

5

Engine Service

ENGINE SERVICE NOTES—403

PISTON AND ROD ASSEMBLY

The cylinders are numbered in reverse, with No. 1 cylinder in the rear of the engine.

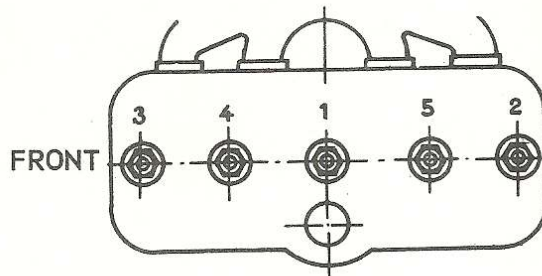
The piston is stamped with the letters AV on the side of the piston pin boss to indicate the front. When installed in the engine, No. 4 piston and rod assembly must be in the front cylinder, with the numbers on the rod and cap facing the camshaft. The slot in the piston skirt must also face the camshaft, with the letters AV facing the front of the engine. (No. 4 cylinder).

CYLINDER SLEEVES

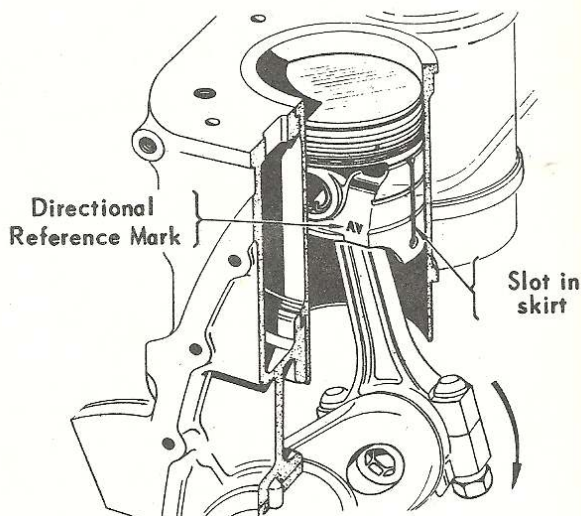
The wet-type sleeves may be installed after removing the cylinder head and the piston and rod assembly. The sleeves are accurately located at the lower end by a machined bore in the cylinder block and at the upper end by a shoulder at the cylinder head mating surface. The installed liners must extend above the cylinder block top surface by 0.005" (0.12 mm.). If they don't, replace the seals to re-establish the correct interference specification.

TIMING CHAIN INSTALLATION

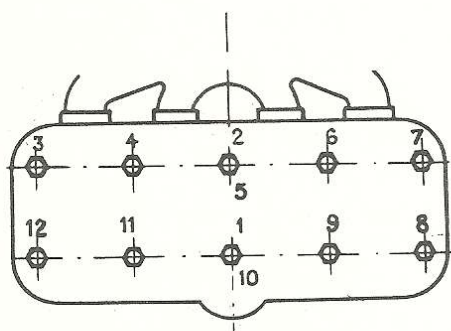
The timing gears are not marked, and the factory recommends adjusting the position of the timing chain with special gauges, the use of which is illustrated in this section. However, because most



Sequence for tightening the rocker arm bracket nuts.



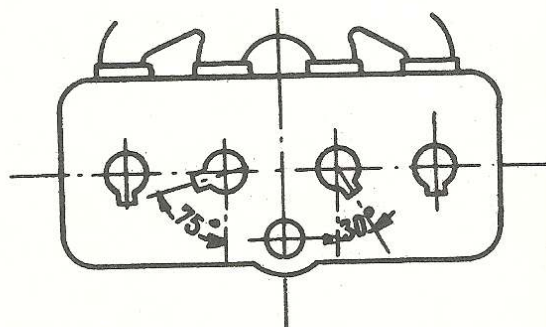
The piston must be installed in the engine with the letters AV facing the front of the engine (No. 4 cylinder), and the piston slot must be on the camshaft side.



NUMERING OF CYLINDERS

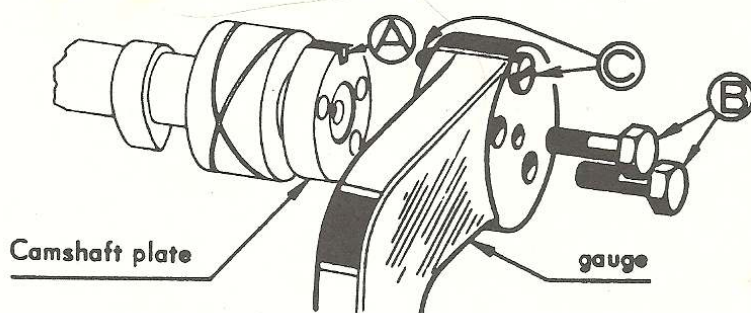


Cylinder head bolt tightening sequence and engine numbering plan. Note that the cylinder next to the radiator is No. 4.

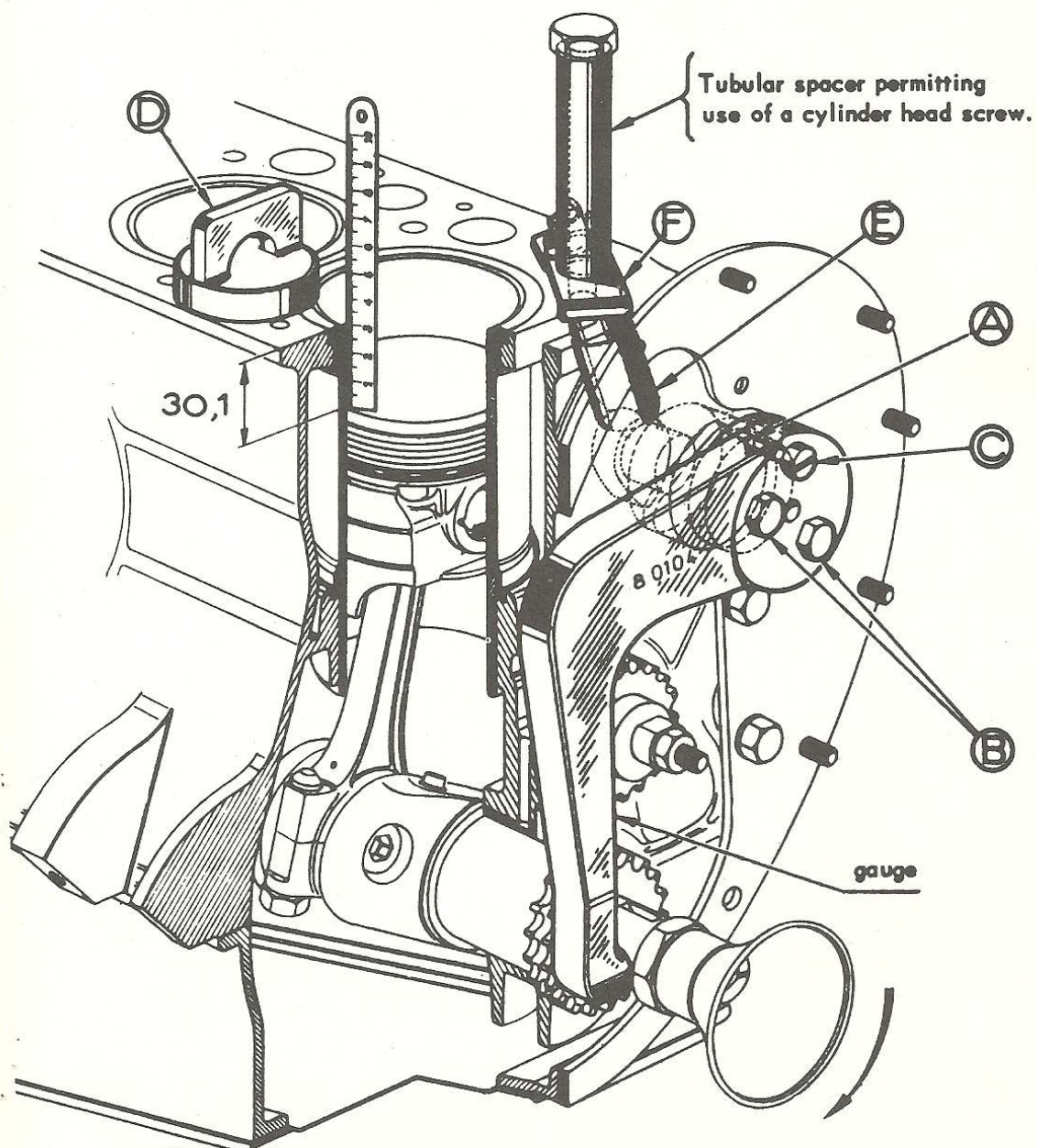


Correct positioning for the spark plug protectors for the 403 model. Use Permatex No. 1 to prevent leaks.

