SUPPLEMENT

Hudson

MECHANICAL PROCEDURE MANUAL

480 - 490 SERIES

FOREWORD

This manual is a supplement to and is to be used in conjunction with the 480-490 Mechanical Procedure Manual.

For quick reference, all service procedure changes and corrections in this supplement refer to group and page numbers as set forth in your 480-490 Mechanical Procedure Manual.

An alphabetical index of the contents of this supplement is on the following page.

This manual provided by
HET Club member
Drew Meyer

ALPHABETICAL INDEX

SECTION 2
ENGINE TUNE-UP

VACUUM TEST - PAGE 2-2

Paragraph 4 should read: An engine in good condition will show a steady or slightly fluctuating high vacuum reading of from 17" to 18". Vacuum readings are affected by altitude. Over 2000 feet the vacuum gauge will show about one inch lower for each one thousand feet elevation.

SPARK PLUGS - PAGE 2-4

A new spark plug H-8 Champion will replace Champion J-7 or J-9 for cast iron heads and replace Champion H-10 for aluminum heads. The new H-8 plug will be the new service replacement for all models in the 480490 series.

VALVES AND TAPPETS - PAGE 2-4

Valve clearances are the same for 6 and 8 cylinder engines as follows: Intake; 6 or 8 cylinder, .008 Exhaust 6 or 8 cylinder, .010.

GENERATOR TEST - PAGE 2-13

A few of the 490 series cars were equipped with a "SHUNT WOUND" generator an d a "VIBRATING TYPE" current-voltage regulator. These units can be identified as follows: Generator No. GDZ-6001-B stamped on generator name plate. Voltage Regulator No. VRP-6002-A stamped on upper face of regulator base. For Adjustment and Repair procedures refer to your "500 Series" procedure manual under "Engine Tune-Up" Section 2 and Section 6, "Electrical".

FUEL PUMP TEST - PAGE 2-14

Paragraph No. 1 should read: Remove and clean the fuel pump sediment bowl and screen on A/C pumps. It should not be necessary to clean the Carter Fuel Pump screen except when the pump is removed for a general overhaul.

Paragraphs No. 4, 5 & 6 should read: Start the engine and run engine at 1800 RPM. Normal pressure should be 3-1/2 to 4-1/2 pounds on the standard A C pump, 3 to 4 pounds with A C combination fuel and vacuum pump and 4 to 5 pounds with Carter M-729-SZ pumps. (Number stamped on front face of mounting flange.) If pressures are lower than the above, examine the fuel line for dents or kinks which would restrict the flow of fuel.

Stop the engine and watch pressure gauge. Pressure should not fall perceptibly after engine is stopped.

If pressure falls, leaking pump valves are indicated.

If pressure is below specifications, attach a vacuum gauge to the inlet port of pump and operate engine. Gauge should show 6" of mercury or higher for satisfactory operation.

If fuel pump pressure is low, but vacuum reading is satisfactory, difficulty is in the gasoline tank or lines to the pump.

If pump pressure and vacuum are both low, pump should be overhauled or replaced.

AIR CLEANER OIL BATH - PAGE 2-15

Paragraph 5 should read as follows: On all 480 series 6 cylinder engines and 490 series 6 cylinder engines including car serial No. 492-51250 with aluminum manifolds and serial No.491-76450 with cast iron manifolds, the intake manifold carburetor mounting flange was machined on the same plane as the cylinder head resulting in a rearward tilt of the carburetor due to the angle of securing the engine in the frame. On these cars it is recommended to refill the reservoir with 3/4 of a pint of 50 S.A.E. engine oil for temperatures above 32° F and 20 S.A.E. for lower temperatures.

On all 6 cylinder engines after the above serial No's. a new intake manifold is used with the flange angle changed to compensate for the angle at which the engine is secured and allows the carburetor to set in a vertical position when mounted. On 6 cylinder engines with this later type intake manifold and on all 8 cylinder engines, refill the air cleaner reservoir to the oil level line with one pint of 50 S.A.E. engine oil for temperature above 32° F and 20 S.A.E. for lower temperatures and reinstall air cleaner reversing procedure of removal.

FAST IDLE ADJUSTMENT - PAGE 2-17

Refer to "Fuel System and Exhaust" Sect ion 4, Page 17, for the new procedure in checking the fast idle adjustment.

SLOW IDLE ADJUSTMENT - PAGE 2-17

Refer to "Fuel System and Exhaust" Section 4, Page 17, for the new procedure in checking the slow idle adjustment.

SECTION 3

ENGINE

LUBRICATION - PAGE 3-8
(6 CYLINDER)

Full pressure lubrication to friction surfaces of the engine is maintained by a rotor type centrifugal pump mounted on the right side of the cylinder block. The pump is driven by a worm gear on the camshaft. Oil is drawn through the suction side of the pump by means of a pipe connecting to a floating screen in the oil pan. The oil is then forced up into the horizontal oil gallery for distribution to the valve tappets, camshaft bearings, main bearings, connecting rod bearings, pistons, piston pins and bushings, timing chain and sprockets and all other movable parts requiring lubrication, Figure 10.

NOTE: Normal oil pressure is 40 lbs. at 30 M.P.H.

OIL PAN TRAY BAFFLE - PAGE 3-14 (8 CYLINDER)

A sheet metal baffle has been added to the oil pan tray as shown in Figure 1.

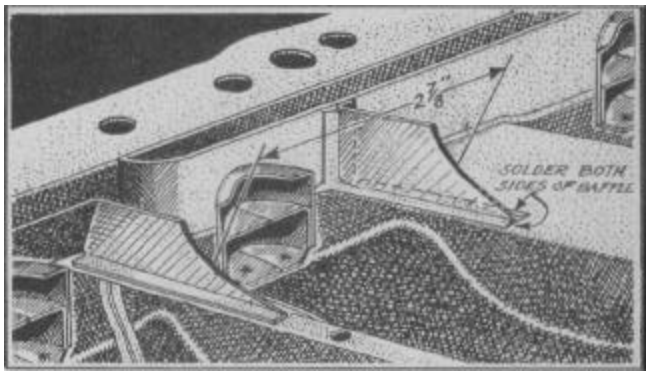


FIGURE 1

The addition of this baffle gives better control of the movement of the oil in the oil pan t r a y, raising the level of the oil in the tray for better lubrication.
This baffle Part No. 302539 became effective in production on all 8 cylinder engines after March 1, 1949 and can be installed on previous models by soldering as illustrated in Figure 1.

OIL PAN INSTALLATION - PAGE 3-14
(6 AND 8 CYLINDER)

CAUTION: The cylinder block machining locating hole at the left rear side of the cylinder block base is so located that one half of the hole opens into the crankcase. A cup shaped plug 9/16" outside diameter is used to close this hole after machining, Figure 2.
Always check to see that this plug is in position

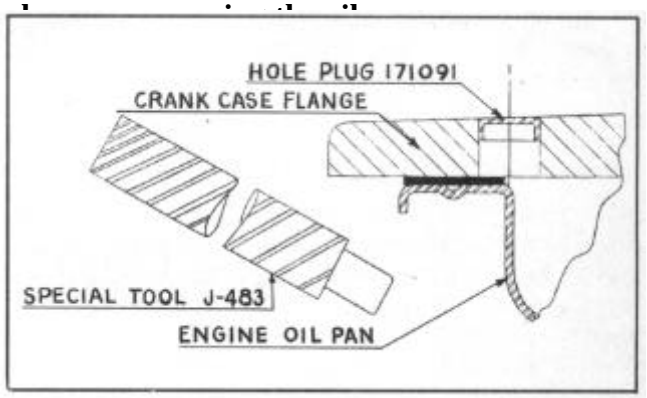


FIGURE 2

A new plug can be installed (with J-483 vibration dampener installer tool handle) from below the engine with the oil pan removed, or from above by removing the starter motor; always apply white lead or sealer to the cup before installation; plug should be positioned as shown in Figure 2.

MAIN BEARINGS - PAGE 3-16 (6 CYLINDER)

It is recommended that a KMO-500 Oil Leak Detector be used before disassembling an engine for repairs, to check the condition of all main, connecting rod and camshaft bearings and leakage points due to breaks and cracks in the main oil header or other internal oil line s. The oil leak detector is equally valuable in obtaining a final check on a complete bearing replacement job. To use the KMO-500 Oil Leak Detector proceed as follows:

1. Remove the filler plug (H) Figure 3, and fill the tank with 5 quarts of S.A.E. No. 30 oil.

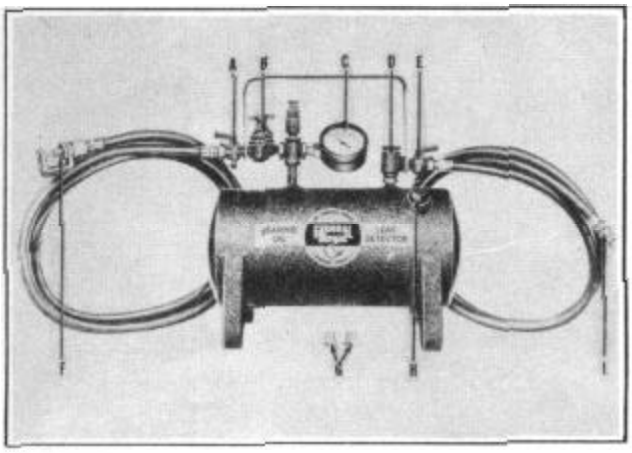


FIGURE 3

2. Remove the oil sender gauge (manifold side) and connect the detector hose (I) direct to the oil sender gauge stand pipe using adapter fittings (G).

3. Connect detector hose (F) to air supply line.

CAUTION: Make sure valves (A) and (E) are turned to the off position before turning on air supply.

4. Raise car and remove oil pan as outlined on page 3-14, 480-490 Procedure Manual.

5. Open shut-off valve (A) admitting air into the detector tank.

6. Adjust pressure reducing valve (B) until air pressure gauge (H) shows 25 pounds pressure.

7. Open shut-off valve (E) admitting oil under 25 pounds pressure to engine oil system an d recheck gauge pressure. (Recheck pressure from time to time as the work progresses.)

8. The bearing condition is indicated by drip or leakage from the ends of the bearings as follows:

A. If this leakage occurs in a steady stream it is evident that there is some fault in the bear in g - badly worn so that excessive clearance exists, lining cracked etc. and that bearing should be removed and carefully checked.

NOTE: Care must be used to differentiate between a stream of oil coming from a faulty bearing and a stream existing because of registration of oil holes (such as spurt holes in connecting rods for cylinder bore and piston pin lubrication.)

B. If the leakage occurs in drops of such a size and shape that a time element can scarcely be noted between drops, that bear in g also is open to suspicion and should be investigated.

C. If no leakage at all is observed the bearing may be too tightly fitted or an obstruction in the oilway to that bearing may exist, (There must be a flow of oil).

D. If the leakage amounts to twenty-to one hundred and fifty drops per minute a satisfactory bearing is indicated.

NOTE: The oil flow described applies only with S.A.E. 30 oil at normal temperatures and an air gauge pressure of 25 pounds.

NOTE: It is usually necessary to reposition the crankshaft for each bearing so that the leakage from the bearing you observe can be properly segregated and not confused with the leakage from another point.

9. After all bearings have been checked the shut-off valves (A) and (E) should be closed (to relieve pressure in the lines), before being disconnected from the air source and engine.

CAUTION: If it is necessary to refill the tank during the checking operation, the tank must be relieved of pressure before removing filler plug (H).

MAIN BEARINGS - PAGE 3-16
(6 CYLINDER)

INSTALLATION:

Recommended main bearing clearance is 0.0005" to 0.0015". These close clearances must be maintained when fitting new bearings.

One method for checking bearing clearance is as follows:

1. Inspect the crankshaft for scoring, out of round and taper. Crankshafts with journals that have more than .001" taper or out-of-round, should be reground or replaced.

2. Install all bearings and bearing caps and tighten all bearing cap screws to 75-lbs. torque.

3. Rotate crankshaft by hand, if crankshaft can be turned by hand one complete revolution; bearing to journal clearance is at least .0005". If crankshaft cannot be turned by hand; bearing fit is too tight.

4. If crankshaft turns too freely, check for loose bearings working one bearing at a time by placing a piece of brass shim stock .002" thick, 1/2" wide and 1" long between the bearing face and the crankshaft journal, Figure 4.

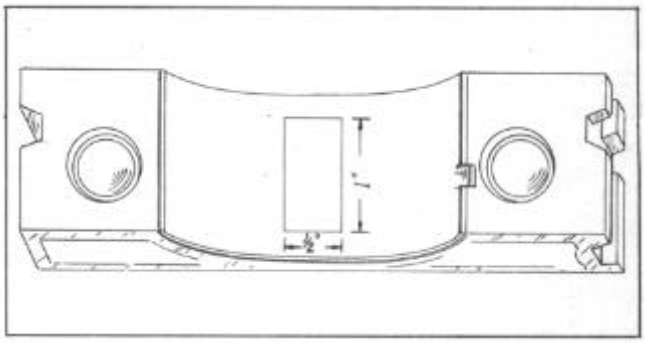


FIGURE 4

5. Oil the shim freely with light engine oil and install the bearing and bearing cap to the block with the shim equally spaced on the bearing. Tighten to 75 foot lbs.

6. Rotate the crankshaft one-half turn by hand; if the crankshaft drags or if the crankshaft cannot be turned by hand with a .002" shim in place, but turns freely without the .002" shim it indicates that the clearance is more than 0.0005" and less than 0.0015" and that the standard size bearing can be used. If however the crankshaft t u r n s freely without any drag, it indicates that the bearing which has the .002" shim stock is too loose.

7. If bearing is too loose in paragraph 6, remove the .002" shim and insert a .003" shim as a checking gauge; now if bearing drags when crankshaft is turned by hand a .001" undersize bearing can be used.

NOTE: The same procedure can be used for checking .002", .010" or .012" undersize bearings keeping in mind that the .0005" to .0015" clearance must be maintained.

It is also recommended that the KMO-500 Bearing Leak Detector be used in final checking of a bearing replacement as this unit will not only give you a recheck of your work but will also pre-lubricate the engine.

The following method recommended by a well known bearing manufacturer requires the use of a special crankshaft gauge (in combination with standard outside micrometers) to measure crankshaft journal diameters, journal taper, and out of roundness without removing the crankshaft or upper main bearings from the engine as follows:

1. Thoroughly clean the crankshaft with a cloth free of lint.

2. Thoroughly clean the crankshaft gauge and outside micrometers especially the angular pads and the faces of both buttons of the gauge, and the anvil and spindle of the micrometers.

3. Lock the plunger of the crankshaft gauge in the farthest down position with the knurled locking screw.

FIGURE 5

4. Place the gauge on the crankshaft journal, Figure 5, and rock it slightly radially several times.

5. Hold the tool firmly against the journal, loosen the thumbscrew so that the center plunger butts and you can hear it click against the shaft.

