops the throttle plate adjustment (see "A", Fig. 40) may be set so that the car is propelled at 6½ to 7 miles per hour in high gear providing the adjustments "A", "E", "F", "H", "I" and "K" are correct.

Dealers should arrange to periodically check each member of his service organization on these adjustments.

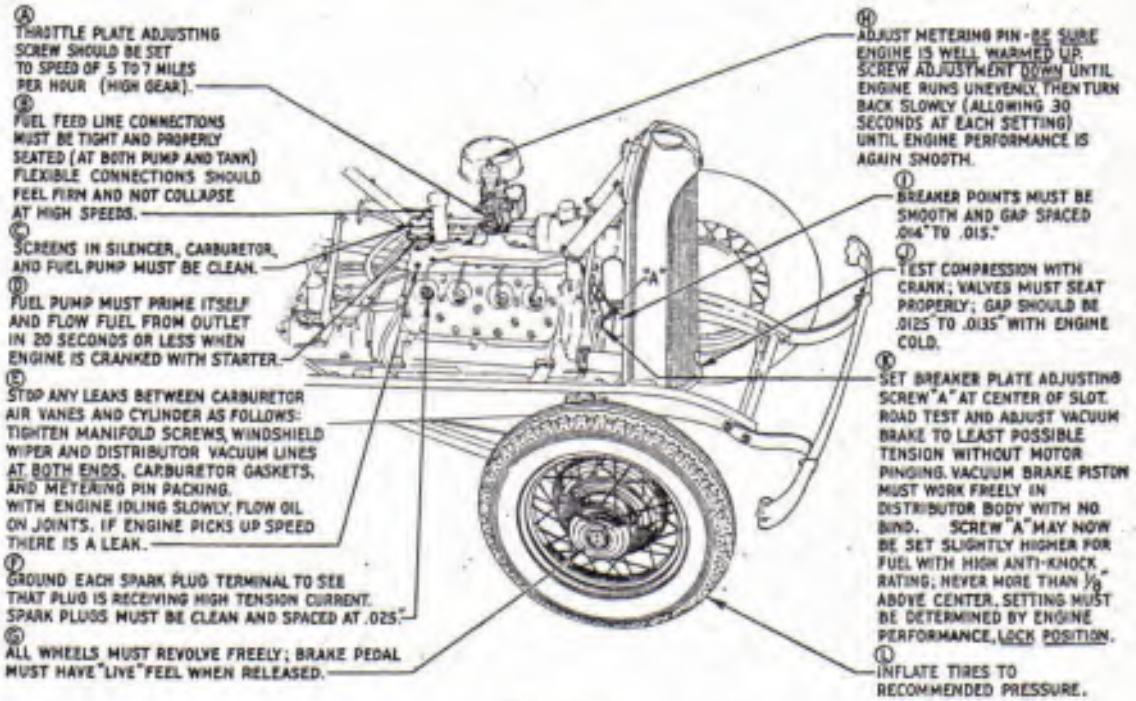



Fig. 40

# Gasoline Mileage Tester

In order to use the mileage tester designed for the "A" on the V-8 or the improved 4-cylinder cars or trucks, a set of extension fittings is necessary as follows:

Electrical extension.

Two rubber tube extensions with fittings.

Aluminum spacing block.

The electrical extension comprises a socket to connect to the plug of the tester, two wires 18" long and two battery clamps, one of which is insulated. The insulated clip is to be connected to a live electrical post on the underside of the ignition switch (See Fig. 41) on the steering column bracket. The other clip should be connected to a grounded part such as the throttle rod (See Fig. 41). The socket and plug should be insulated and a pure gum rubber tube is furnished for this purpose.

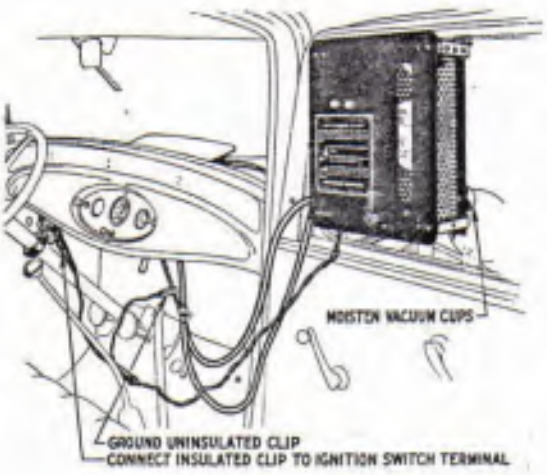



Fig. 41

The gasoline extension tubes should be connected to the two rubber tubes of the tester. (See Figs. 42 and 43).

After installing the tester on the right hand window, open the ventilator and pass the rubber tubes through it.

Lift the hood. Install aluminum spacing block in the drain channel so that the notch is away from the hinge and lay the two rubber tubes in the notch.

Disconnect the fuel line leading to the pump and connect the rubber hose that leads to the pump on tester to fuel line running to the fuel tank. The other rubber hose from the tester

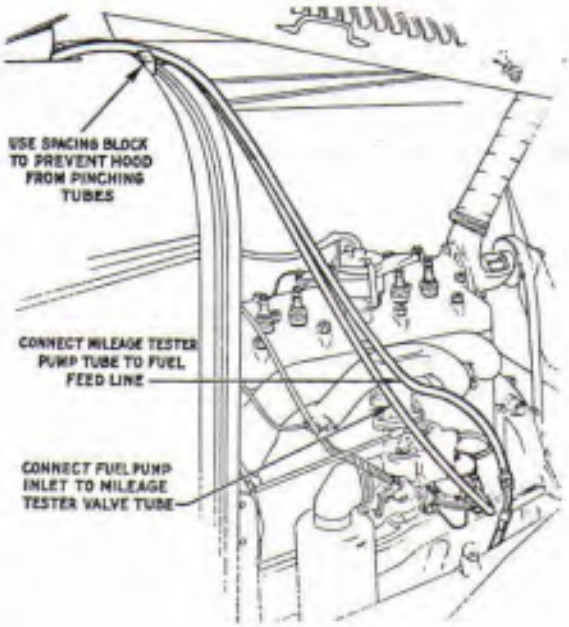



Fig. 42

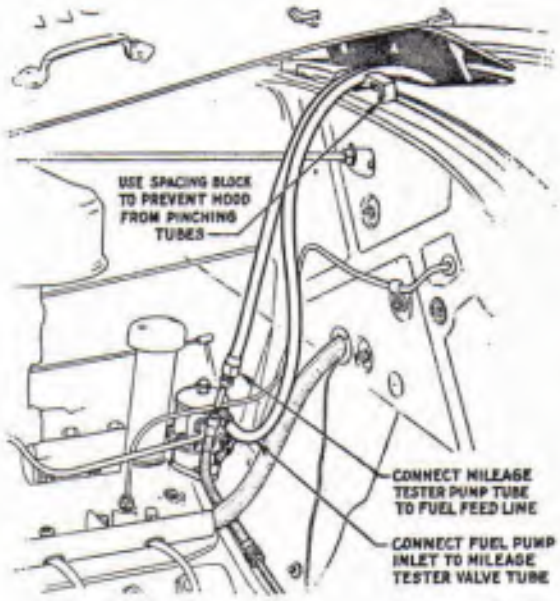



Fig. 43

valve should be connected to the fuel pump on the engine (See Figs. 42 and 43). Close the hood and proceed with the economy test in the usual manner.

Failure to obtain satisfactory mileage is an indication of some mal-adjustment. Various points to check are indicated in Fig. 40. **Do not overlook brake adjustment and tire inflation.**

Create all the enthusiasm possible by encouraging owners to run these tests anytime after the 300 mile inspection and adjustment.

## Tire Pressures

**The air pressure in the tires has a very pronounced effect on fuel consumption, and the action of the brakes, as well as the correct operation of the front wheels and steering gear.**

Inflate tires as follows:

| | |
|---|---|
| 5.25 x 18* | 35 pounds |
| 6.00 x 20 | 45 pounds |
| 6.50 x 20 | 50 pounds |
| 32 x 6 (8 ply truck type) | 80 pounds |
| 32 x 6 (10 ply heavy duty) | 90 pounds |
| 32 x 7 (with BB-1015-B wheel) | 100 pounds |

*Some owners of cars, consistently operated at high speeds, prefer to have the tires on the front wheels inflated to 40 pounds pressure. This extra pressure is permissible for the front wheels where car is operated at high speeds.

## Adjusting Front Wheel Bearings

If there is excessive play in the bearing or if the bearing is too tight it can be adjusted as follows:

Remove the front wheel.

The grease cap may now be removed by turning in a counter-clockwise direction. By removing the cotter key the front wheel bearing nut, bearings and hub may be removed or adjusted.

When reassembling or adjusting, the adjusting nut should be run up tight (don't use a wrench—the handle of which is more than 12 inches long), and then turned back approximately ¼ turn and the **cotter pin replaced.** On the car both the inner and outer hub caps should again be installed. Cars or trucks should never be operated with the front hub caps missing.

## Disc Wheels

Two types of Disc wheels are supplied for truck chassis differing in design as illustrated in Fig. 44. The locking rings (Fig. 45) are not interchangeable due to the difference in the angle of the locking ring flange on the wheel.

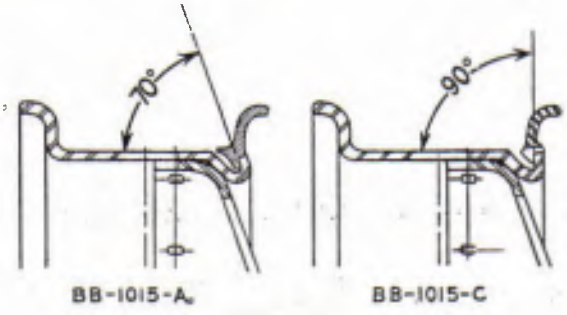
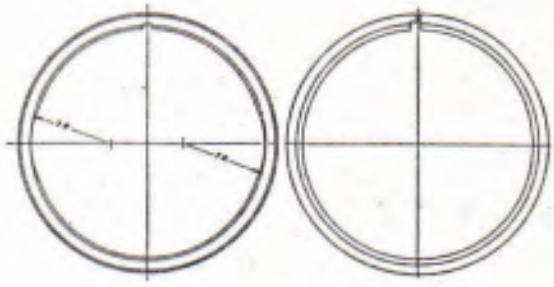



Fig. 44

To remove the continuous type of locking ring BB-1099-C the ring is lifted from the ring channel by means of a tire tool, at the slot provided, until half of the ring is clear of the flange. The ring can then be slipped off of the wheel.

To install the continuous type of locking ring BB-1099-C start at a point at right angles to the two cut away portions of the ring (see Fig. 45). When this half of the ring is at the bottom of the rim channel the opposite half is easily forced in place.

An eighteen inch disc wheel for use with 32 x 7 tires is available as special equipment under part number BB-1015-B.



BB-1099-C BB-1099-A

Fig. 45

## Front Axle Adjustment

The front wheels of both cars and trucks should be toed in $\frac{1}{32}$" to $\frac{3}{32}$".

Before making any adjustments to correct erratic action of front wheels check for the following:

Tire inflation low or uneven.

Dragging brakes.

Loose wheel bearings.

Unbalanced wheel caused by tire or its installation or a boot in the tire.

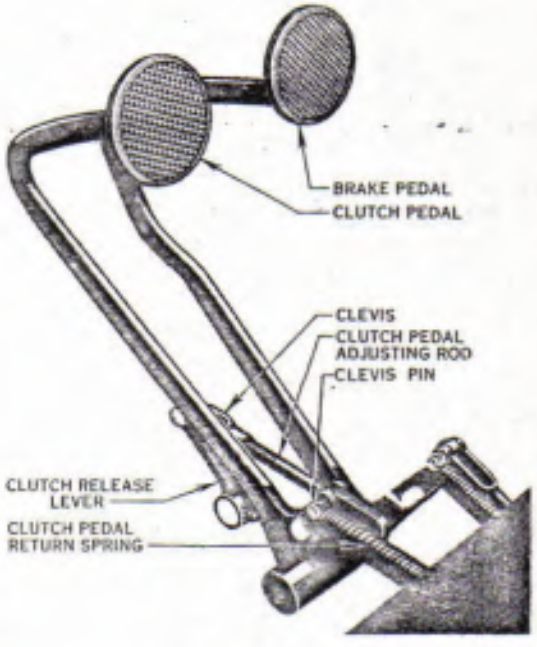



Fig. 46

## Clutch Adjustment

The clearance between the clutch release bearing and the clutch plate release fingers must be maintained at all times, and is indicated by the amount of free travel of the clutch pedal. As the clutch disc facings become worn, it will be necessary to adjust this clearance. The correct adjustment is when the clutch pedal has one inch free movement. This adjustment is easily made by removing the clevis pin (see Fig. 46) and turning the release arm rod. Screwing the rod out decreases the clutch pedal free movement. Screwing the rod in increases the amount of free movement. After making the adjustment, be sure to replace the clevis pin and cotter key.

Caution owners against driving with their foot resting on the clutch pedal, commonly referred to as "riding the pedal." Riding the pedal will result in excessive wear of the release bearing and clutch disc facings, and necessitate frequent adjustment and may in time necessitate refacing the clutch disc.

## Universal Joints

When installing the universal joint to the transmission mainshaft always make sure that the screw is drawn down tightly and that the washer is seated in the counterbore of the universal joint. Fig. 47 illustrates the arrangement of these parts. When correctly assembled the mainshaft rear bearing hub is against the shoulder of the mainshaft and is held in this position by the universal joint with no end play. The outer ring of the mainshaft bearing is held in position by the rear motor support.

Any longitudinal movement of the mainshaft will permit the synchronizer, etc., to change its location with regards to the second speed mainshaft gear which may result in transmission failure.

Dealers should take every precaution necessary to assure themselves that each mechanic understands what constitutes correct assembly of these parts.

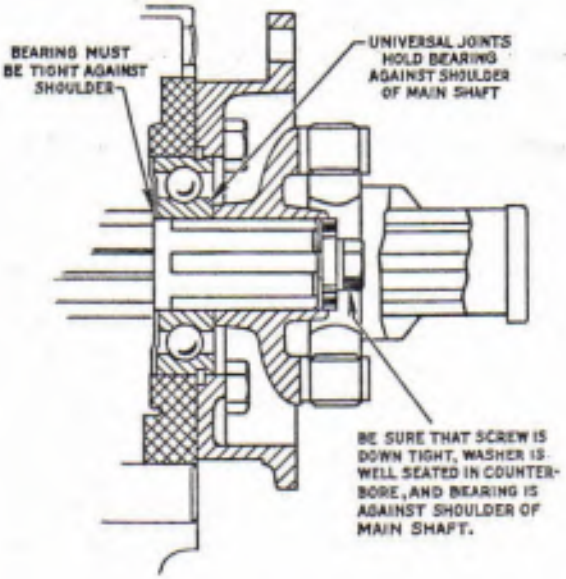



Fig. 47

## Adjusting the Fan Belt

The belt is adjusted to the proper tension when the car leaves the factory and this adjustment should not be changed unless the belt slips.

**On the eight** cylinder engine the fan, water pumps, and generator are operated by the same "V" shaped belt. The adjustment is made by loosening the generator support to engine clamp bolt and moving the generator upward by turning the adjusting nut. Do not tighten the belt more than is actually necessary to keep it from slipping.

**On the four** cylinder engine the fan and water pump both operate from the same shaft. The shaft is driven by a "V" shaped belt. The adjustment is easily made by loosening the generator support to engine screw and moving the generator toward you. Do not tighten belt more than is actually necessary to keep it from slipping.

# DISTRIBUTOR 4 CYL.

## Distributor Cams

The distributor cams used in the "A" and the improved 4-cylinder cars are shown in Fig. 48. Mechanics and stock men should familiarize themselves with these two cams so as to readily identify them. On the cam used in the "A" distributor the radius does not blend with the flats. On the new distributor cam the flats blend with one side of the radius.

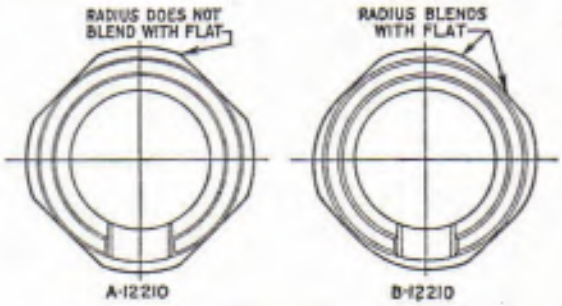



Fig. 48

The A-12210 distributor cam should never be used with the new distributor. Both A-12210 and B-12210 cams are available for service.

## Distributor Body

The distributor body B-12105 used on the improved 4-cylinder engine has been so designed as to be adaptable to the "A" distributor. When installing the B-12105 distributor body on the A-12130 distributor base it will be necessary to increase the height of the breaker arm slot from $\frac{5}{16}$" to $\frac{7}{16}$" to clear the manual control breaker arm used on the A-12100 distributor. This is accomplished by filing the slot with a mill file being careful not to remove any of the material from the sides of the slot (see dotted lines, Fig. 49).

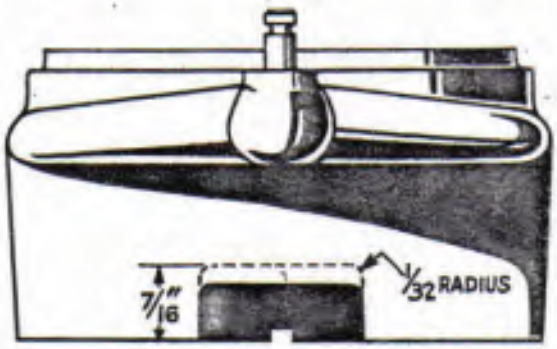



Fig 49

The distributor body and cap should be kept clean at all times as any accumulation of dust may result in "leakage" of the high tension ignition current reducing the efficiency of the ignition system.

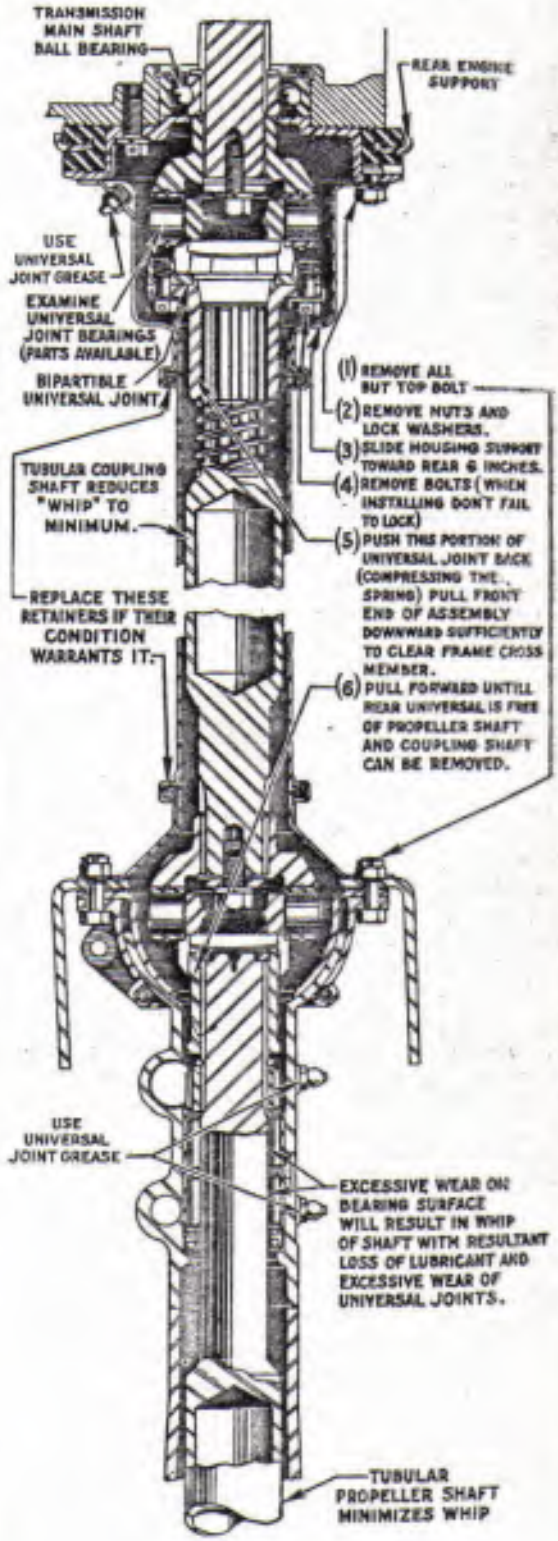
As these parts are of necessity fragile in nature mechanics and stock men must use extreme care in handling.

## Coupling Shafts

The coupling shaft used on the BB chassis has been so designed as to be readily removable permitting access to the universal joints, etc., without disturbing other units of the chassis. This feature in conjunction with the removable cross member on all truck frames, facilitates the servicing of the transmission and clutch.

Fig. 50 illustrates the coupling shaft used on the BB chassis and points out various service suggestions and features as well as the listing of the operations required to remove the coupling shaft.

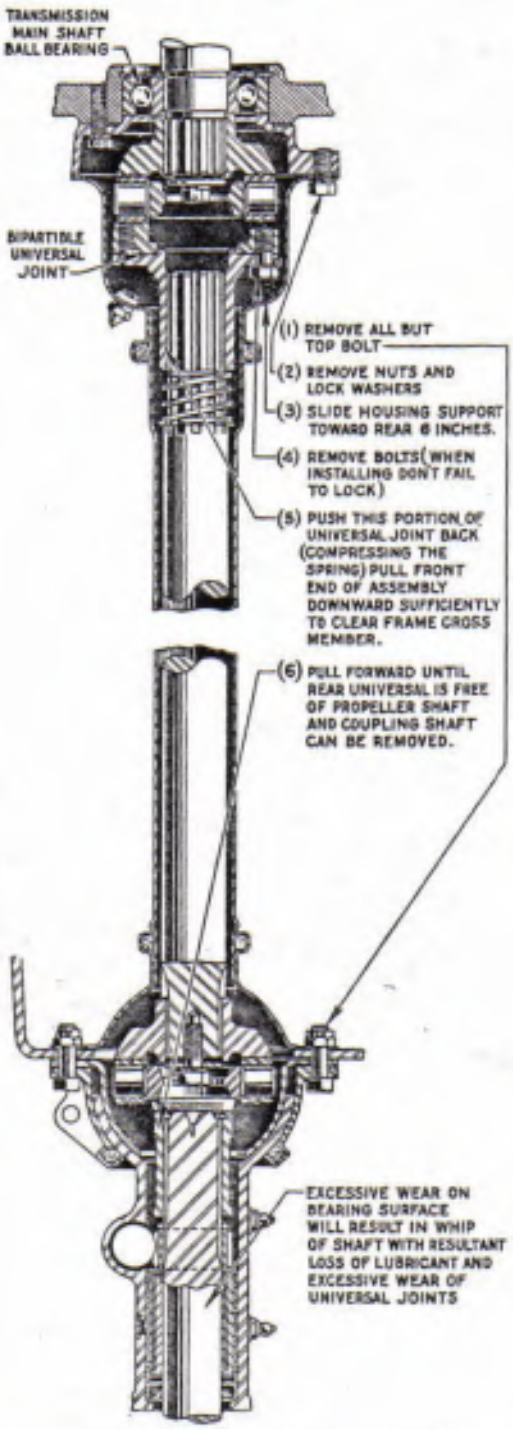
To reinstall the shaft reverse the operations.




COUPLING SHAFT

Fig. 50

Fig. 51 illustrates the coupling shaft recently made available for "AA" trucks having four speed transmission and bevel gear type rear axle.




SERVICE COUPLING SHAFT FOR "AA" CHASSIS
Fig. 51

# LIGHTS

## Headlight Requirements

When the car is delivered, the headlamps are properly focused and aligned, and will pass the lighting requirements of all states.

The focusing of the lights is a permanently built-in feature of the Ford headlamps, requiring no attention. The focus will remain fixed as long as accurately built bulbs are used.

Should the lamps get out of alignment, they should immediately be realigned.

## Aligning Headlamps

Align headlamps with empty car standing on a level surface in front of a white wall or screen, 25 feet from front of headlamps. This wall must be in semi-darkness or sufficiently shielded from direct light so that the light spots from the headlamps can be clearly seen. The wall must be marked off with black lines, as follows:

Three exactly vertical lines spaced 14 inches apart.

Two horizontal lines 37 and 34 inches above the floor.

Position the car 25 feet in front of these lines. Center line of the car should be at 90 degrees from the wall and central with the three vertical lines. Sighting through the center of the rear window the center vertical line should be in line with center of the radiator cap.

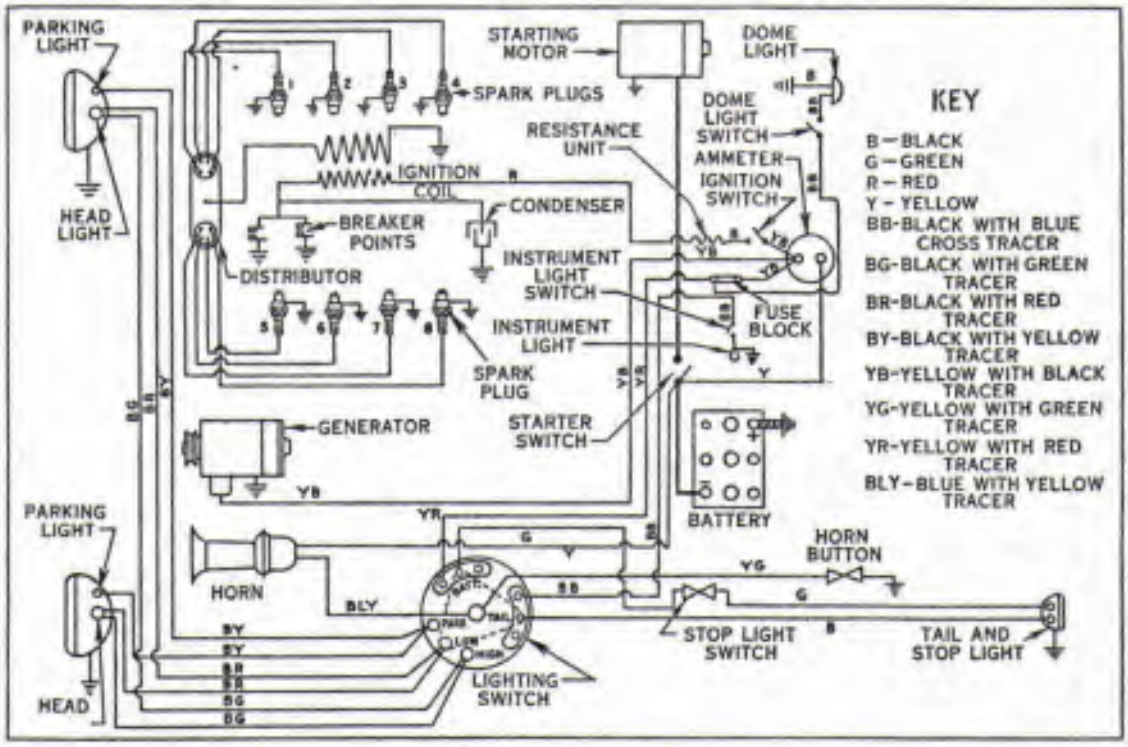
Headlamps are aligned by moving lamps after nut at bottom of bracket has been slightly loosened.

For 5-passenger cars, the tops of the bright spots on the 25-foot wall are to be set at the line 34 inches above level of surface on which car stands.

For all other cars and all trucks, the bright spots on the wall are to be set at the line 37 inches above the level of surface on which it stands.

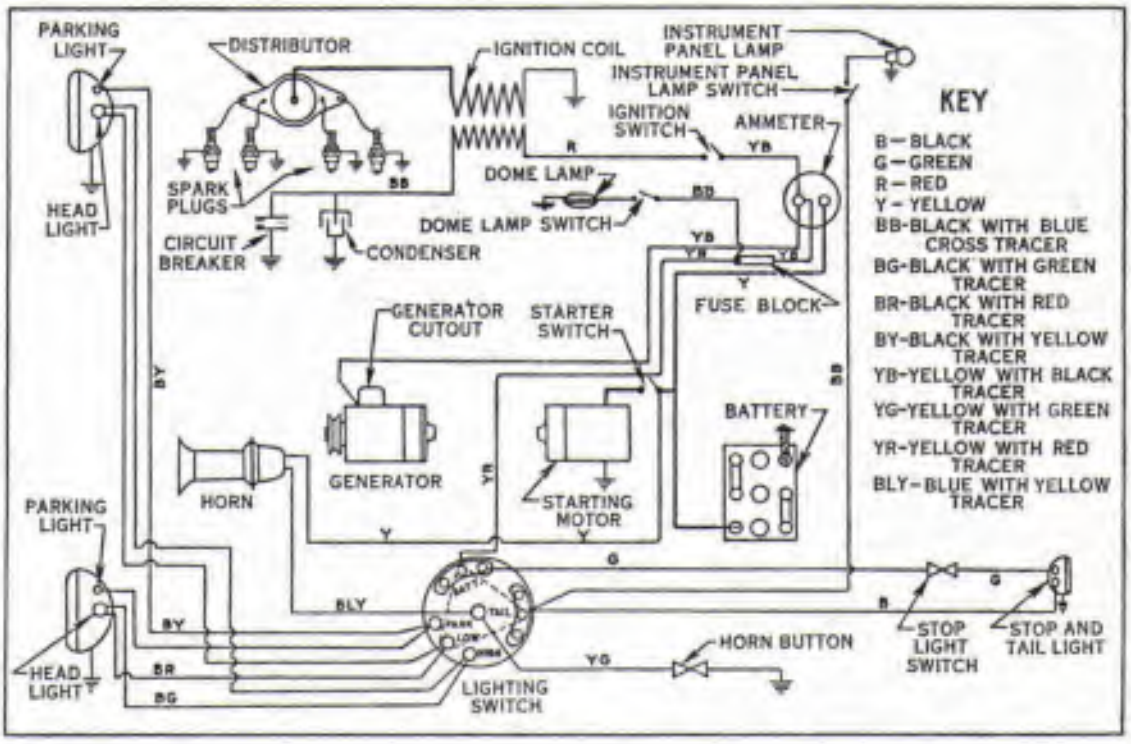
The beam of light from each headlamp is to extend straight forward, that is, the centers of the elliptical spots of light must be 28 inches apart.

With tops of bright spots thus set for empty car the headlamps comply, under all conditions of loading, with the requirements of nearly all states. Consult your local police department.




V-8 WIRING DIAGRAM

Fig. 52




4 CYL. WIRING DIAGRAM

Fig. 53

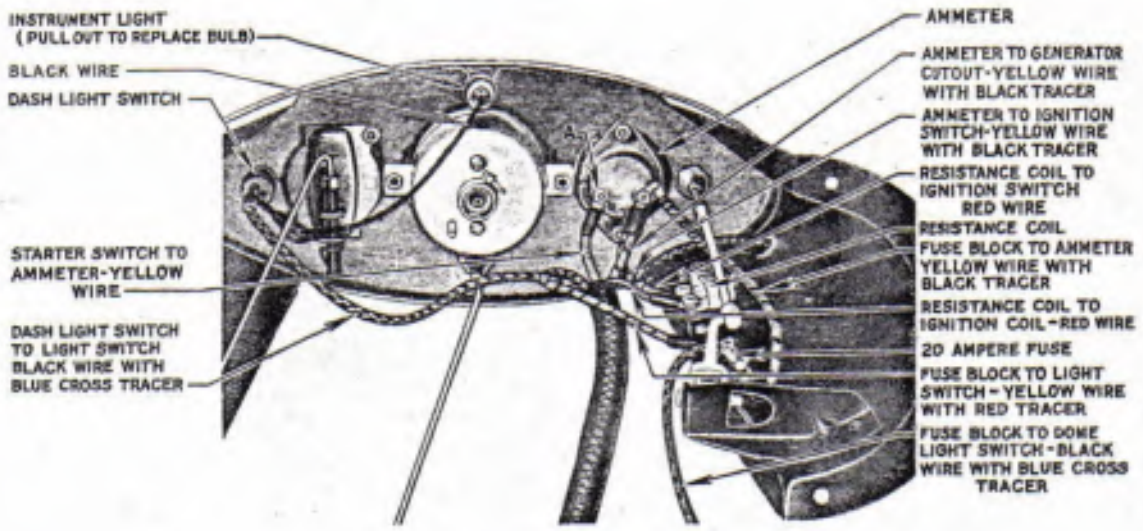



Fig. 54

## Light Fuse

A 20 ampere fuse B-14526 is now provided in the lighting circuit of all cars and trucks to protect the wiring.

**The practice of testing the light wiring by "grounding" the bulb contact points must be stopped as such a practice will result in the burning out of the fuse.**

The adoption of the light fuse changed the wiring arrangements. Figs. 52 and 53 illustrate the arrangement. To facilitate the ready identification of the various wires, etc., behind the instrument panel of the V-8 refer to Fig. 54.