INSTALLATION OF GAUGE



DIRECTION FOR USE OF GAUGE



There are no marks on the timing sprockets of the 403 model; therefore, this gauge must be used to position the chain properly. See the instructions in the text for setting the valve timing properly.

MECHANICAL ENGINE SPECIFICATIONS—PEUGEOT

MODEL	BORE		CRANKSHAFT										PISTON PIN					
			Con. Rod Journal	Main Bearing Journal						End Play		Diameter		Fit in Rod F = Free P = Interference		Fit in Piston F = Free P = Interference		
				Front		Center		Rear										
				In.	Mm.	In.	Mm.	In.	Mm.									In.
403	3.1496- 3.1513	80.000- 80.044	1.7707- 1.7713	44.975- 44.991	2.0055- 2.0061	50.940- 50.955	1.9661- 1.9667	49.940- 49.985	.005- .009	.12- .24	.8653- .8663	21.992- 22.005	.0000- .0010F	.000- .026F	.0008P- .0005F	.014P- .012F		
404	3.3071- 3.3088	84.000- 84.044	1.967	49.962	2.3389	59.41	2.0147	51.17	.003- .008	.076- .203	.8653- .8663	21.992- 22.005	.0000- .0010F	.000- .026F	.0008P- .0005F	.014P- .012F		

VALVE SPECIFICATIONS—PEUGEOT

MODEL	FACE ANGLE (Degrees)		RUNNING CLEARANCE H = Hot; C = Cold				VALVE TIMING						VALVE SPRINGS						VALVE STEM						
							Intake opens before TDC	Clearance for check- ing valve timing		Lift		Number of teeth between sprocket marks	Pressure				Assembled height		Diameter				Clearance		
	In.	Mm.	In.	Mm.	Inner			Outer																	
					Lbs. in. of length	Kg. mm. of length		Lbs. in. of length	Kg. mm. of length	In.	Mm.		In.	Mm.	In.	Mm.									
	403	30	45	.004C	.10C	.008C	.20C	TDC	.028	.7	.307	7.8	①	37.5 @ 1.17	17.0 @ 29.7	81 @ 1.33	36.7 @ 33.7	1.850	47.0	.3228	.3347	8.5	.002	.051	.0025
404	30	45	.004C	.10C	.010C	.25C	TDC	.028	.7	.256	6.5	②	50 @ 1.17	22.7 @ 29.7	81 @ 1.33	36.7 @ 33.7	1.850	47.0	.3354	.3347	8.5	.002	.051	.0025	.064

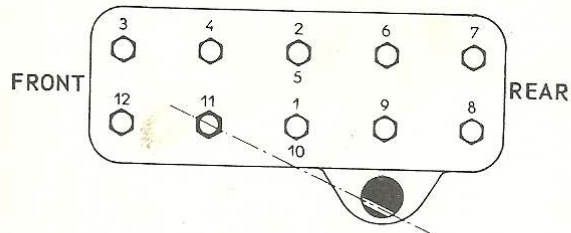
① Checked and installed with a special gauge.

② See text.

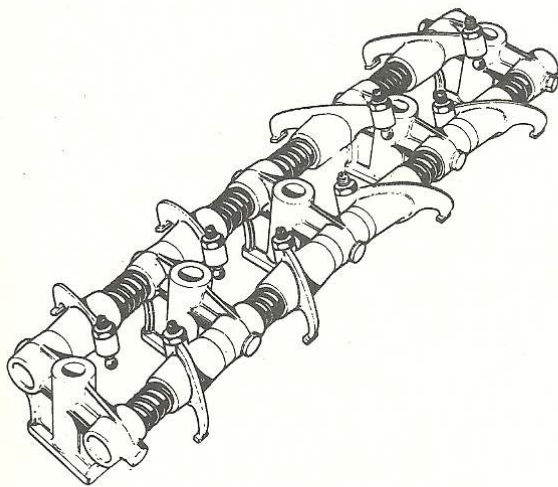
ENGINE TORQUE SPECIFICATIONS—PEUGEOT

MODEL	SPARK PLUGS		CYL. HEAD NUTS ①		CON. ROD BOLTS		MAIN BRG. BOLTS		ROCKER ARM SHAFT BRKTS.		FLYWHEEL TO CRANKSHAFT BOLTS	
	Ft. Lbs.	M. Kg.	Ft. Lbs.	M. Kg.	Ft. Lbs.	M. Kg.	Ft. Lbs.	M. Kg.	Ft. Lbs.	M. Kg.	Ft. Lbs.	M. Kg.
403	18-20	2.5-2.8	50-58	6.9-8.0	31-34	4.2-4.6	50-58	6.9-8.0	50-58	6.9-8.0	44-47	6.1-6.5
404	18-20	2.5-2.8	60	8.3	30	4.1	55	7.6	60	8.3	45	6.2

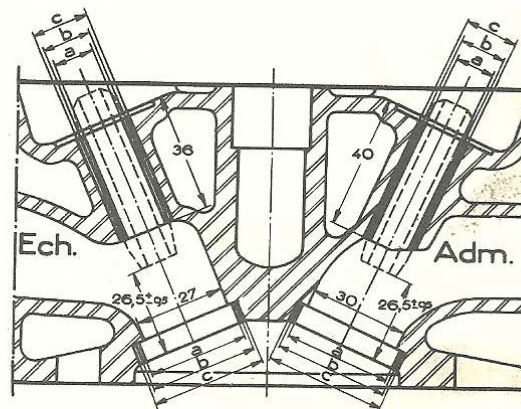
① With cold engine.



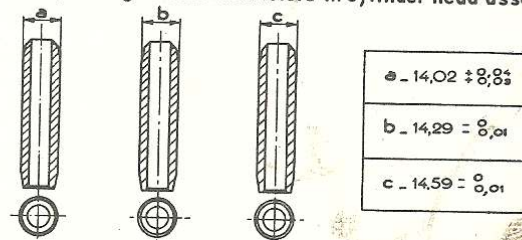
The oil pump gear must be meshed in this manner for the 403 model, with cylinder No. 1 in the firing position, so that the distributor may be correctly inserted.



Details for assembling the rocker arm shafts for the 403 model.

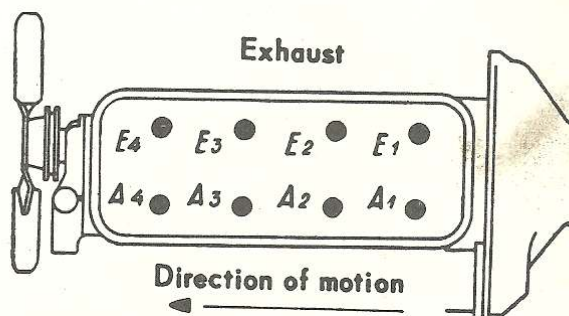


VALVE GUIDE DIAMETERS
Corresponding to bore diameters in cylinder head assembly



Dimensions for pressing in the valve guides for the 403 model. All dimensions are in millimeters.

To adjust rockers	Fully open valve
l ₃	E ₁
l ₄	E ₃
l ₂	E ₄
l ₁	E ₂
E ₄	
E ₂	
E ₁	
E ₃	



Method of setting the rocker arm clearances for the 403 model. Note that the first cylinder is No. 4.

	Angular Setting on engine flywheel	Corresponding piston travel (mm)
Advance - Inlet opening	0° (T.D.C.)	0
Retard - Inlet closing	37° 30'	67.3
Advance - Exhaust opening	37° 30'	67.3
Retard - Exhaust closing	0° (T.D.C.)	0

These are the valve opening and closing points for the 403 model with the rocker arms spaced at 0.028" (0.7 mm.) for checking purposes. Be sure to re-space the rocker arms to the correct running clearance after checking the valve timing.

service stations do not have the illustrated gauges, the following instructions for using the rocking position of the valves are provided. To use this method, turn the crankshaft until pistons Nos. 1 & 4 are at top dead center. Position the chain on the gears and adjust the tension. When properly positioned, the tappets should be in the "rocking position," that is, a slight movement either way will move one tappet up and the other down. Tappet movement must be equal each side of TDC.