6. Turn the thumbscrew back and forth several times, then tighten, DO NOT tighten so hard that the position of the tool against the crankshaft is lost. Check this operation several times to get the feel. Accurate checking will take a little practice

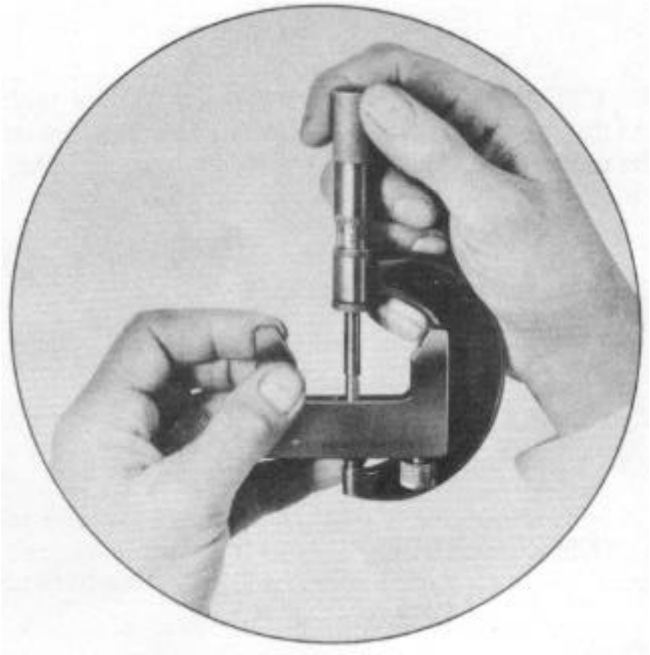


FIGURE 6

The crankshaft journal radius is obtained by accurately "miking" the distance across the two center buttons, Figure 6, and multiply this reading by 2 to obtain the accurate diameter of the shaft.

CAUTION: Micrometers must be accurately calibrated, because any error in the final reading is doubled.

The design of the tool is based upon geometrical proportion. The following is an analysis of the principles involved, as shown in Figure 7.

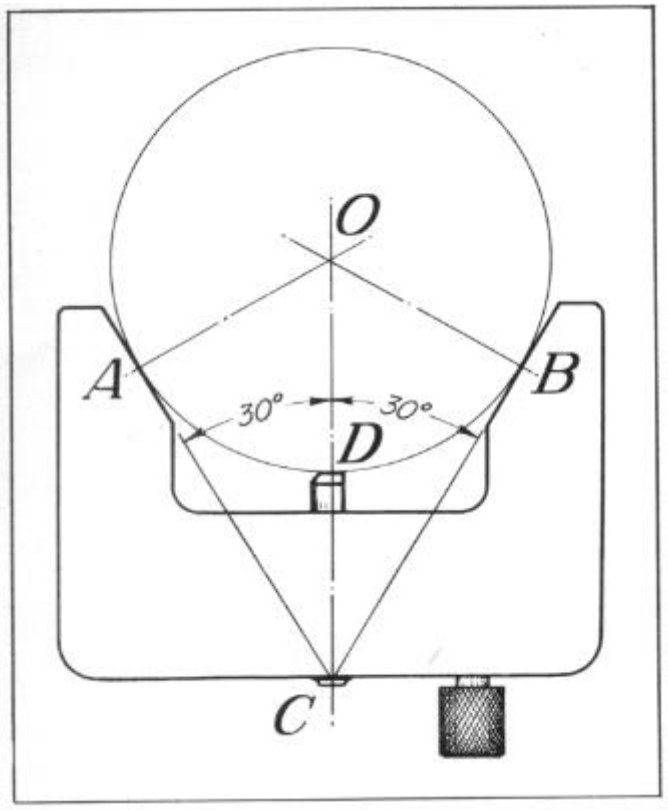


FIGURE 7

2AO = OD + DC
AO = OD
20D = OD + DC
AO = DC
OD = DC

NOTE: When checking for out of roundness or taper on any journal it is necessary to take multiple readings, working across the journal for taper checking and rotating the shaft for out of round check.

MAIN BEARING SIZES - PAGE 3-16 (6 CYLINDER)

Main bearings for the 6 cylinder engines are furnished in standard size and .001", .002", .010" and .012" undersizes.

Bearing upper and lower halves are interchangeable. However bearing No. 1 is not interchangeable with No. 2, 3 or 4. Bearing shells are stamped with the part number or size. Bearings should be replaced in pairs; never use a new bearing half with an old bearing half.

CAUTION: No. 2 and No. 3 bearing caps can be reversed in error. Always place punch marks on the caps and the block before removal to insure proper installation

SIX CYLINDER
MAIN BEARING, CRANKSHAFT, AND CAP BORE DIAMETERS

BEARING SIZE	SHELL THICKNESS	CRANK-SHAFT DIAMETER	CAP BORE DIAMETER
Standard	.0955	2.4998	2.692
	.0952	2.4988	2.691
.001 U.S.	.0960	2.4998	2.692
	.0957	2.4988	2.691
.002 U.S.	.0965	2.4978	2.692
	.0962	2.4973	2.691
.010 U.S.	.1005	2.4898	2.692
	.1002	2.4893	2.691
.012 U.S.	.1015	2.4878	2.692
	.1012	2.4873	2.691

SIX CYLINDER
CONNECTING ROD BEARING SIZES, CRANKPIN DIAMETERS AND BORE

BEARING SIZE	SHELL THICKNESS	CRANKPIN DIAMETERS	BORE
Standard	.0622	2.1254	2.2505
	.0619	2.1244	2.2500
.0005 U.S.	.0627	2.1250	2.2505
	.0624	2.1240	2.2500
.002 U.S.	.0632	2.1234	2.2505
	.0629	2.1229	2.2500
.010 U.S.	.0672	2.1154	2.2505
	.0669	2.1149	2.2500
.012 U.S.	.0682	2.1134	2.2505
	.0679	2.1129	2.2500

EIGHT CYLINDER BEARING CLEARANCE, CRANKSHAFT, AND BORE DIAMETERS

BEARING NUMBER	DIAMETRICAL CLEARANCE	CRANKSHAFT DIAMETER	BORE DIAMTER
No. 1	*.001	*2.280	*2.280 2.6550
No. 2	.001	2.312	2.6855 2.687
No. 3	.001	2.342	2.7155 2.7170
No. 4	.001	2.374	2.7475 2.7490
No. 5	.001	2.405	2.7785 2.7800

NOTE: To determine shell thickness proceed as follows:

1. Add the diametral clearance to the crankshaft diameter.

2. Subtract the total from the block bore diameter.

3. Divide the answer by two to determine the thick ness of the bearing shell.

*EXAMPLE

2.280 Crankshaft
+ 0.001 Diametral Clearance
2.281 TOTAL

2.6535 Bore Diameter
- 2.2810
2 /0.3725
0.18625 Thickness of bearing shell

EIGHT CYLINDER ROD BEARING CLEARANCE, CRANKPIN DIAMETER AND FINISHED BORE DIAMETER

BEARINGS	DIAMETRICAL CLEARANCE	CRANKPIN DIAMETERS	FINISHED BORE
No. 1 thru No. 8	.0003 .0006	1.935 1.9353	1.9353 1.9359

CONNECTING ROD BEARING .010 UNDERSIZE

No. 1 thru No. 8	.0003 .0006	1.925 1.9253	1.9353 1.9359

CRANKSHAFT END PLAY - PAGE 3-17 (6 CYLINDER)

After installation of new bearing shells, check crankshaft end play which should be .003 minimum to .009 maximum.

To check the amount of end play, measure the space between the end of the No. 3 main bearing and the adjacent side of the crankshaft. To check this accurately, mount dial indicator KMO-30 on the base of the crankcase. Set plunger of indicator against a vertical surface of the crankshaft counterweight. (Dial should be set at zero marking). End play can now be checked by prying crankshaft back and forth and note reading of indicator.

NOTE: The thrust face bearing width of the number 3 crankshaft bearing has been increased 3/16" to distribute the thrust over a greater area and improve the life of the bearing. Always use "Genuine Hudson Bearings". Refer to your parts manual for part numbers for this new type bearing.

PISTONS AND CYLINDER BLOCK - PAGE 3-21 (6 CYLINDER)

Due to an engineering change effective with car number 491-95958, production made a change in finishing the cylinder top face by machining an 1/8" deep tapered depression beginning at the valve seat

chamber and extending to the cylinder bores. Figure 8.

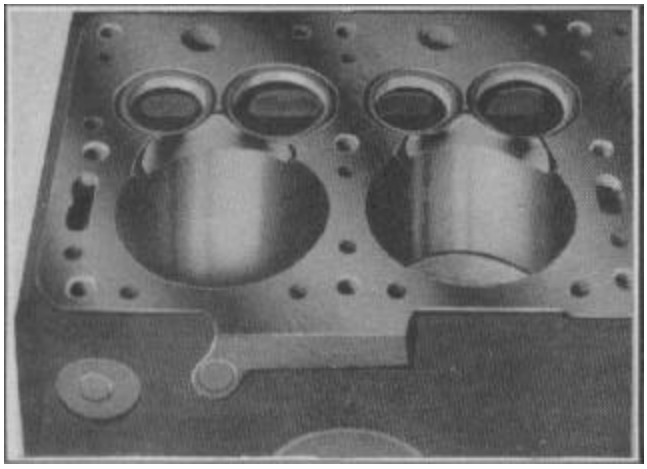


FIGURE 8

This machining change necessitated changing the position of the piston ring locating pin for the upper piston rings from 44° from a center line through the piston pin to 20° from the same center line to facilitate installation of the piston assembly.

NOTE: The old piston with the part No. 300052 cast on the inside of the piston cannot be used with the above cylinder block.

The new piston has the number 302562 cast on the inside of the piston near the piston pin boss and is the type to be used in engines with the latest cylinder machining. The casting No. 3 0 2 5 6 2 i s for identification only. Pistons must not be ordered by this number. Refer to your parts manual for correct part numbers on the new pistons.

FITTING PISTONS - PAGE 3-25

The piston skirt is cam ground and tapered. The 480-490 Mechanical Procedure Manual, Figure 26 and paragraph 2 of Fitting pistons shows the maximum skirt diameter at "A", just below the third ring groove at right angles to the piston pin. This is in error. Correction as follows: the maximum skirt diameter is below the fourth ring groove at the extreme bottom of the piston at right angles to the piston pin.

When checking piston clearance use a 1/2" feeler gauge that will extend the length of the bore. (Use a .002" feeler gauge for 6 cylinder engines and a .0015" feeler gauge for 8 cylinder).

Place the feeler gauge directly opposite the piston skirt slot when checking piston clearance.

Insert the piston with a suitable pair of piston tongs or with connecting rod fitted to t h e piston and with feeler gauge in position (.002" - 6 cylinder, .0015" - 8 cylinder), the feeler gauge should be movable under a 3 to 4 pound pull.

NOTE: Make this pull test at several points in the bore to determine that excessive taper does not exist. Piston pins should be a hand push fit when piston is heated to 200° F. DO NOT DRIVE OR HAMMER piston pins as this will distort the piston requiring rechecking piston clearances.

CONNECTING RODS - PAGE 3-28
(6 CYLINDER)

Additional information on 6 cylinder connecting rods as follows: Starting with car serial No. 482-108180 the process of rifle boring the connecting rods part 300044 for the 6 cylinder engine has been discontinued and superseded by a non-drilled rod, part no. 302293 which provides for piston pin lubrication through a drilled hole at the top of the connecting rod. Figure 9.

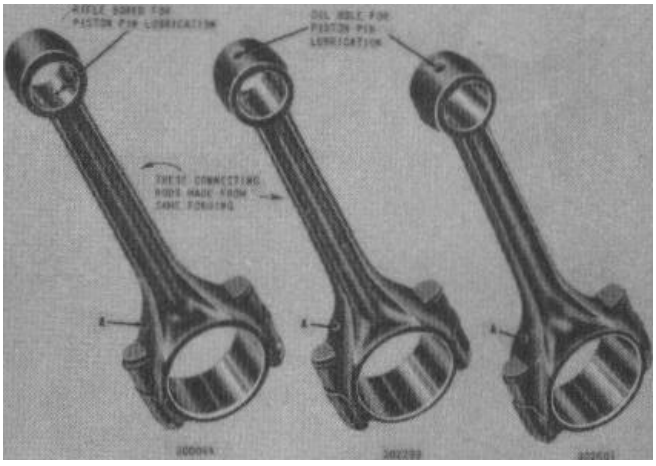


FIGURE 9

Beginning with car Serial No. 491-52515 a third type connecting rod (forging No. 302601) is used. In this type rod the "I" beam section has been changed. The center raised section has been removed and a full "I" section adopted.

Provision for lubricating the cylinder walls through a drilled hole to connecting rod bearing is retained in the non-rifle drilled connecting rods.

All three types of rods are interchangeable with each other, however they must be selected for uniformity of weight and a set of 6 rods must not vary 1/4 oz.

NOTE: It is permissible that the non-drilled rods be a 1/8 of ounce heavier as this will be compensated for by the oil weight in the rifle bore connecting rods.

CONNECTING ROD AND PISTON ASSEMBLY (6 CYLINDER)

Connecting rods and pistons must be assembled with the oil hole in the connecting rod on the opposite side of the slot in the piston, see Figure 10.

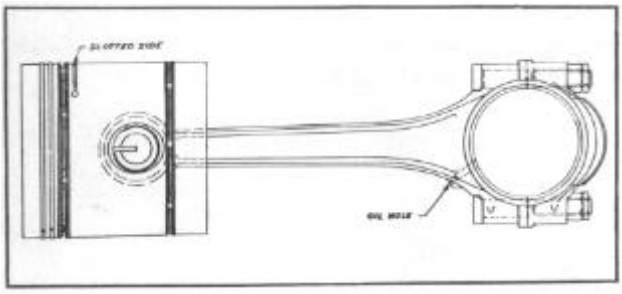


FIGURE 10

Piston and connecting rod assembly must be installed in engine with the connecting rod oil spurt hole toward the valve side of the engine.

VIBRATION DAMPENER - PAGE 3-30

Vibration dampener Part No. 300098 was used on all the 480 models and on 490 series up to June 13, 1949. Part 300098 was superseded by Part No. 301934. This later type dampener has the front face machined at an angle to facilitate the drilling operation on the factory special balancing machine.

Six cylinder engines that have been balanced on the special balancing machine may be identified by a letter "B" stamped on the front machined face of the cylinder block beside the water pump housing. These dampeners may or may not be drilled as indicated in the cut below but are in proper balance with the crankshaft of the engine on which it was installed.

The center punch marks, one on the front end of hub, another opposite it on the pulley; Figure 11. These punch marks indicate the relative position of the inner and outer members when assembled and balanced and may also serve as a guide to the mechanic for proper assembling.

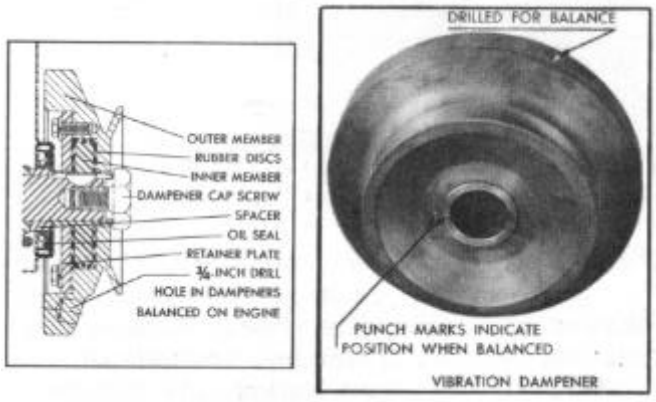


FIGURE 11

NOTE: Whenever it is found necessary to replace a crankshaft of one of these special balanced engines, always use the later type vibration dampener Part No. 301934.