## Replacing the Bulbs

When replacing burned out bulbs, make certain that you use genuine Ford bulbs. Genuine Ford bulbs have the name "FORD" marked on the base. They insure your headlights meeting the lighting requirements of the various states.

Headlamp bulbs are available in the following candle powers:

| | |
|---|---|
| B-13007-A | 21—21 C. P. |
| B-13007-B | 21—32 C. P. |
| B-13007-C | 32—32 C. P. |

Use B-13465 21 C. P. bulb for stop light.

Use B-13466 3 C. P. for tail light, instrument light, and car dome light.

Use B-13799 15 C. P. for dome light on commercial vehicles.

## 4 Cyl. Engine Snubber

**The engine must be idling** when the spring tension of the engine snubber is adjusted. Adjust snubber so that the engine's return to normal position after acceleration **from idle speed** requires approximately 5 times as long as the original movement. Be sure to make this adjustment with engine idling. Accelerate the engine speed after each change of the adjustment to note the action of the snubber.

When the felts used in the engine snubber become dry or when new felts are being installed they must be treated with oil and graphite as follows:

Mix flake graphite and cup grease to make a thick paste; the ratio should be 5 parts cup grease to one part graphite by weight.

Add engine oil to obtain the proper consistency. Mix on a clean flat surface (a smooth board is suitable).

Rub one side of the felts to this surface working it back and forth to permit the felt to absorb the mixture and assure even distribution. **Be sure to oil only one side of the felt.**

The grease and graphite mixture may be kept ready mixed and the oil added and mixed with it on the board as required to obtain the proper consistency.

**The treated sides of the felts are installed next to the dash bracket and the dry side next to the snubber arms.**

# AIR CLEANER

An oil bath type air cleaner, BB-9625, is now available through Service for the improved 4 cylinder trucks.

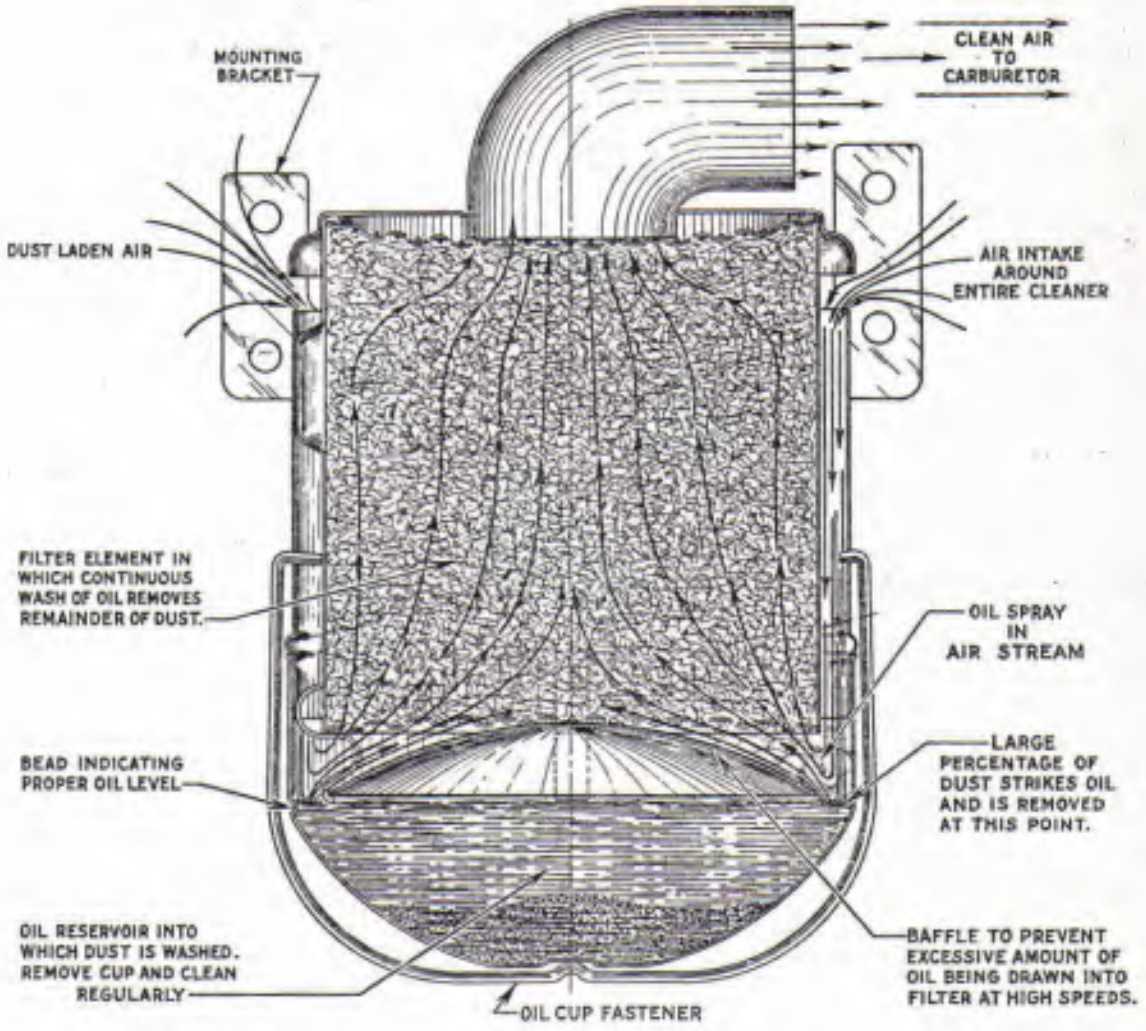
This cleaner is the result of extensive research and experimentation in sections where the dust conditions are the most severe and is recommended for all units operated under dusty conditions.

Tests made in actual service have shown these cleaners to be highly efficient in the removal of abrasives from the air used by the motor, greatly increasing the life of the reciprocating parts.

## Installation

When installing the air cleaner it will be necessary to remove a portion of the right hand engine pan as follows: Start at a point ½" to the rear of the third bolt hole cutting on a line at right angles to the inner side of the pan (see Fig. 56). Then cut around the curved portion approximately $\frac{5}{16}$" below the flat portion of pan (see insert Fig. 56). The leaving of this curved portion contributes to the rigidity of the pan.

The mounting bracket is held to the engine by two of the valve chamber cover screws. The mounting brackets are provided with 2




SECTIONAL VIEW OF AIR CLEANER
Fig. 55

holes each side to make the cleaner adaptable to trucks equipped with speed governor (B-6850).

### Care

At each oil change remove accumulation of dirt from the cleaner and refill the cup with oil. Oil of the same viscosity as is used in the crankcase is satisfactory. **Keep oil in the cup at all times.**

The engine oil pan should occasionally be flushed with a light oil or removed and thoroughly cleaned if the engine is operated under dusty conditions.

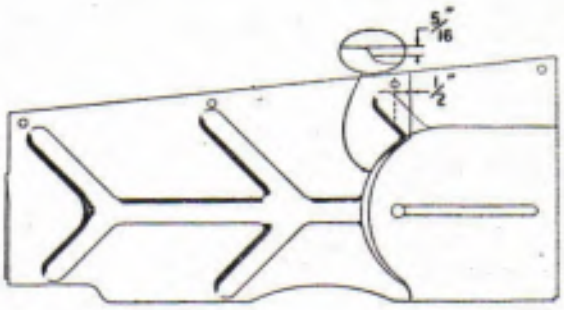



Fig. 56

## Governor 4-Cylinder Engine

A speed governor (B-6850) is now available through service on new 4-cylinder cars and trucks (see Figs. 57 and 58).

The governor is a compact fool-proof, self-contained unit installed between the carburetor and intake manifold of the 4 cylinder engine.

It is easily and conveniently attached and is supplied with the necessary studs and gaskets for installation as well as parts for attachment of the choke control.

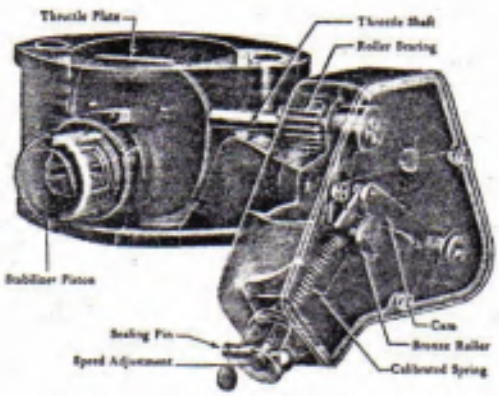



Fig. 57

### Operation

The governor operates automatically to control the speed of the engine with minimum variability throughout the entire load range, and maintains a uniform road speed, the governor control adjusting itself to the requirements of the load and power.

The operation is accomplished by means of a throttle valve, which is offset or unbalanced. Attached to the throttle valve is a small stabilizer piston working within a cylinder at the side of the governor. This piston responds to the flow and pressure reaction of the gas mixtures passing from the carburetor to the engine in accordance with speed.

The valve is controlled in its movement and balanced for every given condition by the cam lever and spring arrangement contained within the dust-proof housing. No oiling or attention is required.

### Construction

The cam is an exclusive feature of patented design.

The shaft, from which the throttle operates, is mounted on **needle type roller bearings,** eliminating friction and providing extremely sensitive regulation.

All material used is of a high grade. This, combined with the fact that there are only two moving parts, which are hardened, insures long life and freedom from mechanical trouble, proven by many years of satisfactory service.

The governor can easily be adjusted to any desired speed by turning the adjusting screw clockwise for increased speed and anti-clockwise for decreased speed.

Locking pins and seals for both the adjustment and studs that hold the governor to the engine, which is most important, are supplied and prevent unauthorized tampering.

### Installation Instructions

Remove carburetor throttle plate control rod, gas line and choke bracket.

Loosen choke lever nut and remove choke wire assembly. Remove snap ring, sleeve, spring and bracket (see Fig. 59).

Remove carburetor and reassemble with governor using studs, nuts and gaskets

**After washing cars,** brakes should be tested and if the lining has become wet the owner should be advised that the braking efficiency is below normal until the brakes have dried. Avoid allowing the car to set over night with hand brake set if the brakes are wet.

## Overhauling the Brakes

When disassembling the brake shoe, such practices as are apt to distort the shoe should be avoided. The rib of the brake shoe should always be supported when removing the brake shoe pin. These pins are pressed into the shoe tightly and if they are driven out with the rib unsupported, serious distortion of the arc of the shoe is liable to result.

## Installing Lining

Fig. 5 shows a method of installing the brake lining on brake shoes and is preferable to the use of various types of stretchers. To install the lining, proceed as follows. With the arc of the brake lining at right angles with the arc of the brake shoe, install and rivet over one rivet at each end of the opposite edges of the lining (see A, Fig. 5). The lining can then be pushed up over the shoe and the balance of the rivets installed starting at the two center rivets (see B, Fig. 5).

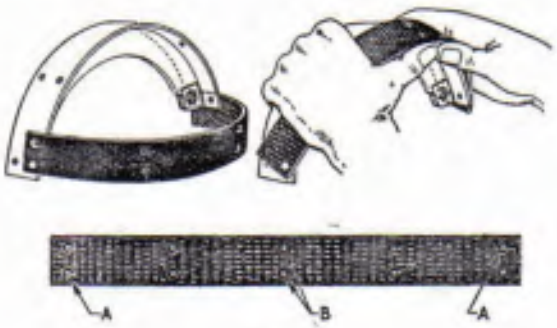



Fig. 5

The lining, when correctly installed, will conform with the arc of the shoe, fitting tightly at all points.

Should you find that the ends of the lining pull away from the brake shoe as shown by the arrow (see A, Fig. 6) this may be corrected as follows. Clamping a vise on the end of the lining on the center line of the end rivet hole, slightly bend the corners down as shown at B and C (Fig.) 6. If reasonable care is used not to break the lining, the result will be as shown in D (Fig. 6).

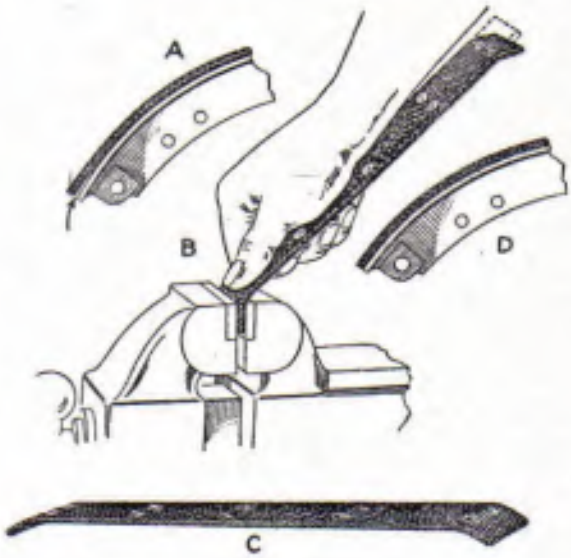



Fig. 6

## Grinding the Lining

The brake shoe is now ready for grinding. **The importance of this operation cannot be over-emphasized.** The brake shoes are held in a non-adjustable fixed position when released and if the arc of the brake shoe is not ground to the correct radius with relation to the pin holes in the shoe proper, dragging brakes when released, or incomplete contact when applied, will result.

The use of a grinder which locates from these holes and grinds to the specified radius is absolutely essential for maximum braking

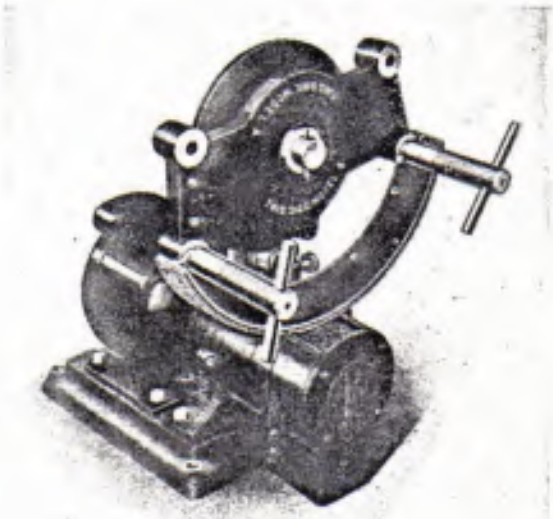


Fig. 7

supplied. (Governor housing to rear). Seal as shown to prevent unauthorized removal (see "E", Fig. 58).

Bend and attach fuel pump to carburetor fuel line. ("B", Fig. 58.) Tighten nut on fuel pump end before carburetor end.

Place new choke bracket, spring and sleeve on choke wire and close snap ring in groove on end of wire (Fig. 59). Place choke rod extension in carburetor (see "F", Fig. 58). Replace choke assembly and tighten nut ("D", Fig. 58).

Attach bracket to manifold with original screw. Tighten clamp screw, allowing armoured cable to extend through bracket ¼" and bend bracket in or out, so choke wire will be in line. **Check choke travel to make sure it will open and close properly.**

Replace throttle rod **and bend accelerator cross shaft lever** (see "G", Fig. 58) **toward front as required to allow full throttle travel.**

Set governor for desired speed and seal.

When the speed governor (B-6850) is installed on units equipped with the BB-9625 air cleaner or the carburetor silencer, it will be necessary to remove a portion of the B-6775

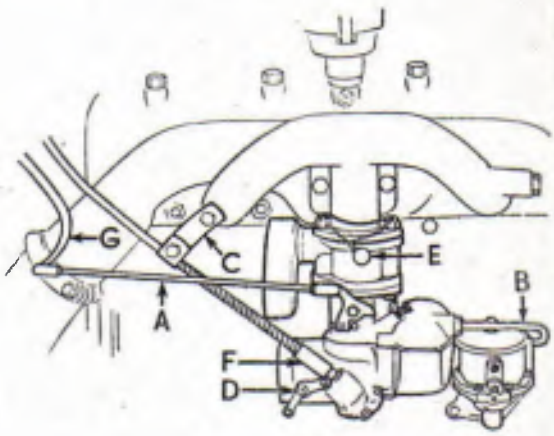



Fig. 58

engine pan as shown in Fig. 56. Start at a point ½" to the rear of the third bolt hole cutting on a line at right angles to the inner side of the pan. Then cut around curved portion approximately $\frac{5}{16}$" below flat portion of pan (see insert Fig. 56). The leaving of this curved portion contributes to the rigidity of the pan.

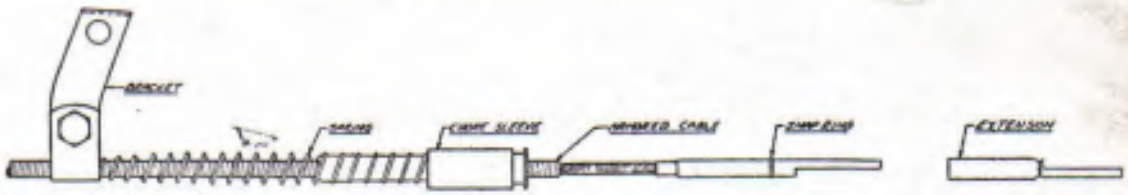


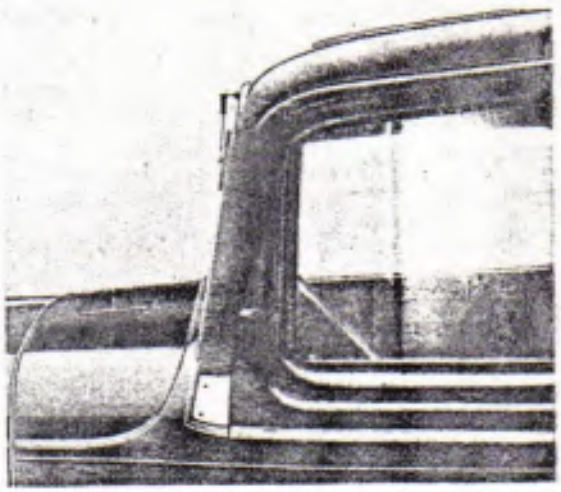
Fig. 59

# SPORTLITES

To exactly locate the correct point for drilling the outside metal to locate the hole in the corner post it is important that the cardboard templet furnished with all new lights be used. The templet is placed on line of front edge of door at top of belt moulding as shown in Fig. 60 and location of the bracket holes are marked. The bracket is then mounted to the corner post. Next place 56-Z-796 drill bushing in the bracket and drill through with a one-half inch diameter by eight inch long drill.

In the manufacture of the new Closed Bodies a hole is provided in the corner post of the body for the installation of a Sportlite.

Providing a hole at this point eliminates drilling through the post and it is only necessary to drill through the outside metal.



POSITION OF TEMPLATE FOR SPORTLITE INSTALLATION

Fig. 60

# Ford SERVICE BULLETIN

Vol. 13 August 1932 No. 3

WHILE the Ford Service Bulletins are primarily for mechanical instruction of Ford mechanics, interesting information is being included pertaining to Ford cars and trucks that if properly assimilated by your Service organization will equip them to intelligently discuss the product with car owners and prospects as well as permit them to correctly diagnose Service complaints.

Insist on each mechanic reading the Service Bulletins and hold periodic meetings to discuss the subjects covered.

The following subjects are covered in this issue:

# V-8 VALVES

When the timing marks on the gears are together as shown on front cover of July Bulletin, the timing of the valves is correct if valve clearance is correct.

The manifold and valve ports of the V-8 engine are 1⅜" in diameter.

The angle of the valve seat is 45 degrees.


VALVE GUIDE REMOVER V-60

Fig. 61

### Explanation of Valve Grinding Chart

When the cylinder heads are removed one of the combinations of valves shown in the first column (see Fig. 62) will be found to be wide open. As an example—when the heads are removed if No. 8 exhaust and No. 5 intake valves are found to be full open, the key would be the letter "B" and the six valves listed in the group on the same line under the heading "Valves to grind" may be ground.

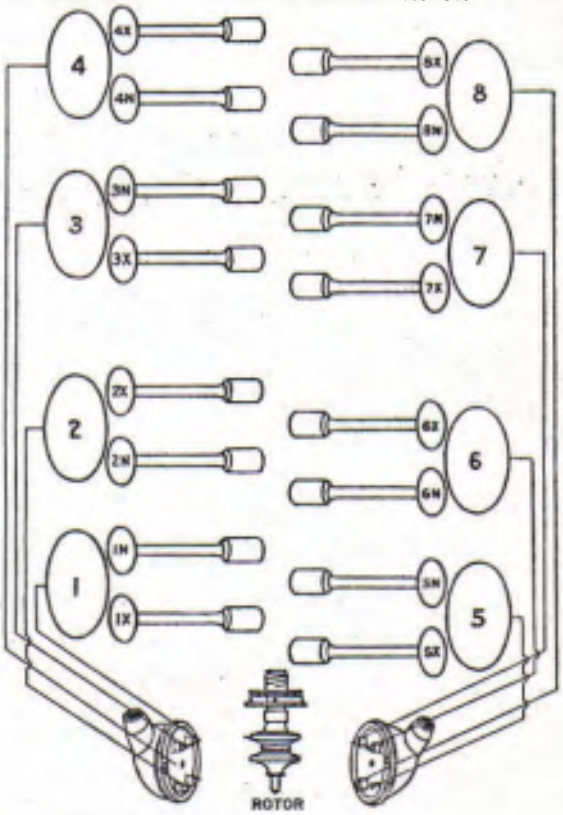
In front of each of the combinations of valves in the first column a letter has been placed. This letter is the key for the next crankshaft setting.

After grinding the six valves designated, turn the crank until the next combination behind the letter "B" is full open. In this position you will find six valves may be ground, after which the next "B" combination is used, namely, No. 5 exhaust and No. 2 intake. In this position four valves may be ground. Thus all the valves are ground with but two part turns of the crank, yet each of the push rods were on the heel of the cam when the valves were being ground and clearance set.

DATA FOR GRINDING VALVES

KEY: N-INTAKE X-EXHAUST

| | VALVES OPEN | VALVES TO GRIND |
|---|---|---|
| A | 4X + 1N | 3X–8N–6N–7X–3N–2X |
| B | 8X + 5N | 1X–7N–6N–7X–3N–2X |
| C | 6X + 4N | 5X–2N–1X–7N–3N–2X |
| A | 3X + 8N | 1X–7N–5X–2N–4X–1N |
| B | 6N + 7X | 5X–2N–4X–1N–8X–5N |
| C | 3N + 2X | 4X–1N–8X–5N–6X–4N |
| A | 1X + 7N | 8X–5N–6X–4N |
| B | 5X + 2N | 6X–4N–3X–8N |
| C | 4X + 1N | 3X–8N–6N–7X |



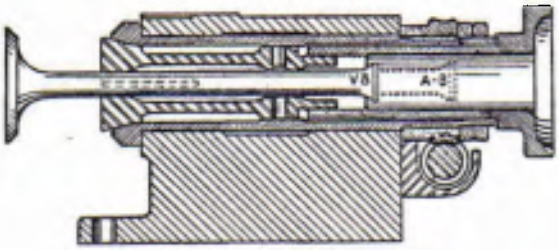

FIRING ORDER 1-5-4-8-6-3-7-2

Fig. 62

If the original combination of valves had been 4-X and 1-N the letter A would be the key for each new position.

Clearance for all V-8 valves should be set to .0125" to .0135" and is best checked by means of the V-45 step feeler gauge (see Figs. 64 and 65).

An attachment for the KRW valve grinder which will accommodate A, B and V-8 valves is illustrated in Fig. 63. Make certain that you are properly equipped for this important service operation.



ATTACHMENT FOR VALVE GRINDER

Fig. 63

## STEP FEELER GAUGE

A set of step feelers (BV-45) have been developed for Ford mechanics (see Fig. 65). These feelers have one plain and seven step blades. The step blades are made as follows: The thickness of the body of the blade is exactly the same as the high limit permissible. The end of the blade has been accurately ground to the low limit. As an example: the blade titled "ALL-VALVES—V8" shown in Fig. 65 is .0125" thick for the first 5/8" of its length, this is the low limit for the setting of all V-8 valves both intake and exhaust. The balance of the blade is .0135" thick which is the high limit for setting V-8 valve clearance. The .0125" portion of the blade is referred to as the "GO" size and the .0135" portion of the blade is referred to as the "NO-GO."

Fig. 64 illustrates this blade being used to test the clearance between the push rod and valve of the V-8. The "GO" end of the gauge must pass between the push rod and the valve freely. If it does not pass freely the

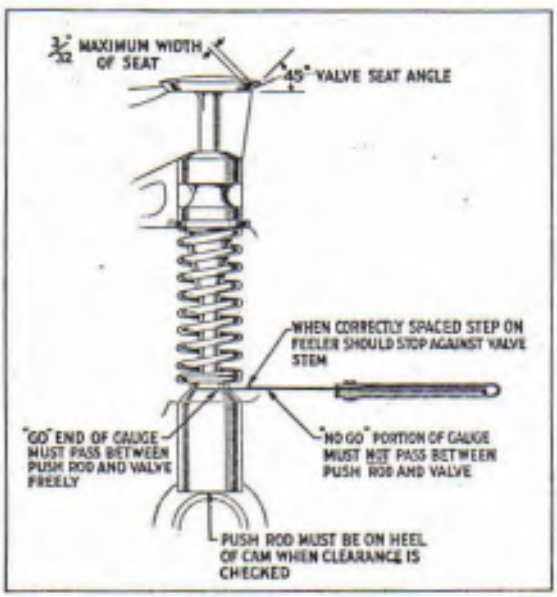



Fig. 64

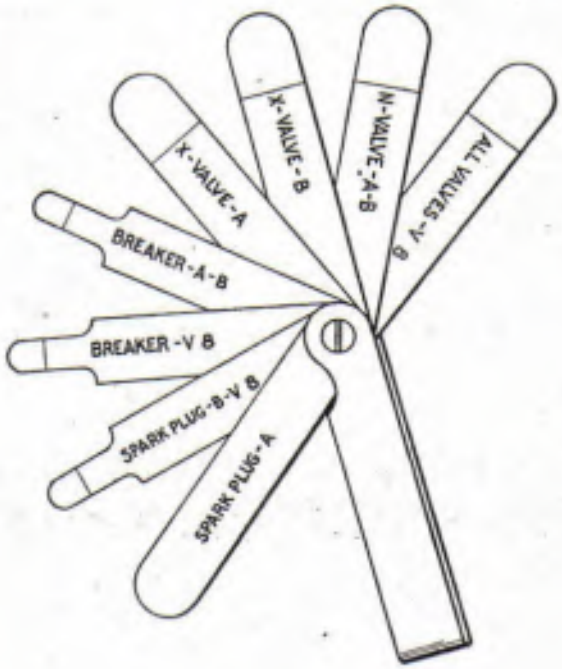



Fig. 65

clearance is too little and the valve stem must be ground off until it does.

The "NO-GO" portion of the gauge must not pass between the push rod and valve. When correctly spaced the step on the feeler should stop against the valve stem. If the "NO-GO" portion of the blade does pass between the push rod and the valve the clearance is too great and the valve must be ground "in" until clearance is correct.

The eight blades in this gauge are as follows:

| NAME | "GO" | "NO-GO" | |
|---|---|---|---|
| ALL VALVES—V8 | .0125" | .0135" | |
| N—VALVE-A-B | .010" | .013" | * |
| X—VALVE-B | .020" | .022" | ‡ |
| X—VALVE-A | .015" | .017" | |
| BREAKER-A-B | .018" | .022" | |
| BREAKER-V8 | .012" | .014" | |
| SPARK PLUG-B-V8 | † | † | |
| SPARK PLUG-A | ▲ | | |

* "N" represents intake

‡ "X" represents exhaust

† "SPARK PLUG-B-V8" this blade is .025" and .030"; this is not a "GO" and "NO-GO" gauge. The end or .025" size is for setting "V-8" spark plug points and the .030" portion is for setting the "B" spark plug points.

▲ The blade titled "SPARK PLUG-A" has no step and is .035" thick which is the correct spacing for spark plug points with the A-6050-A cylinder head. When setting "A" plugs used in the A-6050-B head use the end or .025" portion of the SPARK PLUG-B-V8 blade.

# SPARK PLUGS

Figure 66 illustrates cross section of the two spark plugs supplied for service, as well as points out a means of identification.

**The B-12405 spark plug** used on the improved 4-cylinder engine, and for service requirements on the "A" engine, is what is commonly designated as a moderately hot plug, and is exactly suited to the requirements of the Ford 4-cylinder engines which are of medium compression and are comparatively cold running. Such an engine requires this type plug to prevent the plugs from fouling.

This type of plug however is not suited for the V-8 engine which runs considerably hotter and requires what is commonly referred to as a cold plug. The use of the B-12405 plug in the V-8 engine will result in the electrodes overheating to such an extent that they may cause pre-ignition when the car is operated under sustained high speeds.

**The 18-12405 spark plug** used in the V-8 engine has been designed for the Ford V-8 engine and exhaustive tests indicate that it is suited to the requirements of this engine even when operated under the most unusual conditions. This plug is of the type commonly referred to as the cold type of spark plug. A study of the illustration (Fig. 66) clearly reveals the differences in these plugs. The tip of the porcelain on the 18-12405 spark plug projects beyond the spark plug cage, or housing, thus taking advantage of the cooling influences of the intake gases as they are drawn into the cylinder.

**When adjusting** the spark plug gap, never attempt to bend the center electrode. **Always make the adjustment by bending of the outer electrode.** Failure to take this precaution may result in breakage of the porcelain. Dealers should make every effort to make certain that each of the mechanics in his organization thoroughly understands this point.

Spark plug gaps should be adjusted as follows:

| *Plug* | *Gap* | *Cyl. head* | *Compression* |
|---|---|---|---|
| 18-12405 | .025 | V-8 | 110 lbs. |
| B-12405 | .030 | B-6050 | 90 lbs. |
| B-12405 | .035 | A-6050-A | 75 lbs. |
| B-12405 | .025 | A-6050-B | 110 lbs. |

The new step feeler gauge BV-45 shown in Fig. 65 incorporates blades for setting spark plug gaps.

Dealers having equipment to test the spark plugs under compression should always adjust the spark plug gap as outlined above before making the test, and run the compression up to the point indicated.

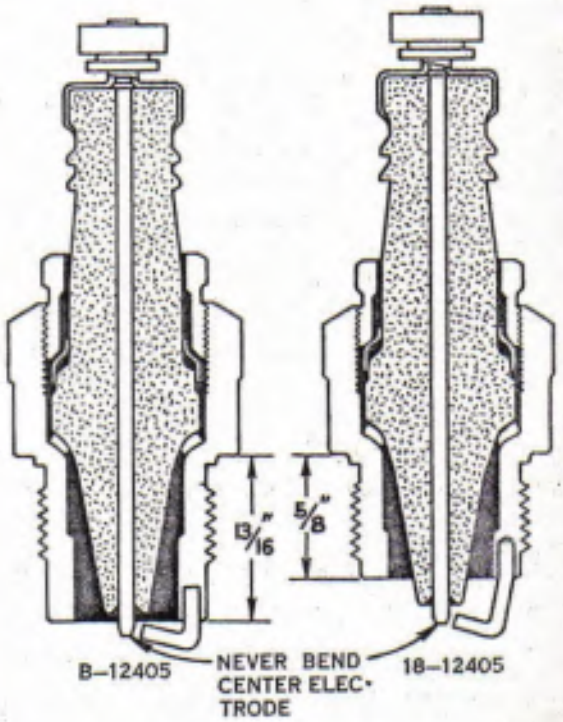



Fig. 66

## Cleaning Spark Plugs

The soft black or fluffy grey deposits should always be removed from the porcelain even when the plug checks OK under compression. These deposits often causes leakage when the plug is hot, yet when tested cold appear to be OK.

Failure to properly clean the porcelain and properly adjust the points before making the test may result in spark plugs being replaced unnecessarily.

The glass-like brown, blistery deposit sometimes found on the porcelain tip of spark plugs, often having the appearance of fused or melted porcelain, is a characteristic ethyl deposit and in no way affects the operation of the plug and need not be removed as it is not an electrical conductor. Mechanics should learn to recognize this deposit and not change spark plugs unnecessarily.

## PISTON ASSEMBLY FIXTURE

A neat, compact, highly efficient, piston assembly fixture embodying a thermostatically controlled piston heater has been developed for Ford dealers. This fixture is available from K. R. Wilson, Buffalo, N. Y., with attachments for the assembly of the V-8 piston.