After the above preliminary adjustment has been made, a more accurate check can be performed after replacing the cylinder head and the valve operating mechanism. Adjust the rocker arm clearance to 0.028" (0.7 mm.) cold, and then rotate the crankshaft in the normal direction of rotation to see if the intake valve opens at TDC. If not, it

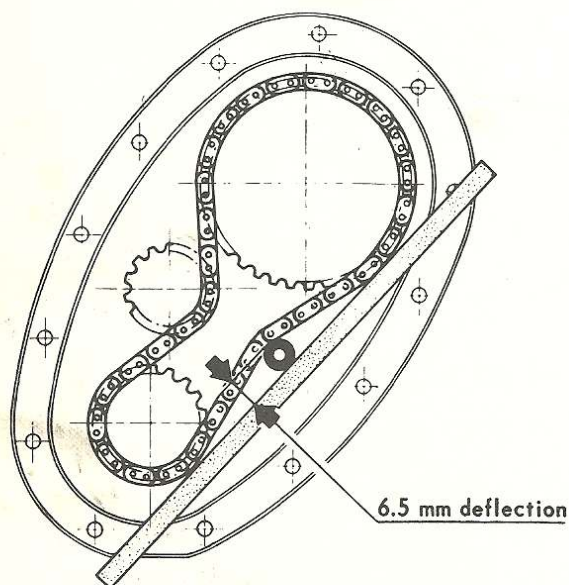
may be necessary to shift the timing chain a tooth or two.

TIMING CHAIN TENSIONER

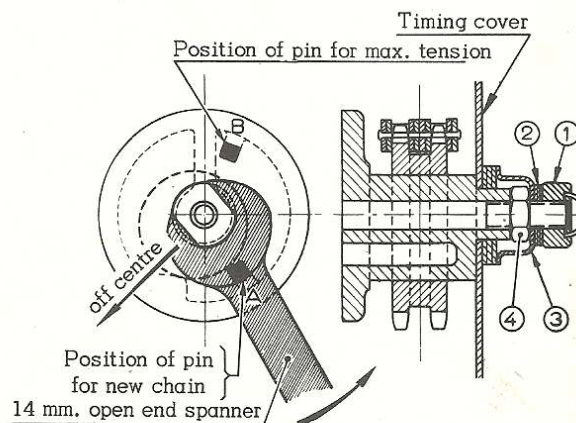
An offset bearing is used to support the tensioner and sprocket. With the engine idling, turn the 14 mm. adjusting wrench slowly until the chain noise increases. Turn it back until the noise disappears. The adjustment can be made with the timing case cover removed by turning the eccentric until a maximum chain deflection of $\frac{1}{4}$ " (6.5 mm.) occurs on the side of the chain opposite the tensioner device. Readjust the rocker arm clearance to the proper running specification when you are finished checking the chain timing.

ENGINE REMOVAL

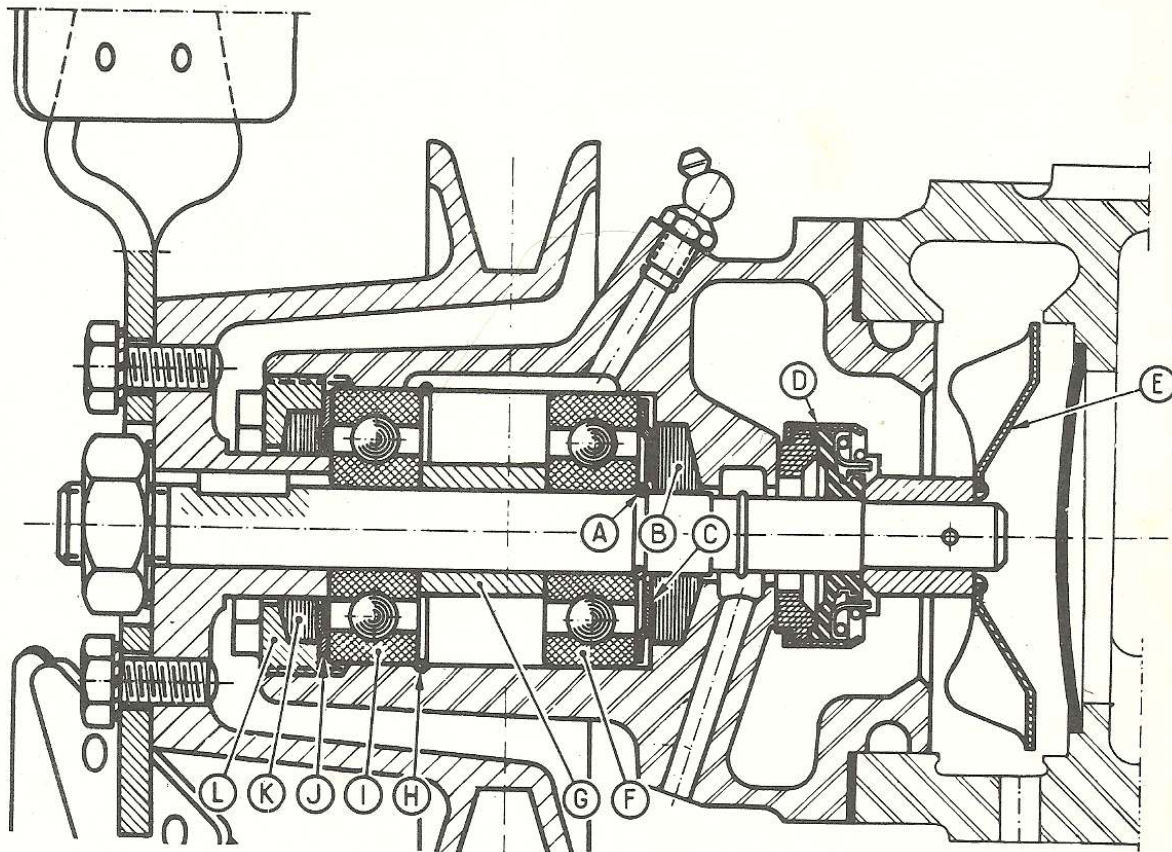
The engine can be removed with or without the transmission attached. It is necessary to pull the engine from the frame in order to service the piston and rod assembly, because the oil pan (upper) cannot be removed with the engine in the chassis. The lower oil pan can be removed to service the oil filter while the engine is still in the chassis.



The timing chain tensioner must be adjusted for a deflection of $\frac{1}{4}$ " (6.5 mm.) midway between the sprockets.



Details of the timing chain tensioner used on the 403 model.



Sectioned view of the water pump assembly used on the early 403 models. Late models use the electro-magnet controlled fan described in the 404 section.

WITHOUT THE TRANSMISSION

FROM INSIDE OF THE ENGINE COMPARTMENT

Drain the coolant and oil. Remove the hood, radiator, battery, and air cleaner. Disconnect the wires and pipe lines leading to the engine, the exhaust pipe at the manifold, and the heater hose at the cylinder head.

FROM UNDER THE CAR

Remove the starting motor and the exhaust pipe bracket at the clutch housing. Disconnect the clutch operating linkage, install a jack to support the rear of the power plant, and unbolt the clutch housing from the block. Remove the deflector plates.

FROM INSIDE THE ENGINE COMPARTMENT

Unbolt the engine front mounts, attach a hoist, and support the weight of the engine. Pull the engine forward and tilt it sharply to pull it from the compartment.

WITH THE TRANSMISSION

FROM UNDER THE CAR

Do not disconnect the clutch bell housing or jack up the rear of the power plant. After supporting

the weight of the engine with the chain hoist, disconnect the front universal joint ball cover and remove the engine rear mount support. Allow the torque tube to rest on the brake equalizer.

FROM INSIDE THE ENGINE COMPARTMENT

Raise the power plant while tilting the transmission to clear the front crossmember.

AUTOMATIC FAN

Since 1959, the 403 model has been equipped with an automatic fan, the service of which is covered in the 404 section.