VIBRATION DAMPENER - NOISE

The inner member or hub of the vibration dampener is secured to the crankshaft with a key and cap screw. The outer member is attached to the hub by means of two rubber discs, a plate and cap screws, Figure 11.

On some of the earlier models it was found that the vibration dampener became inoperative due to the outer member becoming locked by the head of the large cap screw when the screw was tightened. An inoperative vibration dampener is indicated by excessive engine roughness and vibration at approximately 24 to 26 MPH.

If an inspection proves the cap screw lock is contacting the outer member of the dampener, remove the center cap screw, bevel the outer corners underneath the hexagon head as shown in Figure 12. After re-machining, reinstall the cap screw and tighten to 110 lbs. torque; bend all lips of the locking washer over the flat of the cap screw.

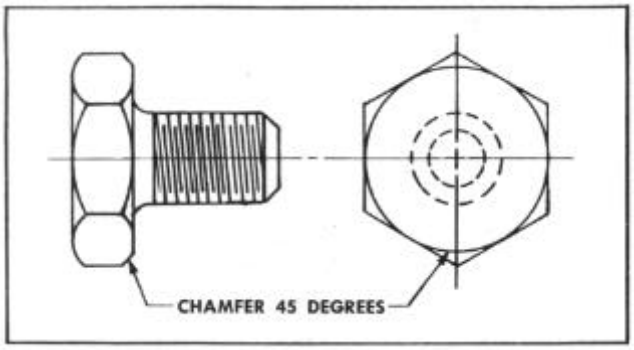


FIGURE 12

NOTE: The later type vibration dampeners have the dampener hub lengthened to provide adequate clearance between the cap screw head and the outer member.

TIMING GEARS - PAGE 3-33

Starting with car Serial No. 491-55683, an oil trough Part No. 302513 is used replacing the oil tube to convey oil to the timing chain. This change was made to eliminate the possibility of stoppage of the oil supply to the chain, due to clogging of the restricted end of the oil tube.

The new oil trough is supplied with oil from the camshaft front bearing thrust plate overflow. The new trough is attached to the cylinder block by the same screw previously used to hold the oil pipe in place, Figure 13. With the new trough installation, the hole drilled for the old type tube oiler is discontinued.

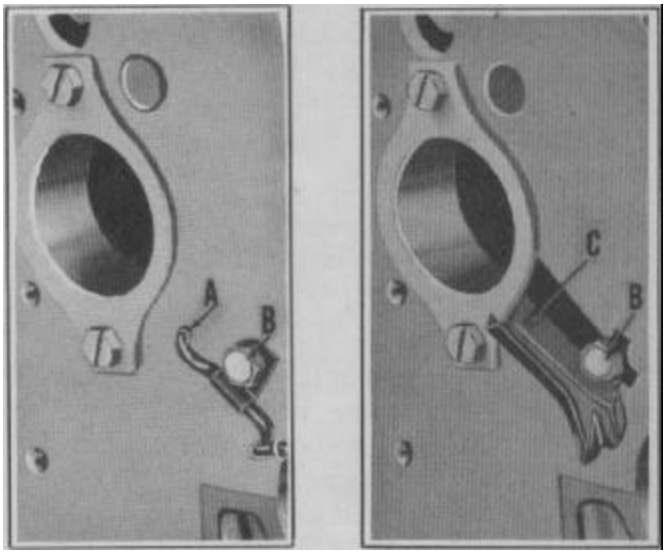


FIGURE 13

To install the new trough on earlier engines perform the operations as outlined for the "Timing Gear Replacement" Page 3-33 and proceed as follows:

1. Remove the screw and clip (B) attaching the oiler tube to the cylinder block.

2. Using a 21/64" drill enlarge the present 3/16" oil hole (A).

3. Tap the 21/64" hole to accommodate a 1/8" headless pipe plug.

4. Install part No. 817 headless pipe plug.

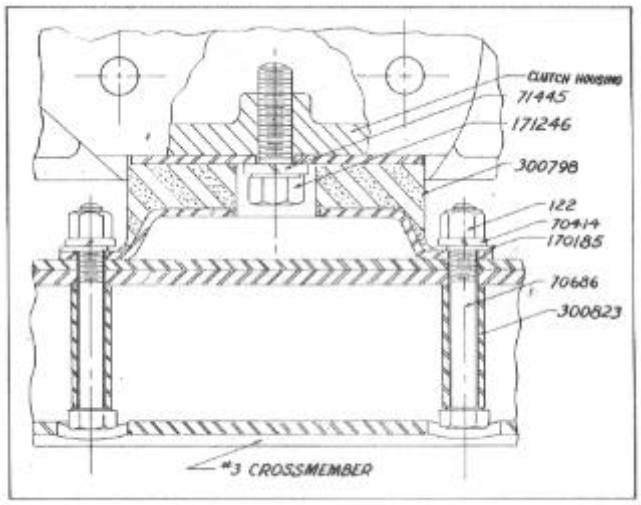
NOTE: Tapped hole should be deep enough so that when plug is screwed tightly in place, that it will be flush with the front of the cylinder. Proper precaution must be taken when performing the drilling and tapping operation to prevent metallic particles entering the oil passages and other parts of the engine.

5. Install trough (C) as illustrated in Figure 13, and secure with screw (B).

ENGINE FRONT MOUNTING - PAGE 3-36

Front engine mountings can be removed without removing the front engine support plate by placing a block of wood between head of jack and oil pan and after removing the self-locking nuts and lockwashers from the insulator center bolts, and the two bolts, nuts and lockwashers attaching the insulators to the frame (each side), jack engine up sufficiently to clear threads of center bolts and remove insulators.

TO INSTALL: Reverse procedure of removal and tighten self-locking nuts to 45 foot pounds torque.



ENGINE REAR MOUNTING

FIGURE 14

ENGINE REAR MOUNTING

A loose rear mounting manifests itself in engine roughness and vibration noise.

To check for looseness of the center attaching bolt:

1. Tighten the two insulator to frame mounting bolts securely.

2. Place a pinch bar between the base of the clutch housing and No. 3 cross-member and apply pressure. Looseness will be readily indicated by the amount of up and down or sideways movement of the clutch housing.

To tighten or remove the engine rear mounting proceed as follows:

1. Remove nuts, lockwashers and bolts attaching the rear mounting to No. 3 cross-member, Figure 14.

2. Place a block of wood between head of jack and oil pan to distribute pressure and avoid damaging the oil pan

3. Jack-up rear end of engine so there is 1-1/4" clearance between the base of the engine mounting and the top of No. 3 cross-member.

4. Insert a 1/2" short socket and a ratchet handle sideways through the 1-1/4 inch clearance, entering socket on head of cap screw that holds mounting to clutch housing; tighten or remove as required.

NOTE: Always examine mounting for possible separation of rubber to metal vulcanize.

TO INSTALL: Reverse procedure cf removal and tighten center mounting bolt to 40-45 foot pounds.

TAPPETS AND GUIDES - PAGE 3-42 (6 CYLINDER)

Tappet guides for the 6 cylinder engines are integral with the block.

To remove the valve tappets it is necessary to remove the oil pan and camshaft.

Perform the operations under "Camshaft and Oil Pan Removal - 6 Cylinder", Pages 14 and 39, 480-490 Procedure Manual and remove the tappets from below.

The proper clearance when fitting tappets is .00075" to .00175". Any tappets worn more than .002" in excess of the standard clearance should be replaced.

Oversize tappets in the following over-sizes .002", .004" and .010" are available and may be ordered in the regular manner through the service parts department.

VALVE TAPPET ADJUSTMENT (6 AND 8 CYLINDER)

1. Jack up front end of car.

2. Remove right hand front wheel.

3. Remove fender side shield with side shield extension.

4. Remove both valve covers and breather pipe.

5. With engine running at idle speed adjust tappets to .008" intake and .010" exhaust for both 6 and 8 cylinder engines. This is in line with a recent engineering release.

NOTE: The tappet adjusting screw on the 6 cylinder is self-locking, whereas the adjusting screw on the 8 cylinder requires a lock nut.

After making the proper valve tappet adjustment:

1. Replace tappet covers and breather pipe.

NOTE: When tightening the breather pipe attaching screw on the early 8 cylinder engines, do not bottom breather pipe against the inner baffle of the valve cover as this will close off the venting action of the pipe and create high crankcase pressure.

2. Replace the fender side dust shield and rear inspection shield. (Tie cord of dust boot to front suspension.)

3. Install front wheel, lower car, remove jack and fender covers.

4. Connect hood prop to hood and align hood.

VALVES AND SEATS - PAGE 3-42

The valves seat directly in the cylinder block. (No valve inserts are used).

To remove the valves proceed as follows:

1. Drain cooling system.

2. Remove cylinder head. See "Cylinder Head Removal", Pages 14 and 15, 480-490 Mechanical Procedure Manual.

3. Raise car and remove right front wheel and fender shield with extension.

4. Re move both valve covers and breather pipe.

5. Using KMO-484 Valve Spring Lifter compress the valve springs and remove spring keepers and retainers.

NOTE: Place corks or wood plugs in valve chamber oil return holes to prevent valve locks from dropping through these holes into the oil pan.

6. Remove valves from the engine and place them in a valve rack to protect them from any damage and to insure that the valves are returned to the same seats from which they were removed.

7. Check all valves for warpage and burning, replace any excessively burnt or warped valves.

8. Valves should be refaced on an accredited refacing machine.

NOTE: The following chart is used in conjunction with the letters and dimensional lines in Figure 15, should be used as a guide when performing any valve work.

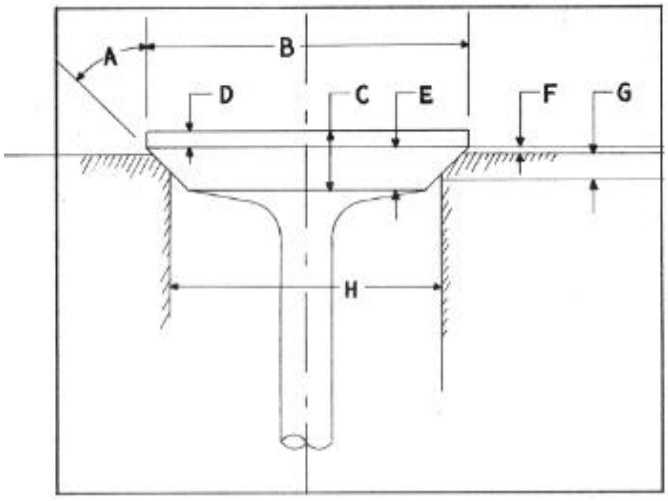


FIGURE 15

	INTAKE		EXHAUST	
	6 cyl.	8 cyl.	6 cyl.	8 cyl.
A -	45°	45°	45°	45°
B -	1.831"	1.500"	1.561"	1.375"
C -	.1135"	.1135"	.1525"	.1295"
D -	.0495"	.036"	.0496"	.036"
E -	.083"	.0765"	.103"	.0935"
F -	.016"	.005"	.008"	.0045"
G -	.054"	.0575"	.075"	.078"
H -	1-11/16"	1-3/8"	1-3/8"	1-7/32"

NOTE: Seat diameter of valve head must be concentric with valve stem within .002" total indicator reading. Valve stem end should be ground flat and square with axis within .002" total indicator reading.

A valve head face that is not concentric with the part of the shim that operates in the guide will contact the valve sat on only a small part of the total circumference. It will slap, rattle, leak compression and affect valve timing.

Valve seats in the cylinder block should be cut with a suitable valve seat cutter. The seats should be cut only enough to remove pits and surface glaze. If seats are made too wide in. the cleaning up process, use a cutter with the proper size pilot to obtain proper valve seat width. When reducing the seat at cylinder head face use a 15° cutter and a 75° cutter at port end.

A properly refaced valve will contact the valve seat throughout its entire circumference and the valve stem will "float" in the guide, free from valve stem friction.

NOTE: The best valve grinding and aligning job will go for naught if care is not used when tightening the cylinder head. Always use a torque wrench and tighten the cap screws or stud nuts in the sequence recommended to the following torque specifications 60-65 foot lbs. for both aluminum and cast iron heads 6 cylinder engines, 40-45 foot pounds for all 8 cylinder engines.

VALVE GUIDES - PAGE 3-43

Before reconditioning a valve seat it is important that the valve guides be checked for wear.

Valve guides that are worn .003" more than the clearances recommended in the following chart they should be replaced.

6 CYLINDER

	EXHAUST	INTAKE
Valve Stem	.3407	.3417
Valve Guide	.3437	.3437

8 CYLINDER

	EXHAUST	INTAKE
Valve Stem	.3397	.3412
Valve Guide	.3437	.3437

Valve guides can be removed upward through the valve seat opening with a suitable puller.

Valve guides can be properly installed with the J-883-A Valve Guide Installer. The installer consists of the driver handle, stop collar, and two pilots calibrated to insure that the guides are driven to the proper depth. On 8 cylinder engines the top of the valve guide should be 15/16" below the top face of the block for both intake and exhaust. See Figure 16.

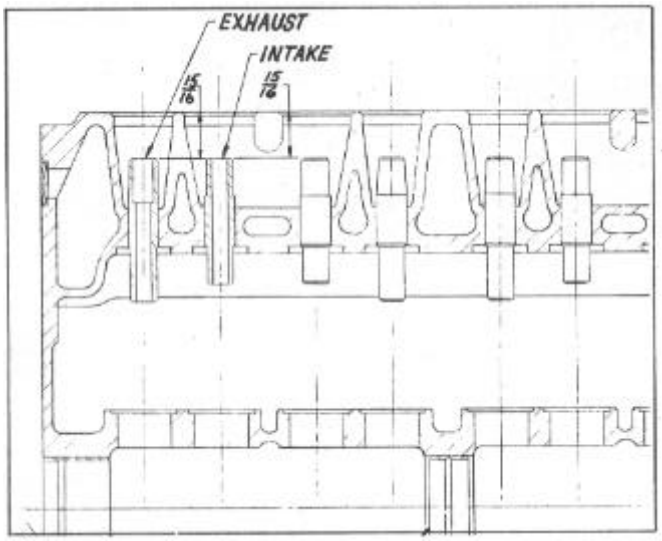


FIGURE 16

For 6 cylinder engines use the Valve Guide Installer Handle part of J-883-A, the J-883-7 Pilot Block, J-883-8 and J-883-9 Valve Guide Installer Pilots, Figure 51. Page 3-43 to install the valve guides.

The installer pilots are fitted with collars to control the height of the valve guides when installing the exhaust guide should be 1-3/32" and the intake guide 1-7/16" from the top of the guide to the top face of the block, Figure 17.