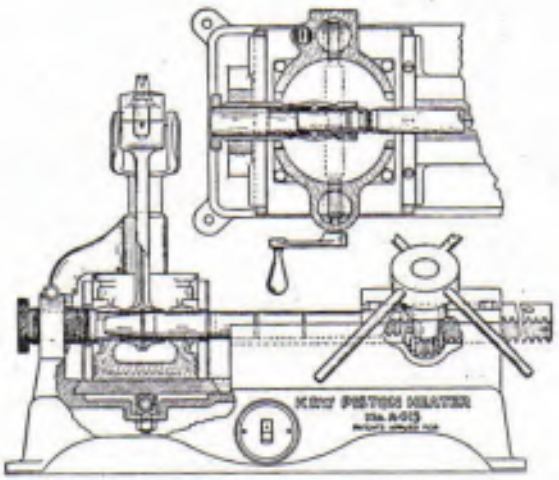


Fig. 67

An automatic heat control switch maintains the correct temperature and only one minute is required to heat the piston sufficiently to freely insert the pin without distorting the piston, and only a slight pressure is required to push the pilot through the locking ring in the connecting rod. An adjustable stop against the outside end of the piston boss prevents distorting the piston out of round. The pistons, including all oversizes, are held "squarely" at 4 points. Attachments are included for installing piston pin retainer rings without damage to the bronze bearing of the connecting rod. The connecting rod is centered with the piston before removing it from the fixture.

## TELESCOPE GAUGE FOR MEASURING CYLINDERS

A new tool, A-426, has been developed for Ford Service work by means of which the diameter of any bore between 2½ inches and 4½ inches may be checked quickly and accurately. The new tool is known as a telescope gauge and is similar to the telescope gauges used by tool and gauge makers everywhere, differing only in its range. The range has been so fixed as to permit the checking of the bore of all "T" and "A" cylinders as well as the cylinders of the improved 4 and V-8, all models of Lincoln cars and Fordson tractors and all of their various oversizes. (Car and truck hub bores also are within the range of this gauge.)

To check the bore size proceed as follows:

Loosen the friction screw on the end of the handle.

Close the points to a size smaller than the bore to be checked, holding them while you retighten the friction screw.

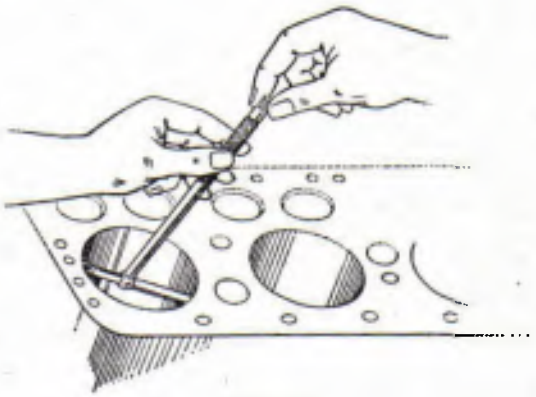


Fig. 68

Place the gauge in the bore on a slight angle (see Fig. 68).

Loosen the friction screw (see Fig. 68). Spring tension will now cause the points to expand until stopped by the walls of the bore.

Retighten the screw. Owing to the angle on which the tool was held the distance between the points will be greater than the bore.

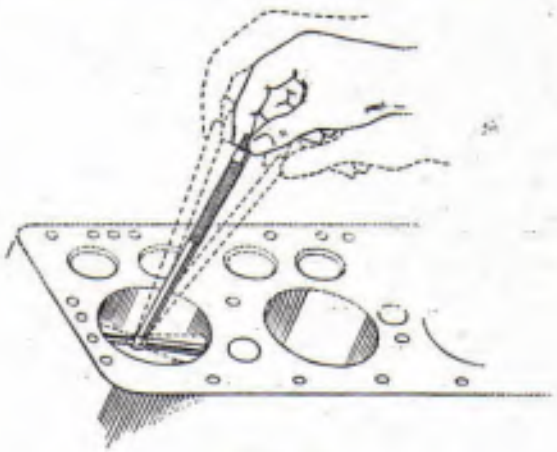


Fig. 69

To close the points to the actual size of the bore move as shown by the dotted lines (Fig. 69). This movement will cause the gauge to find center and will close the points. The friction screw will hold the setting.

Fig. 70

Check this setting with micrometers as shown in Fig. 70.

# SERVICING THE WINDSHIELD WIPER

The vacuum type windshield wiper is used on all models of the new Ford cars and trucks; because of its construction practically no wear takes place on any of the moving parts of this type of windshield wiper and it is seldom necessary to service the unit. In the event a wiper fails to function properly, however, the procedure listed below should be followed:

1. Inspect the suction line and fittings for leaking.
2. If there is no leakage in suction line or fittings, remove the two small screws which hold the cover on the front of the wiper motor and examine the tripper spring for breakage. If broken, replace it.
3. In some cases the failure of the wiper to operate may be due to need of oil in the wiper motor, which can be done without removing it from the car. Secure an old piece of suction hose approximately 6″ in length and slip one end over the outlet of the wiper. Move the wiper bar by hand to either side and just before the valve mechanism "clicks," insert the hose into a small can of good light machine oil. Then pull the wiper bar quickly in the opposite direction, thus sucking the oil into the motor. Next move the wiper bar back and forth in a normal manner so as to allow the surplus oil to be blown back into the can. This operation will fully lubricate one side of the wiper motor. The other side should then be lubricated by repeating the process but by starting the blade on the opposite side of the shield. (Do not permit oil to touch the wiper blade as it might cause the rubber to curl.)

# V-8 DISTRIBUTOR

Improvements in the Centrifugal Governor have been incorporated in the 18-12000 Distributor, smoothing out the spark advance at low engine speeds.

The new distributor can be identified by the graduations on the manual spark adjustment screw plate (see insert, Fig. 71). The addition of these graduations having been made at the same time as the changes in the centrifugal governor.

The breaker gaps on the new distributors (see Fig. 71) are set at .012″ to .014″, which gives a slightly longer "dwell" or period of saturation of the coil.

On the old design V-8 distributors the breaker gaps were originally set at .014″ to .015″ as was given in the June and July issues of the FORD SERVICE BULLETIN, however to establish a uniform service policy and avoid confusion the breaker point gaps on both old and new distributors are to be set the same, namely: .012″ to .014″. All other V-8 distributor information given in June and July bulletins apply equally to both the old and new design.

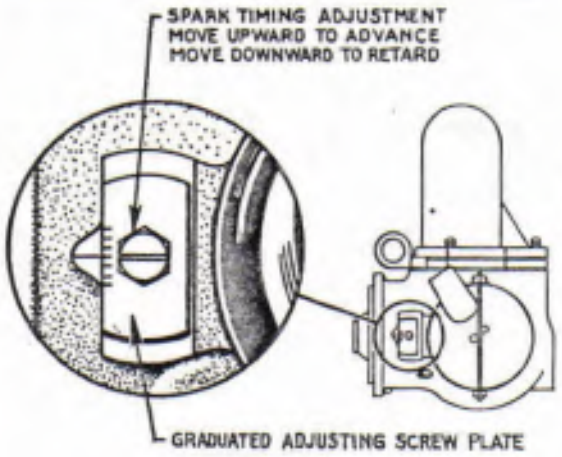


Fig. 71

## Distributor Caps and Cap Covers

Figure 72 illustrates the new design distributor cap and cover which is held together by a small rubber retainer, 18-12115, permitting the cap, cover and gasket to be removed from distributor body as a unit. Extreme care must be exercised when assembling these or the former type of caps and covers to see that all the wires are in place and that the cap is properly seated in the distributor body.

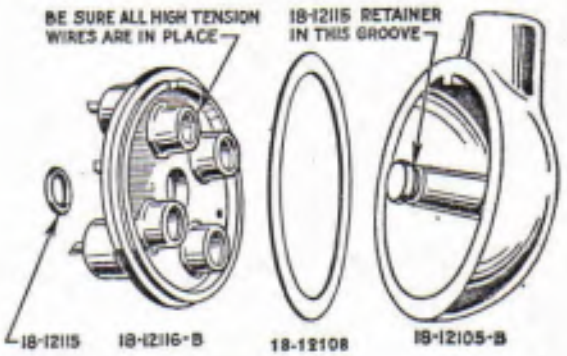


Fig. 72

Broken rotors are usually caused by the pilot on distributor cap not being properly seated in the slot in distributor base.

Shorted distributor caps and rotors are caused by a spark plug wire being disconnected

from distributor cap, or at the spark plug. This condition causes the coil to build an excessively high voltage which will cause the spark to travel over the face of the distributor cap or rotor, and in time will burn a carbon path on distributor cap to distributor base, thus causing one or more cylinders to misfire. On the rotor the spark will travel on the circular edge of the rotor disc, and thus burn a carbon path in the direction of rotation, finally jumping to a terminal on the distributor cap leading to some cylinder not under compression, and may result in back fire in the carburetor.

## To Remove Distributor

When removing distributor from engine the side caps 18-12116, and covers 18-12105, should not be removed from the engine as they will work equally well with either old or new style distributor.

After removing the distributor from the engine, also remove the coil from the distributor, making sure that the high tension brush is not lost. Use extreme care in handling the coil, not to damage it.

## To Install Coil on Distributor

Position 18-12140 gasket on distributor body, set coil in place, making sure that the "spring type" primary contact is not being bent out of position, also see that the high tension brush is in place and contacts the metal band at the center of the rotor. Push down on the top of the coil to see that it contacts the body at all points, then install the three screws loosely and examine joint between the body and coil before finally tightening the screws. Failure to take this precaution may result in breakage of the coil.

## To Install the Distributor

Place the 18-12134 gasket in front cover.

Install the 18-12143 gasket to the flange of the distributor body (a light film of grease will hold it in place). Position the distributor body on front cover, making no attempt to enter the tongue of the distributor shaft in the slot of the camshaft. Next install the three distributor body to front cover screws, screwing them in just far enough so that they will support the distributor in place. Then turn the distributor shaft by means of the rotor until the tongue slips into the camshaft slot (the shaft should turn freely). (If shaft turns hard the screws have been screwed in too far). The three distributor body to front cover screws should now be tightened evenly and securely.

When the distributor assemblies are shipped for service they are properly adjusted for average conditions and no adjustment should be required when making the installation unless the adjustments have been disturbed.

## How to Set the Breaker Gap

To set the breaker point gaps on the V-8 the side caps and covers are removed and the points may be examined. If they are badly burned and pitted deeply they should be replaced.

To replace the breaker points it will be necessary to remove the coil, and the two cotters holding the breaker arms in place. The two breaker arms and spring assembly is easily removed by pushing the center of the spring forward. The two "ground" points may be screwed out after loosening the lock screw.

If the points have been removed to be dressed or replaced adjust the gap before installing the coil in this way the cam is visible and the breaker arms can be set on the high point of the cam without the use of a pocket mirror.

The V-46 special offset screw driver has been designed for this adjustment and this tool along with the V-45 step feeler gauge (see Fig. 65) should be included in every mechanic's equipment.

## Adjusting Vacuum Brake

The vacuum brake should be adjusted with just enough tension to eliminate the sharp

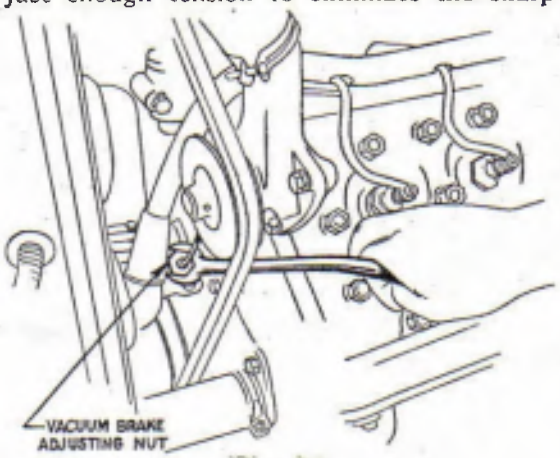



Fig. 73

pinging of the motor under load. The best plan is to back off the adjustment until the engine does ping under load. Then screw down the adjustment nut just enough to remove the ping and tighten the lock nut.

The three wrenches, V-47, V-48 and BV-16, permits this adjustment to be made without removing the distributor caps and covers as shown in Fig. 73.

(The BV-16 wrench is also used to disconnect the fuel gauge line from the rear fuel tank.)

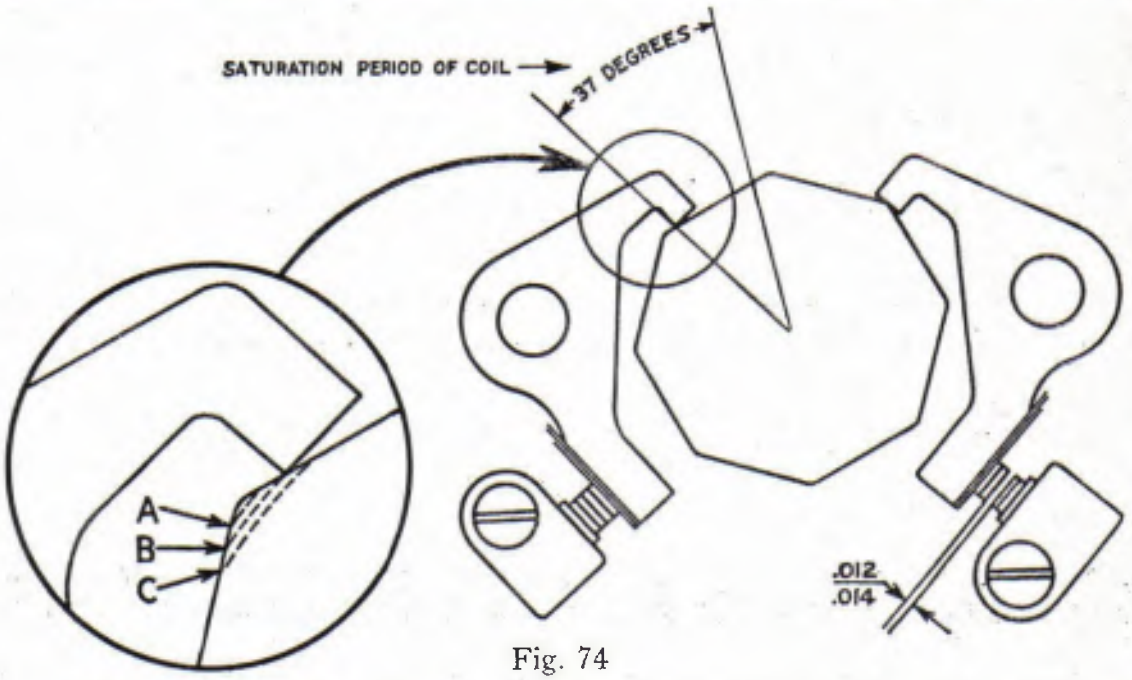



Fig. 74

## Why Breaker Point Gaps Are Important

The Breaker point gaps on any distributor have a direct bearing on the timing of the spark and the performance of the engine as a whole. By referring to Fig. 74 the effect of varying gaps can be clearly understood. In this illustration the breaker points on the left have just closed, closing the circuit. The insert (Fig. 74) is a magnified section of this breaker arm and cam. The dotted ("B," Fig. 74) represents a true radius with its center at the center of the cam and for comparative purposes its length indicates the time the contact points remain open. The points start to open when the lobe of the cam contacts the breaker arm at the point indicated at the arrow "B". Since the distance from the breaker arm fulcrum point to the rubbing block and the contact points are the same the dimensions from the line "B" to the crest of the cam lobe is exactly the same as the breaker gap at the points.

Assuming that the gap shown is exactly .014" the line "A" would represent the time the points will be open when the breaker arm rubbing block has worn .007" with the result that the gap is now .007". Comparing the length of this line "A" with line "B" it will be found to be but half as long and the point where the breaker points start to open is behind the point where it opened when set with a .014" gap (see "B," Fig. 74). This means that the spark has become retarded. The amount of the retard in the instance cited amounts to 4 degrees of travel of the crankshaft, thus lowering top speed, and increasing fuel consumption and otherwise affecting performance in general.

The point "C" represents the point on the cam where the points would start to open if points were set at .021" or .007" too wide. This point is considerably ahead of the point "B" and such a spacing would in effect advance the spark 4 degrees of travel of the crankshaft causing detonation and unsatisfactory performance in general.

### Points to Be Remembered

V-8 breaker point gaps must be set when breaker arm rubbing block is on extreme high point of the cam.

The two V-8 breaker arm rubbing blocks are never both on the high point of the cam at the same time.

The spark timing adjustment (see Fig. 71) should not be changed except after breaker point gaps have been set and the need for adjustment of the timing is still indicated.

The V-8 breaker point gaps must be set at .012" to .014".

The 4 cylinder breaker point gaps must be set at .018" to .022".

Wear of the breaker arm decreases the gap and retards the spark.

Too wide a gap advances the spark and decreases the "dwell" or saturation period of the coil.

.002" wear on the V-8 breaker arm closes the gap .002".

.002" wear on the 4 cylinder breaker arm closes the gap .004".

Be sure the condensor is grounded at all times.

## OIL PRESSURE RELIEF VALVE

Two types of highly efficient oil pressure regulators which require no adjustment are now being used in V-8 engine production. (See "B" and "C", Fig. 75.) These new oil pressure relief valves as well as the former design are illustrated in Fig. 75.

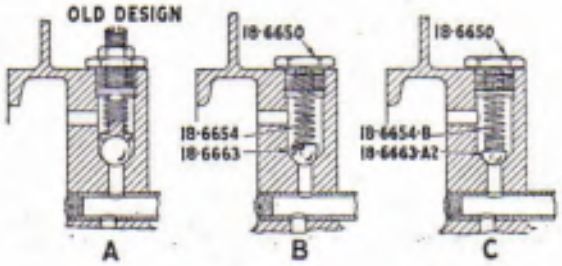



Fig. 75

To establish a uniform service policy with regards to oil pressure and to remove the necessity of dealers equipping themselves with oil pressure gauges, dealers should install this new type regulator in all V-8 engines originally equipped with the old design (see "A", Fig. 75).

When removing the old design oil pressure regulator the ball may be lifted out of its seat with a magnet. Be careful not to drop any of these parts in the motor.

When installing either of the new design oil pressure regulators the 18-6650 nut is run down tight. No gasket is required.

Two types of plungers have been used in these new valves, either one of which is satisfactory to use and springs of different dimensions were used in production. However, as the 18-6654-B spring is satisfactory to use with either type of plunger, only these springs and the 18-6663-A2 plunger will be supplied for service requirements.

## TRUCK AXLE SHAFT NUTS

Truck axle shaft nuts must be kept tight at all times. Axle shaft breakage is more often directly traceable to loose axle shaft nuts than to all other causes combined. This fact has been pointed out to owners in the instruction book he receives with his truck.

A suitable wrench, BB-49, is illustrated in Fig. 76. Each dealer's service department must be properly equipped for this important service operation. When tightening the axle shaft nuts the axle should be jacked up so as to clear floor then lowered just enough so that the tire touching the floor prevents the wheel from turning as the nut is screwed in. The weight of the truck, however, should be supported by the jack and not by the tire when the axle shaft nut is being tightened.

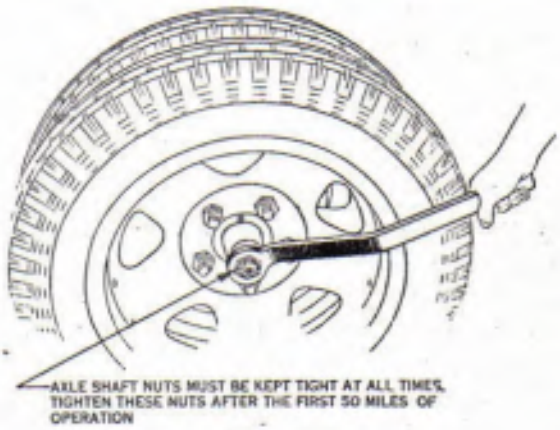



Fig. 76

## V-8 CYLINDER HEAD GASKET

The same cylinder head gasket, 18-6051, is used for both banks of cylinders on the V-8 engine. Always look for the word "*Front*" on the cylinder head gasket when installing it, being sure that it is to the **front** of the cylinder block as it is possible to install this gasket with the front end to the rear of the block, with the result that several of the water passages to the cylinder head, are blocked.

Dealers and dealers' service managers should take every precaution to assure themselves that every member of their service organization understands these instructions. Stock men should likewise point out to purchasers of this part that the gaskets are marked with the word "*front.*"

## SHOCK ABSORBER LINKS

The rubber bushed type of shock absorber link used on "B" and "V-8" cars has proven so superior to the previous design that the "A" shock absorber link has been obsoleted and when present stocks of these old design links are exhausted they will no longer be supplied.

These new links require no lubrication and one or more may be installed on "A" cars without changing the balance of the links.

efficiency. Such a grinder may be secured from the K. R. Wilson Co. of Buffalo, N. Y., with attachments for the eleven, twelve and fourteen inch diameter brakes (see Fig. 7). **When using this grinder the gauge for setting the height should always be used to avoid grinding the lining too deeply.**

Genuine Ford linings only should be used as they have been developed for the Ford car and the Ford brake drum and are manufactured under the most exacting specifications.

### Checking for Dragging Brakes

Many mechanics keep on hand a front and rear hub and drum assembly which has been cut out to permit the use of a feeler gauge between the brake shoe and the drum. This is a very good method of checking for dragging brakes as it removes the human element or guesswork which is necessary when they are checked by feel alone. In using this method of checking a .005" feeler should pass clearly between the lining and the drum at all points.

Chattering brakes are usually caused by either incorrect rod adjustment, oil soaked linings, loose wheel or spindle bearings or brake housing plates loose on the axle.

Squeaking brakes are usually caused by incorrectly ground brake shoes or faulty adjustment of the brake or oil soaked linings.

# CARBURETOR—V-8

The carburetor used on the V-8 cars is of the down draft type particularly adapted to the Ford 8 cylinder engine. The carburetor size is 1¼" with an air capacity ample for even the highest speed operation. The carburetor is made of fine materials manufactured with a high degree of precision which assures an accurately balanced fuel-air mixture at all times, regardless of engine speed, and instant response to foot throttle movement. To properly service or adjust the carburetor, a complete understanding of its operation is essential. Figs. 8 to 10 are diagrams of the V-8 carburetor which will permit the following of the various passages from the float bowl to the carburetor throat from which it is carried to the intake manifold and cylinders.

The carburetor consists chiefly of two units, namely:

1. **The Main Metering Unit** consists of a pair of air valves or vanes, hinged at their upper ends and opening downward to admit air to the mixing chamber. These vanes have fingers which engage a central aspirating tube (see "C," Fig. 11), lowering it as the vanes open. This aspirating tube is attached to a spring-loaded hollow stem carrying the fuel metering orifice in its upper end. An adjustable tapered metering pin projects into this orifice.

2. **The Auxiliary Unit** combines an auxiliary power jet ("A," Fig. 11), an accelerating pump (Fig. 10), and a priming passage for starting. The operation of the auxiliary unit is controlled by the registering of progressively located ports in the starting sleeve which line up with passages in the main body. The starting sleeve rotates with the choke lever; the pump plunger "B," Fig. 11, and piston move downward as the throttle is opened.

### Starting

To start a cold motor in cold weather, the choke control button should be pulled out to its limit and the throttle left in a closed position. This rotates the starting sleeve in the throttle body and lines up the primer passage with a hole in the wall of the starting sleeve, allowing fuel to be drawn into the manifold directly from the float chamber through the pump cylinder and hollow stem of the pump plunger. The throttle button must be in so that a strong suction will be created below the throttle plate to draw fuel through the priming passage.

Actually, the throttle plate will be opened slightly by the kicker rod when the choke button is pulled out, but this action is automatic and allows just enough air to pass the throttle to insure good starting.

In extremely cold weather, starting can be aided by giving several quick strokes of the accelerator pedal after the choke control has been pulled out. By this action the accelerating pump forces fuel through the primer passage into the manifold and so assists starting.

After the motor has started, push the choke control button part way in; the motor will then run on a richer mixture than normal. Experience will show the correct place to set the dash control, which will depend on temperature. As the motor warms up, the dash control should be pushed farther in, and after the motor has become warm the dash control should be pushed in to the limit of its travel.

## OIL LEVEL GAUGES

The bayonet type oil level gauges used on the Ford cars is illustrated in Fig. 77. Three distinct gauges are supplied for service, and it is of extreme importance that the correct gauge be used in each car.

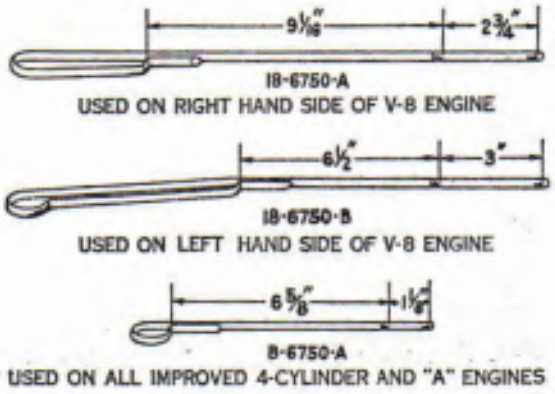



Fig. 77

On the earlier V-8 cars the oil level gauge was at the right side of the motor to the rear. On these motors the gauge 18-6750-A must be used to obtain a true oil level reading.

On the current V-8 engines the oil level gauge is located on the left hand side in a mid position. The gauge 18-6750-B must be used on these engines. Stock men selling these parts over the counter should ascertain from the customer whether the oil level gauge being replaced was located on the right hand or the left hand side, and supply him with the correct part for his particular engine.

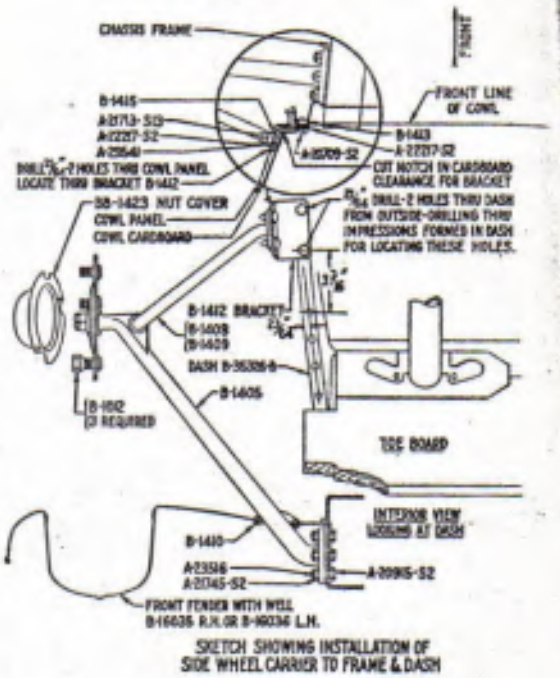
A study of the illustration of the two gauges (Fig. 77) will clearly illustrate why this is of utmost importance.

The gauge B-6750-A at the bottom of the illustration (Fig. 77) is used on production of the improved 4-cylinder engine, and for all service requirements for the improved 4-cylinder and "A" engine.

Dealers should take every precaution necessary to assure themselves that every member of their service organization is able to distinguish between these oil level gauges, as the installation of the incorrect oil level gauge may result in an incorrect oil level being maintained by the owner, with the consequent disastrous results.

## SIDE WHEEL CARRIER INSTALLATION

Well fenders and side spare wheel carriers are easily installed in service. Fig. 78 illustrates a correct installation.




SKETCH SHOWING INSTALLATION OF SIDE WHEEL CARRIER TO FRAME & DASH

Fig. 78

When making this installation be sure to install the B-1412 side wheel carrier support brace bracket and the B-1413 tapping plate as illustrated (see insert, Fig. 78).

On current production two holes are provided in the B-1400 and B-1401 spare wheel carrier flanges for the installation of the BB-1423 nut cover. When installing flanges manufactured prior to the addition of these holes it will be necessary to drill these flanges to accommodate the two A-20413 bolts.

Always install this nut cover to prevent unauthorized removal of the spare wheel.

## ELECTRICAL ACCESSORIES

When installing Cigar Lighters, make the electrical connection from the ammeter terminal nut marked with the letter "A" in Fig. 54 which appeared in the July issue of the FORD SERVICE BULLETIN. This is of extreme importance as when connected to this point the ammeter is not in the circuit and is thereby protected from the heavy amperage draw of the cigar lighter, which may result in the ammeter needle bending.

Should the cigar lighter be installed in any of the lighting circuits, the draw of the cigar

lighter being beyond the capacity of the light fuse, will cause it to burn out.

The B-52900-A De Luxe Coupe cigar lighter can be installed on other closed cars by removing the center screw from the front belt rail finish panel and enlarging the hole slightly.

When installing the B-13303 and B-13302 cowl lamp assemblies in service, the instrument panel lamp wire is disconnected from the dash switch and connected direct to the wire from the lighting switch on the steering column. The dash switch may then be used to operate the cowl lamps. Energy is carried from the ammeter to the dash switch. Fig. 79 illustrates the correct method of mounting the cowl lamps to the cowl.

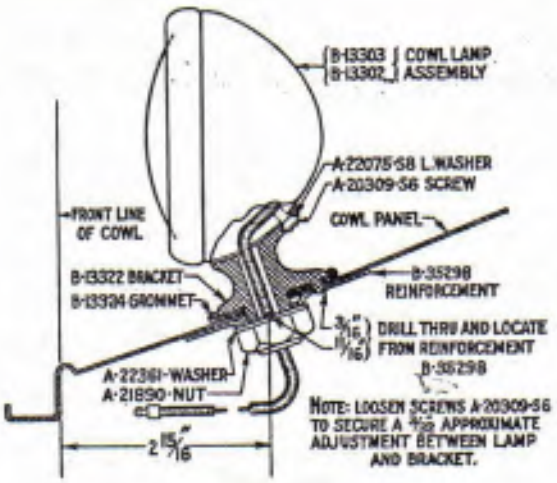
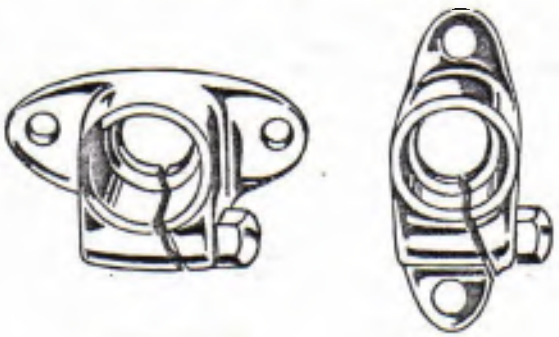



Fig. 79

## SPORTLIGHT BRACKETS

Sportlights which Dealers have in stock can be used by ordering brackets under part Nos. B-18573-A, B-18573-B, or B-18561.



B-18573-B B-18573-A

Fig. 80

B-18573-B sportlight brackets are used for sportlight installations on the De Luxe Coupe B-520. Locate this bracket ½" from front of the door. No template is supplied with this bracket.

B-18573-A SPORTLIGHT BRACKET FOR B45, B50 B55, B160, B190 AND B400 BODIES

Fig. 81

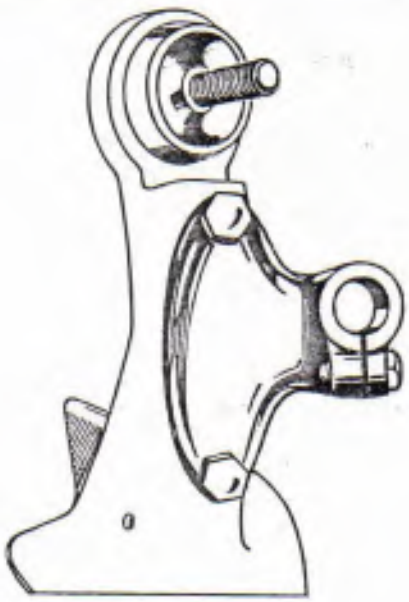
B-18573-A sportlight brackets are used on all of the other closed body types. It is necessary however to rework these brackets slightly for installation on the cabriolet.

B-18573-A SPORTLIGHT BRACKET AFTER GRINDING FOR B68 CABRIOLET

Fig. 82

For sportlite installations on the cabriolet use the B-18573-A bracket (Fig. 81) grinding it flat where its fits the body as shown in Fig. 82. A comparison of Figs. 81 and 82 will point out this change of contour necessary for installation on the cabriolet. A template is furnished with this bracket for locating it.

Fig. 83 shows the B-18561 installation for open cars B-35, B-40.



B-18561

Fig. 83

## CLUTCH PEDAL ADJUSTMENT

When adjusting clutch pedal as outlined on page 33 of the July issue of the SERVICE BULLETIN, make the adjustment so as to obtain 1¼" free movement. Readjust at any time when the free movement becomes less than one inch.

Check this adjustment on all cars coming into your establishment for service or inspection and adjust as outlined above. This is particularly important on new cars and trucks or on cars and trucks in which a new clutch disc has been installed. As the initial wear or burnishing in of the clutch disc decreases the amount of free movement of the clutch pedal.

**Failure to maintain correct clutch pedal adjustment may result in failure of the clutch release bearing.**

## WATER TEMPERATURE GAUGE

A combination fuel and water temperature gauge (see Fig. 84) is now available for sale through service for either V-8 or improved 4-cylinder cars. To install proceed as follows: Drain cooling system, disconnect air line from standard fuel gauge head unit and remove head unit.