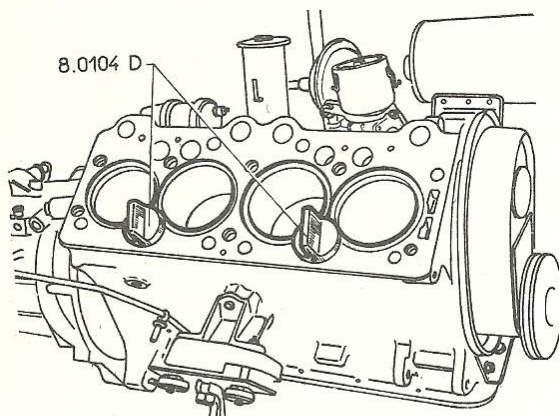
ENGINE SERVICE NOTES—404

CYLINDER NUMBERING

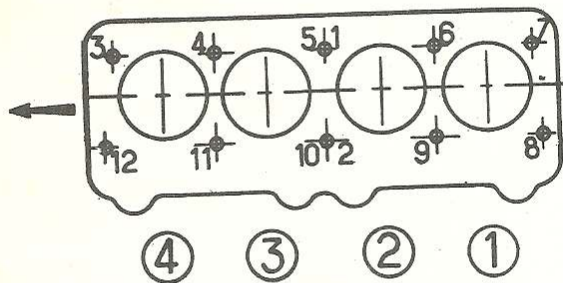
The cylinders are numbered in reverse, with No. 1 cylinder positioned at the rear of the engine.

PISTON AND ROD ASSEMBLY

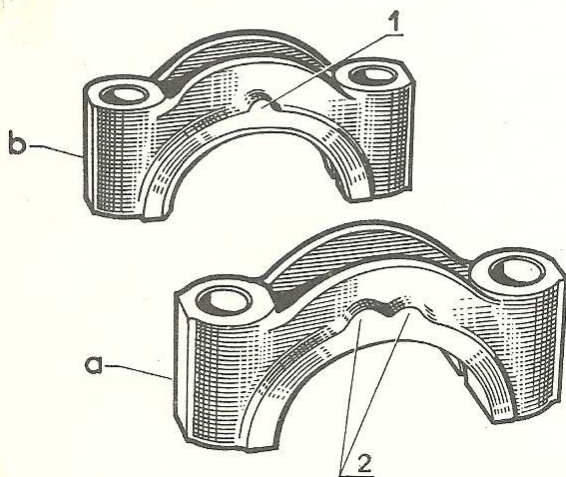
The pistons are stamped on the top surface with A.V. and an arrow pointing towards the front of the engine (No. 4 cylinder). When assembled in the engine, the oil spurt hole must face opposite



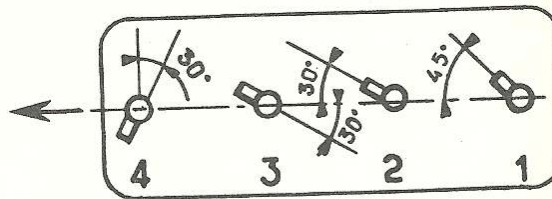
After removing the cylinder head, special tools should be used to hold the cylinder sleeves in place. A large washer can be used with a spacer and a cylinder head stud for the same purpose.



Cylinder head bolt tightening sequence for the 404 model. The head bolts should be torqued with the engine cold in two passes: first to 35 ft-lbs (4.8 m/kg) and then to 60 ft-lbs (8.3 m/kg). Tightening the cylinder head bolts affects the valve operating clearance.



Main bearing caps are identified by means of knobs on the face towards the front of the engine. The center main bearing cap is identified by the two knobs, and the front cap by the single knob.



The spark plug protector tubes must be replaced in the positions shown for the 404 model. Use Permatex No. 1 to prevent leaks.

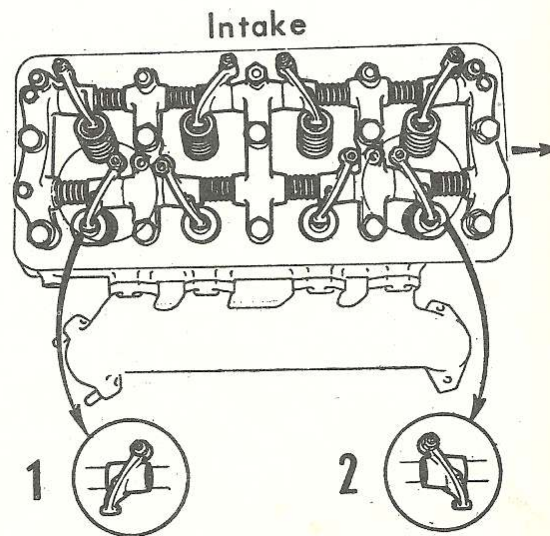
the camshaft. The numbers on the rods must face the camshaft side of the engine.

CYLINDER SLEEVES

The wet-type sleeves may be installed after removing the cylinder head and the piston and rod assembly. The sleeves are accurately located at the lower end by a machined bore in the cylinder block and at the upper end by a shoulder at the cylinder head mating surface. The installed liners must extend above the top surface of the cylinder block by 0.0006"–0.0030" (0.15–0.76 mm.). If they don't, replace the seals to re-establish the correct interference specification.

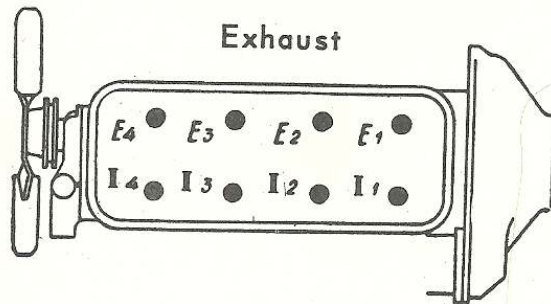
TIMING CHAIN INSTALLATION

The timing gears are marked for correct chain installation. The timing chain has a single copper index link to match the crankshaft gear mark and a double copper link to match the mark on the camshaft. Note that the camshaft and crankshaft gears must be positioned so that their marks are on the exterior side of the gears, in alignment with the axis of the two shafts.



Rocker arm shaft assembly details. Early types used intake arms for 2 and 4 and exhaust arms for 1 and 3. Later models used intake arms for 1 and 3 and exhaust for 2 and 4.

With This Valve At Full Open Position	Adjust These Valves	
Ex 1	In 3	Ex 4
Ex 3	In 4	Ex 2
Ex 4	In 2	Ex 1
Ex 2	In 1	Ex 3

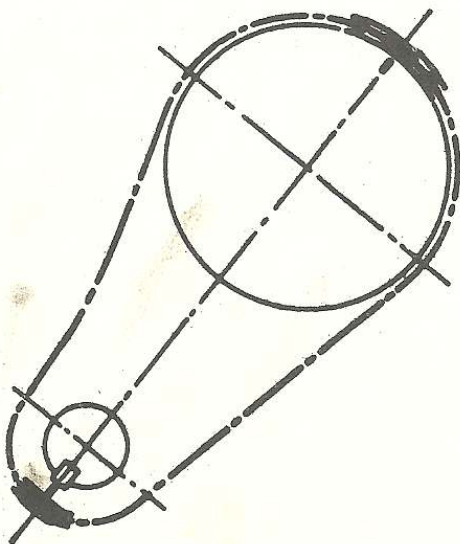


The method of adjusting the rocker arm clearance for the 404 engine. Remember that No. 4 cylinder is in the front.

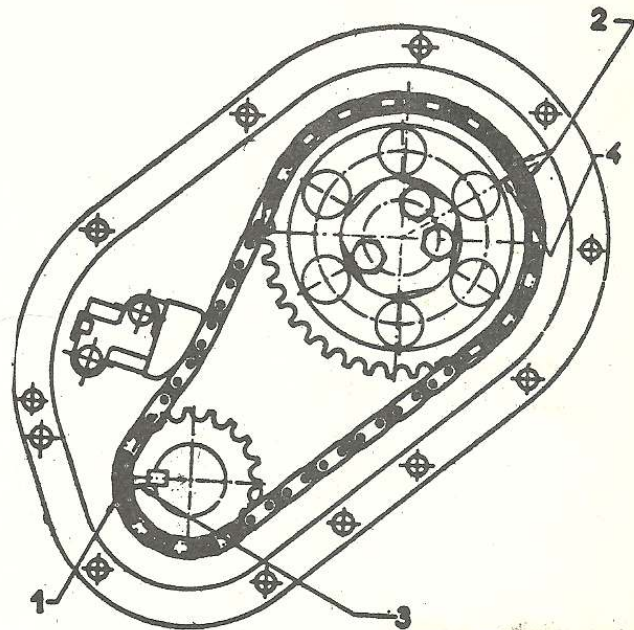
TIMING CHAIN TENSIONER

A timing chain tensioner is used to maintain the proper chain tension for silent operation. The tensioner consists of a spring positioned between a rubber shoe and a hydraulic piston. Engine oil pressure is directed against one side of the piston to increase spring tension proportional to engine speed.