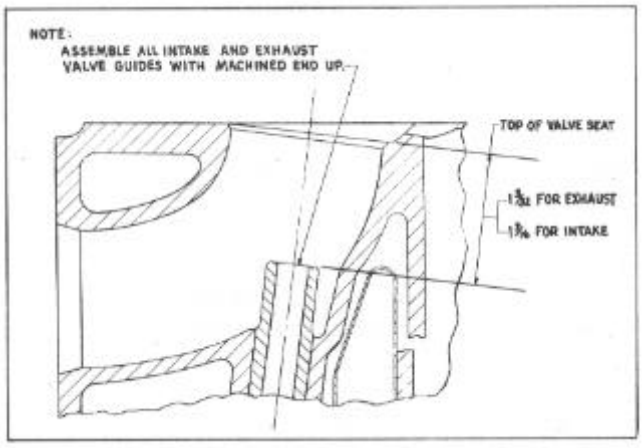


FIGURE 17

To remove the varnish and carbon deposits found in valve guide bores use KMO-122 METAL BRUSH for cleaning the main bore of valve guides. To facilitate removal of stubborn varnish deposits, use lacquer thinner and the KMO-122 Metal Brush.

NOTE: Always place clean rags below the valve guides to absorb any surplus draining of the thinner.

FLYWHEEL MARKING - PAGE 3-44

Flywheel assembly, Part No. 166302, which was previously specified for the 480-490 series six-cylinder engines, has been revised so that the timing marking which read UDC-1-6 now reads UDC-1, Figure 18. This assembly with the changed marking is now being used in production on both six and eight-cylinder engines replacing Part No. 166303 assembly previously used on eight-cylinder engines. This change became effective in production on April 21, 1949.

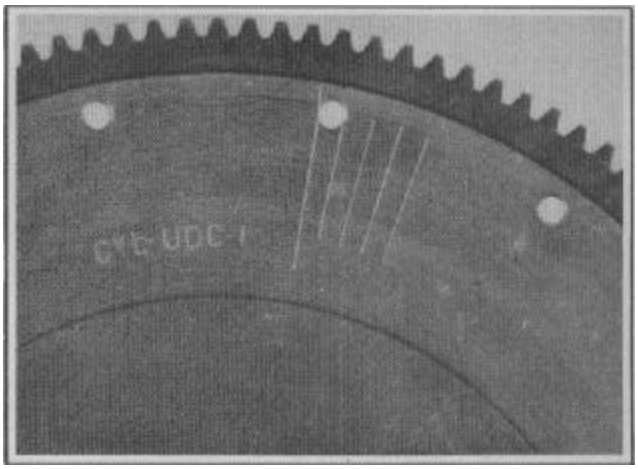


FIGURE 18

VALVE SPRINGS - PAGE 3-44

First paragraph should read: Springs for 6 cylinder engines should exert not less than 54 lbs. when compressed to 2-3/16". Reject springs under 54 lbs.

OIL FILTER - PAGE 3-44

When removing the 1/8 inch pipe plugs for making oil filter connections the use of a 1/4 inch square socket is well suited for this purpose. Tap the socket wrench over the square end of the pipe plug to a snug fit.

SECTION 4

FUEL SYSTEM AND EXHAUST

GENERAL SPECIFICATIONS

Revisions and Additions

Fuel Pump Type A.C.: Model A.H. Standard to 8/26/49
Carter: Model M-729-SZ Standard after 8/26/49
A.C.: Combination Model A.J. Optional - All Models

CARBURETOR SPECIFICATIONS

	6 Cylinder	8 Cylinder
Carter Model Numbers	647-S-647SA	648-S
Float Level	3/16"	13/64"
Pump Plunger Travel from Closed to Wide Open Throttle	18/64"	14/64"
Low Speed Jet Tube - Jet Size	No. 67 Drill	No. 68 Drill
By-pass plug (647S)	No. 51 Drill	No. 54 Drill
(647SA)	No. 52 Drill	No. 54 Drill
Economizer in body (647S)	No. 56 Drill	
(647SA)	No. 56 Drill	No. 56 Drill
Idle Bleed (647S)	No. 54 Drill	No. 54 Drill
(647SA)	No. 56 Drill	

Metering Rod (Vacumeter Type)	Economy step .063" diameter
6 cylinder (647S)	Middle step tapers to .0565"
Hudson Part No. 301943	Power step, .048" diameter.
Carter Part No. 75-610	diameter. Length 2-59/64".
6 cylinder (647SA)	Economy step .061" diameter
Hudson Part No. 302840	Middle step tapers to .0565"
Carter Part No. 75-686	Power step, .048" diameter. Length 2-59/64".
8 cylinder (648-S)	Economy step .068" diameter
Hudson Part No. 301948	Middle step tapers to .063" diameter
Carter Part No. 75-607	Power step, .055" diameter. Length 2-59/64".
Pump Adjustment	plunger travel
6 cylinder (647S, 647SA) 18/64"	(full throttle position)
8 cylinder (648S) 14/64"	long stroke
	Use Gauge No. T - 109 - 117S
Vacuum Spark Port	.039" to .041" diameter
6 and 8 cylinder	Top of port .030" to .040" above valve.

FAST IDLE ADJUSTMENT - PAGE 9

If the carburetor has been removed from the engine use the following procedure for setting the "Fast Idle Adjustment."

1. With the choke valve tightly closed and the fast idle screw on the high step of the fast idle cam, Figure 1, there should be .054" clearance between the throttle valves and bores of carburetor opposite side from idle port hole.

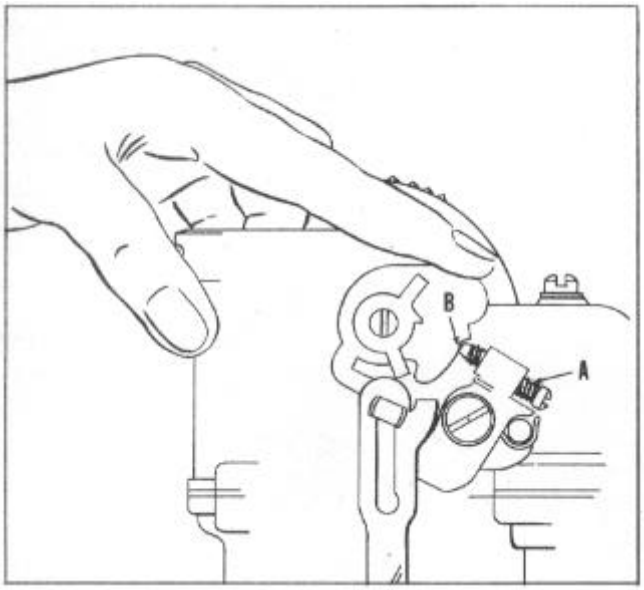


FIGURE 1

2. Turn the fast idle adjusting screw (high step of cam) until specified clearance is obtained.

3. Install carburetor on engine.

4. Start engine and allow engine to warm up.

5. Hold the choke valve open and press down on the fast idle cam until idle adjusting screw (A) is seated on the lower step of second notch of cam (B).

6. While holding screw (A) against the cam as in Paragraph 5, turn idle adjusting screw until engine RPM reaches 700 for warm climate and 800 for cold climate.

NOTE: If fast idle adjustment is checked with the carburetor installed on the engine, use paragraphs 4, 5 and 6 only.

SLOW IDLE ADJUSTMENT - PAGE 4-9

1. Start engine and allow engine to warm up.

NOTE: Check choke valve (must be wide open when engine is warmed up).

2. With engine up to normal operating temperature turn adjusting screws (A) Figure 2, clockwise into their seats alternately an d back out counter-clockwise 3/4 of a turn.

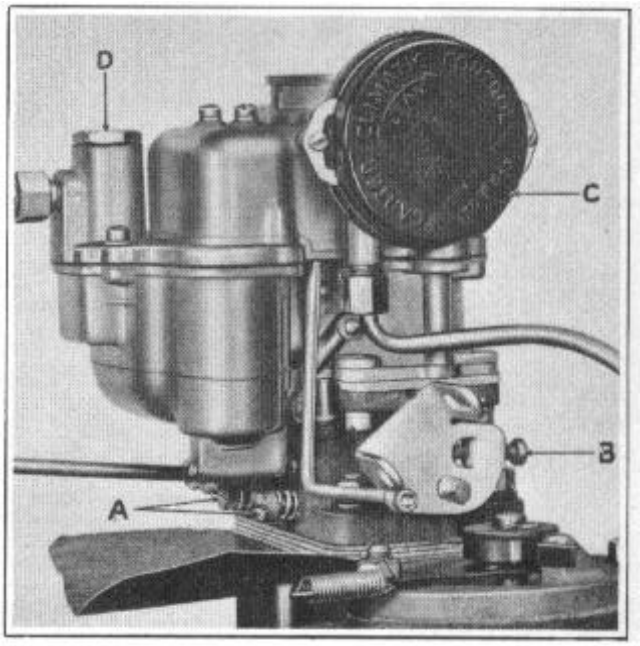


FIGURE 2

3. Adjust the throttle stop screw (B) so that the engine idles at 560 RPM. (If car is equipped with Vacumotive Drive or Drive-Master, set idle at 580 to 600 RPM.)

4. Readjust idle adjusting screws (A) for a smooth idle. On 6 cylinder engines the normal setting is 1-1/4 to 1-3/4 turns open; on 8 cylinder engines 1 to 1-1/2 turns open.

CARBURETOR - PAGE 4-10

Paragraph 9 should read: Remove pump discharge valve retainer plug and check valve; Figure 16 should show a triangular shaped valve instead of a ball.

CARBURETOR REPAIR - PAGE 4-11

If excessive engine "stumbling" or hesitation is encountered at speeds of 15 to 17 MPH, on 6 cylinder engines with the old type carburetor (Vendor tag No. 647S) and having the new style distributor with the revised spark advance (No. IGS-4213A-1 on distributor name plate).

We recommend that the old type metering rods Carter No. 75-610 and the old type idle by-pass plugs Carter No. 11B-167 be replaced with the new type metering rods Carter No. 75-686 and idle by-pass plugs Carter No. 11B-159. This change can easily be made as follows:

1. Raise hood and install fender covers.
2. Remove air cleaner.
3. Remove carburetor dust cover screws and dust cover.
4. Remove air horn attaching screws and remove air horn with all parts attached.

NOTE: The screw inside the carburetor air horn must be removed.

5. Remove old metering rods and install new metering rods. Use a small pair of long-nose pliers to hook up the metering rod spring.
6. Remove idle bleed jets and install new jets.
7. Install air horn (make sure gasket is positioned properly).
8. Install dust cover.
9. Install air cleaner.
10. Start engine and adjust carburetor (use vacuum gauge).

The parts necessary to make this change-over can be procured through the parts department under Part No. 302838 Carburetor Metering Rod and By-Pass Plug Kit.

NOTE: The new type metering rods and idle by-pass plugs were released for production for all 6 cylinder engines of the 490 series about July 1, 1949. This change was made to compensate for a lean mixture resulting from mounting the carburetor in a vertical position and the revision of the distributor automatic advance curve. Carburetors with the new style jets can be identified by the part number (647SA) on the metal tag attached to the carburetor.

CARBURETOR - PAGE 4-13

Paragraph 10 should read: Install check valve and pump discharge valve retainer plug. Figure 29 should show a triangular valve having a conical end.

FUEL PUMP - PAGE 4-17

Carter fuel pumps were used in the 490 series on both 6 and 8 cylinder engines replacing the A.C. standard fuel pump. This change became effective after August 26, 1949. The Carter fuel pumps can be identified by the Part No. M-729-SZ located on the side of the mounting flange.

For repair procedures refer to your 500 Series Mechanical Procedure Manual.

The following list covers the A.C. Fuel Pumps and the Carter Fuel Pump:

FACTORY NO.	SERIES	REPAIR KIT	DIAPHRAGM KIT FUEL	DIAPHRAGM KIT VACUUM
1539109	AH	R-14	D-18	
1539108	AJ	R-139	D-65	D-28
M729SZ				

VACUUM BOOSTER TEST - PAGE 4-23

Paragraphs 2, 3 and 4 should read:

2. Connect the KMO-144 or equivalent vacuum gauge to the inlet port and disconnect outlet.
3. Gauge should show 8-1/2" of mercury at 120 RPM and 12" at 1800 RPM.
4. If vacuum is less than 7 inches, repair or replace the pump.

GAUGE TROUBLE SHOOTING - PAGE 4-24

Paragraph 1B is in error. The condenser at the gas tank gauge unit was not used on 480-490 series cars equipped with radio.

GASOLINE TANK - PAGE 4-24

The gasoline tank vent is located at the top or highest point of the tank and is connected by a hose to a pipe leading up into the gasoline filler spout.

A tank that takes gas only very slowly or cannot be completely filled, likely has a partial or entire obstruction of the vent. To correct this condition, remove the vent hose connection and insert a stiff wire in each of the vent pipes to remove any obstruction, also check the hose connections to determine that the filler hose connections are tightened and that the hose is not twisted or kinked.

INTAKE MANIFOLD - PAGE 4-27 (6 CYLINDER)

On all 480 and 490 series 6 cylinder engines including car Serial No. 492-51250 with aluminum manifolds and car Serial No. 49176450 with cast iron manifolds, the intake manifold carburetor mounting flange was machined on the same plane as the cylinder head resulting in a rearward tilt of the carburetor due to the angle of securing the engine in the frame. On all 6 cylinder engines after the above serial No.'s a new intake manifold is used with the flange angle changed to compensate for the angle at which the engine is secured and allows the carburetor to set in a vertical position when mounted.

This change eliminates the necessity for the use of wedges as outlined in General Technical Policies and Information Bulletin Number 6 dated January 14, 1949.

MANIFOLD STUDS - PAGE 4-27 (6 AND 8 CYLINDER)

There are two types of studs used on both 6 and 8 cylinder engines, namely one type stud has machined threads and the other has a rolled thread.

Studs 170990; 170991 and 170992 having a center punch mark on one end, have a rolled thread and this portion should be out, starting the other end in the cylinder block. When there is no center punch mark on the stud it is a machine cut thread and the end having the 1/1 6 x 45 degree chamfer should be started in the cylinder block, this is important s o that the stud will drive tight before bottoming.

EXHAUST MANIFOLD CHOKE HEATER TUBE - PAGE 4-27 (6 CYLINDER)

To insure silent passage of air through the exhaust manifold automatic choke heater tube, the lower opening of the tube has been choked at the end to a 3/16" diameter. Figure 3, the new tube part No. 300083 became effective in production August 25, 1949.

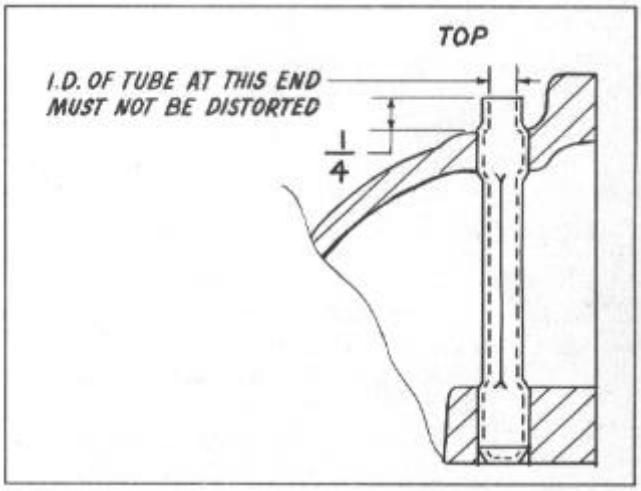


FIGURE 3

The old tube can be removed and the new tube installed without removing the manifold as follows:

1. Remove the air cleaner and heat riser tube at carburetor.

2. Use a piece of 1/4" drill rod approximately 14" long and drive out the old tube from above.

NOTE: The drill rod fits inside the heater tube to prevent swedging.