Remove the rubber plug from unused hole in dash (**not instrument panel,** see Fig. 85) cut dash insulation in back of hole. Increase the size of this hole to one inch diameter (a round file is satisfactory for this operation). The increasing of the size of this hole is necessary to permit the bulb and nut to pass through the dash.

Uncoil gauge, push bulb and tubing through hole in dash. Next mount gauge in opening left by fuel gauge using special nuts provided and lock washers from removed fuel gauge.

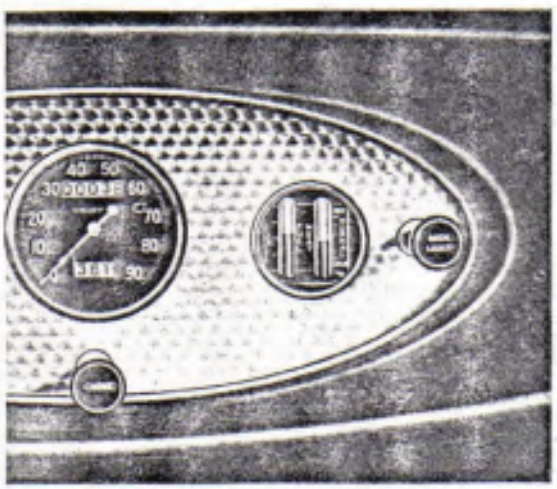


Fig. 84

Remove radiator hose and with sharp knife cut a ⅝" hole in hose 2½" from motor end of hose (see Fig. 85). Wet knife blade for ease in cutting.

Place adaptor in hose (from inside of hose). Secure adaptor and washer in place by screwing adaptor nut down tight, then replace radiator hose and insert bulb in adaptor and tighten down bulb nut. (Loop excess tubing as in Fig. 85.)

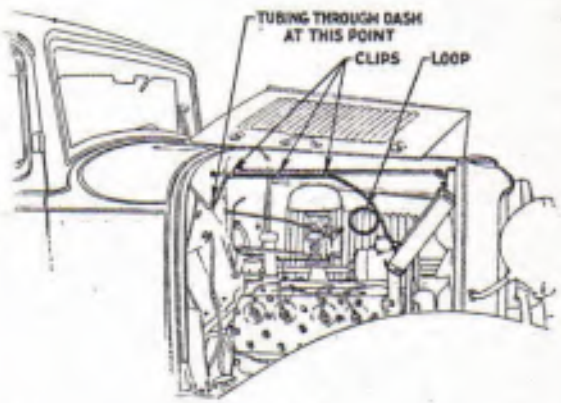



Fig. 85

Clip tubing to tie rod and insert grommet in hole in dash (see Fig. 85).

Remove nut and cone from brass tube at back of fuel gauge and set liquid in indicator to **zero** by adding or removing from **brass** tube. (Use toothpick or match to absorb surplus liquid. If necessary to add liquid to obtain correct reading [zero], take the liquid required from the brass tube of gauge removed.) (Complete fuel gauge service information was given in June issue of Service Bulletin.)

Reconnect air line and bring fuel gauge indicator up to proper reading on passenger cars by disconnecting gas line at fuel pump and blowing back through gas line into gas tank with mouth. (Do not use compressed air.) For trucks driving is best manner to establish reading, turning corners frequently will hasten this action.

Refill radiator, and installation is complete.

## TOOLS

Tools referred to in these Bulletins are available from K. R. Wilson, Buffalo, N. Y., unless otherwise specified. The tool numbers given being the catalog number by which each tool is identified.

# Ford SERVICE BULLETIN

Vol. 13 September-October 1932 No. 4

UNLESS the information contained in these Service Bulletins is absorbed and put to use by the mechanics actually performing the various operations, the Service Bulletin is failing in its purpose.

Last month we suggested periodic meetings to discuss the subjects covered. In these meetings ask questions about the subjects previously covered in the bulletin to assure yourself that every man in your establishment is using the information given.

The following pertinent questions are offered as a suggestion, many others are possible:

| *Question* | *Covered in Bulletin* |
|---|---|
| What is correct spacing for V-8 breaker points | August, Page 46 |
| How is the timing of the spark on the two banks of cylinders synchronized | June, Page 19 |
| How is correct alignment of 4-cylinder engine obtained | June, Pages 23-25 |
| What is correct generator charging rate | June, Page 16 |
| What is correct clearance for "A" exhaust valve | August, Page 43 |

# FITTING PISTON PINS

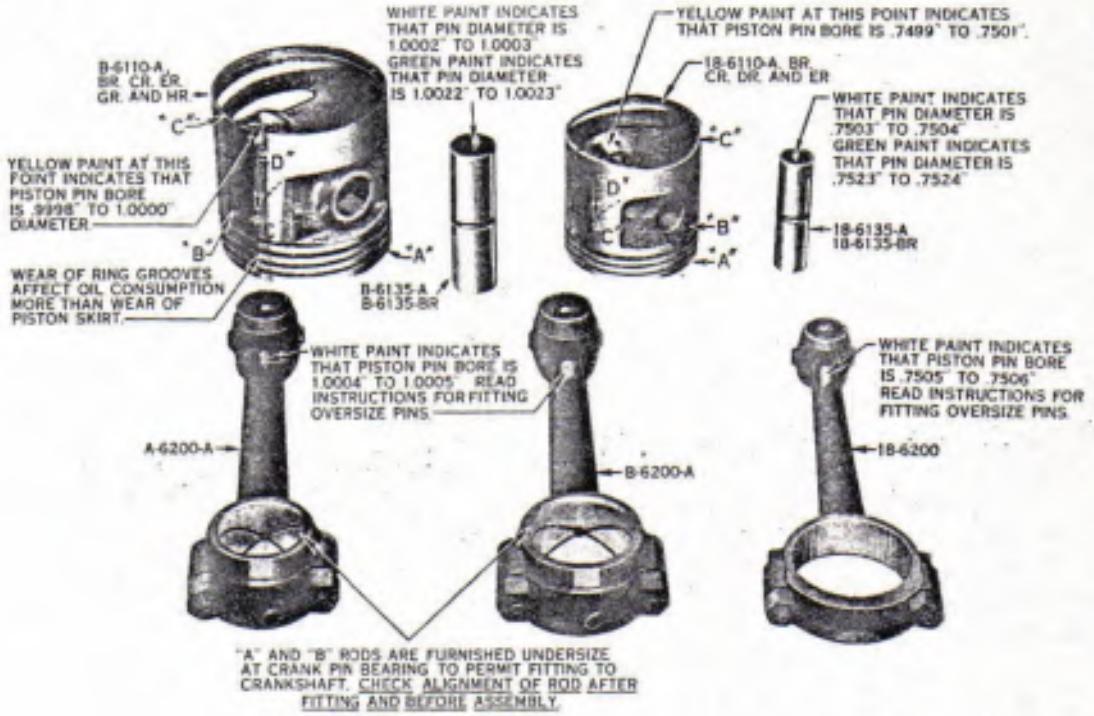



Fig. 86

The piston pin arrangement in the connecting rod is such that a .0002" to .0004" clearance is desired. With this clearance an ample film of oil covers the bearing at all times, yet a maximum amount of wear is possible before the bearing becomes noisy in operation.

The piston **pins are fitted in the piston with a slight shrink fit** so that when the piston is cold, the pin is held in a fixed position; in operation when the piston has become heated to a temperature equal to the temperature used in establishing the shrink fit in assembly, the pin is freed and a longitudinal movement is possible, thus permitting the wrist pin bearing to align itself to compensate for expansion of the crankshaft, etc. It, therefore, is extremely important that when fitting the piston pin to the piston, that a temperature not in excess of boiling water be used. **The piston pin should push into the piston with a slight drag, after the piston has been expanded** by immersion in boiling water for one minute, or by heating for one minute in the K.R.W. thermostatically controlled piston heater adjusted to a temperature not greater than 200 degrees. The pin should be held in a fixed position when the piston has become cold and the bore has contracted.

**Never attempt to install or remove piston pins without first heating the piston.**

The extremely fine limits on the various parts making up the assembly are actually much finer than are practial in the manufacture of these parts. For this reason we have developed a selective assembly plan in production, in which parts having a possible manufacturing limit of .0003 of an inch are separated into three distinct groups or in steps of .0001" each. All other parts forming the assembly are likewise separated into three groups. In this manner it is possible to make the assembly with three times the accuracy possible without this selective assembly plan.

The diameters of the piston pin, piston pin bore in the connecting rod, and the piston pin bore in the piston are calibrated in a glass enclosed room where a temperature of exactly 70 degrees is maintained which permits each of these parts being measured under the same temperature conditions, assuring the accuracy of the measurements.

Starting immediately, parts comprising this

assembly supplied for service will be selected from one of these three groups, thus reducing the limit on piston pins as supplied for service from .0003 inch to .0001 inch.

The piston pin bore in connecting rods as supplied for service will have a tolerance of .0001 inch as compared to .0003 inch, as was formerly supplied.

Due to the fact that the various oversize pistons are not used in production, the possibility of separating these parts into groups is removed. For this reason the limit on the piston pin bore in the piston as supplied for service will be .0002 inch.

Fig. 86 illustrates the various parts affected by this change in tolerances as well as gives the dimensions in which these parts in the future will be supplied.

Under this plan, any piston pin may be assembled with any connecting rod and any piston, yet even when extreme limits of tolerances are encountered, the pin will be within the specified limits for clearance or shrink fit. This will save considerable time when making this assembly and will assure a correct assembly and customer satisfaction.

To assist dealers in readily identifying these parts, each of the parts are marked with paint as shown in the illustration—see Fig. 86.

Dealers can best take advantage of the saving in labor and the increased customer satisfaction possible through this arrangement by keeping stocks of these parts separated, using unmarked stocks first. **It will be necessary for mechanics to select piston pins to fit the piston or rework the piston to fit the piston pin until unmarked stocks are exhausted.**

## Oversize Piston Pins

The necessity for the installation of an oversize piston pin is an indication of wear in the piston pin bearings, and the piston pin bores of the piston and connecting rod must be reworked to assure the roundness of the hole and the permanence of the piston pin fit.

Piston pins are supplied in standard size and .002 inch oversize. The limits on these .002 inch oversize pins have likewise been reduced, thus simplifying the installation.

When installing these oversize piston pins in the piston, a correct fit is obtained when the piston pin bore in the piston has been reworked to a diameter of 1.0018 inch to 1.0020 inch for the 4-cylinder engine and to .7519 inch to .7521 inch for the V-8 engine. A four diameter double end go and no-go plug gauge, to be used for installing the .002 inch oversize pin on either piston is being developed and will be available from K. R. Wilson, Buffalo, in the immediate future. A plug gauge is not required for fitting the oversize piston pin to the connecting rod, as the correct clearance can be arrived at by "feel."

The best method for obtaining the correct fit between the connecting rod and piston pin is as follows:

Assuming that the retainer ring is not binding (establish the fit before installing the retainer), when the piston is grasped in the two hands the **weight of the connecting rod should allow it to drop turning on the piston pin.** This will show you that the fit is not too tight. By grasping the connecting rod, the weight of the piston should not be enough to allow it to turn on the piston pin. This will show you if the pin is too loose in the connecting rod.

## AIR CLEANER

An oil bath type air cleaner, B-9625, is now available through service for installation on the improved 4-cylinder Chassis. The cleaner proper is identical with the BB-9625 air cleaner as described on Page 38 of the July bulletin. For obvious reasons, however, the method of mounting on the B Chassis differs. Fig. 87 illustrates the method of mounting this new cleaner to the forward side of the dash. A study of this illustration will indicate what constitutes correct installation.

When installing this cleaner on cars equipped with the B-6850 speed governor (see Page 39 of July Bulletin) the difference in the position of the carburetor is taken care of in the upper rubber hose connection as indicated by the dotted line (see Fig. 87).

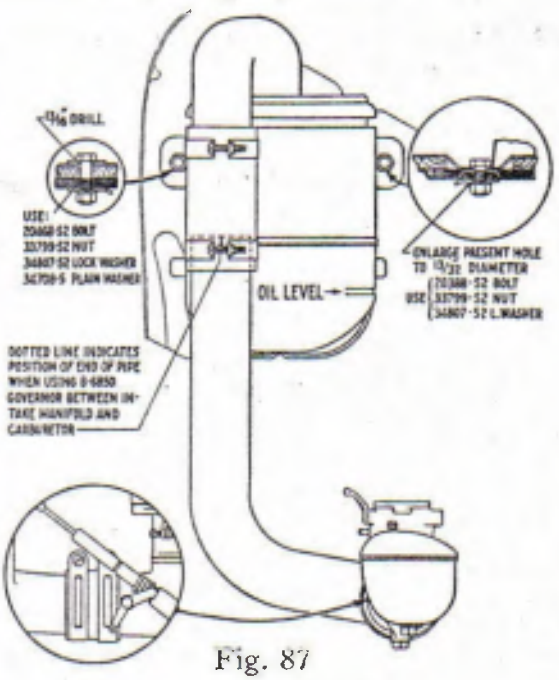



Fig. 87

# HIGH TENSION TEST SET

In the August Service Bulletin on pages 46 and 47, mention is made of leakage of the high tension current caused by the presence of a carbon path having burned its way into either the rotor or the distributor cap or terminal plate. The presence of this carbon path or "leakage" of the rotor or cap due to a breakdown of the insulating material is quite often very difficult to locate as the short is not always continuous, often being noticeable only when the cylinder is under maximum compression.

A simple inexpensive test set as illustrated in Figs. 88 and 89 can easily be built with materials you now have by means of which a positive test of the parts under doubt can be made.

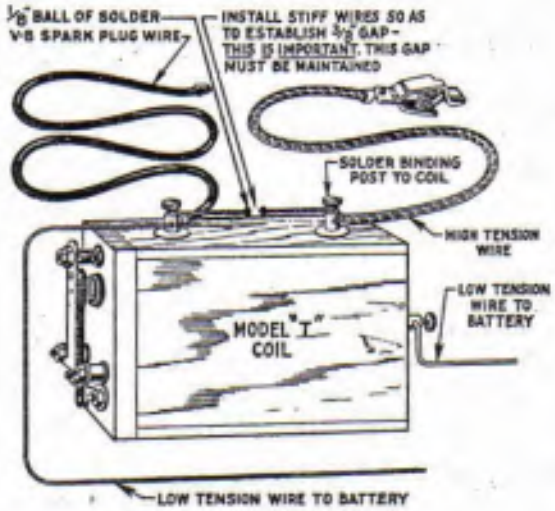



Fig. 88

**To make the set, proceed as follows:** Solder three binding posts to a Model T ignition coil (see Fig. 88).

Solder two lengths of stiff wire between the two posts on the side of the coil as shown in illustration (Fig. 88), establishing a permanent gap of ⅜" as shown. This is extremely important as this permanent gap acts as a safety valve and prevents the coil from becoming damaged due to the building up of extremely high voltage. These wires must not contact the surface of the coil. A ⅛" ball of solder at gap end of each of these wires is necessary.

Secure two high tension and two low tension wires to the coil as illustrated.

Next secure a piece of metal approximately ⅜" x 2" x 4½" as shown in Fig. 89. Drill and tap this plate in the center and install a piece of rod approximately 4" long in this hole as

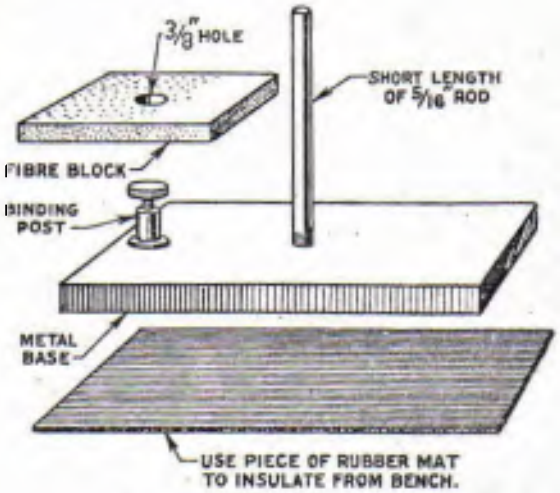



Fig. 89

shown in the illustration. Install a binding post at one end of plate. A piece of floor mat or other suitable insulator will be required to insulate this metal base from the bench. Do not attempt to mount the rod directly into the bench top as the bench will act as a condenser and make the test unreliable. A block of fibre or other suitable insulator as shown in the illustration (see Fig. 89) is also required.

**To Test the Rotor, Proceed as Follows:** In cold weather the temperature of the part to be tested should be brought up to at least room temperature. Place the plate (Fig. 89) on the piece of rubber matting and the fibre block around the pin. The rotor in question is then slipped over the pin, the bore of the rotor must **not** touch the rod at any point.

Connect the two primary leads to a storage battery and secure the high tension lead having the clamp (see Fig. 88) to the binding post

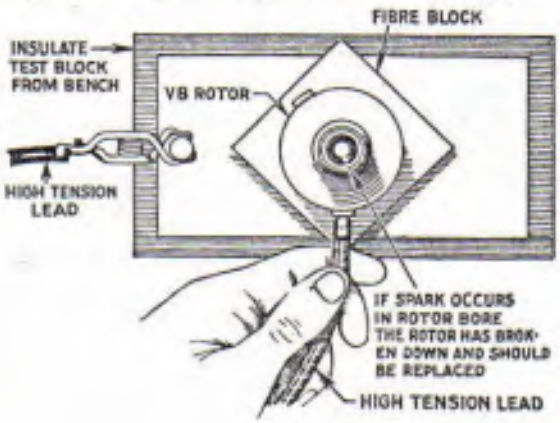



Fig. 90

on the plate (Fig. 89). The other high tension lead is then touched to one of the rotor points. If the insulating material has broken down a spark will occur between the rod and the bore of the rotor as shown in Fig 90.

If the rotor passes this test satisfactorily it should be then given a surface test as follows: Clip one of the high tension wires to one of the rotor points as shown in Fig. 91. The other high tension wire should then be passed quickly over the surface of the rotor, being careful not to actually touch the surface of the rotor. Failure to take this precaution may result in the formation of a carbon path, the very thing which you are trying to detect. **Duration of surface test should not exceed 30 seconds.**

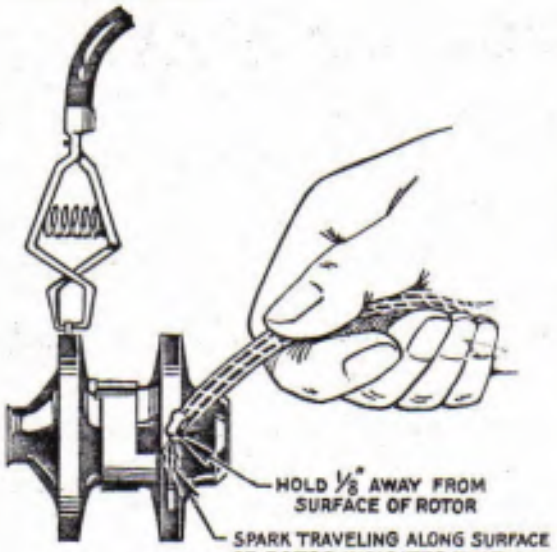



Fig. 91

In case of surface leakage, a spark will jump from this high tension wire to the surface and follow along the surface to the band at the center of the rotor or the rotor point as shown in Fig. 91.

If surface leakage is indicated by this test the rotor should be replaced for while it is sometimes possible to make a temporary repair by scraping the surface with a knife or other sharp instrument, such repairs in nearly every instance are unsatisfactory and should not be practiced by Ford dealers. The scraping of the material will decrease the dielectric strength of the material in which the moulding crust is very valuable.

**To test the distributor cap** or terminal plate, proceed as follows: Insert the V-8 spark plug wire (see Fig. 92) into one of the sockets in the terminal plate. Next touch the other

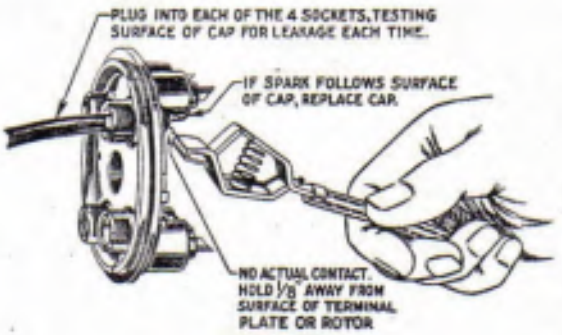



Fig. 92

high tension lead to each of the other three electrodes (opposite side of terminal plate). If a heavy spark occurs, it is an indication of a breakdown of the insulating material and the terminal plate must be replaced. Make this test in all four of the spark plug wire sockets.

To test the terminal plate for surface leakage, proceed in the same manner as with the rotor. It, however, will be necessary to insert the spark plug wire into each of the spark plug wire sockets in the terminal plate, testing the surface of the terminal plate on both sides while the wire is in each of these sockets. Make test quickly, **duration of test should not exceed 30 seconds.**

In nearly every instance failures of these parts are directly traceable to the fact that at some time one of the spark plug wires has been disconnected either from the terminal plate or from the spark plug as described on pages 46 and 47 of the August Service Bulletin and for this reason it is extremely important that dealers make every effort to assure themselves that each member of their organization fully understands the possible damage which may result from an incomplete high tension circuit, taking every precaution necessary to assure themselves that each member of their organization will use extreme care when installing the distributor terminal plate and covers to the distributor body.

## OVERSIZE CAMSHAFT GEAR

A new .004" oversize camshaft gear, B-6256-B, has been released for service in units the crankshaft gear of which have become worn to such a degree as to make it impossible to obtain the maximum of .004" back lash as specified.

Dealers' service managers should advise all mechanics working on Ford cars in their establishments that this oversize gear is now available and will, in many instances, correct timing gear noise on engines, the crankshaft gear of which has become worn sufficiently to prevent a satisfactory installation with the standard gear.

## RUMBLE SEAT INSTALLATION IN DE LUXE COUPE

Rumble seats can easily be installed in the B-520 De Luxe Coupe in service. Fig. 93 illustrates the first step in making the installation, clearly pointing out the parts to be removed. The B-52600-A deck door assembly can not be used and must be replaced with B-52600-B deck door assembly (with rumble seat).

Fig. 94 illustrates the parts to be added and points out the method of attaching.

Fig. 95 illustrates the mounting of the deck door remote control.

A study of these illustrations and the keeping of them readily available when making the installation, will save considerable time and will avoid confusion when making the installation.

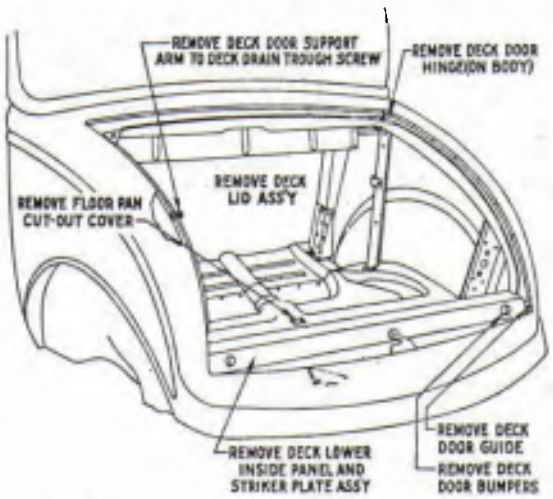



Fig. 93

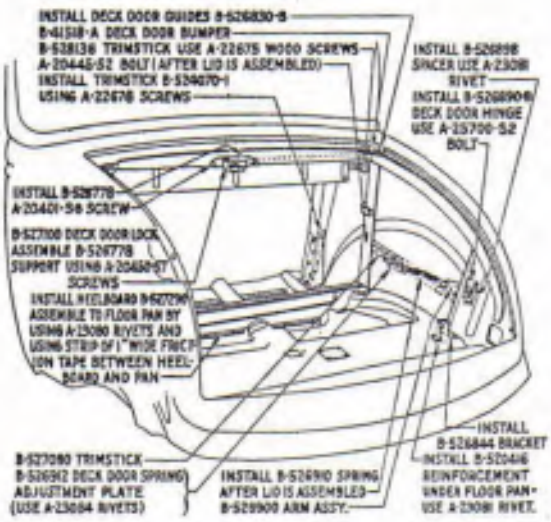



Fig. 94

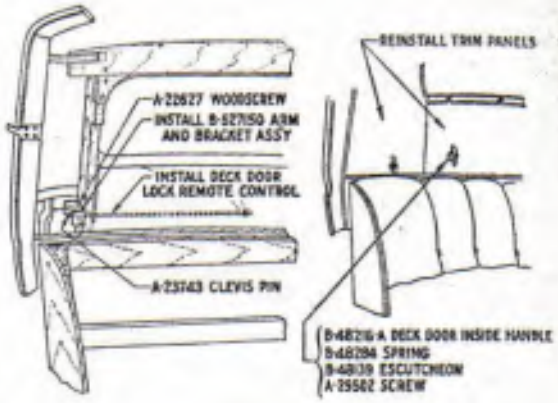



Fig. 95

## SPECIAL WATER PUMP LUBRICANTS

Many special water pump lubricants are now on the market and are no doubt being offered to Ford dealers for use in the water pumps of the Ford Cars and Trucks. As specified in the June issue of the Ford Service Bulletin, pages 24 to 28 inclusive, special lubricants are not required for the water pump on any of the Ford Cars or Trucks. The use of pressure gun lubricant is recommended for these water pumps.

The water pumps (both 4-cylinder and V-8) were designed to use pressure gun lubricants which melt at temperatures below the temperatures reached by the water in the cooling system and offer little resistance to the flow of the water should any find its way into the cooling system, whereas many of these special water pump lubricants have a melting point considerably higher than the maximum water temperature which permits such surplus as is forced into the cooling system to lodge in the radiator tubes, effectively blocking them.

While there is little objection to the use of these stiff water pump lubricants in the 4-cylinder water pumps, these same special water pump lubricants when used in the V-8 water pump offer sufficient resistance to the coiled packing spring as to impair its action, often resulting in the water pump leaking. Dealers should check their lubrication departments and assure themselves that they are not using a lubricant unsuited to the Ford water pump when a less expensive lubricant which they already use in quantity is more desirable than these more expensive lubricants.

# DRIVE PINION BEARING SLEEVE

A proper assembly of the Rear Axle Drive Pinion Bearing Sleeve is accomplished in the following manner:

The housing should be heated sufficiently to expand the bearing sleeve neck. A suitable fixture, V-61, has been developed and is now available which when used in conjunction with a blow torch is entirely satisfactory for this operation (see Fig. 96).

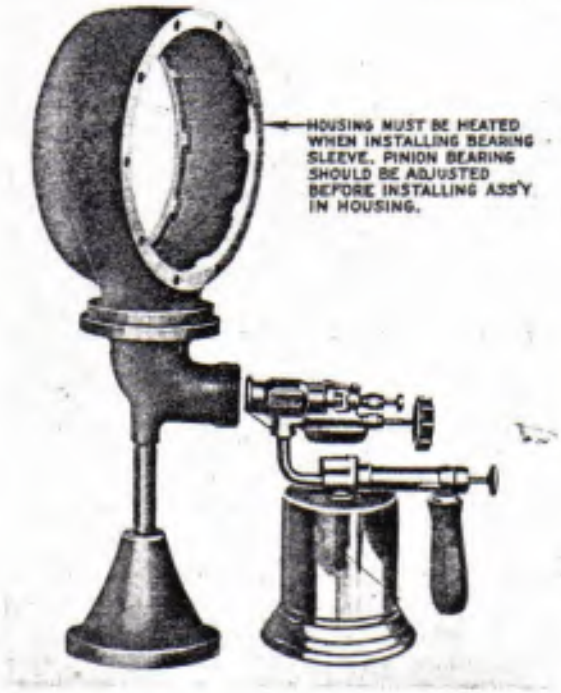



Fig. 96

When assembling the bearing sleeve to the heated housing, the drive pinion bearing and bearing sleeve should be assembled to the propeller shaft and the assembly slipped as a unit into the differential housing. (A light film of gear lubricant over the outer surface of the bearing sleeve will assist in the installation).

When the bearing sleeve has been removed from the differential housing make the pinion bearing adjustment before re-assembling.

**To test the adjustment** use a towel to prevent the bearing sleeve slipping in the hand. If the adjustment is too tight the sleeve can not be turned. If too loose it can be turned with the use of a towel. In "inch pounds" the effort required to turn the sleeve amounts to 22 to 34 pounds.

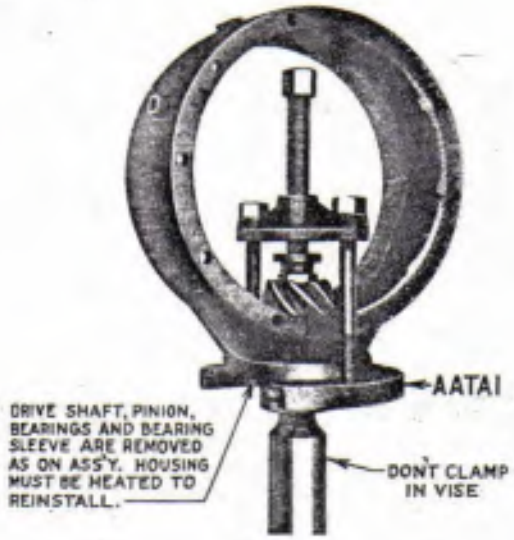



Fig. 97

## To Remove the Differential Pinion Bearing Sleeve

When for any reason it is necessary to remove the differential pinion bearing sleeve, the

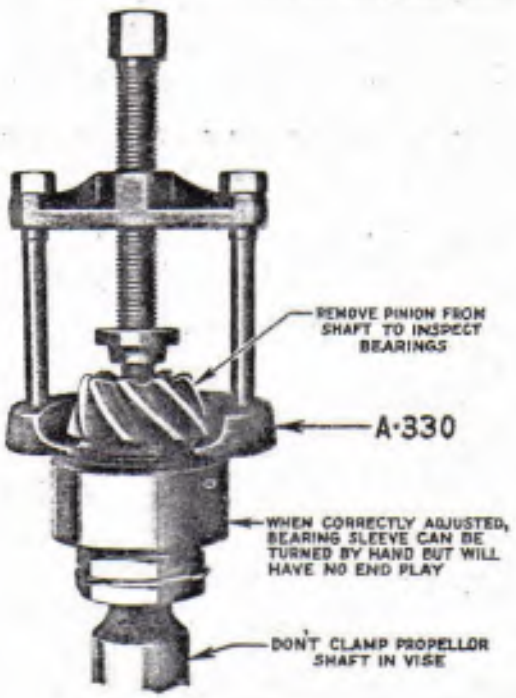
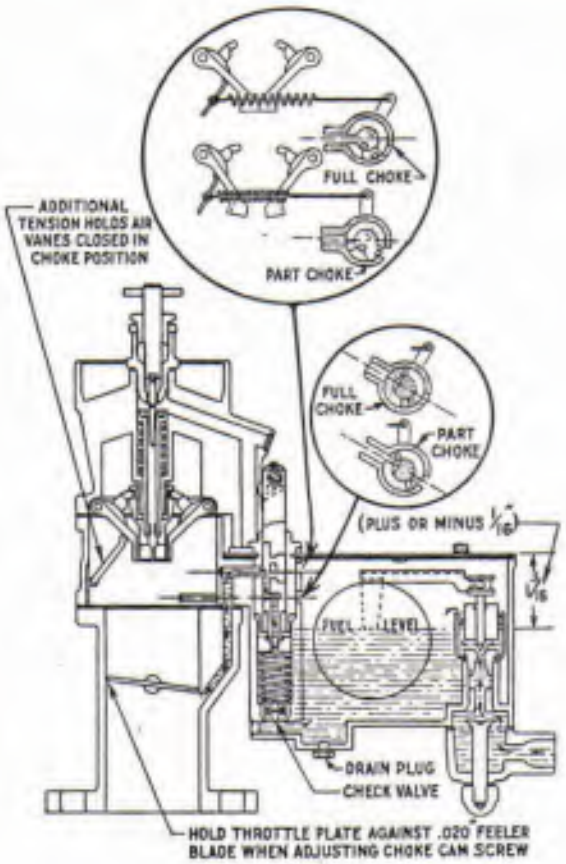



Fig. 98



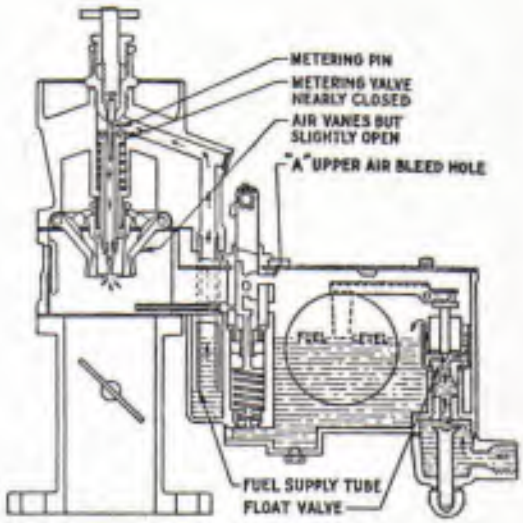

STARTING
Fig. 8

If the motor fails to start, check the position of the choke lever and see that the choke lever stops tight against the stop on the float bowl cover.