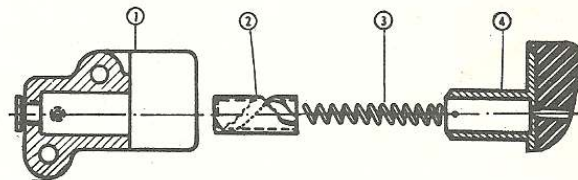
To assemble the tensioner, insert the spring and piston into the cylinder. Use an Allen wrench to release spring pressure by turning the wrench clockwise. Insert this assembly into the tensioner body.



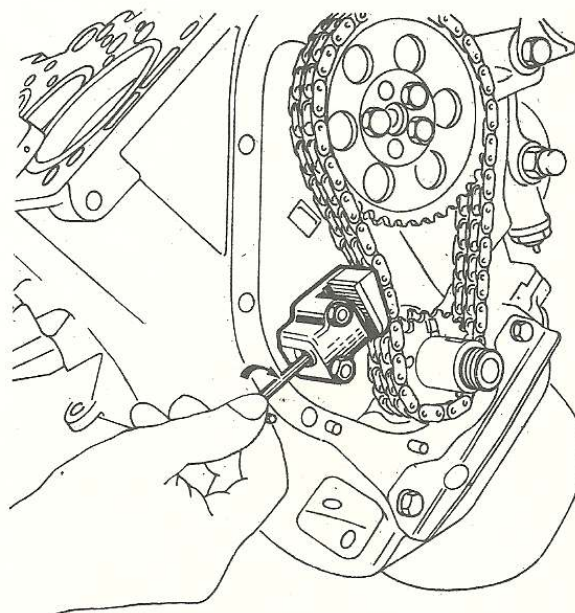
The timing chain is assembled over the sprockets so that the marks align when they are on the centerline, but on the exterior sides of the shafts.



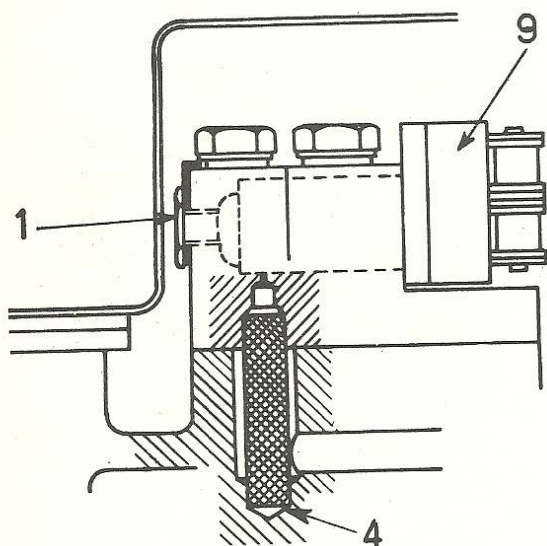
Correct timing chain installation for the 404 model: 1. single copper link, 2. double copper link, 3. crankshaft key, 4. mark on camshaft sprocket.



The timing chain tensioner is composed of the body (1), a piston with a spiral groove to take up the play (2), a spring (3), and a rubber shoe (4).



Method of tensioning the chain after installing the unit on the 404 model. See the text for details.



When installing the tensioner on the block, center the filter (4) in the feed port. Piston (9) should be positioned against the chain before installing and tightening the cover screw (1).

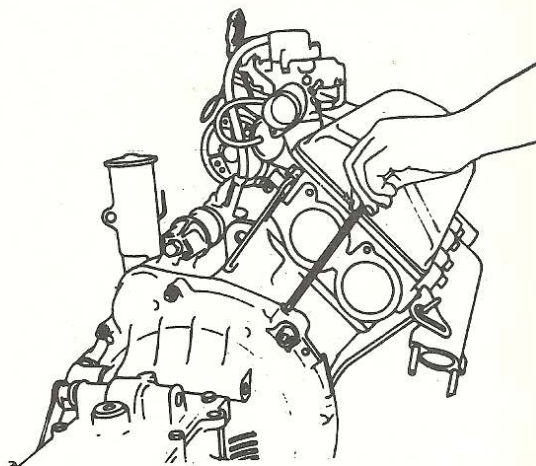
Center the filter in the feed port, and then position the tensioner over the filter. Make sure that the tensioner body is flush with the block, and then torque the two mounting bolts to 5 ft-lbs (0.7 m/kg). Set the tensioner by turning the Allen screw slowly clockwise until you hear the piston release under spring tension. Install and tighten the cover screw.

OIL PUMP INSTALLATION

The oil pump shaft drives the distributor and, therefore, must be installed correctly in order to maintain the proper relationship with the distributor drive flange. To install the pump, turn the crankshaft until the front piston (No. 4) is at top dead center firing position. Insert the oil pump with the small side of the slotted end towards the outside of the block. Check the alignment of the pump drive sleeve by sighting through the distributor port. The slot of the pump shaft must line up with the threaded hole of cylinder head bolt No. 12.

	Flywheel Angle	Piston Position
Intake opening (advance)	0° TDC	0° TDC
Intake closing (retard)	30° 30' ABDC	2.720" From TDC
Exhaust opening (advance)	35° BBDC	2.689" From TDC
Exhaust closing	4° 30' ATDC	.007" From TDC

To check the valve timing, adjust the rocker arm clearance to 0.028" (0.7 mm.). Readjust the rocker arm clearance to the running specification after checking the valve timing.



The flywheel is notched so that you can drop a bar into it when the crankshaft is correctly positioned for No. 1 cylinder to fire. This is true of both models.

CYLINDER HEAD GASKET

Place the head gasket on the block with the word "dessus" facing up.

SPARK PLUG PROTECTOR TUBES

When pressing in a spark plug protector tube, it is important that the plug covers face the positions shown. Use Permatex No. 1 to prevent leaks.

PUSH RODS

The longer push rods are for the exhaust valves and the shorter ones for the intake valves. The ball ends must be installed down in either case.

ROCKER ARM ASSEMBLY

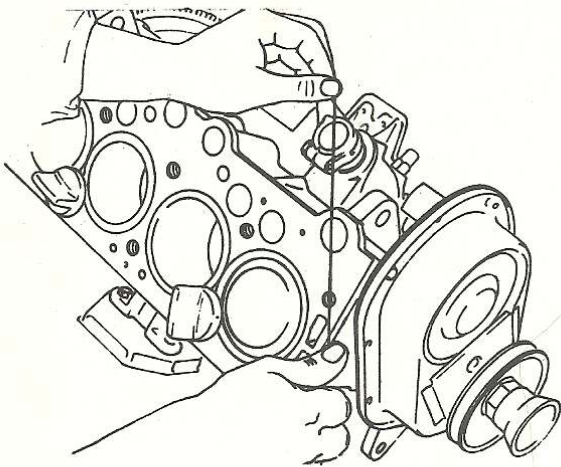
Rocker arm supports Nos. 2 and 4 are interchangeable. When assembled, the oil holes must face each other.

ENGINE REMOVAL

The engine is removed without the transmission.

FROM INSIDE THE ENGINE COMPARTMENT

Disconnect the battery cables, and then remove the windshield washer jets, hood, crank handle, windshield washer jar, air cleaner, ignition coil, battery, and the town horn. Disconnect the radiator, heater hoses, and the carburetor heater hose. Remove the radiator. Remove the two bolts holding the starting motor to the bell housing. Disconnect the starter cables, all low-tension wiring, accelerator cable, and the choke cable. Remove the fuel line from the oil breather. Remove the baffles from the bell housing and the two bolts holding the exhaust pipe at the manifold.



The oil pump drive gear must be positioned so that the slot is in line with the threaded hole of cylinder head bolt No. 12 for the 404 model. This aligns the distributor drive flange correctly.