3. Install the new tube from above with the same drill rod, driving the tube only far enough so that the bottom end of the tube is flush with the bottom of the manifold.

4. Reinstall air cleaner and riser heat tube.

SECTION 6
ELECTRICAL

SPECIFICATIONS

CORRECTIONS AND ADDITIONS

GENERATOR - PAGE 6-2

Max. Charging Rate - Cold 43 amps @ 8 volts
Max. Charging Rate - Hot 37 amps @ 8 volts
Field Draw Total, @ 6 volts - - 1.60 - 1.78 Amps.
Motorizing Draw @ 6 volts - - 4.85 - 5.40 Amps.

DISTRIBUTOR - PAGE 6-3

AUTOMATIC ADVANCE CURVE (STATED IN DISTRIBUTOR DEGREES AND RPM)

6 CYLINDER		8 CYLINDER	
DISTRIBUTOR NO. IGS-4213-1	DISTRIBUTOR NO. IGS-4213-A1	DISTRIBUTOR NO. IGT-4204-A1	DISTRIBUTOR NO. IGT-4204-B1
0° at 400 RPM	0° at 500 RPM	0° at 300 RPM	0° at 300 RPM
1º at 535 RPM	1° at 660 RPM	1° at 335 RPM	1° at 335 RPM
6° at 1200 RPM	4° at 1200 RPM	3° at 400 RPM	3° at 400 RPM
11° at 1870 RPM	8° at 1850 RPM	10° at 1025 RPM	10° at 1025 RPM
12° at 2000 RPM	8.5° at 2000 RPM	17.5° at 1700 RPM	17.5° at 1700 RPM

Advance must follow on a smooth curve within 1° of above values.

VACUUM ADVANCE
(DISTRIBUTOR DEGREES AND INCHES OF MERCURY)

6 CYLINDER		8 CYLINDER	
DISTRIBTOR NO. IGS-4213-1	DISTRIBUTOR NO. IGS-4213A-1	DISTRIBUTOR NO. IGT-4204A-1	DISTRIBUTOR NO. IGT-4204B-1
0° at 9.50"	0° at 13.25"	0° at 9.50"	0° at 13.25"
1° at 10.00"	1° at 14.00"	1° at 10.00"	1° at 14.00"
4° at 11.50"	2° at 14.50"	4° at 11.625"	2° at 14.50"
7° at 13.25"	3° at 15.25"	7° at 13.125"	3° at 15.25"
8.5º at 14.00"	3.5º at 16.00"	8.5º at 14.00"	3.4º at 16.00"

Allowable variation from curve, plus or minus 1°.

Condenser Capacity - - 6 cyl. .25 to .28 microfarads; 8 cyl. .20 to .25 microfarads.

BATTERY - PAGE 6-6

BATTERY GROUND STRAP

A clean tight battery to ground strap is important for good electrical efficiency, as all current flow to and from the battery must pass through this conductor.

The battery ground strap on the 480 and 490 series is of two pieces, the longer section connects the battery positive terminal to a ground post at the base of battery support, effecting a ground connection to body and frame. A shorter strap leads from the post at base of battery to the left engine mount bolt, thus assuring continuous electrical ground of the engine.

To prevent damage to the ground strap terminal at left engine mount, a plain washer, part number 171096, supersedes the lock washer heretofore used at this point. Figure 1.

The battery hold down bolt nuts should be drawn up not tighter than 2 to 3 foot-pounds torque. This low tension is ample to hold the battery securely, yet is not liable to result in cracked battery cells on account of being too tight.

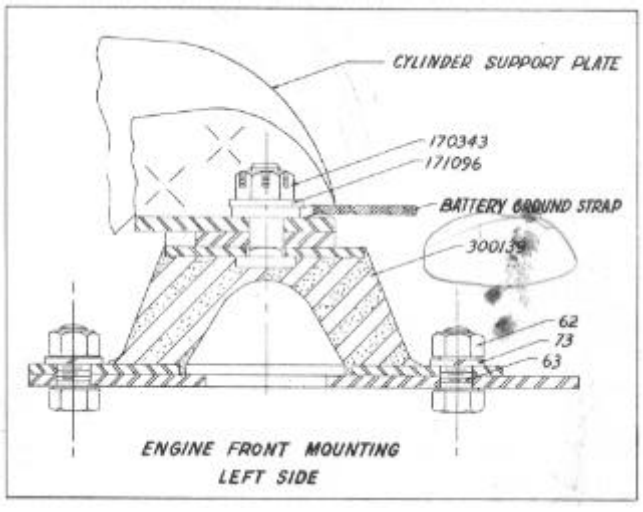


FIGURE 1

GENERATOR - PAGE 6-7

A few of the late 490 series cars were equipped with a "Shunt Wound" generator and a "Vibrating Type" current - voltage regulator. These units can be identified as follows: Generator No. GDZ-6001-B stamped on the generator name plate. Voltage Regulator No. VRP-6002A stamped on upper face , of regulator base.

For adjustment and repair procedure refer to your "500 Series" manual under "Engine Tune-up", Section 2 and "Electrical" Section 6.

DISTRIBUTOR - PAGE 6-17

VACUUM AND MECHANICAL ADVANCE (6 CYLINDER)

General Technical Policies and Information Bulletin No. 5 dated January 14, 1949 outlined in detail a change in vacuum spark advance from 8.5 degrees to 4 degrees maximum. Although this change became effective with car 491-33913, some of the distributors have been reworked in the field prior to this number. When testing a distributor for vacuum advance always check the number stamped on the breaker plate as shown in Figure 2. This number indicates the vacuum advance. Beginning with car

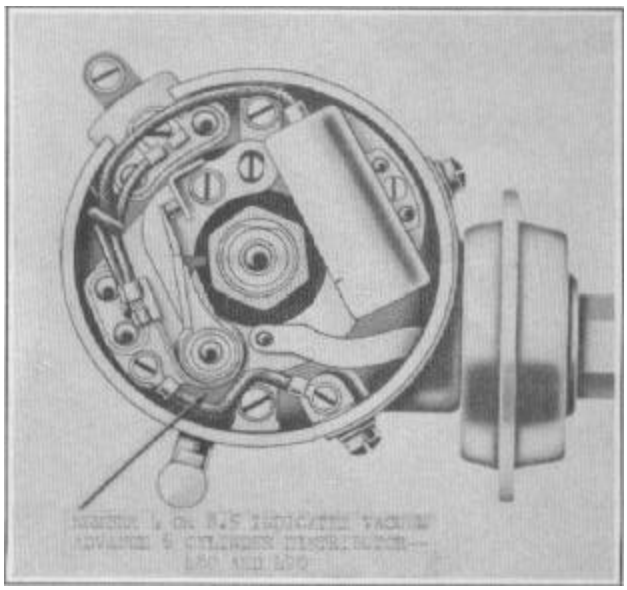


FIGURE 2

491-76984 the mechanical advance range was modified. These distributor assemblies may be identified by the vendor part number on the name plate: IGS-4213-1 has a 12 degree advance and IGS-4213A-1 has a 8.5° degree advance.

The change in vacuum and mechanical advance must be taken into consideration when testing the distributor. Refer to the specification section of the "Electrical Section" for the latest specifications.

VACUUM ADVANCE - PAGE 6-17
(8 CYLINDER)

Effective with car number 494-114018 the 8 cylinder distributor vacuum advance was changed from a maximum of 8.5 degrees to 4 degrees at the distributor. The mechanical advance has not been changed.

The new distributor with the 4° plate has part number IGT-4204 B-1 on the distributor housing and has a small figure 4 stamped on the breaker plate just opposite the vacuum control diaphragm, Figure 3.

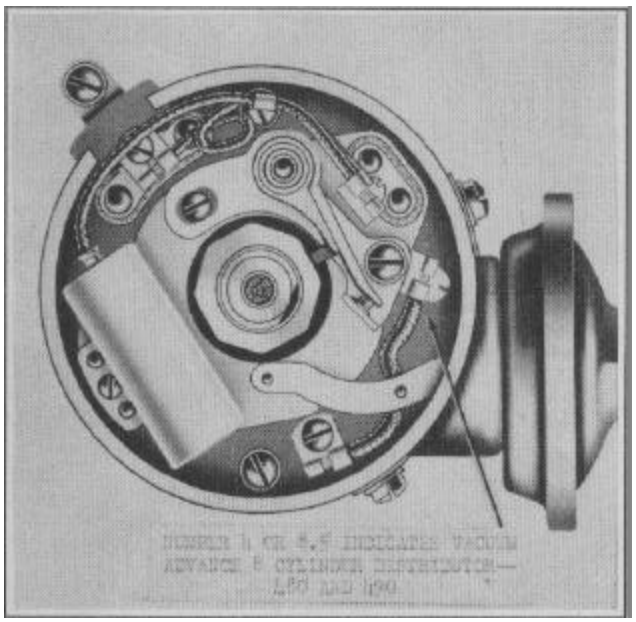


FIGURE 3

The first type distributor carries part No. IGT-4204A-1 and has a figure 8.5 stamped on the breaker plate. Refer to the specification section of the "Electrical Section" for the latest specifications.

SPARK SETTING - PAGE 6-17

Paragraph three should read: Correct spark setting is obtained with the number one cylinder at top dead center, rotor facing No. 1 terminal of distributor cap with distributor set in mid-position in the quadrant and points just beginning to open.

IGNITION TIMING - PAGE 6-20

The flywheel markings were revised after April 21, 1949 as follows: "U.D.C. 1-6", and "U.D.C. 1-8" have been changed to "U.D.C. 1" for both 6 and 8 cylinder engines. The figures 6 and8 immediately following figure "U.D.C. 1" have been removed. Figure 4.

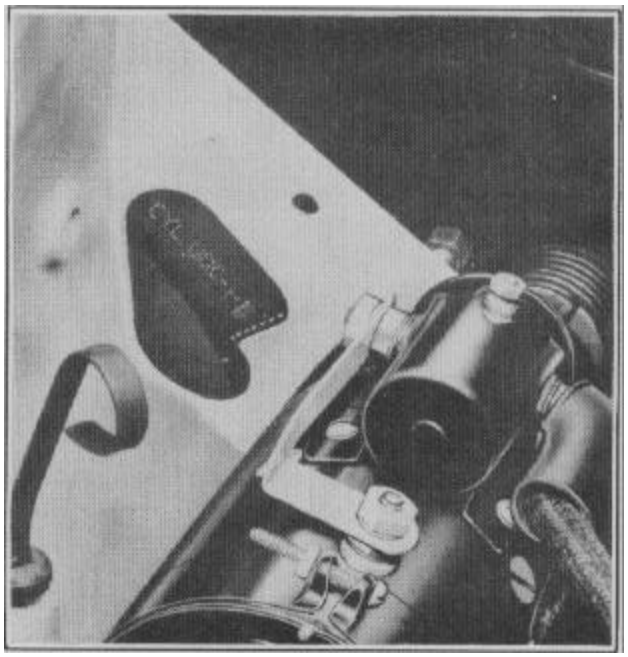


FIGURE 4

The change in marking will not effect the procedures for the setting of "Ignition timing" and "Fuel and Altitude Compensation" as outlined on pages 6-20 and 6-21 - 480-490 Mechanical Procedure Manual.

SPARK PLUGS - PAGE 6-21

The new H-8 Champion spark plugs will replace Champion J-7 or J-9 for cast iron cylinder heads and replace Champion H-10 for aluminum heads.

CIRCUIT BREAKERS - PAGE 6-25

Starting with car serial No. 491-133694 the main circuit breaker was changed from 30 ampere rating to 20 ampere to give better wiring protection.

When ever necessary to replace a circuit breaker use the 20 ampere circuit breaker.

DIRECTION INDICATOR - PAGE 6-28

Paragraph 1 should read: The direction indicator switch is operated by a lever located on the steering column and this lever is turned manually in the same direction that the steering wheel is to be turned (up for right or down for left turn). The switch turns off automatically as the turn is being made. If the lever is turned to signal for one direction but the turn is made in the opposite, the switch will be turned off automatically as the turn is made.

DIRECTION INDICATOR - PAGE 6-32

REPAIR PROCEDURES:

1. Disconnect switch wires from connectors under instrument panel.

2. Connect black wire to hot side of circuit breaker.

3. Connect one lead of test lamp to blue switch wire and ground the other lamp lead. Move switch lever down and lamp should light.

4. Connect one lead of test lamp to yellow switch wire and ground the other lamp lead. Move switch lever up and lamp should light.

5. If lamp fails to light in either position, switch should be replaced.

MECHANICAL CHECK:

NOTE: For proper operation of direction indicator, steering wheel must be properly installed in straight ahead position on steering column.

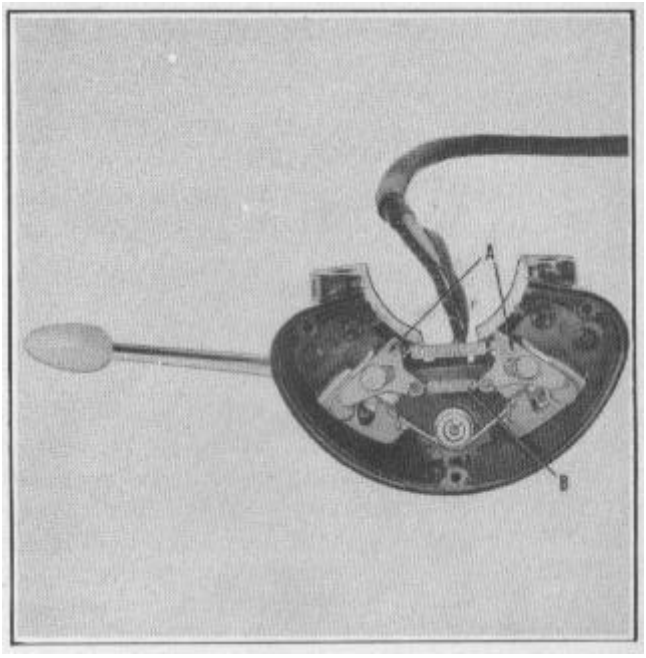


FIGURE 5

1. Remove switch case cover and check canceling pawls (A), Figure 5, to see that they slide freely. Apply a small amount of vaseline to slot in each pawl.

2. Move switch lever up and turn steering 1/2 turn right. Canceling pin in steering wheel hub should strike and pass left pawl without moving switch. The pawl spring (B) should return the pawl to extended position when the pin clears.

3. If canceling pawls do not return to extended position, pawl may be binding on pawl lever. Examine spring attaching loop on pawl and see that open end of loop is bent up - not down. If pawl still fails to return, pawl spring may be weak. (Spring may be removed and shortened.)