## Normal Running

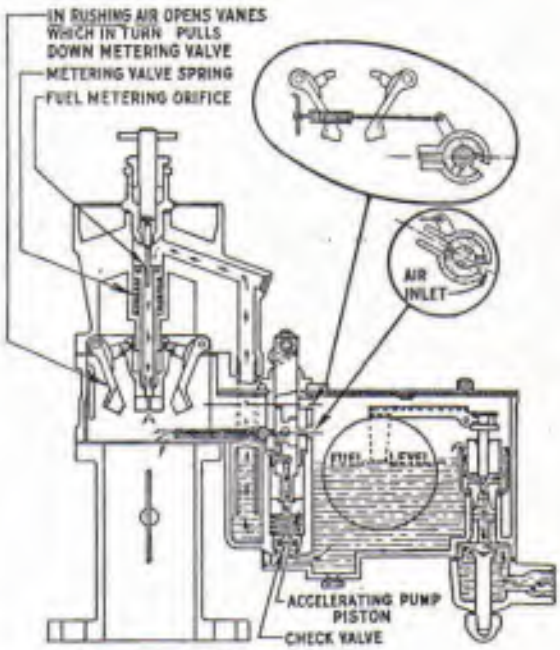
Fuel enters the carburetor float bowl through the strainer and float needle valve, and is maintained at constant level by the float and float needle valve. This level of fuel should be 1⅛ inches to 1¼ inches below top of float bowl casting. (See Fig. 8.)

Air enters the carburetor through the air inlet and opens the vanes as it passes downwards into the mixing chamber. The load of the metering spring on the metering valve connected directly to the vanes, causes a partial vacuum to exist in the mixing chamber which draws fuel from the aspirating tube "C," (Fig. 11). The quantity of fuel flowing is controlled by the tapered metering pin; at idle speed the vanes are closed and the metering pin




NORMAL RUNNING
Fig. 9

almost fills the orifice in the air valve piston. As the vanes lower to admit more air, the metering valve also lowers, and the metering orifice becomes larger due to the taper of the metering pin. This combination maintains the correct ratio of fuel and air for average running.




MAXIMUM POWER
Fig. 10

propeller shaft, drive pinion and bearing sleeve should be removed as an assembly. This is easily accomplished by the use of the AATA-1 Tool as shown in illustration (see Fig. 97). This method is preferable over the use of the A-329 Tool which was developed for this operation on the "A" cars. (It is not possible to use the A-329 Tool on the "B" axle due to the tubular propeller shaft.)

If disassembly is to be made without the removal of the bearing sleeve, the propeller shaft nut should be removed, and the propeller shaft removed from the taper of the drive pinion in the same manner as shown in Fig. 97 with the exception that Fig. 97 shows the propeller shaft nut in place.

The bearing adjusting nuts are then removed and the drive pinion and bearing cone are easily slipped out of place.

The A-330 Tool as shown in Fig. 98 is used for removing the propeller shaft when the propeller shaft, pinion, pinion bearing and bearing sleeve have been removed from the housing as an assembly.

## OIL LEVEL GAUGES

To establish a higher minimum oil level in V-8 engines a change has been made in the 18-6750-B oil level gauge as follows: the dimension from the bottom of the "F" to the bottom of the "L" marks on the gauge has been changed from 3″ to 2″.

The three types of oil level gauges supplied for service were illustrated in Fig. 77 of the August Service Bulletin. In this illustration the dimension between the "F" and "L" marks was given as 3″ for the 18-6750-B oil level gauge. On future shipments this dimension will be 2″. The 6½″ dimension as shown in Fig. 77 of the August Bulletin remains unchanged and this dimension should be ample to serve as a means of identification when endeavoring to distinguish between the 18-6750-B and the 18-6750-A gauges.

Any 18-6750-B gauges in dealers' stock, measuring 3″ from the bottom of the "L" to the bottom of the "F," should be returned to the branch.

It may be advisable to make a marginal note in your copy of the August Service Bulletin alongside of Fig. 77 to the effect that the 3″ dimension has been changed to 2″ on the 18-6750-B oil level gauge.

No change has been made in the 18-6750-A gauge.

## VACUUM BRAKE SPRING

In the August Service Bulletin on Page 46 announcement of the improvement in the centrifugal governor of the V-8 distributor were given along with a means of identification (see Fig. 71). The difference in the spark advance characteristics of these improved distributors as compared with the former type necessitate the use of a vacuum brake spring of different tension. Two types of vacuum brake springs will be carried for service, as follows:

The 18-12225-AR vacuum brake spring used on distributors manufactured prior to the improvements in the centrifugal governor as outlined on Page 46 of the August Service Bulletin (identified from distributors in which the improvements were incorporated by the *absence* of the graduations on the adjusting screw plate—see Fig. 71). These springs can be identified by the cadmium plating.

The 18-12225-B vacuum brake spring is used exclusively on the new distributor and can be readily distinguished from the 18-12225-AR springs as they are not cadmium plated.

Dealers' stock men when selling this part over the counter should make every effort to assure themselves that they are supplying the correct part for the distributor in question.

## COMPRESSION GAUGE

A compression gauge A-429 for testing the compression on Ford Cars or Trucks is now available.

When testing compression on either 4-cylinder or 8-cylinder cars it is important that **all** of the spark plugs be removed before attempting to make the test. The gauge is then installed and the engine is turned over by means of the **starter.** A notation is then made of the compression of each cylinder. It is extremely important that all the spark plugs be removed before making the test. Usually a variation in compression less than 5 pounds will not noticeably affect the operation of the engine.

## FAN BELT ADJUSTMENT

Many cases of overheating of the V-8 engine have been found to be directly traceable to loose fan belt adjustment, and as the initial stretching of the fan belt takes place within the first several hundred miles it is extremely important that **the adjustment of the fan belt be included in the 300 mile inspection** given to new cars. When correctly adjusted the fan belt will have not over 1″ total movement as shown in Fig. 99. The belt should be grasped between the thumb and finger and pulled out to take up all slack, then pushed in. The total movement should be 1″; if incorrect, adjust as required.

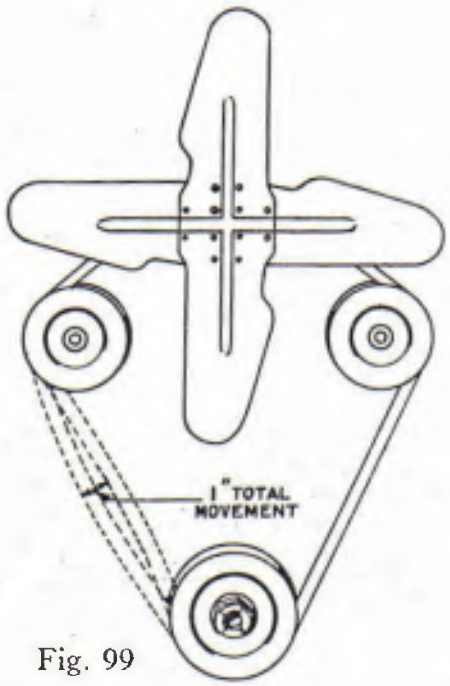



Fig. 99

The adjustment is made by loosening the generator support to engine clamp bolt and moving the generator upwards by turning the adjustment nut. (Use a spanner wrench when making this adjustment.)

## TRUCK DIFFERENTIAL

To better preserve the alignment between the two halves a change has recently been made in the "BB" differential case and the BB-4216 bolt as illustrated in Fig. 100.

In the new design the body of the bolt acts as a dowel, holding the two halves in perfect alignment. A study of Fig 100 will clearly illustrate this. Under no circumstances should the old design differential case bolt, which is 2½" long, be used in the new design differential cases and due to the increased length of the new design bolt, they cannot be used in the old design cases.

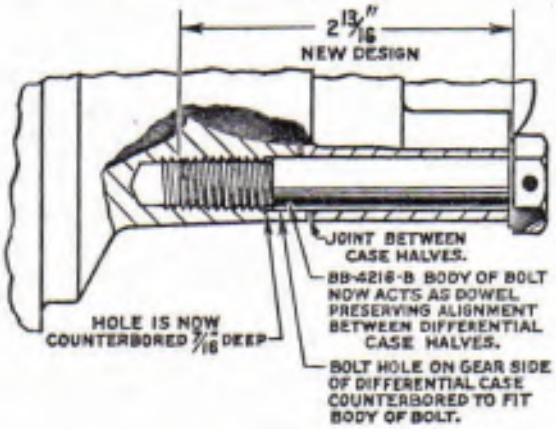



Fig. 100

## TRUCK UNIVERSAL JOINT LUBRICATOR

To better distribute the lubricant around the rear universal joint on the Truck Chassis the universal joint lubricator fitting location has been changed from the front end of the torque tube to the coupling shaft housing support, rear, as illustrated in Fig. 101.

Dealers' stock men and mechanics must keep this change in mind when servicing these parts. When installing a torque tube without the lubricator fitting at the front end, in a unit formerly equipped with a lubricator fitting at this point and having no lubricator fitting on the coupling shaft housing rear support, it will be necessary to drill and tap the torque tube for a lubricator fitting as shown in Fig. 101.

The coupling shaft rear housing support having the lubricator fitting may be used with torque tube assemblies either with or without the universal joint housing lubricator fitting. However, assemblies should never be made without a lubricator fitting at either the front end of the torque tube or the coupling shaft rear housing support.

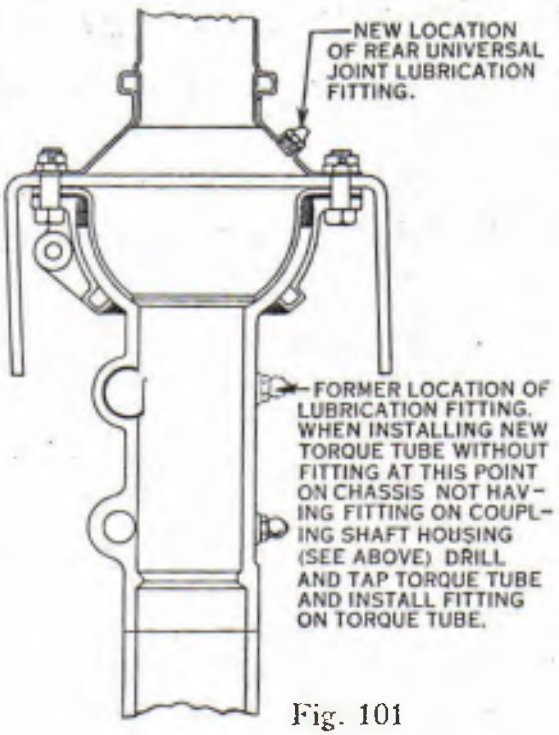



Fig. 101

# V-8 CARBURETOR

Consistent with the Ford policy of constant improvement of its products, several changes have been made in the V-8 carburetor since its inception.

The following is a brief outline of such of the changes as affect the servicing of the carburetor. The letter stamped on the float bowl cover designates the month of manufacture, "A" representing January, "B" representing February, etc. The first two figures following this letter represents the year. Hence the carburetor shown in Fig. 106 being marked H32907 was manufactured during August, 1932.

On carburetors manufactured prior to April 6th, the 18-9578 kicker (see Fig. 104) was made of a round rod instead of the flat stamping as shown in the illustration. On these carburetors, it is possible to assemble the accelerating pump piston plunger in a reverse position. Mechanics should use extreme care when assembling these parts on early carburetors. (It is not possible to assemble the later type plunger incorrectly.)

Approximately April 8th, a ratchet was added in the float bowl cover for the starting lever so as to prevent the flexing of the motor on its mountings from changing the choke lever position as set at the dash control.

Approximately April 14th this ratchet was removed from the float bowl cover and was incorporated in the float bowl body.

Approximately April 19th the diameter of the accelerating pump piston was increased to 5/8". This improvement is not adaptable to previous carburetors (see Fig. 104).

The next change affecting service was made approximately May 26th at which time a spring loaded metering pin packing gland was adopted. No change was made in the metering pin proper and this new part is adaptable to all previous carburetors as shown in the illustration (see Fig. 104). These new spring loaded packing glands are highly efficient in the elimination of air leaks at this point.

At this same time, a change in the float bowl assembly was made, including a change in the float valve (see Fig. 104), the float bowl drain plug, and, due to the effectiveness of the screen in the fuel pump, the carburetor inlet body and inlet screen were removed (see Fig. 104).

During the month of August a baffle was added to the float bowl cover to prevent undesirable gas fumes in the car as a result of the surge of the fuel in the float bowl, permitting a quantity of the fuel to escape through the float bowl vent. This change has been

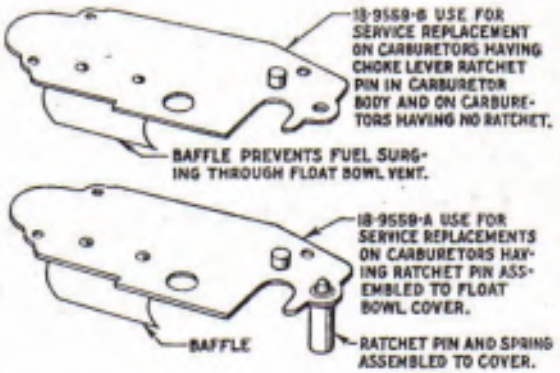



Fig. 102

incorporated in all float bowl covers as supplied for service. Two types of covers are available as shown in Figs 102 and 104.

## Cleaning and Disassembling

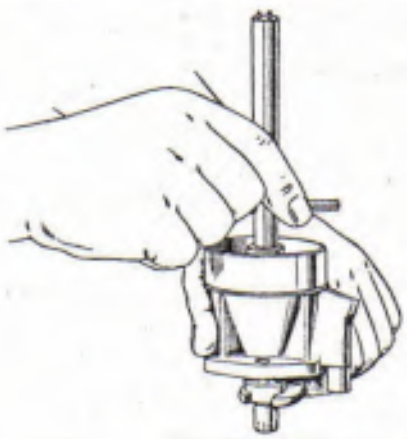
The carburetor can be disassembled for cleaning or repairs as follows:

First, remove metering pin assembly so that the metering pin cannot be damaged by being jammed into the orifice when the air vanes are removed.

Lift off the upper body by removing two cap screws. Remove vanes from upper body by lifting hinge pins from slots in body.

To remove the aspirating tube and metering valve, a special spanner wrench V-71 must be used to turn the metering valve, while the aspirating tube is held with a wrench on the flats provided as shown in Fig. 103.

It should be seldom necessary to remove metering valve and aspirating tube, as long as these parts move freely up and down it is



REMOVING METERING VALVE

Fig. 103

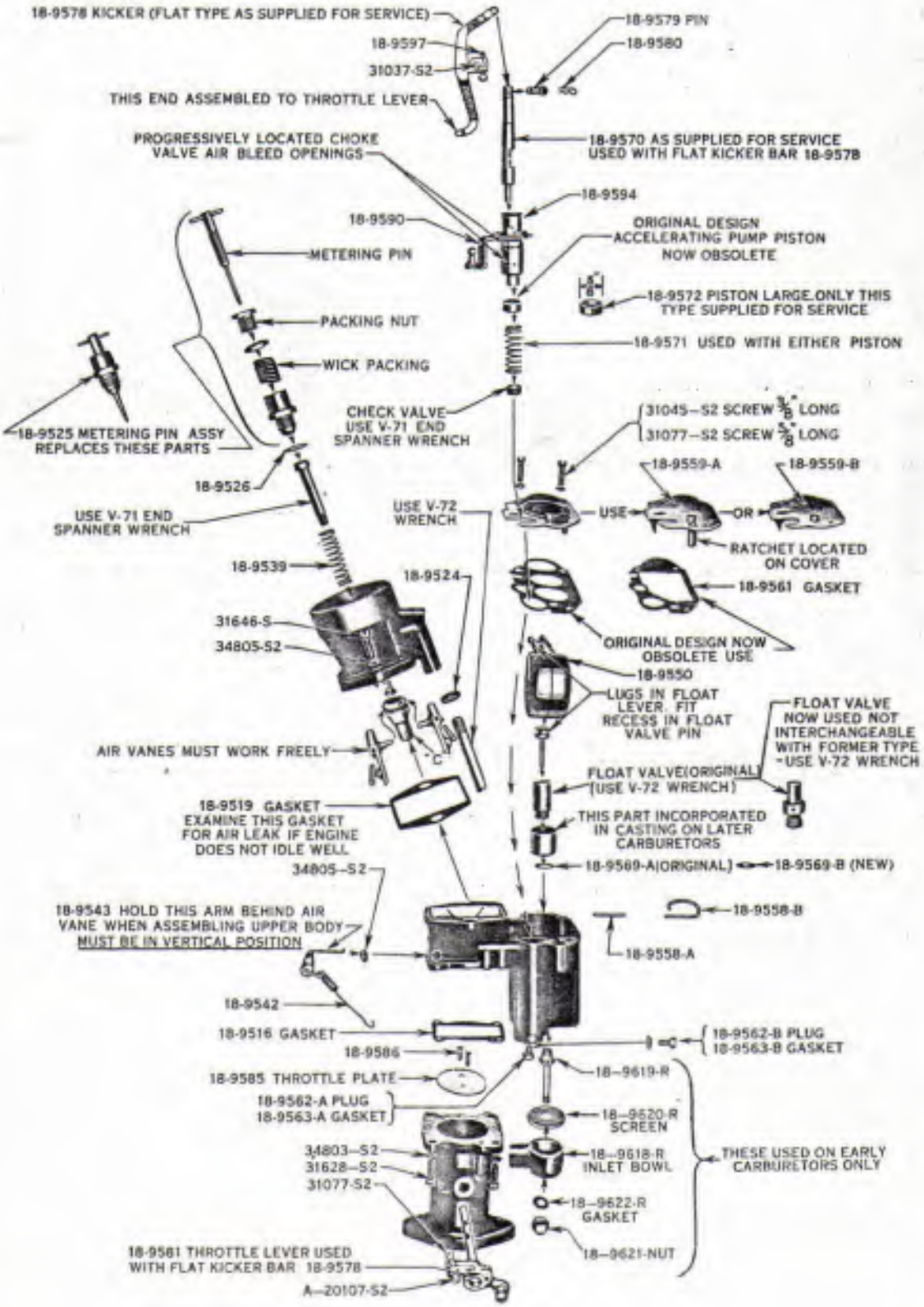

18-9578 KICKER (FLAT TYPE AS SUPPLIED FOR SERVICE)
18-9597
31037-S2
THIS END ASSEMBLED TO THROTTLE LEVER
18-9579 PIN
18-9580
PROGRESSIVELY LOCATED CHOKE VALVE AIR BLEED OPENINGS
18-9570 AS SUPPLIED FOR SERVICE USED WITH FLAT KICKER BAR 18-9578
18-9594
18-9590
METERING PIN
ORIGINAL DESIGN ACCELERATING PUMP PISTON NOW OBSOLETE
18-9572 PISTON LARGE.ONLY THIS TYPE SUPPLIED FOR SERVICE
PACKING NUT
18-9571 USED WITH EITHER PISTON
WICK PACKING
CHECK VALVE USE V-71 END SPANNER WRENCH
31045-S2 SCREW 3/8" LONG
31077-S2 SCREW 5/8" LONG
18-9525 METERING PIN ASSY REPLACES THESE PARTS
18-9526
18-9559-A
18-9559-B
USE V-71 END SPANNER WRENCH
USE V-72 WRENCH
USE
OR
RATCHET LOCATED ON COVER
18-9539
18-9524
18-9561 GASKET
31646-S
34805-S2
ORIGINAL DESIGN NOW OBSOLETE USE
18-9550
LUGS IN FLOAT LEVER FIT RECESS IN FLOAT VALVE PIN
FLOAT VALVE NOW USED NOT INTERCHANGEABLE WITH FORMER TYPE USE V-72 WRENCH
AIR VANES MUST WORK FREELY
FLOAT VALVE(ORIGINAL) (USE V-72 WRENCH)
18-9519 GASKET EXAMINE THIS GASKET FOR AIR LEAK IF ENGINE DOES NOT IDLE WELL
THIS PART INCORPORATED IN CASTING ON LATER CARBURETORS
18-9569-A(ORIGINAL)
18-9569-B (NEW)
34805-S2
18-9543 HOLD THIS ARM BEHIND AIR VANE WHEN ASSEMBLING UPPER BODY MUST BE IN VERTICAL POSITION
18-9558-B
18-9558-A
18-9542
18-9516 GASKET
18-9562-B PLUG
18-9563-B GASKET
18-9586
18-9585 THROTTLE PLATE
18-9619-R
18-9562-A PLUG
18-9563-A GASKET
18-9620-R SCREEN
34803-S2
31628-S2
31077-S2
18-9618-R INLET BOWL
THESE USED ON EARLY CARBURETORS ONLY
18-9622-R GASKET
18-9621-NUT
18-9581 THROTTLE LEVER USED WITH FLAT KICKER BAR 18-9578
A-20107-S2

Fig. 104

best not to remove them unless they require cleaning, however if these parts are removed make sure that they are handled carefully and that the 18-9539 spring is not tampered with and the small disc jet is not lost.

The starting sleeve and float mechanism may be removed by loosening the four throttle body screws and sliding throttle body out from under carburetor. Then lift throttle body so as to remove pump plunger from starting sleeve.

Loosen the three float cover screws and starting sleeve will slip off with the cover. Two of the float cover screws act as retaining screws for the float hinge pin 18-9558-A used on the earlier carburetors (see Fig. 104), so this pin can now be removed. On the later carburetors using the 18-9558-B pin (see Fig. 104) the pin is retained by the cover.

REMOVING FUEL SUPPLY TUBE WITH V-72 WRENCH

Fig. 105

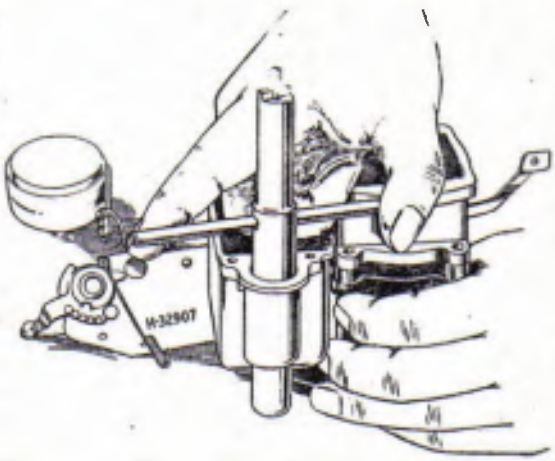
Two special wrenches V-71 and V-72 are required to completely disassemble the V-8 carburetor (see Figs. 103 to 106).

Wash the disassembled parts in gasoline and dry with compressed air. **Never use any sort of abrasive such as a file or emery cloth for cleaning the moving parts.**

## Reassembling

Always use new gaskets throughout when reassembling the carburetor. This is particularly important on carburetors originally equipped with the black surfaced asbestos gaskets which have been discontinued and are replaced by treated brown paper gaskets.

Reassemble the float and needle valve and put on cover, holding starting sleeve in place. On the earlier carburetors be sure that the



REMOVING FLOAT VALVE WITH V-72 WRENCH (USE OPPOSITE END FOR EARLY DESIGN)

Fig. 106

float hinge pin is properly entered in the body so the float cover screws will screw down past it and retain it in place.

Place pump plunger into starting sleeve and slide throttle body into place with a new gasket between it and main body to prevent leakage.

Engage vane fingers in groove on aspirating tube and place hinge pins in slots. Press firmly into place.

Open vanes and place upper body on main body with a new gasket between so that they will seat firmly together. **Before tightening the two cap screws be sure to inspect the vane check** (18-9543) **to see that it is not caught below the vanes in a horizontal position.** It should be in a vertical position and loose after the bodies have been tightened together.

After the carburetor has been assembled, check the vanes for free movement up and down and see that the throttle and pump work freely; also see that the choke lever moves freely and stops against the stop at both ends of its travel.

## Float Level

In Figure 8 of the June Service Bulletin, Page 6, a float level of $1\frac{3}{16}$" plus or minus $\frac{1}{16}$" was given as being correct for the V-8 carburetor. This information was given to permit the dealers' mechanics to more readily understand the operation of the carburetor. The float level in all Ford carburetors is accurately set at the time of manufacture and will not change unless altered in the field. In cases where the appearance of the various parts indicate a change has been made, install a new part or parts as required rather than attempt to change the level by altering the various parts.

Ford

SERVICE BULLETIN

Vol. 13 November 1932 No. 5

# Seasonal Service Requirements

THE mileage accumulated is usually considered the yardstick for judging the necessity for most of the various service maintenance operations, and such adjustments as are required to compensate for normal wear. However, all cars have additional requirements governed almost entirely by climatic conditions and dealers must be prepared and alert to render these services.

Be sure you have sufficient stocks of batteries, radiator hose, anti-freeze and such other items, seasonal in nature, as are required to efficiently render these services.

Check your equipment such as battery charger, hydrometers, master ammeter, etc. to make sure that you can properly handle this seasonal work.

Dealers must anticipate these seasonal service requirements and prepare their organizations to properly solicit and perform this work. Have each member thinking of and suggesting such services as are made necessary by the approaching season. Each member of your organization should review the seasonal requirements covered on Page 27 of the June issue of the Service Bulletin.

# FITTING PISTONS

Pistons used in both 4 cylinder and V-8 Ford Cars and Trucks are of aluminum alloy split skirt constant clearance design, fitted to the cylinder with .0005″ to .0025″ clearance.

The skirt of the piston tapers approximately .001″ in its length. The large diameter being at the bottom of the piston where it contributes to the wiping action of the piston. Pistons manufactured since approximately June 1, 1931 have been "cam ground" to compensate for the expansion of the piston pin boss and supporting ribs (see "E" Fig. 86 September and October Bulletin). The cam ground portion of the piston skirt blends into the tapered portion at approximately the point indicated by the dotted line "D" (Fig. 86) this improvement is not detectable with the eye. However, dealers stocks of pistons manufactured prior to this improvement should now be exhausted if stock men have consistently adhered to the policy of using their old stocks first.

Since the piston skirt is neither straight nor round and the skirt is split it is impossible to check the piston size with micrometers with any degree of accuracy. However, piston diameters (both Standard and all oversizes) are accurately held to a tolerance of plus or minus .0005 inch in manufacture. Cylinder bore sizes are held to the same limits in both production and service. Thus a Standard 4 cylinder piston at the high limit would be 3.8745 inches in diameter. A cylinder bore of the minimum size would be 3.875 inches. The resultant clearance would be .0005″.

A 4 cylinder Standard piston on the low limit or minimum size allowed would be 3.8735 inches in diameter. Should this piston be fitted to a cylinder bored to the maximum size, 3.876 inches, the resultant clearance would be .0025″. These are the most extreme cases possible with these limits. The same limits are also held on all oversize pistons and must be observed in service when cylinders are reworked.

Standard pistons for the 4 cylinder engine are from 3.8735″ to 3.8745″ in diameter.

Standard cylinder bore of the 4 cylinder engine is 3.875″ to 3.876″.

Standard pistons for the V-8 engine are from 3.061″ to 3.062″ in diameter.

Standard cylinder bore for the V-8 engine is 3.0625″ to 3.0635″.

To ascertain the size of any oversize piston add the amount of the oversize to these sizes —thus a .045″ oversize piston for the 4 cylinder engine is 3.9185″ to 3.9195″ in diameter. The standard cylinder bore is 3.875″ to 3.876″; thus, to fit a .045″ oversize piston the cylinder must be bored to a diameter between 3.920″ and 3.921″.

An accurate method of measuring the cylinder bore was described and illustrated on page 45 of the August issue of the Service Bulletin. Measure the cylinder bore at several points, top, bottom, front to rear and side to side the piston size is determined by the **smallest** measurement obtained.

## Fitting Piston Rings

If the cylinder bore has been reworked to the correct size for any of the various oversize pistons, piston rings of the same oversize will have the correct gap and will require no reworking. **However, when new piston rings are being installed in a cylinder bore which has not been reworked it will be necessary to establish the gap for each ring as follows:**

**4 Cylinder Ring Gaps**

Top ring .012″ to .015″.
Center ring .010″ to .012″.
Oil control ring .008″ to .010″.

**V-8 Ring Gaps**

Top ring .010″ to .012″.
Center ring .008″ to .010″.
Oil control ring .005″ to .008″.

When establishing the piston ring gap in cylinders not reworked be sure to check the gap at the smallest diameter of that portion of the cylinder bore in which the ring operates.

The piston rings are fitted in the piston ring grooves with .001″ clearance. Excessive clearance of the rings in the ring grooves more often than any one other condition causes high oil consumption.

Mechanics should examine old pistons closely for excessive wear in the piston ring grooves recommending the installation of new pistons also, if excessive wear is noted and where the need of an efficient air cleaner is noted the installation of a Ford oil bath type air cleaner (see Figs. 55 and 87) should also be recommended. These cleaners are now available for all "B," "BB" and "V-8" chassis.

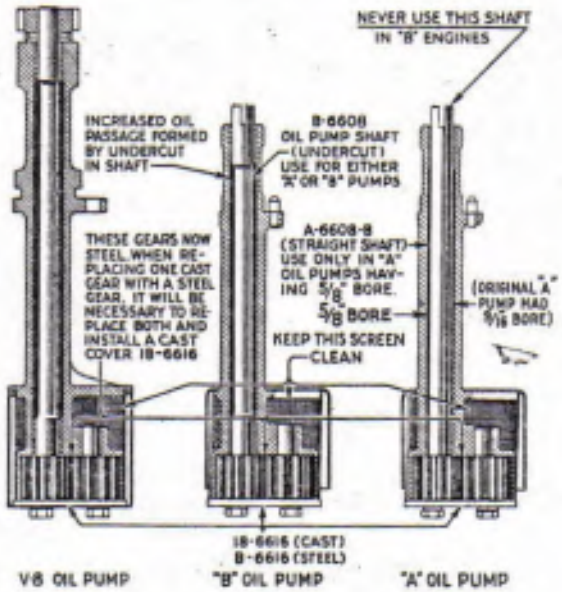
## Connecting Rods

When installing a new connecting rod in the 4 cylinder engine, ream the crank pin bearing to fit the crank pin for which it is intended. **After reaming** the rod must be checked for alignment—and fitted to the crank pin bearing. The alignment of the connecting rod was completely covered in the Service Bulletin for January, 1929. Reamer and aligning fixture are available through K. R. W. Co.

## OIL PUMPS

Several improvements affecting service have been made in the oil pumps used on Ford Cars and Trucks.

At the inception of the improved 4-cylinder engine the oil pump shaft as used in the "A" Cars and Trucks was redesigned to include an undercut between the two bearings, thus permitting a larger volume of oil to pass along the shaft. The difference between the "B" oil pump shaft and the "A" oil pump shaft is shown in Fig. 107.




OIL PUMPS

FIG. 107

The B-6608 oil pump shafts (undercut) can be used with either "A" or "B" oil pump, and it replaces the A-6608-B oil pump shaft used on the "A" engine when stocks of this part are exhausted.

The A-6608-B oil pump shaft (without the undercut, see Fig. 107) must be used only in "A" oil pumps, having $\frac{5}{8}$" bore as shown in the illustrations (see Fig. 107).

Use the B-6608 oil pump shaft in "A" oil pumps having $\frac{9}{16}$" bore (manufactured during the first four months of 1928).

Approximately June 25th the gears used for all production and service requirements in all oil pumps (V-8, B and A) were changed from cast iron to steel, greatly increasing their strength.

When stocks of the cast iron gears are exhausted the steel type of gear only will be supplied for service requirements.

When replacing either oil pump gear in an oil pump equipped with cast iron gears with a steel gear, it will be necessary to replace both gears and install a cast iron cover.

Two types of oil pump covers are available as follows: 18-6616 (cast type) and B-6616 (steel type).

The B-6616 steel cover should never be used with the steel oil pump gears.

The 18-6616 (cast) oil pump cover may be used with either the cast or steel oil pump gears (see Fig. 107).

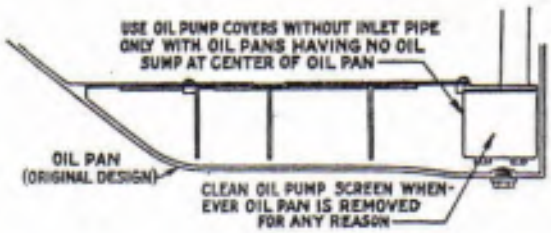



FIG. 108

On the earlier V-8 engines the oil pump intake was at the left rear corner of the oil pan as shown in Fig. 108. To reduce the effects of the oil surging in the pan (as when making turns at high speed) a sump has been incorporated in the engine pan and an inlet pipe added to the oil pump cover as shown in Fig. 109.