FROM UNDER THE CAR

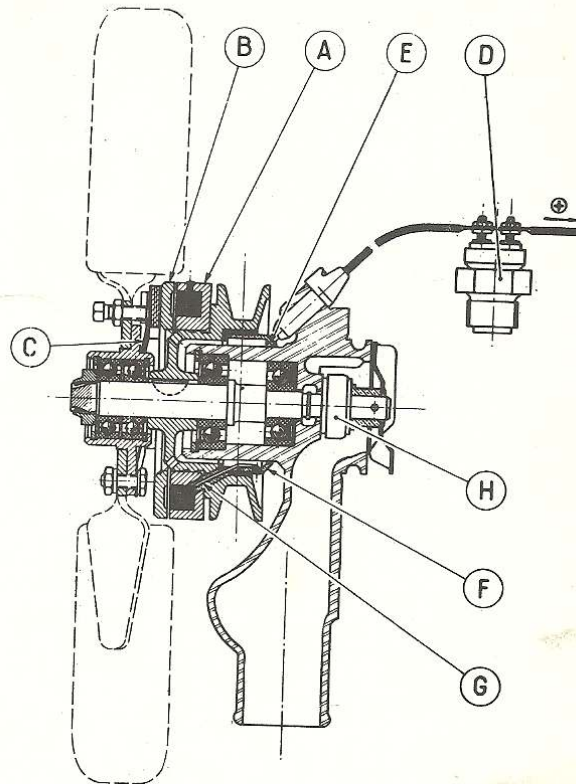
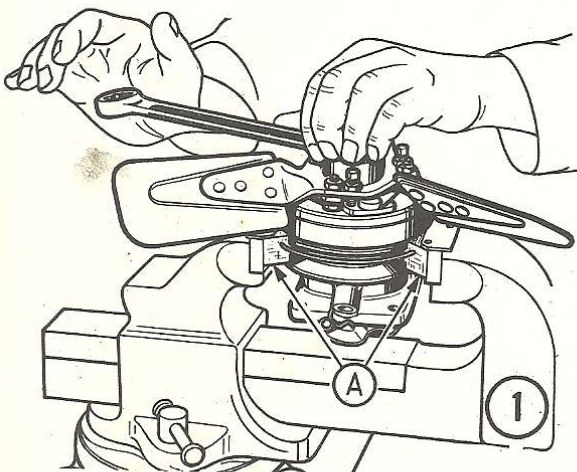
Remove the bolt holding the exhaust pipe clamp to the transmission housing. Support the bell housing with a fixture as shown. Remove the three Allen bolts holding the bell housing to the engine.

FROM INSIDE THE ENGINE COMPARTMENT

Attach a chain hoist and lift the engine enough to support its weight. Remove the nuts from the engine front mounts, and then pull the engine forward to free it from the transmission. Turn the engine clockwise and pull it from the frame.

AUTOMATIC FAN

The fan is electro-magnetically controlled by the temperature of the coolant. The fan clutch assembly is made up of an electro-magnet (A), which is part of the water pump pulley and an armature



The electromagnetically controlled fan used on the 404 model and later 403 models. (A) Electro-magnet, (B) armature, (C) support arms, (D) thermo-contact switch, (E) brush, (F) commutator, (G) wire to coil, (H) impeller seal.

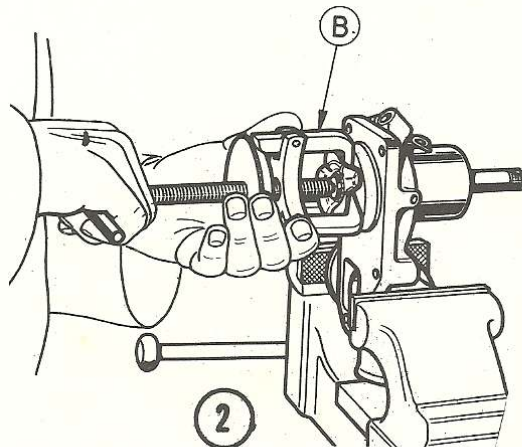
(B) which is supported by three arms (C) on the fan hub. The fan is secured to the fan hub by means of three gap-adjusting screws.

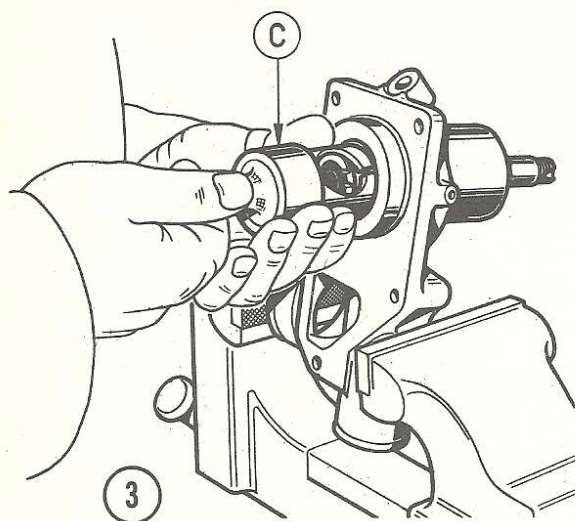
The fan is set to operate when the coolant temperature reaches 180° F. (82.2° C.) and to cut out when the temperature drops to 155° F. (68.3° C.) for the late models.

WATER PUMP OVERHAUL

DISASSEMBLING

- ① Hold the pulley in a vise and remove the





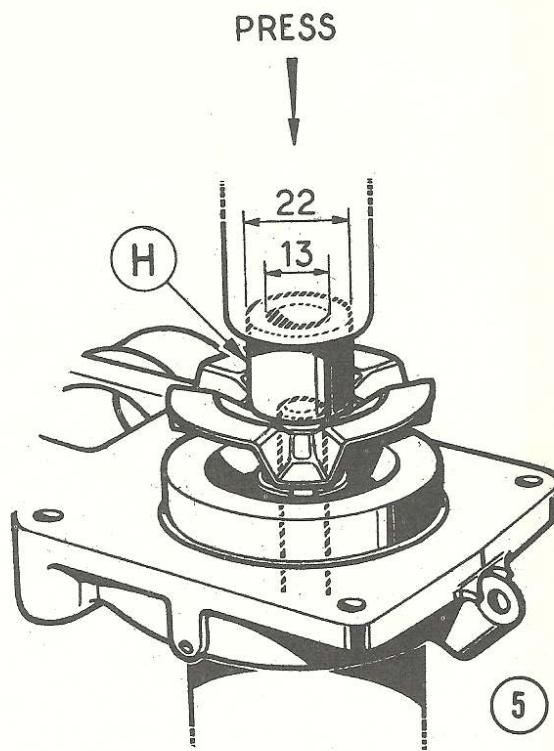
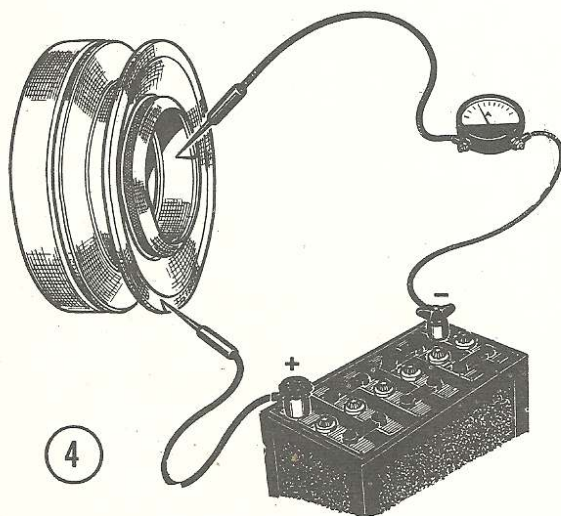
center nut. Hold the pump body by hand and tap the end of the shaft with a mallet. Remove the Woodruff key in the shaft. **CAUTION:** Do not rest the pulley on the bronze collector ring, or you will damage it.

② Remove the impeller with a puller (B).

③ Place a few drops of oil under the collar of the seal and rotate the puller (C) in order to remove the seal. Remove the front bearing snap ring. Submerge the pump body in boiling water for about a minute, and then press out the shaft with its two bearings. The bearings can be removed from the shaft in a press.

CLEANING AND INSPECTING

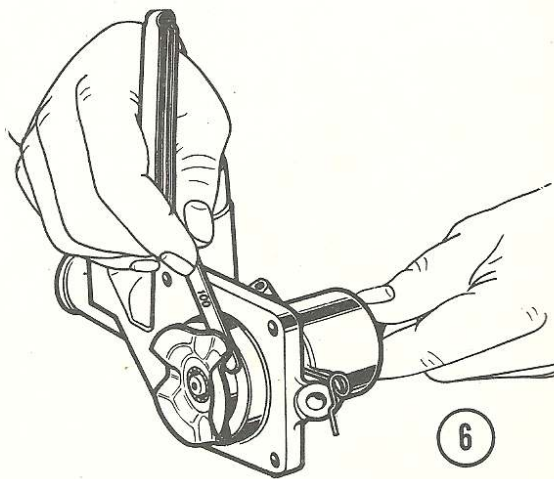
④ Clean all parts and inspect for wear. Always replace the seal, bearings, and gasket. The clutch surface of the pulley may show signs of galling, but this is normal. Check the resistance of the electromagnet with an ohmmeter, which should register 20 ohms.