4. Return wheel to straight ahead position. Canceling pin should strike pawl and disengage switch.

5. Repeat test with switch lever down and turn wheel left.

6. If switch fails to operate properly, canceling pin in wheel hub may be too short or bent.

7. Move switch lever up and turn wheel 1/4 turn left. Pin should strike left pawl and disengage switch.

8. Repeat with switch lever down and turn wheel right. Pin should strike right pawl and disengage switch.

9. If pin fails to strike pawl, pin may be too short or bent.

NOTE: Switch lever must NOT be held in position while steering wheel is turned. If lever is held, canceling pawl may be locked on the trip lever and switch will cancel in one direction only. The additional tension on the canceling lever spring may cause the switch to change to the opposite direction when cancelled.

REMOVAL:

1. Remove three switch wires from clip under instrument panel and disconnect wires at connectors.

2. Remove two Phillips head screws attaching switch case to control lever tube bracket.

3. Loosen steering column bracket cap at instrument panel and remove switch wire cover.

4. Remove switch case and wire assembly.

INSTALLATION:

Reverse procedure of removal. Connect switch wires to harness wires of same color.

NOTE: If direction indicator lights flash too rapidly, the front indicator lamp is reversed, placing the parking filament in the indicator circuit and increasing the circuit resistance, or only one lamp is operating.

SECTION 7
CLUTCH
ENGAGING SPRINGS - PAGE 7-7

Instructions should read as follows:

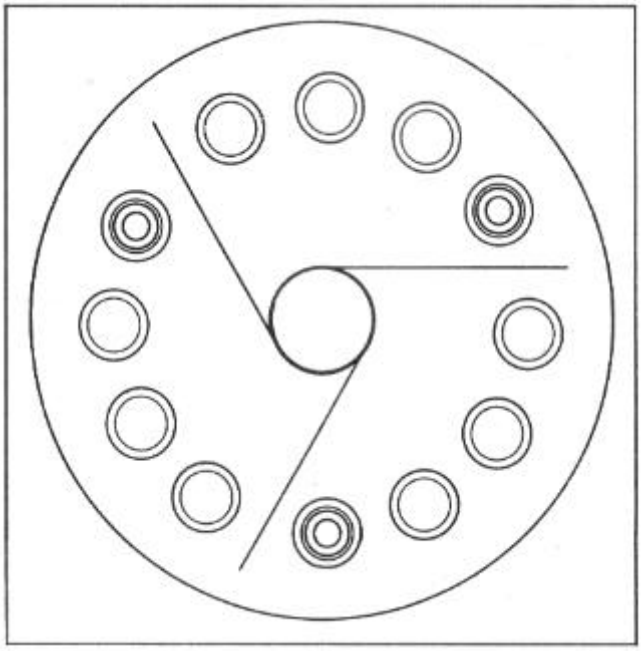


FIGURE 1

If clutch pressure plate shows signs of overheating, it is likely that the engaging springs will require replacement. Inner and outer springs should be checked for tension at each overhaul using the Valve Spring Tester Tool KMO-607 and checking against the tension data as follows:

Inner all @ 1-5/8" - 80 lbs. ± 5 lbs.

Outer all @ 1-5/8" - 150 lbs. ± 5 lbs.

Arrangement of clutch engaging springs in relation to the clutch throwout fingers is shown in Figure 1.

SECTION 8
VACUMOTIVE DRIVE

ADJUSTMENTS - PAGE 8-10

Adjustment No. 8, Page 8-12, should read as follows: Check length of valve rod (applicator valve) (25) Figure 1. If the setting is correct, the center line of the pin (24) will be exactly in line with the center line of the piston rod pivot bolt (23) as indicated by large arrow.

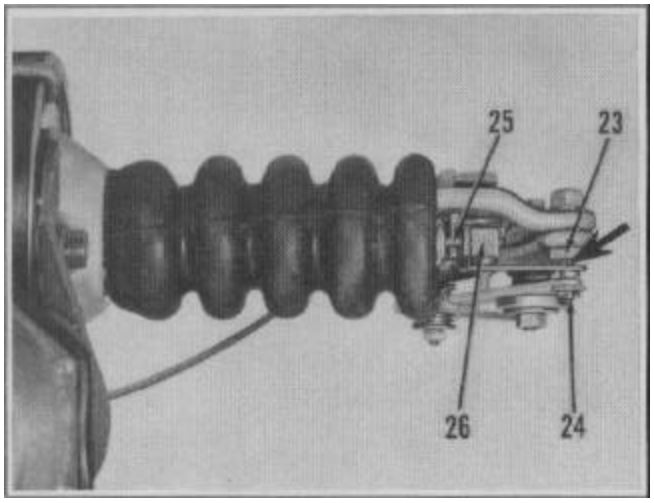


FIGURE 1

Valve rod (25) can be adjusted by loosening the lock nut and turning the valve rod in or out of the threaded trunnion (26). After making the proper adjustment secure the locknut.
NOTE: The valve rod assembly is properly adjusted at the factory and should never have to be adjusted unless the adjustment has been altered by someone unfamiliar with proper adjustment procedure.

If it is found necessary to change the "Valve Rod Adjustment" recheck the "Threaded Sleeve Rod Adjustment", adjust the threaded sleeve (33) Figure 2, until the vacuum cylinder piston is 1/2" from its extreme forward position.

Check this adjustment by pushing on valve lever (28) and then releasing. Above adjustment should be made with the compensator lever in starting position; pin (F) forward as shown in solid lines Figure (11) in the 480-490 Procedure Manual.

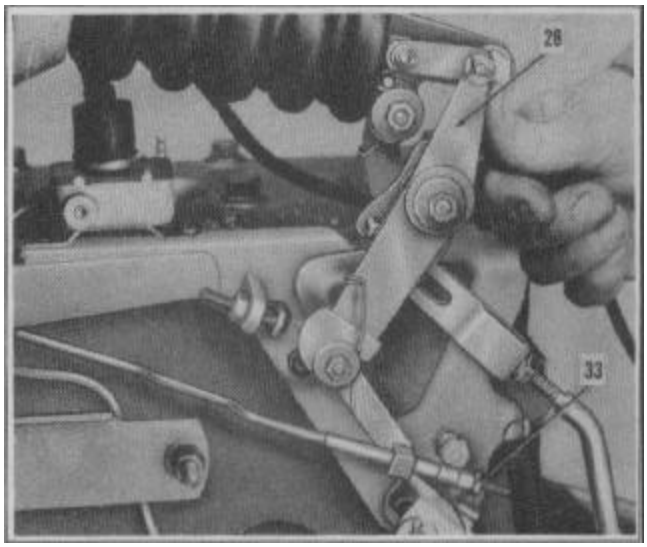


FIGURE 2

ADJUSTMENT NO. 10 - PAGE 8-12

Add the following note:

To provide a greater area of contact and more positive adjustment, the cushion point adjusting screw on Vacumotive Drive and Drive-Master equipped cars has been changed from the knurled, slotted head type to a hexagon head design having a screw driver slot at the small end.

The new screw is installed so the large hexagon head contacts the valve lever cam instead of the small end as was previously and is secured by a lock nut. Refer to your parts manual for the part number of the new type screw.

ADJUSTMENT NO. 12 - PAGE 8-12

Depress clutch pedal (Important) and start engine; do not race engine. Put transmission in second gear manually and release the brake s. Slowly rotate the accelerator bell-crank (0) Figure 3, until clutch drags. Adjust the throttle cross shaft screw (T), Figure 11, 480-490 Mechanical Procedure Manual, until there is a slight increase in engine speed to 625-750 RPM at time car begins to move.

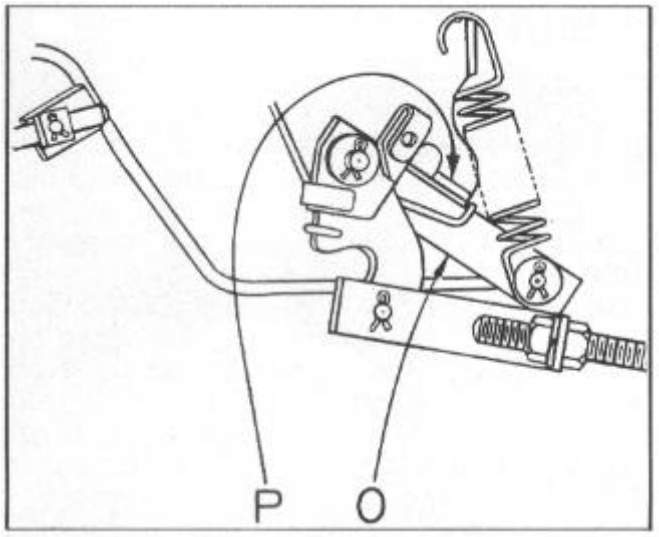


FIGURE 3

VACUMOTIVE DRIVE SOLENOID - PAGE 8-16

Add the following note: To improve operation of the clutch power unit, the Vacumotive Drive solenoid body check valve made of bakelite has been cancelled and replaced by a new valve consisting of rubber molded on a brass disc Part No. 302753.

The new valve went into production on August 18, 1949 on 6 cylinder models and September 19, 1949 on 8 cylinder models.

To check for solenoid valve leakage; short out coil primary circuit or pull out center distributor wire; clutch unit should release slowly approximately 7 seconds. If clutch unit drops back suddenly it indicates a faulty solenoid or a leaking solenoid valve seat.

CLUTCH POWER CYLINDER - PAGE 8-16

REMOVAL:

1. Disconnect power unit air intake pipe and the pipe from intake manifold to clutch power unit solenoid.

2. Remove the valve lever eccentric bushing nut and pull the clutch unit bellcrank lever an d compensator out to allow clearance for removal of the piston valve and rod link.

3. Remove the cotter pin at the piston valve and rod link pin and disconnect lever link from bellcrank.

4. Remove piston rod pivot bolt (23).

5. Remove two bolts attaching clutch unit solenoid to the clutch power unit cylinder and remove clutch unit solenoid.

6. Remove pal nut, nut and bolt attaching clutch power cylinder to mounting bracket and remove clutch power unit, piston rod and piston valve rod and link as a complete unit for disassembly and overhaul.

INSTALLATION:

Reverse procedure of removal and recheck piston valve rod adjustment, Adjustment No. 8. 480-490 Procedure Manual.

CLUTCH POWER CYLINDER MOUNTING BRACKET

REMOVAL:

1. Remove two nuts, washers and bolts attaching rear of bracket to throttle bell-crank bracket.

2. Disconnect power air intake pipe assembly and vacuum pipe at clutch power unit solenoid.

3. Remove two bolts attaching clutch power u n i t mounting bracket to support bracket and one bolt attaching mounting bracket to throttle cross rod mounting bracket.

4. Remove palnut, nut and bolt attaching clutch power cylinder to mounting bracket.

5. Pull complete bracket towards fender to allow for removal of the cotter pin, flat washer, one small and one large spacer washer and spring washer attaching bell-crank support pin to mounting bracket.

6. Slide out bracket toward engine and remove.

INSTALLATION:

To install reverse procedure of removal and check for throttle cross rod binding in the mounting bracket.

PISTON VALVE LEVER

REMOVAL:

1. Remove cotter pin at piston valve and rod link pin.

2. Remove cotter pin attaching threaded sleeve swivel to valve lever cam.

3. Remove valve lever eccentric attaching nut and washer, and remove the clutch unit bellcrank and compensator assembly with valve lever cam and springs attached.

INSTALLATION:

Reverse procedure of removal, recheck cushion point adjustment No. 13 and piston valve rod adjustment No. 8, also stake valve lever eccentric bushing nut securely after tightening.

COMPENSATOR LEVER REMOVAL:

1. Perform operations 1, 2 and 3 under valve lever removal and remove pin attaching the eccentric bushing to the compensator lever shaft.

2. Push piston rod forward (towards power cylinder) and remove compensator lever.

NOTE: A spring loaded detent ball is positioned between the compensator lever and bellcrank; use care when removing the compensator lever.

INSTALLATION:

Reverse procedure of removal, and check eccentric bushing installation. Heavy side of bushing is assembled up. Also check adjustment No. 13.

BELLCRANK TO COUPLING LEVER ROD AND PLAY LINK

REMOVAL:

1. Perform operations 1, 2 and 3 under valve lever removal and remove the cotter pin, flat washer, spring and pin attaching play link to piston rod bellcrank.

2. Raise car and remove cotter pin and plain washer at clutch coupling lever and remove bellcrank to clutch coupling lever rod.

INSTALLATION:

Reverse procedure of removal and check Adjustments 8 and 13; also make sure spring is underneath flat washer at play link. Cotter pin should be securely fastened with the ears of the pin down so not to interfere with the action of the compensator lever.

COMPENSATOR TRIP LEVER AND SPRING

REMOVAL:

1. Remove nut and washer at clutch unit compensator trip lever shaft.

2. Remove clutch unit compensator trip lever spring.

3. Remove clutch unit compensator lever and pin.

INSTALLATION:

1. Install clutch unit compensator lever and pin.

2. Install clutch unit compensator trip lever spring hooking one end of spring on anchor but do not fasten other end of spring on trip lever.

3. Install trip lever shaft washer and nut and fasten securely.

4. Hook end of spring at trip lever and stake clutch unit compensator trip lever shaft nut securely in place.

VACUMOTIVE DRIVE HARNESS CHECK

NOTE: When making a harness check, disconnect the complete Vacumotive Drive Harness: one wire at instrument panel switch, socket plugs at clutch power unit solenoid and accelerator switch and wires at shift rail and governor switches.

A. Connect one lead of test lamp to negative battery terminal, prod to clutch power unit plug socket No. 1. Lamp should not light.

B. With test lamp connected as in "A", ground the wire removed from the instrument panel switch. Lamp should light.

C. With test lamp connected as in "A" connect a jumper wire between the clutch power unit plug socket No. 2 and a ground. Lamp should not light.

D. With jumper connected as in "C", connect a test lamp between negative battery terminal and prod to accelerator switch plug socket Nos. 1, 2 and 3 successively. Lamp should light on No. 3 only.

E. Remove jumper wire, connect a test lamp between battery negative terminal, prod to No. 1 socket of accelerator switch plug; lamp should light when grounding governor switch wire but should not light when wire disconnected from shift rail switch is grounded.

F. With shift rail switch wire still grounded move test lamp prod to the No. 2 accelerator switch socket plug; lamp should light.

SECTION 9
TRANSMISSION

GEAR RATIO - PAGE 9-4

Up to August 24, 1949 two transmission gear ratios were used in the 480-490 series cars as follows: 1.82:1 used with Drive-Master and 1.65:1 used on all standard transmissions without Drive-Master equipment. The difference in these ratios was effected by the number of teeth in the main shaft drive gear and counter shaft cluster gear.

After approximately August 24, 1949 the 1.65:1 ratio was discontinued in production and only the 1.82:1 ratio will be standard with all transmissions regardless of equipment.

The two ratios were identified by a metal tag attached to the transmission cover screw.

NOTE: Main drive gears and countershaft cluster gears will be available for either ratio through your service parts department. When making replacement repairs DO NOT use a main drive gear of one ratio with a countershaft cluster gear of another ratio or vice-versa.

END PLAY - PAGE 9-4

Reverse Idler Gear .003" to .010".

MAIN DRIVE GEAR - PAGE 9-12

A change was made in the transmission main drive gear, incorporating a stop ring to prevent overshift in high gear position which resulted in premature wear of the shift sleeve and fork.