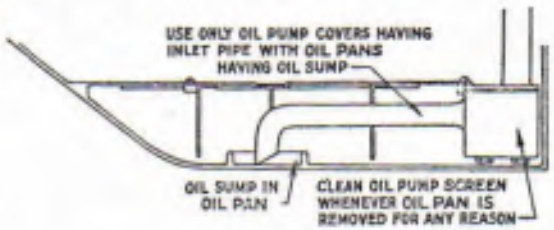



FIG. 109

Use only the oil pump cover assembly having the inlet pipe on oil pumps used with oil pans having the sump as shown in Fig. 109.

Use only the cover without inlet pipe on oil pumps used with oil pans having no sump (see Fig. 108).

# BATTERIES

This year more than ever Dealers **should be on the alert to render efficient battery service** not only to increase the sale of batteries, but also to increase the owner's satisfaction with his car and the Dealer's service department. For the next few months increased electrical requirements will draw heavily on the batteries in all cars and trucks and Dealers must assume the responsibility of adjusting the generator charging rate on these cars when they come in for any service. **In many instances you will find that owners have been operating their cars with the battery in such condition that the first real change in temperature will necessitate battery replacement.**

**Inspect the batteries on all cars coming into your shop for any service.** Remember that the replacement of the battery before its complete failure will save the owner considerable inconvenience and loss of time.

## Adding Water

It is of extreme importance that only distilled water be added to the battery and it should cover the plates at all times. A rapid loss of water in the battery usually is an indication of an excessive charging rate.

## Battery Connections

It is important that battery connections be kept clean, free from corrosion and tight, as when the connections are poor or dirty the generator voltage automatically increases until it is sufficient to overcome this resistance often raising the voltage beyond the capacity of the various light bulbs in the lighting system, causing them to burn out and breaker points to burn and pit and causes the generator to overheat damaging the insulation, materially shortening the life of the generator.

## Adjusting Charging Rate (in the Car)

Clean the commutators and examine the brushes of both generator and starting motor before adjusting the charging rate for the approaching season.

Many battery failures are due directly to charging at an excessive rate, either in the car or on the battery charger. The ideal setting for the charging rate of the generator is the lowest rate which will maintain full charge. The generator charging rate should be set **below** the estimated requirements of the individual owner, and raised as required. A check of the specific gravity of the battery after 300 miles will indicate the amount the charging rate should be increased.

The electrical requirements for cars equipped with the Ford Auto Radio are between 4 and 6 amperes more than for cars without radio receiving equipment and the generator charging rate of such cars should be adjusted accordingly.

Special generators are available for "A," "B" and V-8 cars, trucks and busses having heavy electrical requirements or low cruising speeds.

If the battery, when in the car, fails to charge it may be because of a short in the wiring system, a faulty cutout or the generator is not properly operating. Observe the ammeter, if with lights and other electrical equipment turned off there is a discharge showing on the ammeter with the engine running at a speed equivalent to 20 miles per hour or more, the generator is not charging the battery. A constantly discharging battery may indicate that **the electrical requirements are such that the generator is not charging sufficiently to keep the battery in a fully charged condition. Increase the charging rate.**

If there is a ground in the wiring system it may be determined by turning all switches to the "off" position and removing the battery cable from the battery terminal, then touching it lightly to the battery post. If there is a short in the wiring a spark will occur between the cable and battery terminal. **This test should be made whenever the connections are being cleaned.** If neither of the above conditions are present the cause is probably due to some internal disarrangement within the battery, such as warped or buckled plates having cut through the separators.

## Batteries in Stock

Batteries which are not in use gradually lose their charge and must be recharged at least every 30 days. The specific gravity drops from .0015 to .002 every 24 hours, varying with the temperature. The rate of this internal discharge increasing with a raise of temperature.

**Dealers should regularly check all batteries in their establishment, recharging them when the specific gravity drops below 1.250. This applies to batteries in both new and used cars, as well as batteries in stock.**

## Charging Batteries (out of the Car)

The temperature of the electrolyte of a battery on charge should never exceed 110 degrees F. A thermometer should be readily available at all times at the battery charger, a thermometer, the bulb of which actually is submerged in the electrolyte of the battery is preferable.

## Time Test

After a battery has been charged it is advisable whenever possible to allow the battery to set for 24 hours, at which time the specific gravity should again be checked. The difference between this check and the check immediately after charge, will indicate the amount of internal discharge. If this internal discharge for the 24 hour period amounts to more than .005, the internal discharge is excessive, and would indicate that trouble will result at a future date.

## Electrolyte

Electrolyte should never be added to a battery except after the following procedure: If for any reason the specific gravity of the battery is either too high or too low when the battery is fully charged, the electrolyte should all be removed and discarded and pure water only should be added. The battery should then be placed on the battery charger and recharged until maximum specific gravity reading is obtained. After this recharge the battery should again be emptied and sufficient electrolyte of 1.340 specific gravity added.

## Mixing Electrolyte

Caution must be exercised when mixing electrolyte. **Commercial sulphuric acid is not suitable—use only chemically pure sulphuric acid and distilled water.** Only glass, glazed earthenware, stone, rubber, lead or porcelain vessels should be used. Always put the distilled water in the vessel first, otherwise an explosion might result from the heat generated upon the addition of the water to the acid. When adding sulphuric acid to water, place the nozzle of the syringe below the surface of the water. The solution may be stirred with either a glass rod or a clean wood stick. When taking specific gravity reading of solution never take the reading of the first filling of the syringe but empty the contents back into the solution and take the reading from the second filling of the syringe. If this precaution is not taken the acid remaining in the syringe will cause an inaccurate reading. If specific gravity reading is too low add more acid, if too high add more water.

## Freezing Point

Electrolyte having the specific gravity as shown below will freeze at the following temperatures:

1.150— 6 degrees F. above zero.
1.200—17 degrees F. below zero.
1.225—35 degrees F. below zero.
1.250—62 degrees F. below zero.

## Computing Specific Gravity

When the battery is in good condition the specific gravity reading of the electrolyte in all cells will be within .025 of each other. **Never transfer the electrolyte from one cell to another.**

Use 70 degrees F. as a standard when computing the specific gravity of the battery.

At 70 degrees F. the specific gravity of a fully charged battery is from 1.270 to 1.290. The specific gravity raises approximately .001 with each 3 degrees drop of temperature.

## FRONT COVERS FOR 4-CYLINDER ENGINE

Due to the fact that different distributors are used, two types of front end covers, B-6019 and A-6019-B, are supplied for service on the 4-cylinder engine. Both are made from the same casting, the only difference being in the location of the timing pin hole, as follows:

On the B-6019 cover, the timing pin hole is at the upper end of the boss as shown in Fig. 110. When the timing pin on the improved 4-cylinder engine slips into the recess in the cam gear as outlined on page 21 of the June Service Bulletin, number 1 piston is exactly 19 crankshaft degrees before top dead center on the compression stroke.

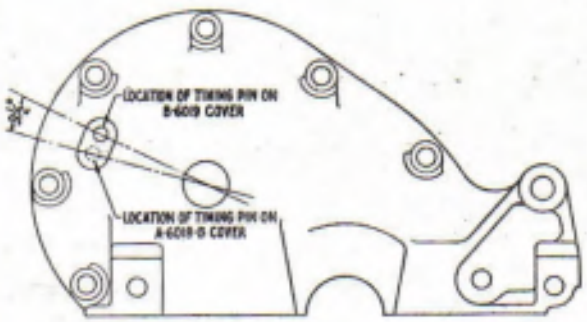
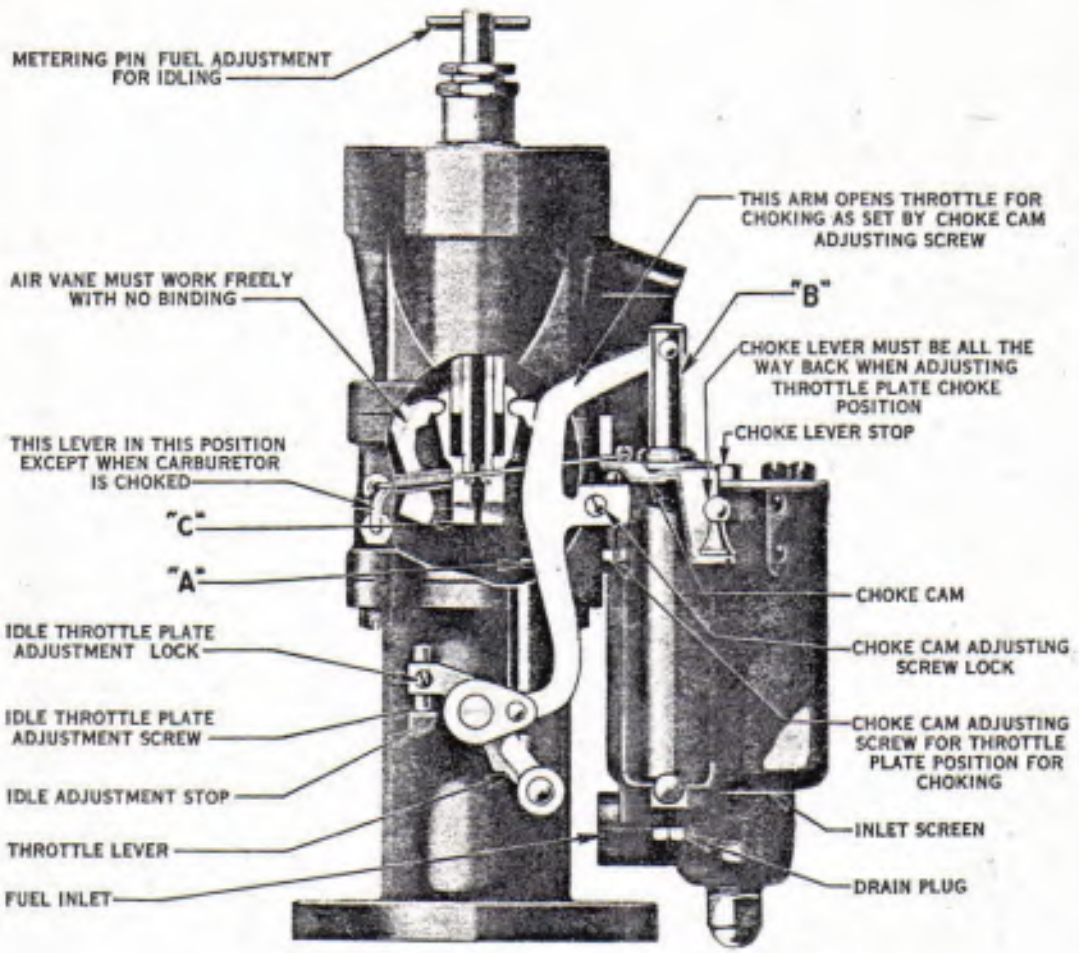



Fig. 110

The timing pin hole on the A-6019-B cover is at the lower end of this boss (see Fig. 110) and when the timing pin on these covers is in place, in the recess in the cam gear, number 1 piston is on exactly top dead center. Procedure outlined on Page 346 of May 1929 Service Bulletin (mechanics should also review article on Page 480 of August 1930 Service Bulletin).

It would be practically impossible to correctly time the spark of either of the four cylinder engines if the wrong front end cover were installed on them and for this reason it is extremely important that all mechanics and stock men be familiar with these covers and means of identification.




CARBURETOR (V-8)
Fig. 11

## Maximum Power

For maximum power at any speed, a richer mixture is required than is necessary for running with throttle but partially open. The power jet "A" (Fig. 11) supplies the required extra fuel, while the throttle is held open. At this throttle position, the pump plunger has traveled downward and has shut off the air vent to the power jet; therefore, the suction on the discharge nozzle draws fuel from the pump cylinder up through the hollow stem of the pump plunger "B" (Fig. 11) and through the power jet into the mixing chamber. At part throttle positions this power jet does not supply fuel, since it is vented to the outside air through the air vent hole in the upper part of the starting sleeve.

The quantity of fuel drawn from the power jet is controlled by the lower air bleed holes in the starting sleeve.

## Acceleration

For rapid acceleration, it is necessary to supply a momentarily rich mixture. This extra fuel is supplied by means of the accelerating pump.

A quick opening of the throttle causes a rapid downward movement of the pump plunger and piston, forcing fuel up through the hollow stem of the pump plunger and out through the discharge nozzle into the mixing chamber. The fuel in the pump cylinder is prevented from escaping back into the float chamber by the check valve in the bottom of the pump cylinder. (See Fig. 10.)

## V-8 CONDENSER

A change has been made in the condenser assembly used with the V-8 ignition coil.

On the original design the condenser was grounded at the left end of the condenser bore in the coil base. (See Fig. 111.)

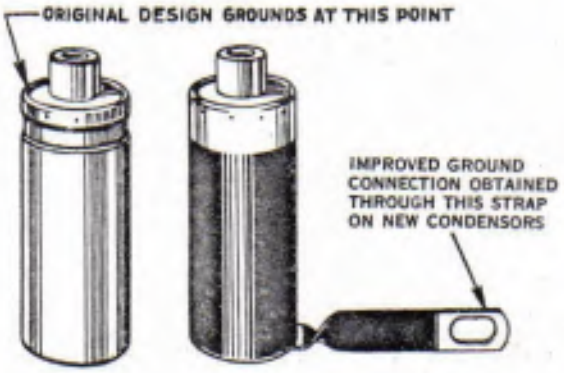



Fig. 111

On current production a short strap has been added to the right hand end of the condenser assembly which is grounded to the distributor body by means of the coil to distributor base screw.

Mechanics should use extreme care when installing the former type of condenser, thoroughly cleaning the end of the condenser before installing it in the coil base and drawing the condenser screw tight so as to prevent the ground connection becoming loose. A loose ground connection will cause burning and pitting of the circuit breaker points and cutting out of the ignition.

Fig. 111 illustrates both the former and the present designs of condenser.

## REAR BUMPER BRACKET

A change has been made in the rear bumper brackets, B-17821 and B-17822, used on B and V-8 cars, raising the rear bumper approximately 1¾ inches—thus affording increased protection to the rear of car. This change is illustrated by Fig. 112.

When replacing either the right or left hand bracket on cars formerly equipped with the original design as indicated by the dotted lines (see Fig. 112), it will be necessary to replace the bracket on the opposite side also. Failure to change both brackets will result in one side of the bumper being mounted higher than the other.

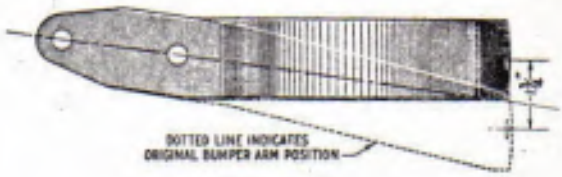



Fig. 112

The BV23 drift and the BV24 wrench will materially assist mechanics when installing these rear bumper brackets.

## OIL FILLER PIPE

Fig. 113 illustrates the B-6763-B oil filler pipe released for production on 4-cylinder engines and for all service requirements for "B" and "A" engines.

This new design oil filler pipe is larger in diameter and has more baffles than the previous design. The increased diameter offers less restriction to escaping crankcase vapors, reducing the velocity of the oil vapors sufficiently to permit the oil particles to deposit on the baffles and return to the crankcase, and permits the easy escape of the more volatile gases thus tending to reduce crankcase dilution.

The installation of this oil filler pipe is recommended where loss of oil through the previous design filler is indicated.

Fig. 113

## OIL RETURN PIPE

A crankshaft rear main bearing oil return pipe, B-6328, is available through service for trucks that are used in work that necessitates the front end of the truck being elevated to an angle of 17 degrees or greater. For example in grain elevators where the grain is emptied by raising the front end of the truck with a hoist.

This oil return pipe is provided with a ball check valve which prevents any possibility of oil flowing through the rear main bearing cap assembly into the clutch compartment when the engine is tipped at an angle of 17 degrees or greater from the horizontal.

**To install** take off rear main bearing cap. Cut weld and remove standard pipe from bearing cap. Screw the new pipe assembly into bearing cap with lower end of pipe pointing forward and solder pipe securely in place.

# VIBRATOR HORN

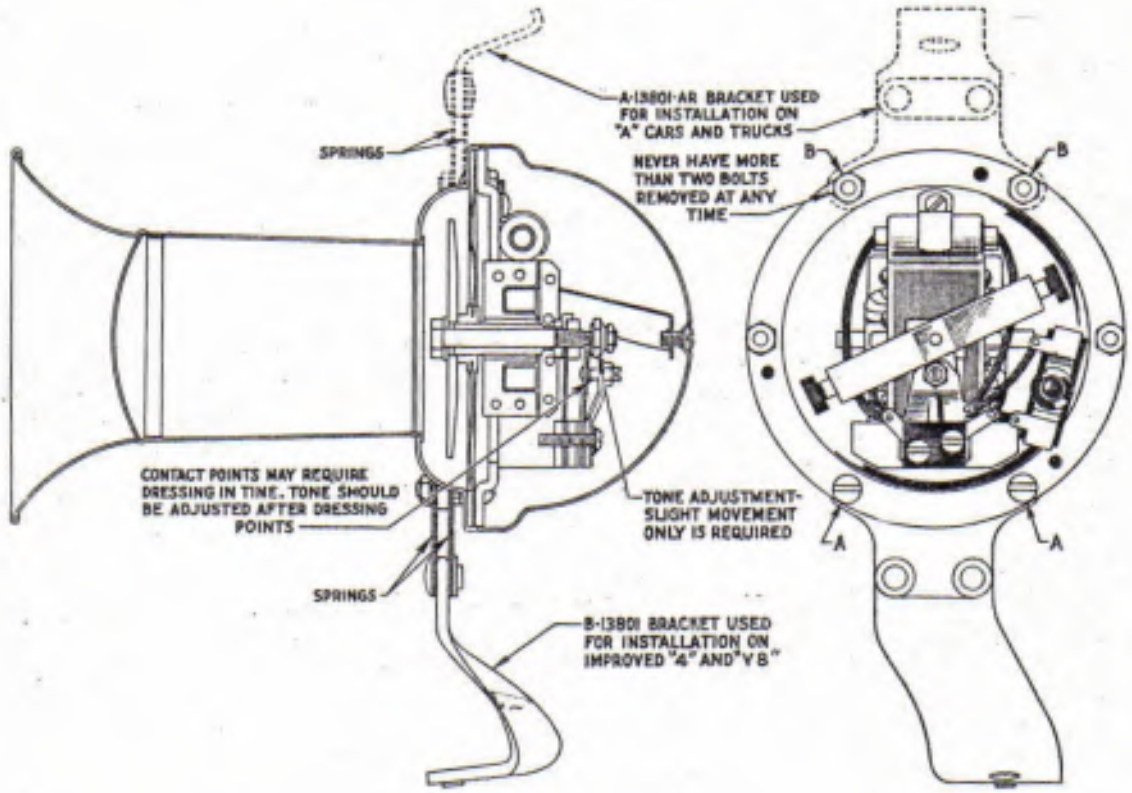



Fig. 114

The B-13802-B vibrator type horn having met with widespread public approval has been released for all service requirements for the Ford Cars and Trucks.

These vibrator horns cannot be satisfactorily mounted on the previous type of horn bracket and for this reason it will be necessary when installing one of these horns on cars originally equipped with motor-driven horns to install a new horn bracket also.

These horns will be supplied for service with two long bolts at the bottom (see "A", "A", Fig. 114) for assembly to the B-13801 brackets used on the improved 4-cylinder and V-8 Cars and Trucks.

To install the new vibrator horn on "A" or "AA" units it will be necessary to remove these long bolts ("A", "A", Fig. 114) and install them at the top of the horn (see "B" and "B", Fig. 114). To do this, proceed as follows: remove **one** of the long bolts ("A") and **one** of the short bolts ("B", see Fig. 114), putting the short bolt in the hole where the long bolt formerly was and securely tightening it in place and the long bolt in the hole formerly occupied by the short bolt, securely tightening it. Then remove the other long and short bolts whose positions are to be reversed. **Never have more than two bolts removed at any one time** as the horn diaphragm is held by the six bolts around the edge and if it is at any time held by less than four bolts it may change its position seriously affecting the tone of the horn.

Stock men when selling these horns over the counter for either "A", "AA", "B" or "BB" units should determine from the customer whether or not the unit for which the horn is intended was formerly equipped with a motor-driven horn, in which case it will be necessary for the customer to purchase a suitable bracket also. If the horn is to be installed on an A or AA unit, stockmen should advise the purchaser never to remove more than two bolts from the diaphragm flange at one time as outlined above.

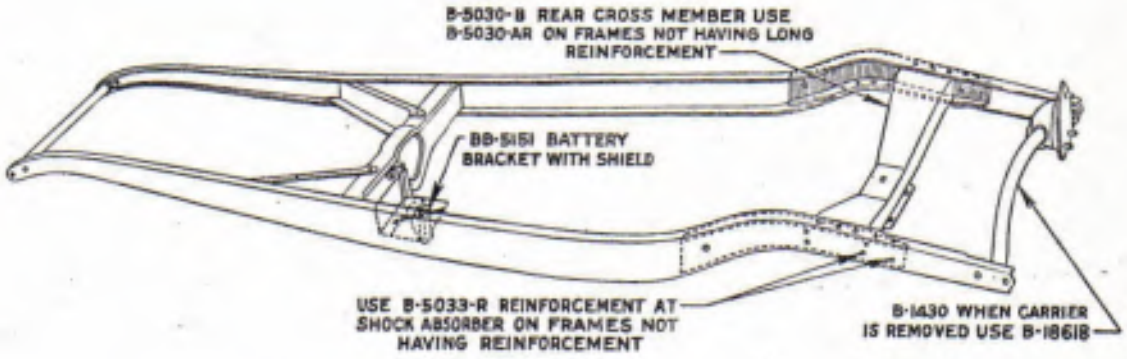



Fig. 115

## FRAME

During July reinforcements were added and welded in place on both frame side members as shown in Fig. 115.

The addition of these reinforcements removes the necessity for the B-5033-R frame reinforcement at the rear shock absorber on all frames equipped with the new reinforcements as shown in Fig. 115. It is, however, extremely important that the B-5033-R reinforcements be used on all frames not provided with the long reinforcement as shown in the illustration.

The addition of these reinforcements to the frame side member also necessitates the use of a shorter rear cross member as follows:

B-5030-B rear cross member (short) used on all frames reinforced as shown in Fig. 115.

B-5030-AR rear cross member (long) used for replacement on all frames manufactured prior to the addition of the reinforcements to the frame side members as illustrated in Fig. 115.

The B-1430 spare wheel carrier shown in the illustration (Fig. 115) also acts as a frame cross member, greatly contributing to its rigidity. In instances where this spare wheel carrier is removed, as on fender well installations, it should be replaced with B-18618 bar. Either the B-1430 spare wheel carrier or the B-18618 bar must be in place on all cars and commercial chassis.

## BATTERY SHIELD

Fig. 115 also illustrates the BB-5151 battery bracket now used in production having a flange at the front affording maximum protection to the battery from flying stones, etc.

A new battery shield, B-5167-R, as shown in Fig. 116 is now available for all chassis manufactured prior to the adoption of the flange at the front of the battery support base as shown in Fig. 115. These B-5167-R battery shields are easily installed by removing the floor board and battery and inserting the shield in the battery bracket with the high flange toward the front of the car. (See Fig. 116.)

When the battery is reinstalled it will hold the shield in place.

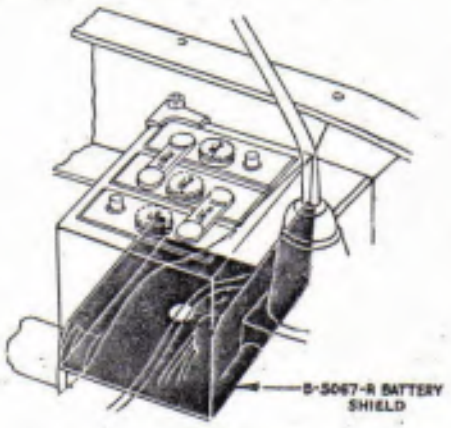



Fig. 116

## STEERING GEAR

Due to a slight difference in the angle of the "B" Commercial Chassis Steering Gear, as compared with the passenger car chassis, these steering gears were originally provided with a different steering gear cover assembly B-3583-B. To remove the necessity of dealers carrying this part in stock, the B-3583-B housing cover has been obsoleted, and when present stocks are exhausted, will no longer be supplied.

The steering gear housing cover bolt holes in the frame side member are now elongated on all current production, as shown by the dotted lines (see Fig. 117). The elongation of these holes permit sufficient variation in the angle of the steering column, thus making the B-3583-A steering gear housing cover adaptable to both the car and commercial chassis.

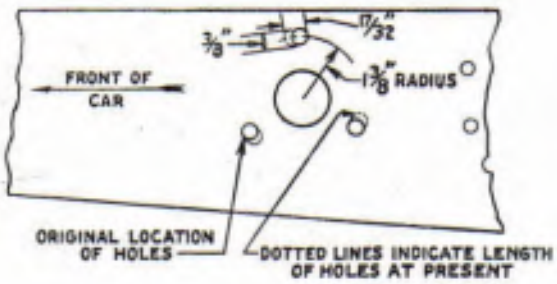



Fig. 117

On commercial chassis manufactured prior to the elongation of these holes, whenever the steering gear assembly or the steering gear housing cover B-3583-B requires replacement, these holes in the side member may be elongated as shown in Fig. 117 to adapt them to the B-3583-A cover.

These holes can be quickly elongated by laying out the location as shown in the illustration (see Fig. 117) using a 10" round or rat-tail file to remove the necessary metal.

On frames having the elongated holes, either the B-3583-B or the B-3583-A cover can be used for either the passenger car or the commercial chassis.

## SPARE WHEEL LOCKS

An attractive spare wheel lock affording maximum theft protection is now available to owners of the improved 4-cylinder and V-8 cars and commercial chassis equipped with well fenders.

These spare wheel locks take the place of the spare wheel hub cap and are provided with

Fig. 118

a neat emblem similar to the emblem on the original hub cap. Locks for the 4-cylinder units are carried under part No. B-18305-B (see Fig. 118). The spare wheel locks for the V-8 wheel are carried under part No. 18-18305 (see Fig. 118).

In addition to displaying these locks, dealers' service managers and floor men contacting owners will be rendering a real service to owners of Ford cars equipped with side wheel carrier by informing them that these locks are now available.

## ASSEMBLING V-8 FLYWHEEL

Several improvements have been made in the V-8 flywheel affecting service as follows:

The undercut has been removed and a $\frac{1}{32}$" radius added to the corner of the flywheel counterbore as shown in lower insert (see Fig. 119). This change necessitates the chamfering of the crankshaft flange as shown in the upper insert (see Fig. 119). This chamfer will be machined on all future production of the V-8 crankshaft and must be added to crankshafts manufactured prior to this change when a flywheel not undercut at the bottom of the counterbore is installed. This is important as it would be impossible to correctly install the flywheel if the corner of the crankshaft flange was resting on the radius at corner of the counterbore.

These same instructions apply when a new crankshaft is being installed.

First examine the counterbore of the flywheel. If the flywheel counterbore has a radius in the corner as illustrated (see Fig. 119) a $\frac{5}{64}$" chamfer must be added to the crankshaft flange if it is not already present.

The depth of the clutch pressure plate bolt holes in the flywheel has been reduced from $\frac{3}{4}$" to $\frac{9}{16}$" necessitating the use of a shorter 20036-S bolt in place of the 20346-S bolt previously used.

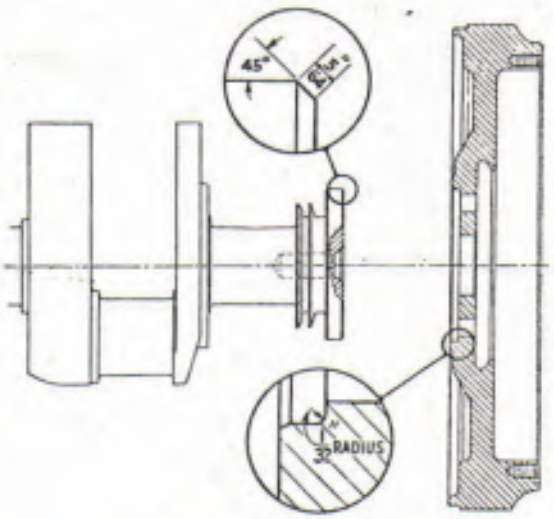



Fig. 119

# ANTI-FREEZE SOLUTIONS

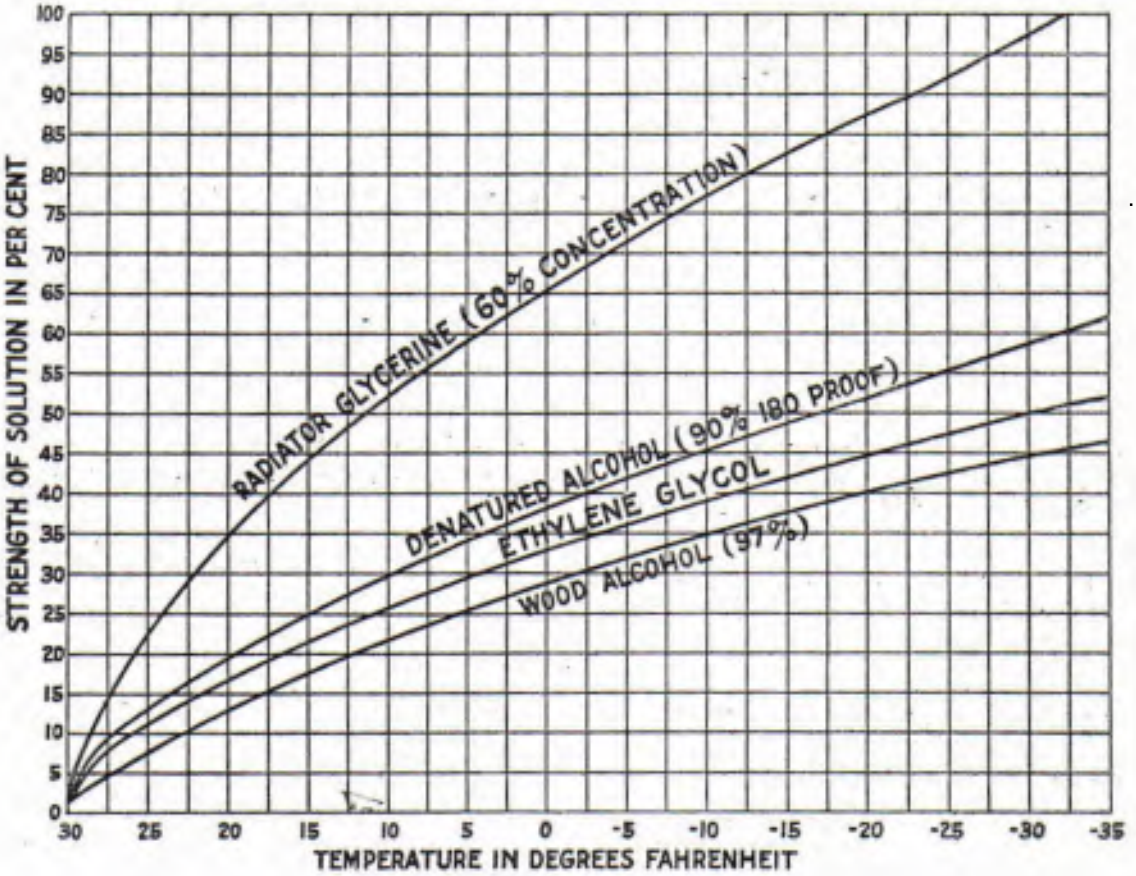



Fig. 120

Fig. 120 is an anti-freeze protection chart giving the percentage of the various anti-freeze solutions required to afford protection to the cooling system at various temperatures.

Fig. 121 is used to convert these percentages into pints of anti-freeze required for the various capacities.

## Alcohol

The curve entitled "Denatured Alcohol" in Fig. 120, is for 90% pure denatured alcohol (180 proof). The line entitled "Wood Alcohol" (see Fig. 120) is given for 97% pure wood alcohol. Many wood alcohols marketed in the United States are diluted with 24% water. For such wood alcohol, the denatured alcohol curve applies; however, differently calibrated hydrometers are required for testing.

## Ethylene Glycol and Radiator Glycerine

The curve entitled "Radiator Glycerine" (see Fig. 120) applies to a 60% concentration glycerine, as almost universally adopted by producers of radiator glycerine. Chemically pure glycerine is not desirable.

Both Ethylene Glycol and Radiator Glycerine used as anti-freeze solution must contain effective inhibitors designed to control corrosion.

Before adding either Ethylene Glycol or Radiator Glycerine to the cooling system, it is important that the entire system be thoroughly flushed. Cylinder head gaskets must be in good condition and kept tight at all times to prevent the solution leaking into the crankcase where it may cause gumming and sticking of the working parts.

## Other Anti-Freeze Solutions

Salt solutions, such as calcium or magnesium chloride, sodium salicylate, etc., honey, glucose and sugar solutions, and oils are not satisfactory for use in the cooling system.