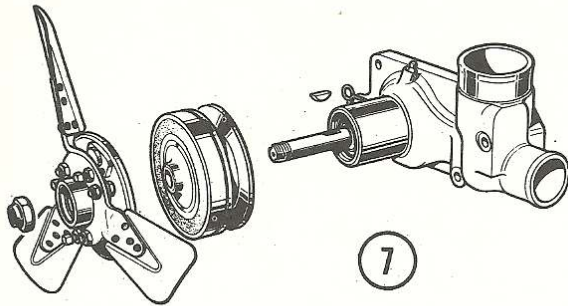


ASSEMBLING

⑤ Coat the bearings with multi-purpose lubricant and press them onto the shaft, with their open sides facing each other. Place the pump body in boiling water for a minute, and then press in the shaft. Position the bearing snap ring, and then tap the shaft until the bearing seats against the snap ring. Lubricate the rear end of the shaft. Install a new seal. Engage the impeller into the driving fingers of the seal and over the splines on the shaft. Press the impeller on gently with a bushing (H) having an inside diameter of $\frac{1}{2}$ " (13 mm.) and an outside diameter of $\frac{7}{8}$ " (22 mm.).

⑥ Adjust the position of the impeller, which must rotate without run-out and with a maximum

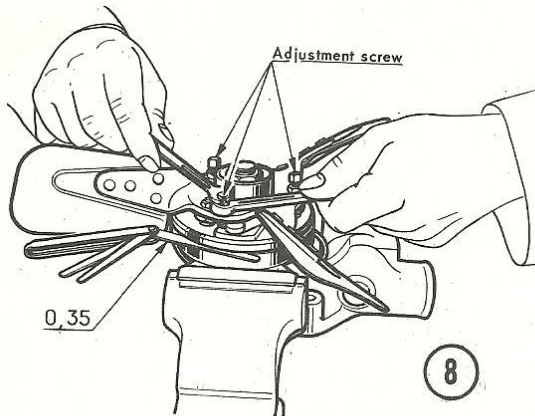




clearance of 0.040" (1.0 mm.) between the blades and the pump collar.

⑦ At the front end of the shaft, install the Woodruff key, the electro-magnet pulley, and the fan. Torque the center nut to 25 ft-lbs (3.5 m/kg.), and then stake the nut.

⑧ Check the gap between the fan and the magnet. The clearance must be adjusted to 0.015" (0.35 mm.), evenly measured around the hub. Lock the screws.



TROUBLESHOOTING

The fan clutch may be tested on the bench by connecting the positive terminal of a battery to the brush wire and the negative terminal to the pump body.

To test the installation on the car, start the engine and, when the temperature reaches 183° F. (85° C.), the fan should engage.

If the fan does not operate properly on the engine, check fuse F-3 under the dashboard. If the fuse is OK, short the two terminals of the thermocontact located at the bottom of the radiator. If the fan now engages, replace the thermocontact. If the fan does not operate within proper temperature limits, replace the thermocontact.

FAN BELT INSTALLATION

The adjustment of the drive belt is based upon a calculated amount of stretch after installation. Before installing the belt, draw two pencil lines on the top surface of the belt, 4" (100 mm.) apart. After installing the belt, tension the belt so that the distance between the pencil marks, made before installation, does not exceed 4 1/8" (104 mm.). The belt will appear to be loose by American car standards, but it should not be tightened unless it is slipping. Excessive strain will cause the belt to wear out quickly.

6

Clutch, Transmission, and Rear End

CLUTCH

The clutch pedal free play for both models is $\frac{3}{4}$ " (20 mm.), and this is adjustable by turning the brass nut behind the master cylinder reservoir clockwise to reduce the play.

To service the clutch, it is necessary to pull the rear end and transmission, and this can be done without pulling the engine.

TRANSMISSIONS

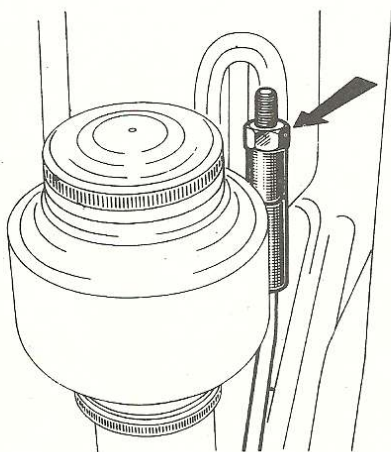
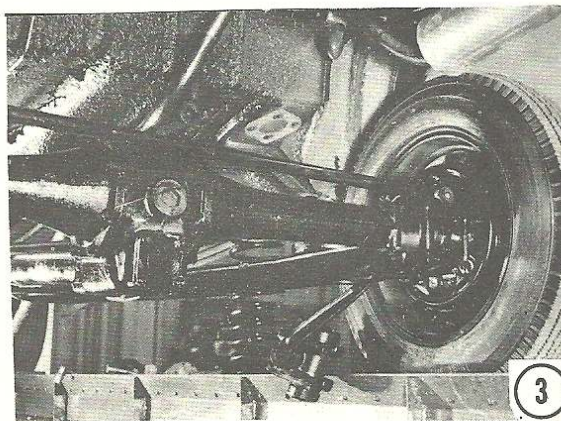
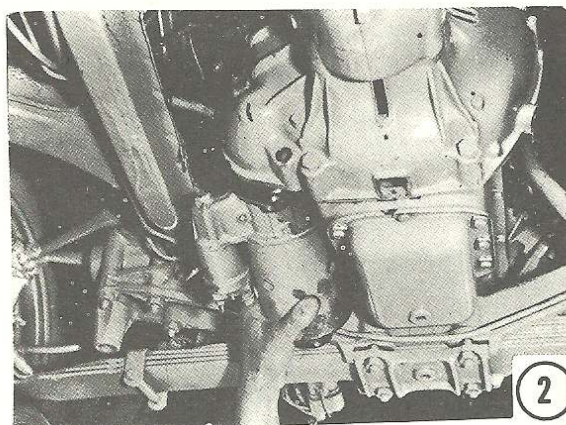
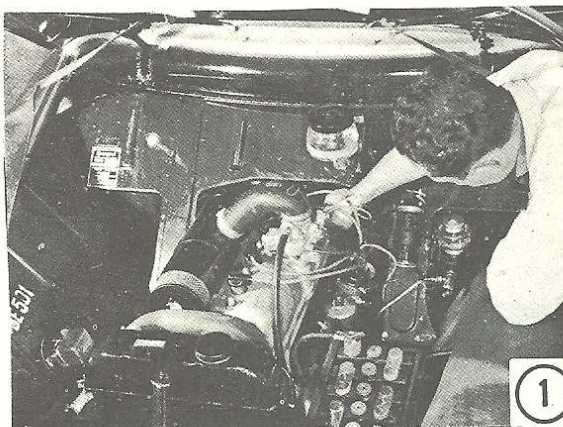
Both models use similar transmissions having four-forward speeds. All of the gears are synchronized in the C-3 transmission. To remove the transmission, it is necessary to pull the rear end.