The redesigned parts that are now in production and will be supplied for service are as follows:

Transmission Main Drive Gear - less HDM - 1.65:1 Second Speed ratio Part 302471.

Transmission Main Drive Gear - with HDM - 1.82:1 Second Speed ratio Part 302472.

Transmission Main Drive Gear Stop Ring (2 required) Part 302468.

Transmission Main Drive Gear Stop Ring Center (2 required) Part 302469.

Transmission Main Drive Gear Stop Ring Spring (1 required) Part 302470.

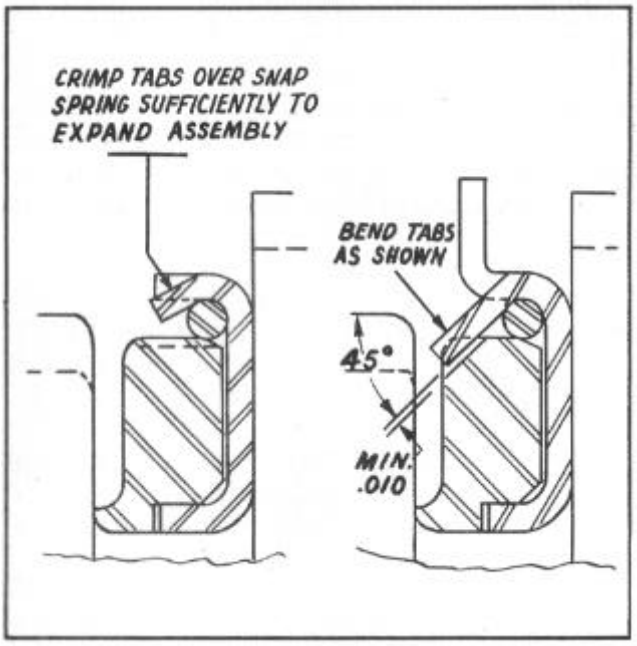


FIGURE 1

This stop ring may not be installed on clutch gear shafts not so fitted at the factory due to clearance between the constant mesh gear and direct drive (high gear) teeth. This w a s affected by a slight change in machined clearance preparatory to the change.

This change began in production on standard transmission (1.65:1 Second speed gear), Dec. 29, 1948 after 22645 cars of 490 series. All other transmissions have had the stop ring on main drive gear since January 18, 1949.

If necessary to replace the stop ring proceed as follows:

1. Straighten the eight locking ears of the stop ring.

2. Remove lock ring and ring center (die cast).

3. Insert the new stop ring and ring centers and turn ring center in the stop ring 1/4 turn to line up recesses in the ring center with the 8 locking ears on the stop ring.

4. Install wire lock ring and bend all locking ears in recesses as shown in Figure 1.

NOTE: Use a small drift and a light hammer for this operation.

SECTION 10
HUDSON DRIVE-MASTER

CONDITION NO. 8 - PAGE 10-14

Paragraph "C" should read: Follow with Drive-Master Adjustments No. 3, 5 and 7 in order. Also check "Vacumotive Drive Adjustments" No. 4 and 6.

CONDITION NO. 10 - PAGE 10-14 NOISY CROSS-OVER

This is due to looseness in the transfer diaphragm rod ball joint. See "Drive-Master Adjustment" No. 1, Page 10-11.

INSTRUMENT PANEL SWITCH - PAGE 10-16

Add the following note: The 10 ampere fuse has been replaced with a 15 ampere fuse on all cars equipped with Drive-Master built after May 20, 1949.

Under certain operating conditions it was f o u n d that the momentary current draw was sufficiently high to part the element without having blown the fuse, this was very difficult to see, yet the circuit would be broken causing the unit to become inoperative.

This is one of the first points that should be checked in case of an inoperative unit, replace the 10 ampere fuse with a 15 ampere fuse.

TRANSMISSION SWITCH - PAGE 10-19

The "Neutral and Limit Switch Check" paragraphs 2 and 3 should read:

2. Move power lever to second (to the rear of car). Gear shift lever in neutral.

3. Move power lever to high (forward). Gear Shift lever in neutral.

TRANSFER DIAPHRAGM CYLINDER - PAGE 10-20

REMOVAL:

To facilitate replacement of the transfer diaphragm, remove the diaphragm housing as an assembly as follows:

1. Loosen the transfer rod lock nut.

2. Disconnect the transfer diaphragm engaging rod from the transfer diaphragm rod end.

NOTE: Prevent the diaphragm rod from turning, holding the diaphragm rod end with a 1/2" end wrench while turning the transfer diaphragm engaging rod.

3. Remove the upper section of the selector valve to power cylinder tube assembly by disconnecting the fitting at the selector valve.

4. Grasp the transfer diaphragm housing and turn housing counter-clockwise to disconnect the transfer diaphragm housing from the selector valve housing

.

NOTE: A strap-spanner wrench will facilitate t he removal of the housing. DO NOT use a pipe wrench.

DISASSEMBLY OF DIAPHRAGM CYLINDER ASSY.

1. Use 2 three inch "C" clamps to hold the diaphragm cylinder assembly compressed during the removal of the 6 bolts, lock-washers and nuts which attach the front and rear housings of the diaphragm cylinder.

2. After the 6 screws have been removed release the pressure of the "C" clamp slowly to relieve the pressure of the diaphragm spring.

3. Separate the two housings and remove the spring and diaphragm.

NOTE: At this time recheck the diaphragm for excessive hardness and small cracks in the diaphragm fabric.

To Install: Reverse procedure of removal

NOTE: When assembling the diaphragm cylinder the hole in the rear cover and the depression in the front cover should both be at the bottom to insure proper locating when installing.

TRANSFER DIAPHRAGM CYLINDER

INSTALLATION:

1. Use two gaskets Part No. 164973 between diaphragm mounting bracket and diaphragm housing and install diaphragm cylinder.

2. Use a hack-saw blade to hold the mounting nut from turning when installing the diaphragm assembly.

NOTE: The teeth of the blade should be held against the threads and the blade should be removed before the diaphragm housing squeezes the blade against the gaskets.

3. When installing the transfer diaphragm housing determine that the round hole in the diaphragm cylinder rear cover faces down when cylinder is tightened securely.

4. Connect the transfer diaphragm engaging rod to the diaphragm cylinder rod end and adjust as follows:

With engine not running shift transmission into high gear, adjust length of the transfer diaphragm engaging rod until it is just long enough to allow the transfer key to bottom solidly in the slot of the shifter shaft hand shift lever. Check this adjustment by starting engine and turning HDM switch "ON". Shift transmission to neutral. Selector key should bottom solidly in the slot in the shifter shaft power shift lever. If it does not, recheck shift shaft hand shift lever adjustment.

5. After adjustment has been properly made tighten the engaging rod lock nut securely. See the "Note" following paragraph 2 under "Removal".

SECTION 11
OVERDRIVE

OIL SEAL (O.D. MAINSHAFT) - PAGE 11-6

To the installation instructions add: Use Installing Tool J-2038 to install the overdrive output shaft oil seal.

OIL SEAL (O.D. CONTROL SHAFT) - PAGE 11-6

Should read: Remove control lever and pry out old seal with sharp punch. Coat outside of new seal with white lead and drive the new seal into place with a tubular driver having an inside diameter of 5/8" and outside diameter of 15/16".

OVERDRIVE CIRCUIT FUSE - PAGE 11-16 (6 AND 8 CYLINDER)

A 30 ampere fuse has been placed in the overdrive circuit in order to protect the harness, solenoid and relay in case of a ground or short. Effective in Production after March 29, 1949.

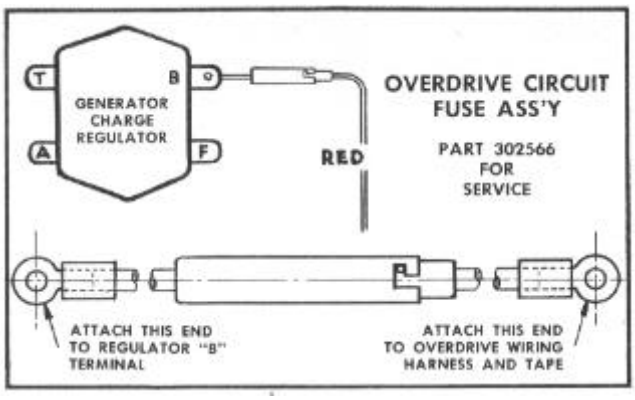


FIGURE 1

This fuse is mounted in an insulated holder and located on left front side of dash; the fuse wire end is connected to the "B" terminal of the generator charge regulator as shown above. When replacing the fuse be sure the insulator is in position in the holder.

When it is necessary to replace either the solenoid or relay on account of damage by a short circuit, it is important that the service overdrive circuit fuse and holder assembly Part 302566 be installed.

TROUBLE SHOOTING MECHANICAL

CONDITION NO. 10

DASH CONTROL IMPROPERLY CONNECTED:

A. Unless the overdrive dash control wire is connected to the control lever on the left side of the overdrive housing in such a manner as to move the lever all the way back when the dash control knob is pushed in, the lock up switch may be held open, thus disabling electrical control operation. Likewise, it may hold the shift rail in such a position as to interlock the pawl against full engagement, even though the control switch is not held open, resulting in a buzzing noise when overdrive engagement is attempted.

B. To correctly make this connection, loosen binding post at lever, pull dash control knob out 3/64", move lever all the way to the rear, and tighten binding post.

CONDITION NO. 11

TRANSMISSION AND OVERDRIVE IMPROPERLY ALIGNED:

A. The same symptoms as above may also result from misalignment at assembly of the overdrive housing to the transmission case, resulting in binding of the overdrive shift rail, so that the retractor spring cannot move the rail fully forward, when the dash control knob is pushed in, and the transmission is not in reverse. Under such conditions the unit may remain fully locked up.

B. To test for this, be sure that the transmission is not in reverse; disconnect the dash control wire from the lockup lever, and feel the lever for free forward movement. If the lever can be moved forward

more than 1/4 inch, it indicates that misalignment probably exists. To correct this, loosen the 4-cap screws holding the overdrive housing to the transmission; remove the lower right hand screw completely and insert J-1597 Aligning Pilot or any short .375" diameter rod. Tighten the 3 cap screws to 20-30 foot pounds torque. Remove pilot and similarly tighten 4th cap screw. To check shift rail alignment compare loads on overdrive control lever with transmission in reverse and with transmission not in reverse.

NOTE: With transmission in reverse overdrive control lever will move forward under a pull of less than 1 oz. When transmission is not in reverse pull required should be about 5 lbs.

CONDITION NO. 12

IMPROPER INSTALLATION OF SOLENOID:

A. If car cannot be rolled backward under any circumstances and there is no relay click when the engine is started it is probable that the solenoid has been improperly installed, jamming the pawl permanently into overdrive engagement.

B. If the car will occasionally roll backward s, but not always, (and there is no relay click when the engine is started) it may indicate that upon installation the bayonet lock was caught and the solenoid forcibly twisted into alignment with the attaching flange, thus shearing off the internal keying of the solenoid. Under these circumstances, the end of the solenoid stem may not catch in the pawl and upon release of solenoid the pawl will not be withdrawn promptly from engagement, but may simply drift out. If the solenoid stem end has its two flats exactly facing the two solenoid flange holes, it will not withdraw the pawl properly. If the stem can be rotated when grasped by a pair of pliers, it indicates that the internal keying has been sheared.

CONDITION NO.. 13

IMPROPER POSITIONING 0F BLOCKER RING:

A. Occasionally, either in assembly at the factory, or in service operations in the field, the internal parts of the overdrive unit may have been rotated with the solenoid removed, and the pawl withdrawn from its normal location. This may cause the blocker ring to rotate, so that its two lugs are not located with respect to the pawl. In other words, the solid portion of the blocker ring may be in alignment with the pawl, which will prevent full engagement of the pawl with the sun gear control plate.

B. To test for this condition, remove solenoid cover, pull dash control knob out, roll car 2 ft. forward. Push dash control in, disconnect "A" wire at generator and connect loose end of wire to negative post of batter y. Then ground the governor terminal and watch movement of center stem of solenoid. It should not move more than 1/8 inch when the solenoid clicks. Then, with the relay terminal still grounded, shift into low gear, and roll car forward by hand. Solenoid stem should then move an additional 3/8 inch as the pawl engages fully. These two tests indicate proper blocker action. Unless both tests are met, the blocker ring is probably not in the correct position.

SECTION 12
PROPELLER SHAFT AND UNIVERSAL JOINTS

LUBRICATION - PAGE 12-3

The Universal Joints and splined sleeve should be lubricated every 1,000 miles with S.A.E. 140 straight mineral oil using a hand gun with an adapter having a relief valve to guar d against excessive pressures which would damage the needle bearing seals.

NOTE: When all Universal Joints are in the same plane, the arrow on the front face of the rear propeller shaft tube will be in line with the arrow on the rear propeller shaft sleeve yoke assembly, Figure 1. If arrows are not lined up, rough car operation will result which will cause wear or failure of the universal joints and put an unbalanced load on the transmission, clutch, engine and rear axle.

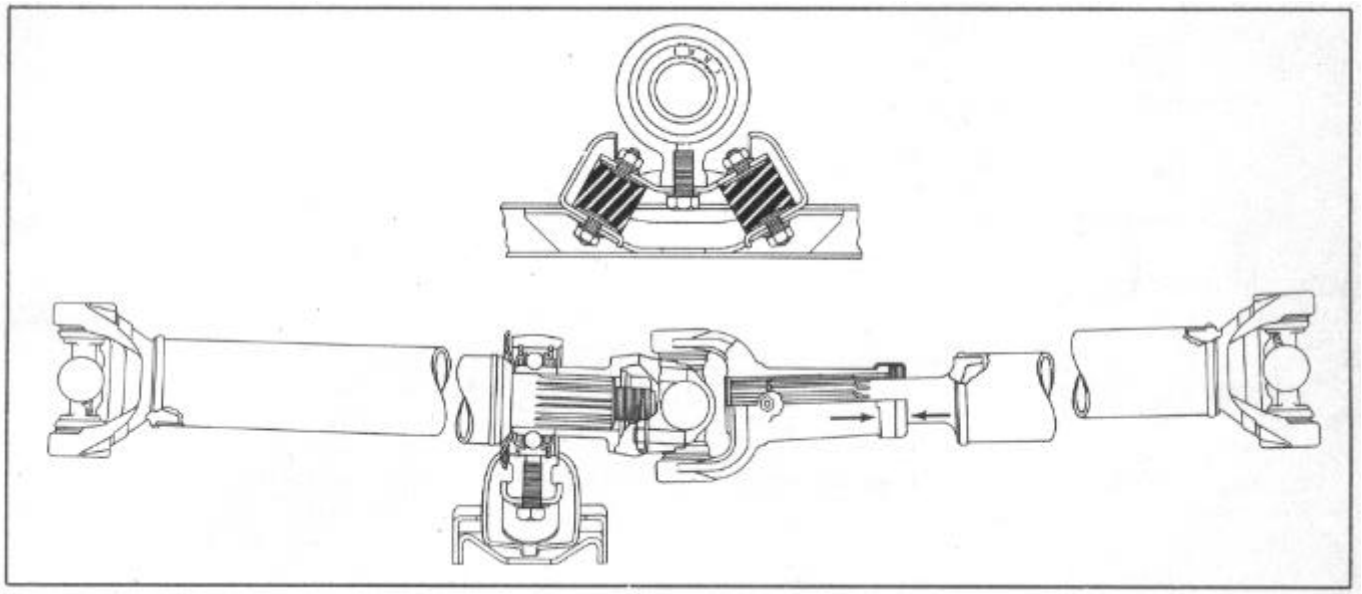


FIGURE 1

SECTION 14
FRONT SUSPENSION

CENTER STEERING ARM - PAGE 14-11

Paragraphs 3 and 4 are changed as follows:

3. Remove the 3 bolts attaching the center steering arm bracket (42) to the No. 2 cross member, Figure 16.

4. Remove the center pivot nut (41) and remove the steering center arm and pivot as an assembly.

Add the following: The needle roller bearings are a press fit and can be removed with a suitable arbor press.