## Testing Anti-Freeze Solution

In using a hydrometer to determine the temperature at which a solution will freeze, the test must be made at the temperature at which the hydrometer is calibrated. If the solution is warmer or colder, it must be brought to this temperature, or large errors

| Capacity Pints | 5% | 10% | 15% | 20% | 25% | 30% | 35% | 40% | 45% | 50% | 55% | 60% | 65% | 70% | 75% | 80% | 85% | 90% | 95% | 100% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 22 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 17 | 18 | 19 | 20 | 21 | 22 |
| **24** | **2** | **3** | **4** | **5** | **6** | **7** | **9** | **10** | **11** | **12** | **14** | **15** | **16** | **17** | **18** | **19** | **20** | **21** | **23** | **24** |
| 26 | 2 | 3 | 5 | 6 | 7 | 8 | 10 | 11 | 12 | 13 | 15 | 16 | 17 | 18 | 20 | 21 | 22 | 23 | 25 | 26 |
| 28 | 2 | 3 | 5 | 6 | 8 | 9 | 10 | 11 | 13 | 14 | 16 | 17 | 19 | 20 | 22 | 23 | 24 | 25 | 27 | 28 |
| 30 | 2 | 4 | 5 | 6 | 8 | 9 | 11 | 12 | 14 | 15 | 17 | 18 | 20 | 21 | 23 | 24 | 26 | 27 | 29 | 30 |
| 32 | 2 | 4 | 6 | 7 | 9 | 10 | 12 | 13 | 15 | 16 | 18 | 19 | 21 | 23 | 25 | 26 | 28 | 29 | 31 | 32 |
| 34 | 2 | 4 | 6 | 7 | 9 | 10 | 12 | 14 | 16 | 17 | 19 | 21 | 23 | 24 | 26 | 27 | 29 | 31 | 33 | 34 |
| 36 | 2 | 4 | 6 | 8 | 10 | 11 | 13 | 15 | 17 | 18 | 20 | 22 | 24 | 25 | 27 | 29 | 31 | 33 | 35 | 36 |
| 38 | 2 | 4 | 6 | 8 | 10 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 25 | 27 | 29 | 31 | 33 | 34 | 36 | 38 |
| 40 | 2 | 4 | 6 | 8 | 10 | 12 | 15 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 |
| 42 | 2 | 4 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 25 | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 |
| **44** | **3** | **5** | **7** | **9** | **11** | **13** | **16** | **18** | **20** | **22** | **25** | **27** | **29** | **31** | **33** | **35** | **38** | **40** | **42** | **44** |
| 46 | 3 | 5 | 7 | 9 | 12 | 14 | 17 | 19 | 21 | 23 | 26 | 28 | 30 | 32 | 35 | 37 | 39 | 41 | 44 | 46 |
| 48 | 3 | 5 | 8 | 10 | 13 | 14 | 17 | 19 | 22 | 24 | 27 | 29 | 32 | 34 | 37 | 39 | 41 | 43 | 46 | 48 |
| 50 | 3 | 5 | 8 | 10 | 13 | 15 | 18 | 20 | 23 | 25 | 28 | 30 | 33 | 35 | 38 | 40 | 43 | 45 | 48 | 50 |

**TABLE FOR DETERMINING PINTS OF ANTI-FREEZE REQUIRED FOR VARIOUS CAPACITIES**

Fig. 121

may result. In some cases these errors may be as large as 30° F. Freezing point hydrometers are not interchangeable. Different floats are required for denatured alcohol, wood alcohol, glycerine, and Ethylene Glycol.

### Warning

Lacquers are softened by wood or denatured alcohol, and it is, therefore, extremely important that every precaution be taken or avoid spilling either on any of the painted surfaces of the car. If this should accidentally occur, the surface should be immediately flushed with a large quantity of water.

## IGNITION COIL TEST

An effective test for the ignition coil is easily made on the car without the aid of any special equipment as outlined below.

**To test the V-8 coil** proceed as follows: Turn on ignition. Remove one spark plug wire from the spark plug. Hold the end of this wire exactly ½ inch away from the cylinder head while the engine is cranked. If the spark jumps this gap—the coil is O. K. If the spark fails to jump this ½-inch gap, additional tests are required as follows:

Be sure the primary circuit is complete and is not grounded at any point. Note particularly that the primary spring type contact (see Fig. 28 June Service Bulletin) is properly seated and repeat test.

If the spark still fails to jump the ½-inch gap, remove the insulation for approximately one inch on one end of an 18-inch length of high tension wire. Slip this uninsulated portion between the high tension brush and the metal band around the center of the rotor (see Fig. 29) insulating it away from the rotor with a thin piece of fibre or bakelite. Connect one terminal of a fully charged battery to the terminal on left side of the distributor (to which red wire is normally connected). A wire from the other terminal of this battery is intermittently touched to the spring type primary contact (see Fig. 28). Hold the high tension wire so as to establish a ½-inch gap. Make and break the connection between the wire running from the test battery and the spring type primary contact. A spark should occur at the ½-inch gap each time the primary circuit is broken. If spark jumps the ½-inch gap, the coil is O. K., if not, the coil should be replaced.

The same principles apply also to the 4-cylinder coil. A ⅜" gap, however, will be satisfactory for the 4-cylinder coil.

# LUBRICANT SPECIFICATIONS

The various lubricants for Ford cars and trucks have been specified only after exhaustive tests by Ford Motor Co. laboratories working in conjunction with leading oil companies. Compare these lubricants with the lubricants you are now using. Your supplier will advise you if the oils and greases you are now using meet with these recommendations.

| | WINTER* | SUMMER* |
|---|---|---|
| Engine Oil | S.A.E. 20 | S.A.E. 40 |
| Gear Oil | S.A.E. 110** | S.A.E. 250** |
| Zerk Fittings | Pressure gun lubricant | Pressure gun lubricant |
| Universal Joints | See specifications below | See specifications below |
| Front Wheel Lubricant | See specifications below | See specifications below |
| Distributor Cam | Vaseline | Vaseline |
| Automatic Shock Absorbers | M-1046-C‡ | M-1046-C |
| Manually Adjusted Shock Absorbers | M-1046-B‡ | M-1046-B |

*In general winter oil recommendations apply to temperatures below freezing and summer oil recommendations apply to temperatures above 32 degrees Fahrenheit.

**Due to the overlapping of S. A. E. viscosities for gear oils S. A. E. viscosity No. 90 can satisfactorily be substituted for S. A. E. No. 110 when No. 110 is not available.

S. A. E. viscosity No. 160 can be substituted for S. A. E. No. 250 when S. A. E. No. 250 is not available.

‡M-1046-C shock absorber fluid has been developed to meet the requirements peculiar to the automatic type Ford shock absorber. This fluid is not suited to the requirements of the manually adjusted shock absorber. M-1046-B shock absorber fluid is exactly suited to the requirements of the manually adjusted type of shock absorber used on "A" chassis and "B" commercial chassis.

Use only genuine Ford shock absorber fluids in Ford shock absorbers. Combinations of glycerine and alcohol do not have the necessary cold test and viscosity characteristics and should never be used. Genuine Ford shock absorber fluids meet with cold test and viscosity requirements, are non-corrosive and are harmless to the rawhide gaskets.

## Front Wheel Bearing Lubricant

As specified in the June 1931 Service Bulletin, a short fiber sodium soap grease having a high melting point is desired in all front wheel bearings. This front wheel bearing lubricant has been carefully tested under severe operating conditions and has proven unusually efficient. Front wheel lubricants meeting these specifications are available and Dealers can obtain them by insisting that the lubricant they purchase meets the specifications given below.

The following are the specifications of this lubricant:

| | |
|---|---|
| Sodium Soap | 15.0—17.0% |
| Free Fatty Acid (Calc as Oleic) | 0.2% Max. |
| Free Alkali as NaOH | 0.3% Max. |
| Moisture | 0.2% Max. |
| Mineral Oil | 82.3—85.0% |

Viscosity of Mineral Oil at 100° F. to be 290—310 (Saybolt Universal) and to have nil acidity.

Consistency—Penetration of an unworked sample determined according to A. S. T. M. method D-217 shall be 175—200 at 77° F.

Shall contain no filler.

Shall be non-corrosive.

Shall contain no grit.

Shall be non-rancid and shall not bleed in storage.

Shall be made by Open Fire Process.

Melting Point to be 350° F. Min.

## Universal Joint Grease

The material desired is a mineral oil thickened with sodium tallow soap and shall have the following composition:

| | |
|---|---|
| Sodium Tallow Soap | 9.0—10.5% |
| Mineral Oil—100% less other ingredients | |
| Free Tallow Oil | not over 1.5% |
| Moisture | 2.5% Max. |
| Free Alkali | None |

Shall contain no grit.

Consistency—Penetration on unworked sample according to A. S. T. M.—D-217 to be 310 to 330 at 77° F.

The mineral oil shall have the following physical constants:

| | |
|---|---|
| Flash Point | 370° F. Min. |
| Fire Point | 410° F. Min. |
| Viscosity at 210° F. (Saybolt Universal) | 85-90 |

The tallow used shall be the clear rendered product obtained from solid tallow.

Ford

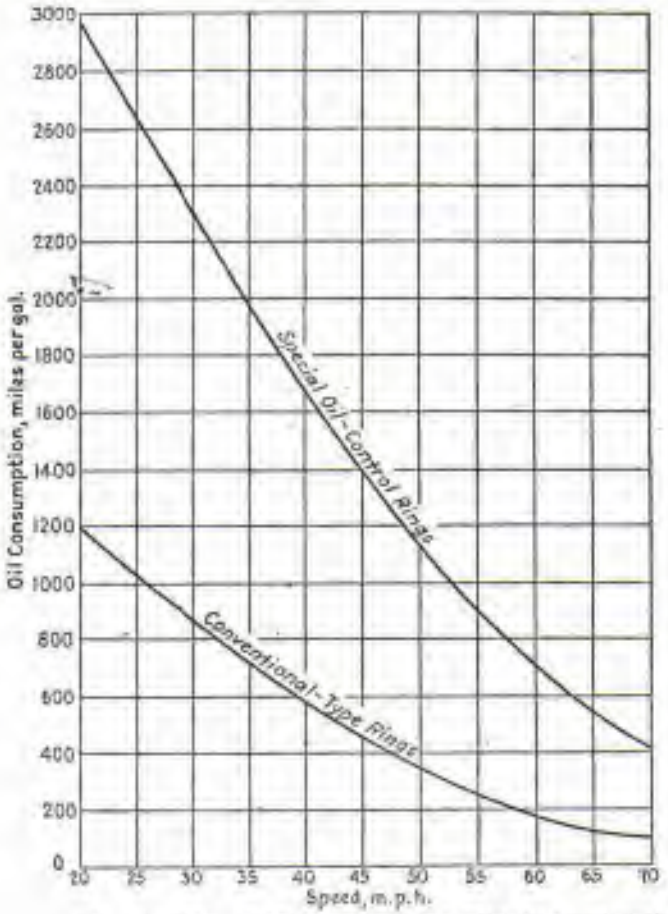
SERVICE BULLETIN

Vol. 13 December 1932 No. 6

# The Effects of High Speed Operation on Oil Consumption

Oil consumption increases several hundred percent with sustained high speed driving. This is a natural phenomenon characteristic of all cars and in effect is assurance of sufficient cylinder wall lubrication.

Even at sustained high speed the cost of oil per mile is insignificant compared to the expense of premature wear as a result of insufficient oil at high speeds. Caution your owners as to the necessity of frequently checking the oil level when operating their car at high speeds.




*(Reprinted from SAE Journal of Sept. 1931, by permission)*

Fig. 122

# The V-8 WATER PUMP

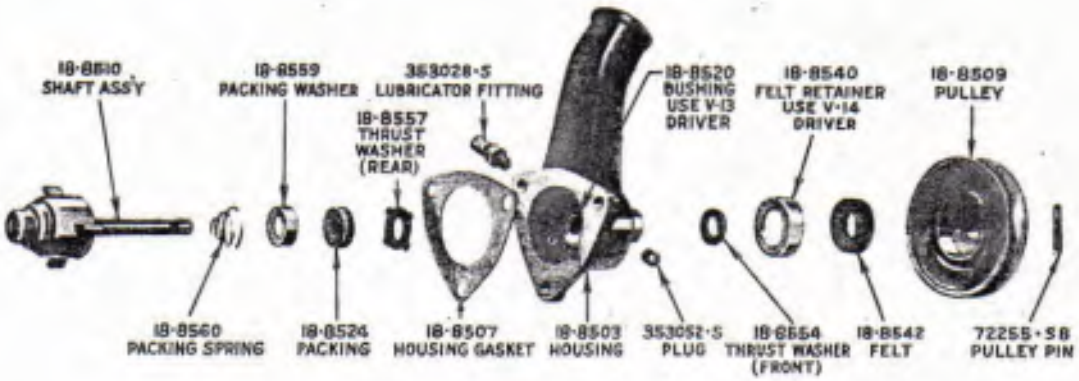



Fig. 123

A change has been made in the V-8 water pump as supplied for service, making them adaptable to either right or left hand side of the engine. These water pumps differ from the water pump used in production in that provision has been made for the installation of the lubricator fitting on either side (see Fig. 124).

These water pumps will be supplied with a lubricator fitting correctly located for installation on the right hand side of the engine and a 353052-S pipe plug on the opposite side.

When these pumps are desired for installation on the left hand side of the motor the lubricator fittings and the pipe plugs are removed and their positions are reversed.

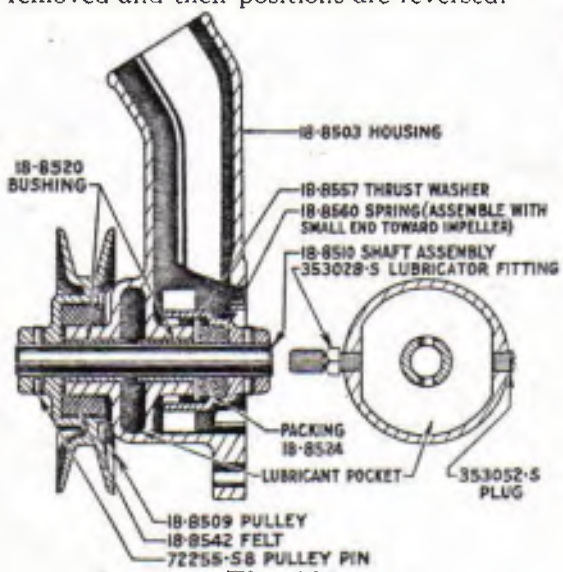
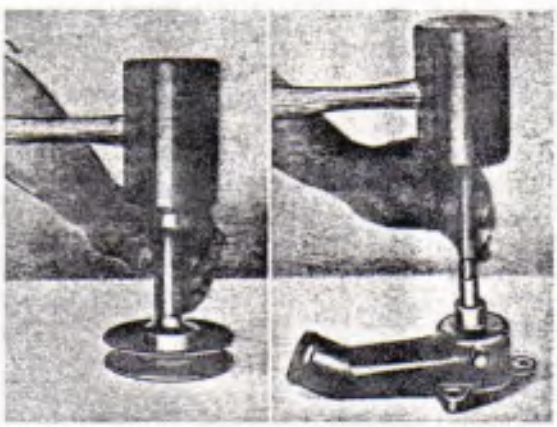



Fig. 124

Dealers' stockmen should watch their stocks closely so as to exhaust any stocks they may have of the production type of pump as originally supplied for service.

Various tools are required to service the V-8 water pump as follows:



V-14 V-13

Fig. 125

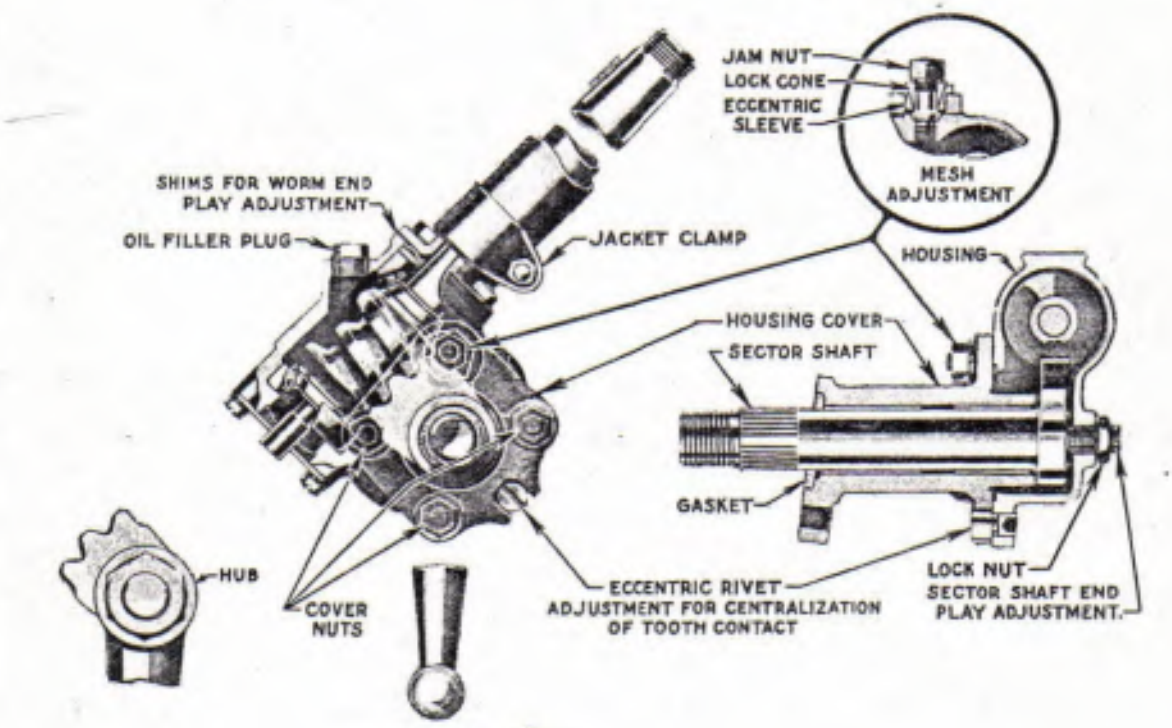
V-14 driver for installing the felt retainer in the water pump pulley as shown in Fig. 125.

V-13 bushing driver (see Fig. 125).

Figure 123 shows the pump completely disassembled with all of the parts correctly positioned for assembly.

Mechanics should review the article on Page 58 of the Sept.-Oct. issue of the SERVICE BULLETIN and if the presence of these special lubricants is noted when the water pump is disassembled, caution the owner against their use.

# *The* STEERING GEAR




STEERING GEAR

Fig. 126

With the inception of the current models three different steering gear assemblies were adopted as follows:

B-3503-A used on all "B" and "V-8" passenger cars and on all commercial chassis having elongated mounting holes in the frame side member as shown in Figure 117 (November SERVICE BULLETIN).

B-3503-B differs from the B-3503-A in that the B-3583-B housing cover is used on this assembly instead of the B-3583-A as used on the B-3503-A. The B-3503-B assembly is used on all commercial chassis either with or without elongated mounting holes in frame side member (see Fig. 117).

BB-3503 used on all "BB" chassis. This steering gear is of heavier construction; however, it is of the same design and the following instructions apply equally to all of these steering gears.

The chief consideration in steering gear life, however, is proper lubrication.

## Lubrication

Fill with approved lubricant until it is level with filler hole (see Figs. 37, 38 and 39).

**Avoid use of graphite, white lead or heavy solidified oils or greases.**

## Adjustments

Owing to efficient design and sturdy construction, the steering gear assembly used on current production with ordinary care will last indefinitely and should require little attention from a repair standpoint. In time, of course, it will require adjustments to compensate for natural wear. As means of mechanically eliminating all play within the mechanism have been provided, there is no

In general, for steady driving conditions up to 65 miles per hour on level roads, the fuel is all supplied from the aspirating tube. When the throttle is opened suddenly, an additional charge of fuel is supplied from the accelerating pump; and, if the throttle is held open as for hard pulling or high speed, extra fuel continues to flow from the pump discharge nozzle through the power jet "A".

### Adjustment

**The idle speed** of the engine should be set by means of the throttle plate adjusting screw to a speed equivalent to five miles per hour (high gear). See Fig. 11.

When the metering pin is correctly adjusted at idle speed, the carburetor is set for maximum engine performance, and usually no other adjustments are required.

### Metering Pin Adjustment

Normally, only one adjustment of the carburetor is required, this adjustment being the fuel adjustment for idling. The metering pin is raised or lowered by screwing it into or out of the fuel orifice. The metering pin is properly adjusted when the car leaves the factory, but **it will require readjusting after the breaking-in period.**

This adjustment should be made at the 300 mile inspection. **Be sure the motor is well warmed up,** and there are no air leaks at manifold (**tighten screws**) or windshield wiper or distributor vacuum line (**tighten connections**), then remove carburetor silencer, adjust the metering pin carefully at idle speed.

Turning the pin clockwise moves the pin downward into the orifice and makes the mixture leaner; turning it anti-clockwise increases the orifice and makes the mixture richer.

Screw the adjustment down until the performance of the engine indicates that the mixture is **too lean,** then turn it back slowly, (allowing approximately **30 seconds at each setting** to note the performance of the engine) until engine performance is again smooth.

For initial setting **for cold engine,** screw down the metering pin until air vanes just start to open. **Then turn back** 5 full turns. **Readjust after engine is warmed up.**

### Throttle Plate Position for Starting

Unless tampered with this adjustment will remain permanently correct. To check this adjustment, carburetor assembly would have to be removed then: insert a .020" feeler blade as shown in Fig. 8 and adjust position of throttle plate adjusting screw to maintain this throttle plate position when **choke lever** is all the way **to rear** and starting sleeve lug is **against** the **stop** provided on the float bowl cover.

### Warning:

Most cases of suspected carburetor trouble resolve themselves into: under-inflated tires, dragging brakes, faulty ignition (check breaker point gap, **with arm on high point of cam**), check spark plug gaps, loss of compression (check with crank), air leak at manifold or vacuum lines (distributor and windshield wiper), or dirty carburetor silencer screeen (clean with gasoline, dry with compressed air, dip in engine oil and reinstall).

## CARBURETOR 4-CYLINDER

Fig. 14 shows the carburetor used on the 4 cylinder motor. The carburetor size is 1⅛". A power jet is employed which cuts in when the throttle butterfly is approximately two-thirds open. This jet slightly enriches the fuel air mixture when the car is operated at high speed or under heavy load.

Fig. 12 is a diagram of the 4 cylinder carburetor which will permit the following of the various passages from the float bowl to the carburetor throat from which it is carried to the intake manifold and cylinders.

The same distinguishing symbols are used in both Fig. 12 and Fig. 13 so by referring to both of these figures a complete identification of each of these orifices may be made.

When the throttle plate is less than two-thirds open the suction at "M" (Fig. 12) draws air through the opening "J" (see Figs. 12 and 13) by the "flat" on the throttle shaft and through the passage "N" (Fig. 12).

When throttle shaft is rotated until the flat of the shaft is away from the opening "N" (as indicated by dotted line, Fig. 12), the shaft closes this opening thus shutting off this supply of air. With the air supply cut off the vacuum thus created causes the fuel to be lifted in the power jet tube "E" and discharged into the carburetor throat at the opening "M."

An improvement has been made in the compensator tube by the addition of several holes through the side (see "L", Fig. 12), which permit air to be drawn through the quill (after the idling well is emptied), thus forming an emulsion of air and fuel which vaporizes more readily and being lighter in

need of being forced to choose between a stiffly operating unit and one having lost motion, since all of the adjustments can be set at the will of the adjuster at the most desirable point.

The thrust on the worm is taken up by roller thrust bearings, placed at each end of the worm. This insures proper alignment and prevents any binding of the steering worm shaft.

An automatic take-up device is provided between the upper worm thrust bearing and housing cap (see Fig. 126). Its purpose is to remove the need for adjustment except, perhaps, after considerable usage.

BEFORE altering this adjustment, be sure that cause of trouble is not from some other looseness such as in ball sockets, or end play in sector shaft (see Fig. 126).

If these adjustment instructions are followed carefully and correct lubricant used, proper functioning of the steering mechanism will result. Do not deviate from these instructions to correct any erratic action of the front wheels, as evidenced by shimmy or hard steering, but instead see that tires are properly inflated and front axle checked for correct toe-in. Tie rod and drag link sockets or connections must also of necessity be adjusted to correct tension and freedom.

## Make Adjustments in Following Order:

Steering wheel should swing throughout its turning radius without tight spots, and not pull more than 10 pounds on drag link in either direction.

**It is important that front wheels of car be jacked up and the drag link removed from steering gear ball arm in order to effect a satisfactory steering gear adjustment.**

## Adjustment of End Play in Sector Shaft

First see that housing cover nuts and the mesh adjustment jam nut (see Fig. 126) are **securely** tightened. Next turn steering wheel to either extreme, then back one-eighth of a turn. Gripping steering arm at hub (see Fig. 126), the shaft should move freely when turned back and forth, without a particle of end play. Adjust as required for above movement by means of sector thrust screw at side of housing next to motor (see Fig. 126). A special offset

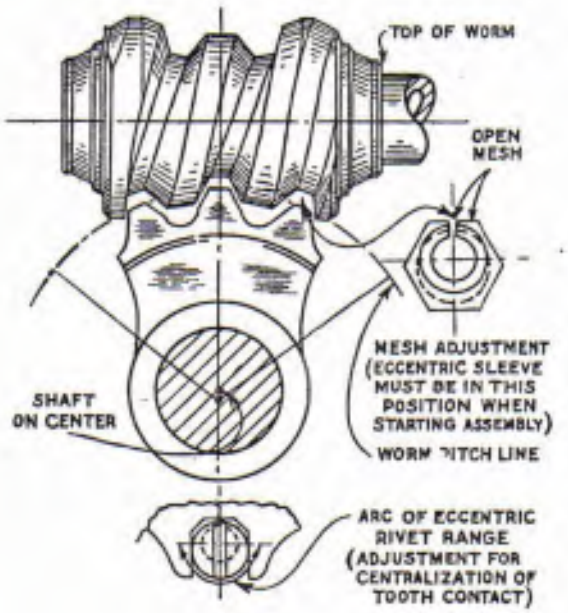



Fig. 127

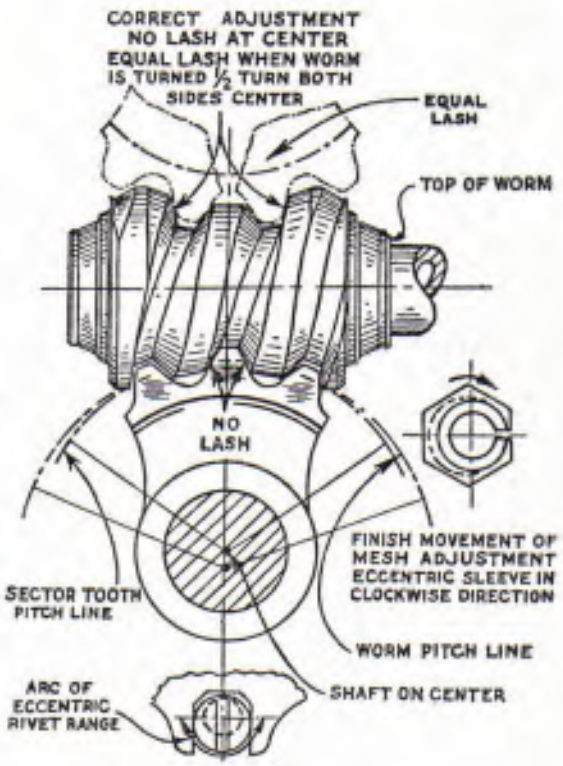



Fig. 128

screw driver, A-345, is required for this purpose. After making adjustment, be sure to tighten lock nut (see Fig. 126), then reinspect for end play and freedom.

## Adjustment for Proper Mesh of Sector Teeth in Worm

Turn steering wheel to the mid-position of its complete travel or turning limits. (**Drag link disconnected.**) Shake steering arm to determine amount of lost motion. Next loosen the three housing cover nuts exactly one-quarter turn, then loosen mesh adjustment jam nut one-half turn. Turn the eccentric adjusting sleeve clockwise, very gradually, checking at each movement the amount of lost motion still existing at the steering arm. Adjust only sufficiently tight to eliminate all lash of steering arm (no more), **being sure to finish movement of eccentric adjustment sleeve in clockwise direction.** Turn steering wheel throughout full travel to test for free operation. If too tight, turn eccentric adjusting sleeve counter-clockwise to free and readjust, as above, more carefully. Next securely tighten mesh adjustment jam nut (Fig. 126) and follow by tightening housing cover nuts. It is important that the **mesh adjustment nut be tightened before tightening housing cover nuts.**

The worm is machined in such manner that close mesh with sector teeth is provided at the mid-position or place corresponding to the straight ahead driving range with gradual relief toward the extremes. Since any normal wear is most pronounced at mid-position, this provision allows for subsequent adjustment without fear of binding toward the extremes.

When the sector teeth are properly centralized in relation to the worm thread, there should be an equal amount of lash in the mesh of these parts at one-half turn of hand wheel each side of mid-position previously described. If this is not the case, correct as follows:

## "Centralization of Tooth Contact" (Seldom Required)

Start check at center of worm (see Fig. 128) as indicated by keyway being in line with filler plug (see Fig. 126).

Turn steering shaft exactly one-half turn to right and shake steering arm to note amount of play or lash.

Then turn the shaft back to the left one complete revolution, or in other words, one-

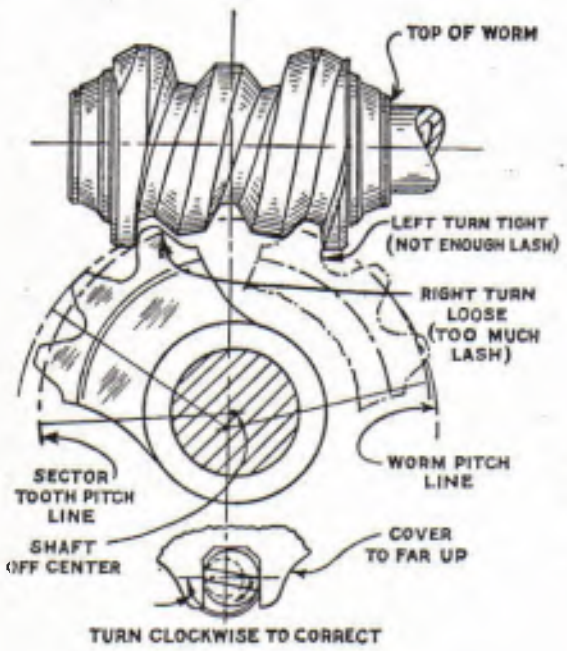



Fig. 129

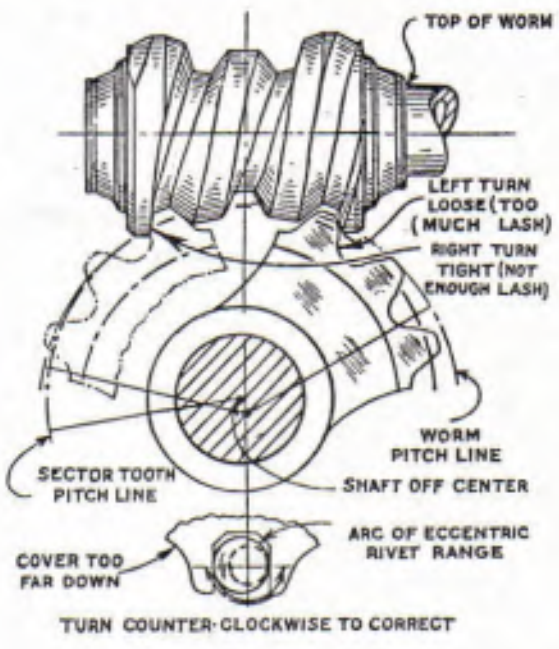



Fig. 130

half revolution to the left of center, and shake steering arm to see if there is any difference in the amount of lash in the arm as compared with other location (see Fig. 129).

If there is less lash when steering shaft is turned to the left, slightly move eccentric rivet in a clockwise direction (see Fig. 129).

If the lash is less when the shaft is turned to the right one-half turn than it was when the shaft was turned to the left, move the eccentric rivet a small amount in an anti-clockwise direction (see Fig. 130).

When the amount of lash of the steering arm is equal when the steering shaft is turned both right and left one-half turn from central position, adjust for proper mesh of sector teeth in worm as described under heading "Adjustment for Proper Mesh of Sector Teeth in Worm."

After making final adjustment, securely tighten mesh adjustment jam nut, then follow by tightening housing cover nuts. It is important that the jam nut be tightened first.

## End Play of Worm Shaft

End play of the worm shaft is adjusted by the removal of shims from beneath the housing cap (see Fig. 126). The necessity for this adjustment is an indication of excessive wear and the entire assembly should be removed and reconditioned.