To Install reverse procedure of removal and note the following:

1. When installing new bearings in steering center arm bracket (E) space as shown in Figure 1, apply pressure on outer race, on end carrying manufacturers name and part number.

2. If necessary to replace the steering arm pivot shaft, the new shaft should be pressed in place maintaining the 2.053" to 2.055" dimension as shown in Figure 1 before drilling the hole for the No. 5 taper pin (A).

3. Old type all rubber seal Part No. 300597 has been superseded with Part No. 302553 seals (F) and (D). The later seal is a steel wash e r bonded to synthetic rubber. A separate retainer is not used with the new seal. The new seal became effective in production after car Serial No. 49173777.

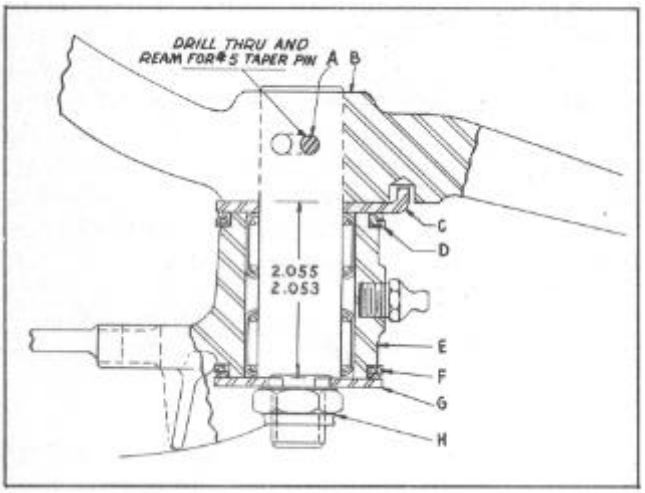


FIGURE 1

4. When installing the seals the rubber lip faces to the casting as shown in cross-section Figure 1 and the spacers (C) and (G) positioned as shown.

5. The center steering arm pivot bolt nut (H) should be tightened to 50-60 foot lbs.

FRONT SUSPENSION - PAGE 14-17

Paragraph 4 should read: Caster and camber are measured when the car is set to 4-1/4" dimension at the front as shown in Figure 6, 480-490 Mechanical Procedure Manual and 5-1/4" at the rear (curb height) as shown in Figure 2, the camber should be 1/2° to 1-1/2° positive.

Note should read: One complete turn of eccentric bushing changes caster 1/2°. Set caster 1/2º to 1-1/2º positive, but never over 1/2° variation right or left.

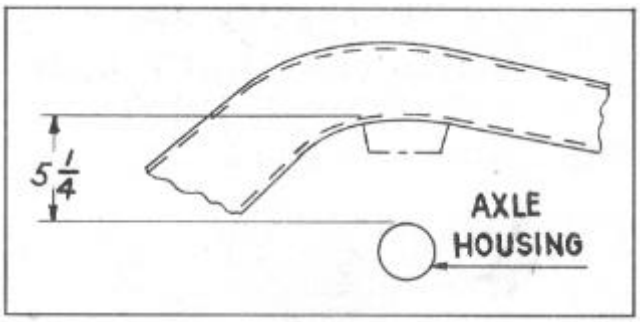


FIGURE 2

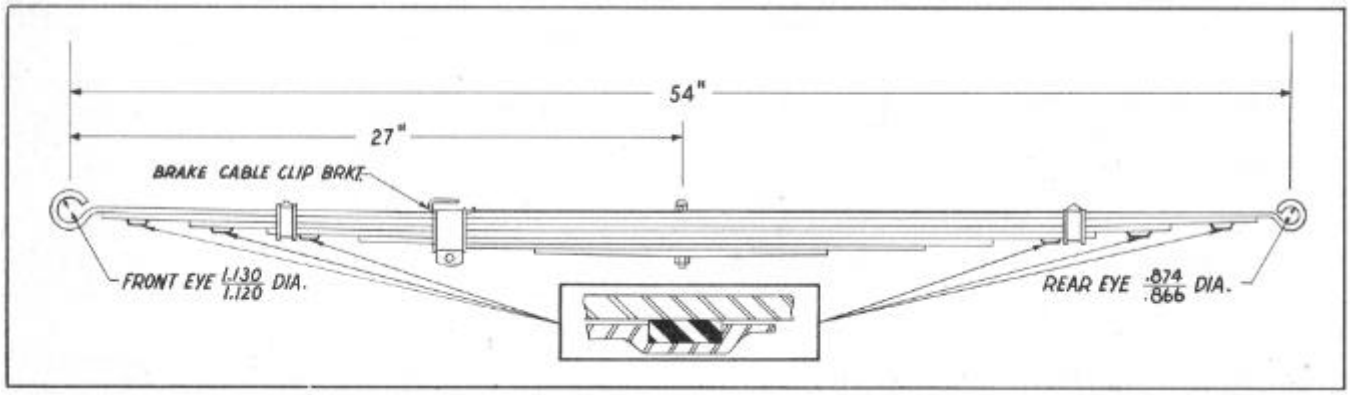
SECTION 16
SPRINGS, SHOCK ABSORBERS AND STABILIZERS

REAR SPRINGS

Effective November 14, 1948, production began using as an option for light scale only, a Spring Perch rear spring Part No. 302440 on model 491 Broughams and all Coupes. This spring has rubber inserts at the ends of the long leaves as illustrated in Figure 1. Following.

All the spring leaves of this type spring are covered with a preparation called "Sleekkote", which affords adequate permanent dry lubrication and prevents rust formation.

Under no circumstances should these springs be lubricated as it will affect the rubber inserts; neither should spring covers be applied, as it is intended that they should operate without covers. It is recommended that any replacement be of the same as that removed.



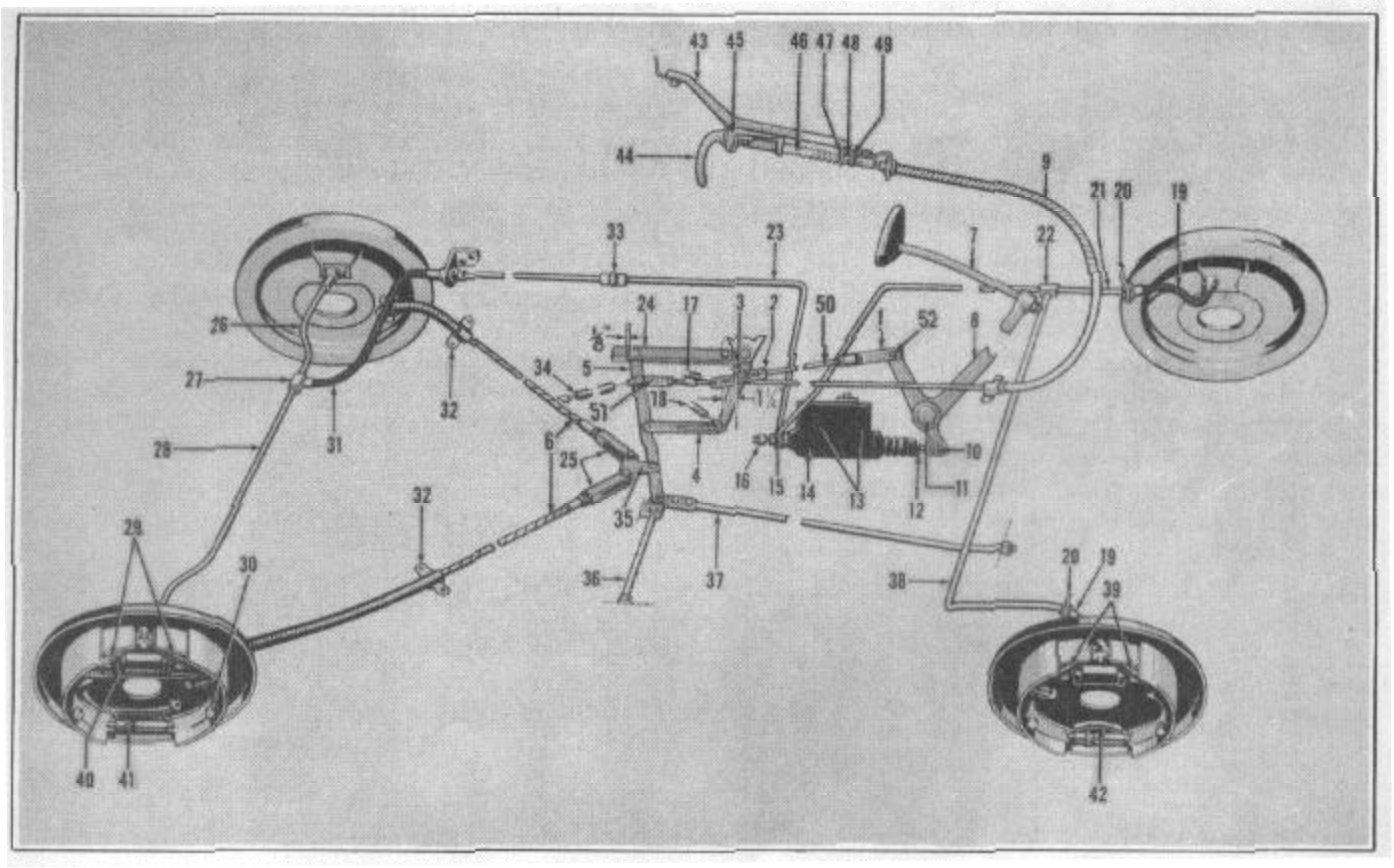


FIGURE 1

SECTION 17
BRAKES

BRAKE PEDAL ADJUSTMENT - PAGE 17-9

The brake pedal lever (8) Figure 1 should have between 1/4" to 3/8" free play; this free play is the movement of the pedal lever (8) before the master cylinder push rod touches the master cylinder piston.

This adjustment is important to assure that the master cylinder piston returns to its normal position, otherwise the brakes will drag.

To adjust; loosen the pedal link clevis nut and remove clevis pin (52). Turn the pedal link rod clevis (1) to increase or decrease the length of the pull rod (50).

Tighten the pedal link clevis nut - lubricate linkage and recheck pedal free-play.

HAND BRAKE LEVER AND BRAKE CABLE ADJUSTMENT - PAGE 17-9

With the hand brake fully released, the brake cables should permit the anchor ends of the rear brake shoes to rest on the anchor pin; if not readjust as follows:

Pull hand brake grip two notches from full release. There should be 1/8" clearance between the hand brake cable lever (5) and end of slot in lever guide plate (24). If not - adjust hand brake cable clevis (51) until 1/8" clearance is obtained.

Pull rear brake cables (6) tight and adjust clevises so that clevis pins just enter holes in toggle (35). All slack should be removed when clevis pins are in place and hand brake applied two notches.

Check engagement of hand brake ratchet rod lock springs. Replace worn or broken springs.

BRAKE PEDAL - PAGE 17-10

Add the following note: After May 31, 1949 there was released for production a new brake pedal rod which is 1/4" shorter than the pedal rods used on previous production for the 480-490 Series.

To adapt the J-2795 Brake and Clutch Pedal Remover for the shortened pedal rods it will be necessary to add a horseshoe washer 1/4" thick with a slot milled in the washer. The opening in the washer must be large enough to enter over remover adapter; for specifications see Figure 2.

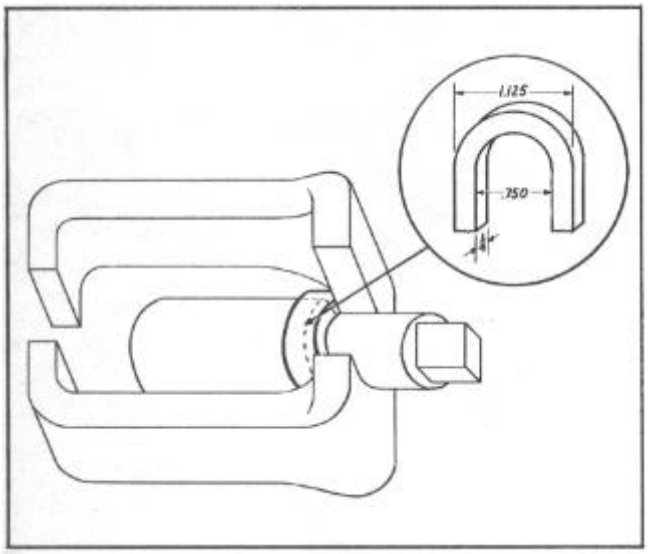


FIGURE 2

PEDAL PUSH ROD ADJUSTMENT - PAGE 17-10

With the brake pedal free-play between 1/4" - 3/8" there must be a clearance of 1-1/4" between the rear side of retaining pin (3) and end of slide link (2), Figure 1.

This adjustment is important in order to obtain the proper mechanical follow-up to the hydraulic operation of the rear brakes. The safety factor of having mechanical brakes following the hydraulic brake action is lost unless this adjustment is checked on every car, whenever brake work or inspection is done.

MAJOR BRAKE ADJUSTMENT - PAGE 17-13

Refer to paragraphs 14, 15, 16 and 17, also note references and make the following changes: The .015" feeler gauge and clearance dimension is in error. This should be .020". Also add; Insert the .020" feeler gauge between center of secondary shoe lining and brake drum and turn adjusting screw until feeler gauge is gripped lightly. After removing the feeler gauge, the retraction springs will automatically adjust both shoes to the recommended .010" clearance between the lining and drum all around.

SECTION 19
WHEELS AND TIRES

TIRE INFLATION - PAGE 19-4

Paragraph 5 should read: Keep tires inflated to the following pressure:

Size	Front	Rear
7.10 x 15	- - 26 pounds cold	- 24 pounds cold
7.60 x 15	- - 26 pounds cold	- 24 pounds cold

Normal city driving will cause a pressure build-up of at least three pounds above the "cold" pressure, while highway driving will cause a pressure build-up of at least five pounds above "cold" pressure. Use these pressure build-up values only as a guide when it is necessary to check tire pressures (hot). Never reduce (bleed) build-up pressure in a tire. The tire is designed to protect itself by building up a safe pressure of a few pounds after it is run. This avoids excessive side- w all flexing and heat--both of which are detrimental to a tire.

Ordinarily tire pressure should be checked at least once a week. However, when touring, or if the car is driven extensively, they should be checked every morning before starting out.

Tire valve caps should be finger tight to prevent loss of air due to a leaky valve and to prevent dirt getting into the valve. Replace missing valve caps promptly.