## Tools for Reconditioning the Steering Gear

The simplicity of the steering gear permits easy dismantling and the replacement of any parts. Suitable tools for the reconditioning of the car and truck steering gears are available through K. R. Wilson, Buffalo, N. Y. Tools for the car steering gear are as follows:

BV-21 Puller for steering wheel. This tool is also adaptable to the "A" steering gear; however the A-373 is not adaptable to the "B" wheel. Fig. 131 shows this tool in use.

BV-20 Puller for steering arms. This tool is very necessary as the sector shaft and the arm are tapered as well as serrated and the arm is very difficult to remove. The use of this tool is illustrated in Fig. 132.

BV-34 driver for removing bearing cup.

BV-35 driver for installing bearing cup.

A-345 offset screw driver.

BV-12 tool for removing the B-3731 stud from the steering lock assembly.

Reamers and bushing drivers are available for rebushing the steering gear housing covers.

## Disassembly and Inspection

The steering gear should be removed from the car and disassembled. The parts should be washed in kerosene and each part carefully examined for wear. The lower bearing cup in the housing and the bushing in the steering column tube should also be inspected and replaced if required. New gaskets should be installed when reassembling. Inspect each gasket before installing; see that the surface against which it fits is clean and in good condition.

The B-3517 and B-3533 bushings may be lubricated with C. P. castor oil before assembly.

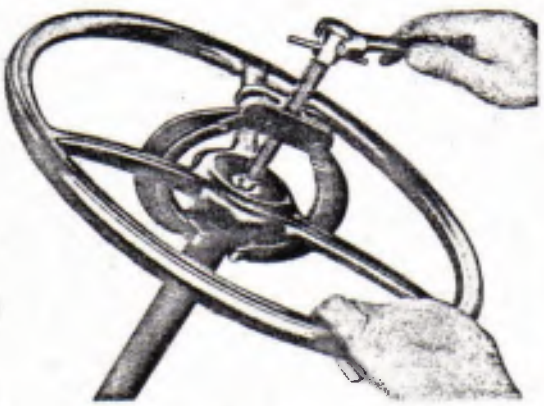


Fig. 131

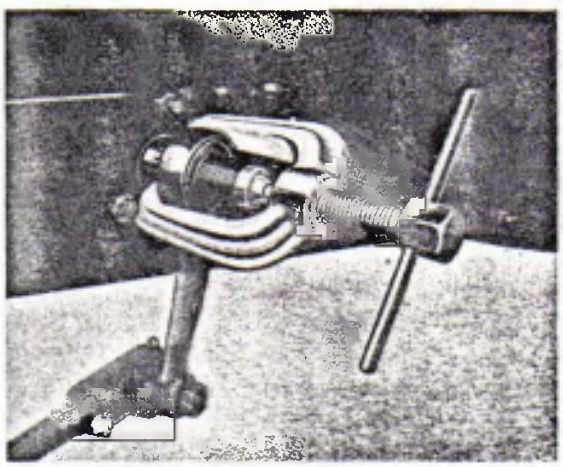


Fig. 132

### Assembling

Insert steering shaft assembly into housing being sure lower bearing is in proper position.

Adjust end play of the worm to not less than .002″ and not more than .010″. With this adjustment the B-3562 or BB-3562 spring tension is from 500 to 700 pounds which has proven the most satisfactory tension for absorbing worm thrusts.

Less than .002″ end play when the thrust spring is completely compressed will result in hard steering and excessive wear of the bearings.

More than .010″ end play when the spring is completely compressed will result in misalignment of bearings with their cups and resultant premature wear as well as making other steering gear adjustments inaccurate.

When the steering gears are built, a .010″ shim is placed on top (see Fig. 126). Usually when in time adjustment of the worm end play becomes necessary, the removal of the top shim will give the correct adjustment.

Do not attempt to attain the .002″ to .010″ clearance by adding shims. **The necessity for additional shims indicates incorrect assembly which should be corrected.**

After making this adjustment, turn steering shaft until keyway in shaft lines up with oil filler plug (see Fig. 126).

Reassemble sector shaft, replacing the cork gasket, and adjust sector shaft end play and mesh as outlined on Pages 79 and 80.

When reinstalling the steering gear assembly in the chassis be sure to secure the steering column at the B-3675 bracket before securing the assembly at the frame side member. This will permit the column to align itself. Failure to take this precaution may result in undue distortion, hard steering and subsequent failure of the gear.

**If when the steering gear was disassembled the presence of grease or other than the correct lubricant is noted, be sure to caution the owner against their use.**

## CLUTCH RELEASE BEARING GREASE CONNECTIONS

Three different types of grease connections are supplied for service on the current models, as follows:

18-7557-C—These connections are $5\frac{27}{32}$″ long and are used on V-8 cars having the grease cup located on the top of the clutch housing portion of the transmission case, but without the handhole cover at this point.

18-7557-D—These connections are $6\frac{1}{2}$″ long measuring the overall length as shown in Fig. 133. These grease connections are used on V-8 cars having the grease cup on the side of the transmission case.

B-7557-B—These grease connections are $6\frac{3}{4}$″ long when measured as shown in the illustration (see Fig. 133) and are used on all "B" and "BB" chassis, as well as on all V-8 chassis having the handhole cover in the clutch housing portion of the transmission case.

Dealers' mechanics and stock men should be familiar with all three types as much inconvenience and delay may be avoided by ordering the correct parts.

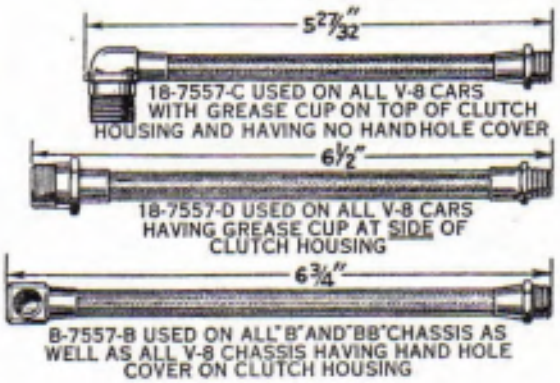



Fig. 133

## SIDE WHEEL CARRIER INSTALLATION

Instructions for installing side wheel carriers on the B and V-8 Chassis were given in the August issue of the FORD SERVICE BULLETIN on Page 50 (see Fig. 78).

The upper rivet shown in Fig. 78 used to establish the $3\frac{7}{16}$″ dimension for the location of the holes to be drilled in the dash can no longer be used for this purpose due to a slight change in the location of this rivet.

These holes may now be located by drilling through the small impression found in the dash for this purpose.

Dealers and dealers' service managers should immediately make the necessary marginal notes on Page 50 of any copies they may have of the August issue of the FORD SERVICE BULLETIN.

# FUEL PUMP

A new fuel pump has been released for production on the V-8 engine as shown in Fig. 135. These fuel pumps differ in operation from the former type in that the down or intake stroke of the diaphragm is completed on the high side of the camshaft eccentric instead of the low portion of the eccentric as was true of the original design. In this respect these new V-8 fuel pumps are the same as the 4-cylinder fuel pump.

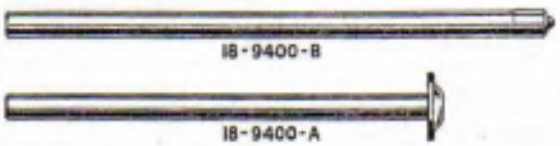



Fig. 134

A new fuel pump push rod 18-9400-B is used with the new fuel pumps as shown in Figs. 134 and 135 and may be identified from the alternate design by the absence of the flange at the upper end as shown in Fig. 134.

## Operation

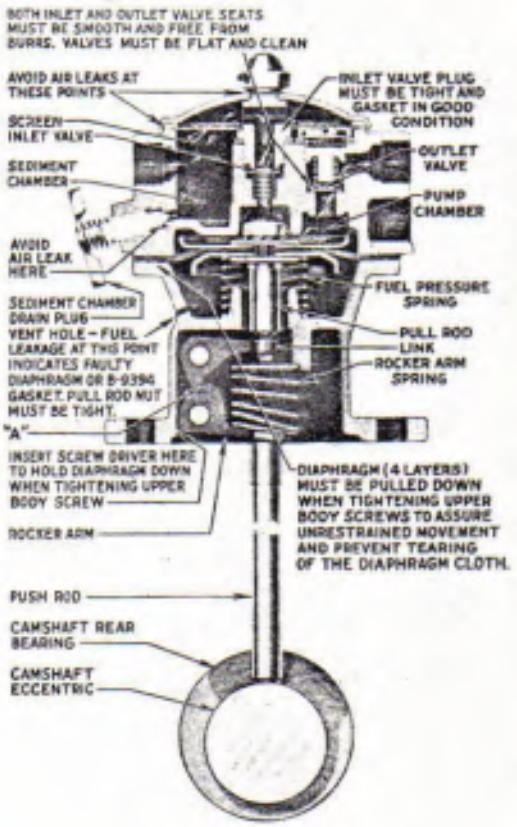
The operation of these new V-8 fuel pumps is as follows: The 18-9400-B push rod lifts the 18-9377 rocker arm, which action causes the lug "A" (see Fig. 135) to push against a similar lug on the 18-9383 link, resulting in the link moving downward pulling the 18-9405-B pull rod and the diaphragm down.

When the 18-9400-B push rod is on the low portion of the eccentric the 18-9384 spring pushes the 18-9377 lower arm downward serving the same purpose of the B-9380 spring on the 4-cylinder fuel pump (see Figs. 141 and 142).

The difference in operation of these new pumps as compared to the original design can be readily seen by a comparison of Figs. 16 and 135, paying particular attention to the above paragraph as compared to the first paragraph on Page 12 of the June, 1932, SERVICE BULLETIN.

## Repairs Made Without Disturbing the Pump Installation

It is possible for a few adjustments to be made on any of the fuel pumps to correct certain troubles without removing the pump from the engine. These troubles and remedies are as follows:




V-8 ROCKER ARM TYPE FUEL PUMP

Fig. 135

### 1. Loss of Vacuum

This permits the pump to pump air instead of fuel. Tighten all pipe connections at gasoline tank and at pump. See that there is no air leak at cover, cover nut or drain plug. The tightening of the cover nut and drain plug would have corrected the trouble experienced with 75% of the pumps that have been returned as defective.

### 2. Dirty screen

Remove cover plate and clean screen, observing that the B-9357 and B-9364 gaskets are in good condition and are properly seated when reassembling the B-9355 cover. Failure to take this precaution may result in loss of vacuum as described above.

If the screen is badly distorted install new screen as shown in Fig. 138.

### 3. Leakage around edge of cover plate

Tighten cover plate nut making certain that both the B-9357 and B-9364 gaskets are unbroken and in good condition, also inspect inlet valve seat.

### 4. Loose valve plugs

Remove cover plate and screen, tightening both inlet and outlet valve plugs securely, replacing valve plug gaskets if required.

### 5. Leakage at diaphragm flange

Tighten upper body screws evenly and securely.

**NOTE:** Presence of fuel at diaphragm flange does not always indicate leakage at that point. The leak may actually exist under the cover plate or at the pipe fittings, and the fuel allowed to run down to the diaphragm flange, appearing to originate there. It is also advisable to check and make certain that the drain plug is seated properly and is not allowing leakage at that point.

Figs. 15, 16 and 135 are sectional views of the pumps. Fuel leakage at the vent hole is an indication of the diaphragm or the B-9394 gasket leaking, in which case repairs are made by disassembling the fuel pump. (Care should be taken in removing the pump from the 4-cylinder crank case not to damage the rocker arm or body of the pump.)

Before disassembling the pump, a mark should be made across the edge of the upper and lower pump body to facilitate proper reassembly. If the diaphragm is punctured or worn out, replace complete diaphragm. Do NOT attempt to replace just one or two layers, but replace all four layers.

Diaphragms are supplied in cartons containing 40 layers (10 set). Keep your stock in these cartons, they afford excellent protection for the diaphragms

If the valves stick, remove both inlet and outlet valve plugs, valve springs and valves. Wash valves in gasoline. Examine valve seats to make certain there are no irregularities which prevent the valve from opening or closing properly. Replace valve if worn or warped. Reassemble valve using new gaskets under valve plugs. (A drop of oil on a new valve before installing will assist in first priming.)

In case of a loose outlet valve seat, it will be necessary to replace fuel pump upper body.

In case of fuel leakage around pull rod evidenced by gasoline dripping out of the pump body through vent hole in lower body, replace pull rod gasket and diaphragm if needed, reassemble diaphragm washer and tighten pull rod nut securely, using the V-83 wrench to prevent wrinkling the diaphragm (see Figs. 141 and 142).

In case of leakage at diaphragm flange, replace diaphragm, tightening cover screws alternately and securely. **Do not use shellac or any other adhesive on diaphragm.**

## Procedure in Assembling

As many service operations require either a complete or almost complete disassembly of the fuel pump, it is imperative that the operator follow the systematic procedure and order of assembly, in order to save time and in order to make certain that the pump will function properly when reassembled. Unless the instructions are followed, there is no assurance that the pump will operate properly when reassembled on the engine.

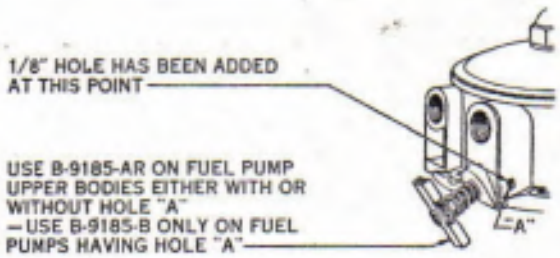



Fig. 136

A 1/8" hole has been added to the upper bodies of all fuel pumps as shown in Fig. 136. A different drain plug B-9185-B is used in conjunction with these drilled upper bodies on production as shown in Fig. 137.

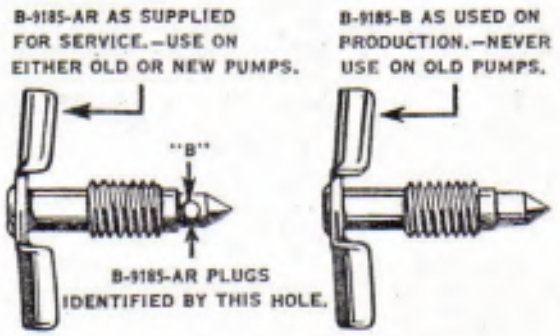



Fig. 137

The B-9185-B drain plugs are used in production on fuel pump upper bodies having the 1/8" hole as shown in Fig. 136. These plugs are not supplied for service as the B-9185-AR drain plug can be used on fuel pump upper bodies either with or without the 1/8" hole.

If the B-9185-B plug were installed on a fuel pump not having the ⅛" hole it would be necessary to completely remove the plug to drain the sediment chamber.

NEW DESIGN ORIGINAL DESIGN

Fig. 138

To prevent the possibility of the high vacuum developed in the pump chamber from distorting the inlet screen a stiffener has been incorporated in this part as shown in Fig. 138. Mechanics should note the condition of the old design screens when reassembling fuel pumps, replacing the old design screen with a new design screen if its condition warrants it. Old and new designs are illustrated in Fig. 138.

Fig. 139 illustrates all of the component parts of the upper body of the 4-cylinder fuel pump positioned in the manner in which they are assembled.

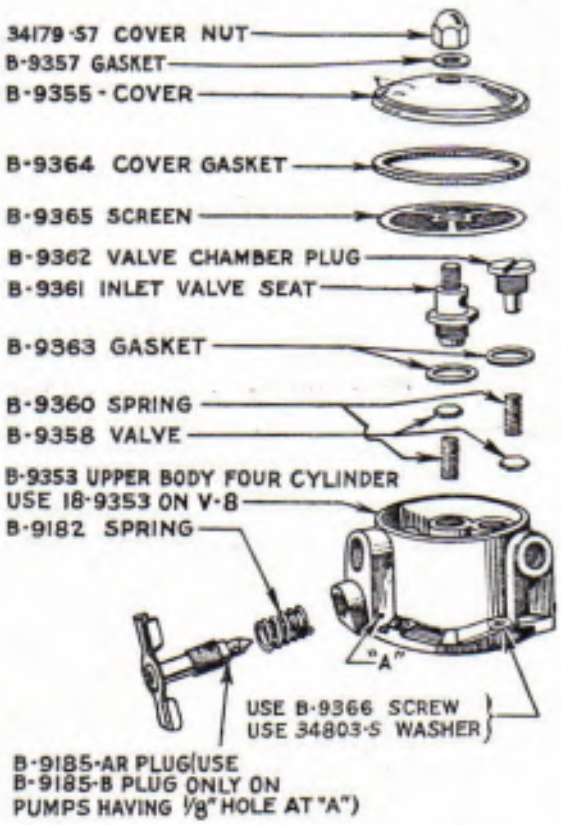



Fig. 139

The V-8 fuel pump uses 18-9353 upper body aside from this Fig. 139, applies equally to either the 4-cylinder or V-8 fuel pump upper body.

## Valves and Cover

Before installing valves in pump upper body, blow out both valve chambers to make certain there are no foreign particles present and ascertain that no burrs or irregularities exist in the valve seats which would prevent the valves from closing properly. A drop of oil placed on each fibre valve before installing will assist in first priming.

Assemble inlet valve spring in pump upper body, making certain that bottom coil of spring rests flat in its seat.

Place fibre valve on top of inlet valve spring.

Assemble inlet valve plug, using valve plug gasket and tightening securely.

Place outlet fibre valve in position in upper body on top of outlet valve seat.

Place outlet valve spring on top of fibre valve and assemble outlet valve plug, using valve plug gasket and centering pilot of outlet valve plug in valve spring. Tighten plug securely.

Place strainer screen in position on top of upper body, making certain that it fits snugly around the gasoline inlet and edge of upper body. Screen should be flat and not buckle at any point.

Assemble cork gasket in cover plate and install cover plate in position on top of pump. Use care to see that gasket seats properly and strainer screen is not wrinkled or distorted.

Place small gasket and cover plate nut on top of cover plate, tightening securely.

Place drain valve spring on stem of drain valve and insert drain valve in proper opening in the side of the pump.

## Assembling the Diaphragm

On the new V-8 fuel pump or the pump used on the 4-cylinder engines (see Figs. 141 and 142) it is necessary to complete the assembly of the diaphragm and pull rod outside of the pump body.

Different pull rods are required for the 4-cylinder and V-8 fuel pumps as follows:

18-9405-B pull rod $1\frac{13}{16}$" long overall used on V-8 rocker arm type fuel pumps (see Fig. 142).

B-9393 pull rod $2\frac{1}{8}$" long overall used on 4-cylinder fuel pumps (see Fig. 141).

Mount pull rod in bench vise, engaging flatted end of pull rod between jaws of vise.

Place pull rod gasket over threaded end of pull rod.

Place diaphragm protector lower washer, with dished edge down or away from diaphragm, over threaded end of pull rod.

Place four layers of diaphragm cloth over threaded end of pull rod, on the 4 cyl. fuel pump line up tabs on circumference of diaphragm with center line of flats on pull rod (see Fig. 140).

On the V-8 rocker arm-type line up tabs so as to bring center line of pull rod flats midway between the tabs and the next nearest hole.

Place upper diaphragm protector on top of four layers of diaphragm cloth over threaded end of pull rod with dished edge away from diaphragm.

Place diaphragm alignment washer, pull rod lock washer, and pull rod nut on threaded end of pull rod, tightening nut loosely with fingers.

Tighten pull rod nut securely, holding diaphragm alignment washer with V-83 wrench. Holding alignment washer with special wrench prevents diaphragms from twisting or turning. **IMPORTANT:** Make certain that diaphragms do not change position or become wrinkled, and that tabs are in correct location with center line of flats on pull rod as described above.

Remove completed diaphragm assembly from bench vise and place pump body in vise, holding mounting flange of pump between jaws of vise.

Place diaphragm spring in position in pump body with lower end over boss, as shown in Figs. 15 and 135.

Dip diaphragm and pull rod assembly in kerosene and install in pump body. Tabs on the diaphragm should be 30 degrees to one side of the centerline of the rocker arm on the V-8 rocker arm type fuel pump. On the 4-cyl. fuel pump the tabs on diaphragm should be in line with rocker arm. Push downward against diaphragm spring pressure, and engage flatted end of pull rod into slot in end of link; turning diaphragm assembly 90° right or left leaves diaphragm assembly in its proper position.

**NOTE:** If holes in diaphragm do not line up with holes in mounting flange when diaphragm assembly is turned 90°, turn slightly so that diaphragm holes line up with holes in flange and the tabs are at a point nearest 90° from original position (see Fig. 140).

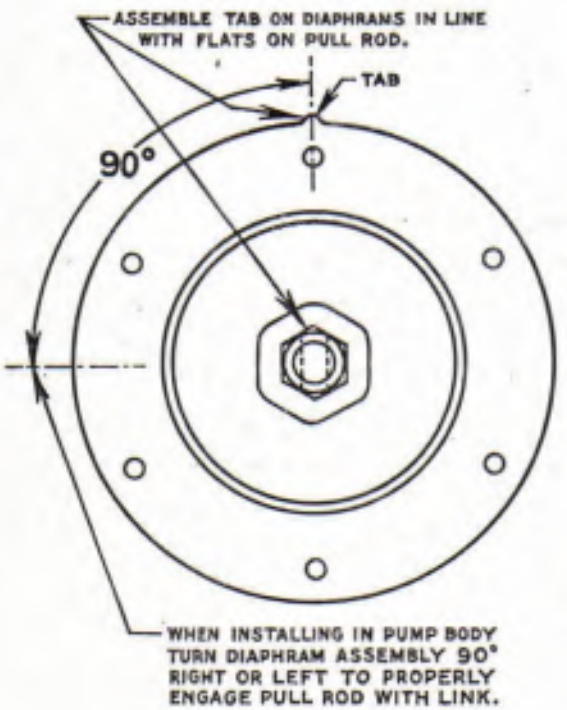



Fig. 140

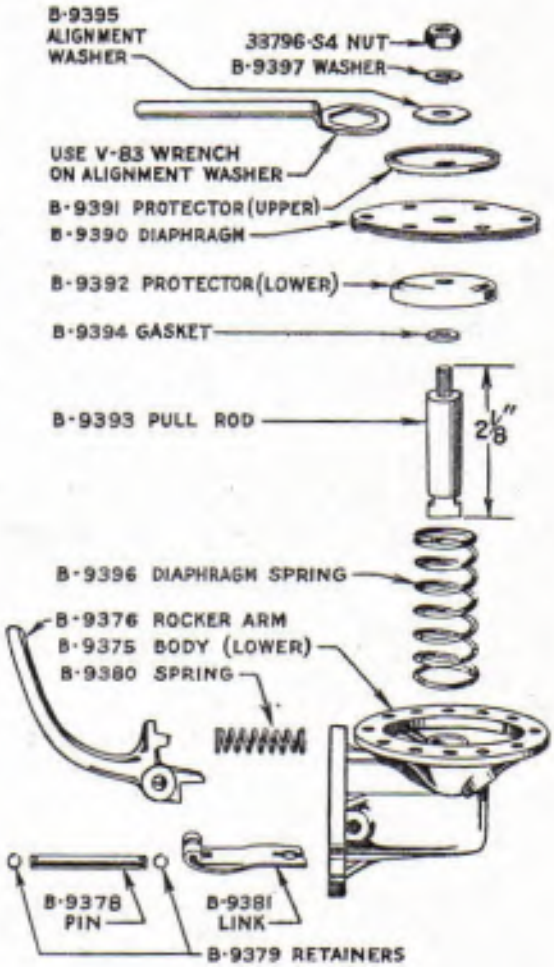



Fig. 141

Fig. 141 illustrates all of the component parts of the lower body of the 4-cylinder fuel pump.

Fig. 142 illustrates all of the component parts of the lower body of the new V-8 fuel pump described on preceding pages (see Fig. 135).

By referring to these illustrations no trouble should be experienced in assembling either of these pumps.

To replace any parts of the lower body assembly exclusive of the diaphragm assembly on either the new V-8 or the 4-cylinder fuel pump the rocker arm, link and spring can be removed by removing the rocker arm and link shafts (two shafts 18-9378 on the new V-8 pump, one B-9378 pin on the 4-cylinder).

The B-9378 pin on the 4-cylinder pump is held in place by two B-9379 retainers.

The 18-9378 pins on the new V-8 pump are held in place by upsetting or swedging both ends of the hole in the lower body.

When assembling the B-9381 link in the 4-cylinder pump be sure the loop is up as shown in Figs. 15 and 141.

## Upper and Lower Body Assembly

1. Place upper body assembly in proper position on top of lower pump body.

2. Drop cover screws into proper holes in cover, using lock washers, and making certain that screws pass through the four layers of diaphragm correctly.

3. Tighten screws slightly so that a **light** tension is placed on the lockwashers.

4. With diaphragm in its **lowest possible position** (attained by pressing the rocker arm in to the limit of its travel [see note on Fig. 135]), or at the highest possible position (attained by pressing the 18-9383 link "in" by means of a small rod through the hole in the end of the 18-9377 rocker) tighten cover screws alternately and securely.

## Fuel Pump Test

There are different ways of checking the suction and pressure of the pump when it is not mounted on the car. One of these is to assemble a gasoline line about three feet long to the inlet of the pump; then by placing the lower end of the this line in a tank of fuel and manipulating the operating sleeve or rocker arm, observe whether or not there is a suction and pressure. The pump should force fuel from the outlet opening with this method of test, raising the fuel at least thirty inches with a maximum of forty strokes. If fuel does not appear on the outlet opening with this number of strokes, the pump will not function properly and the pump must be disassembled to locate the cause.

A simple check of the suction and pressure may be made by holding the fingers over the inlet and outlet of the pump, manipulating operating sleeve or the rocker arm. Whenever possible, reinstall the pump on the car and check it by watching the priming action. A pump properly repaired and installed will prime itself—that is, show a flow of fuel at the outlet of the pump, when the starter is depressed, in about twenty seconds or less.

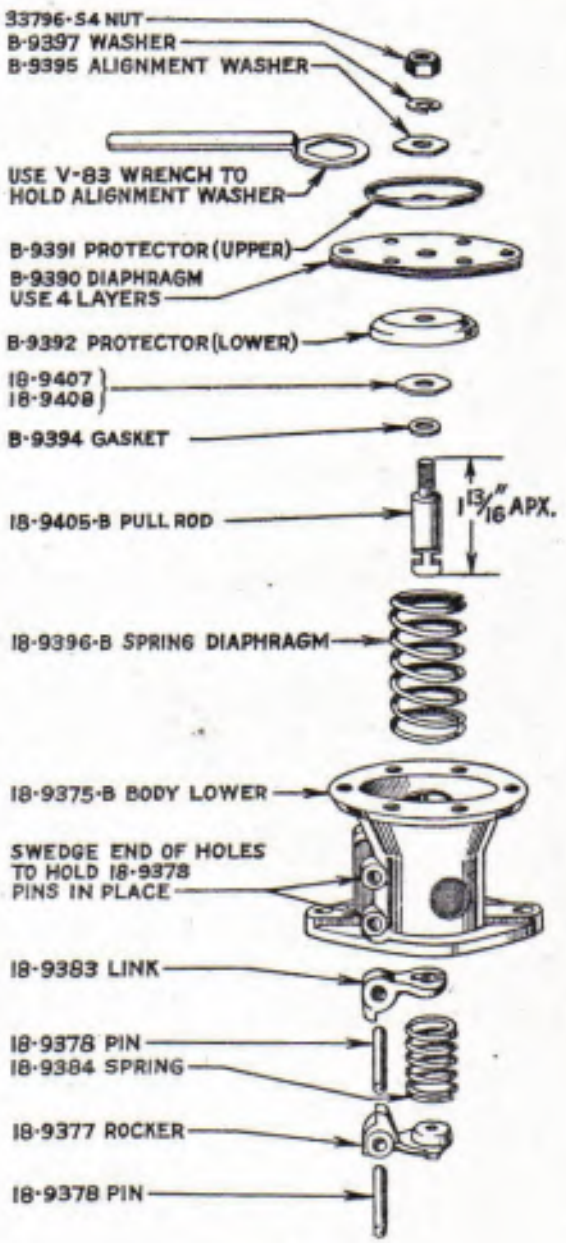



Fig. 142

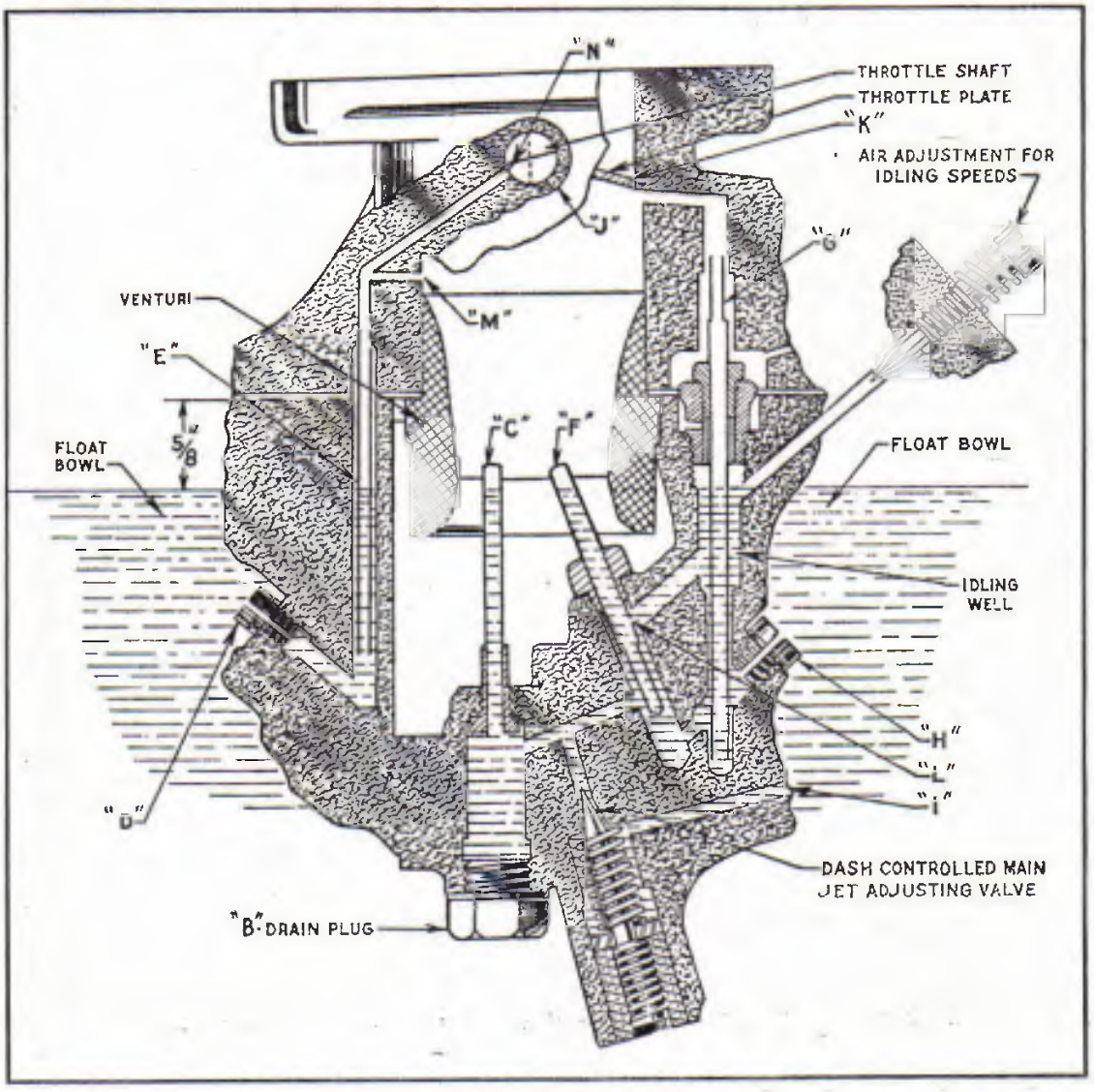



Fig. 12

weight responds more quickly to the throttle movement.

As the carburetor is almost entirely automatic in action there is little cause for carburetor trouble and with occasional cleaning the carburetor will operate efficiently for the life of the car.

In cases of suspected carburetor trouble or complaints of poor fuel economy, first check spark plugs, breaker points, compression, etc., before removing the carburetor. Many so-called carburetor troubles may be traced to one or more of the following causes:

Dirty spark plugs; points incorrectly spaced —clean points and set gap.

Breaker contact points burnt or pitted—dress points down with an oil stone and set gap with breaker arm on high point of cam. (Excessive pitting is usually an indication of a faulty condensor or a poor battery connection.)

Leaky manifold, windshield wiper line, or carburetor connection—with engine idling slowly flow a little oil on joints, if engine picks up speed there is a leak.

Poor compression—check compression in each cylinder by turning engine over slowly with hand crank.

Brakes dragging—jack up car and see that all wheels revolve freely and that the brake pedal has a "live" feel when released.