REMOVING THE REAR END AND/OR TRANSMISSION

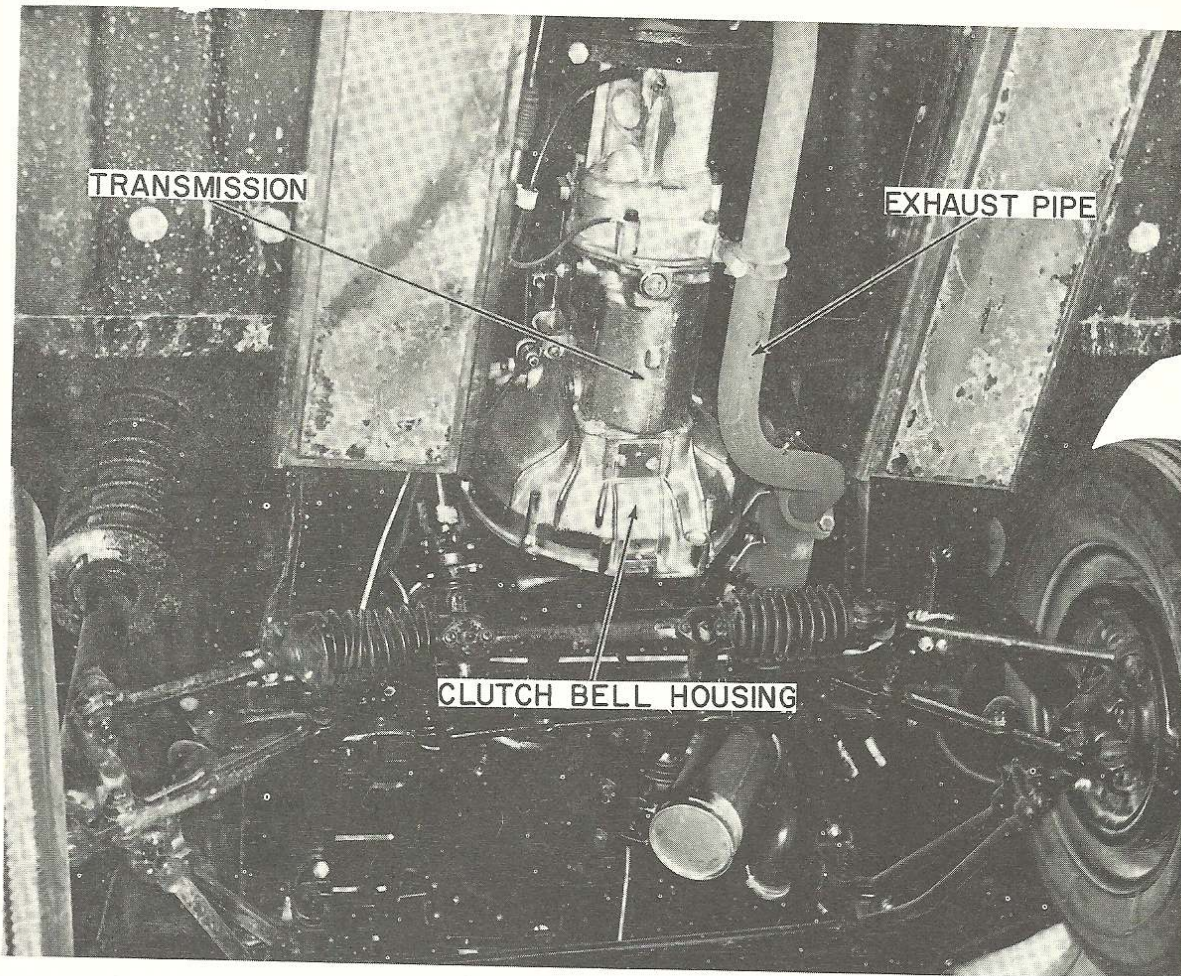
① Disconnect the battery and the gear shift linkage from the transmission.

② Remove the starting motor, the two shields from the clutch housing, and the exhaust pipe clamps. Disconnect the speedometer cable.

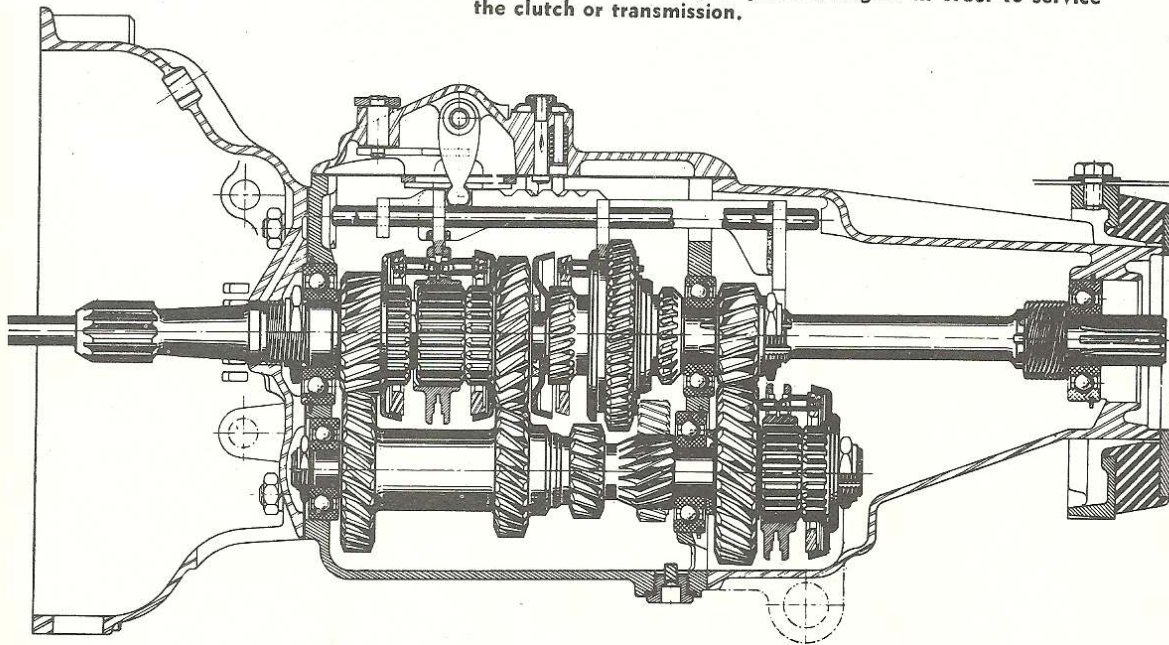
③ To pull the rear axle assembly, disconnect the rear shock absorbers, the stabilizer bar, the parking brake control cables, and the brake lines. Lift the rear end of the body in order to remove the helical springs.



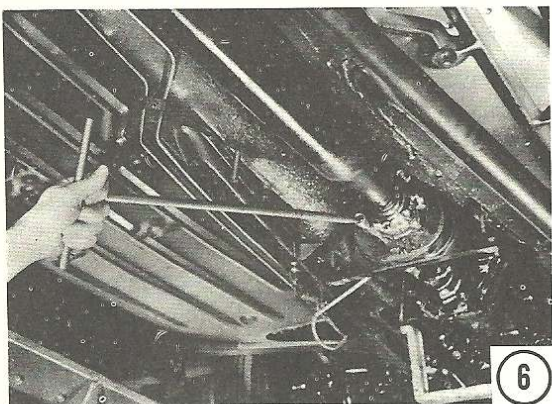
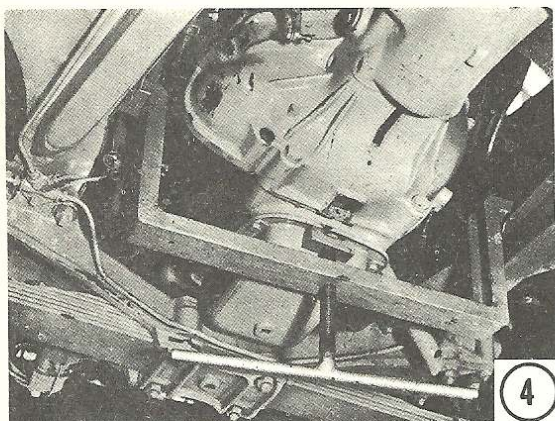
The clutch free play adjustment is located behind the master cylinder reservoir.



Details of the transmission and clutch. It is not necessary to pull the engine in order to service the clutch or transmission.



Sectioned view through the C-2 transmission used on early 403 models.



④ Remove the exhaust pipe clamps from the manifold and clutch housing. Support the rear end of the engine.

⑤ Disconnect the clutch linkage and remove the brake equalizer support plate. Remove the rear crossmember, and then lower the rear of the engine about 3" (70 mm.).

⑥ Remove the torque tube ball joint cover, separate the universal joint, and lift the body enough to permit removal of the rear axle assembly.

⑦ Remove the bolts holding the clutch housing to the engine, and then pull out the transmission.

OVERHAULING A C-2 TYPE TRANSMISSION

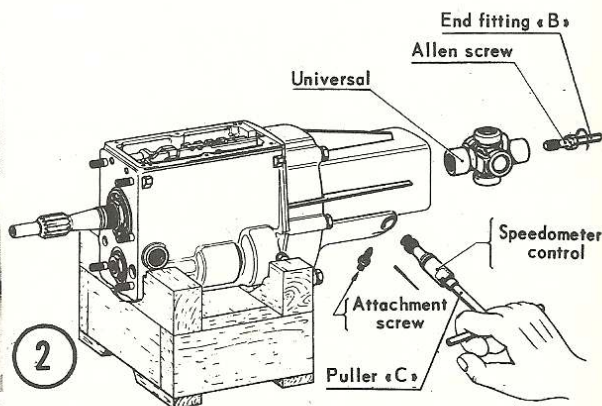
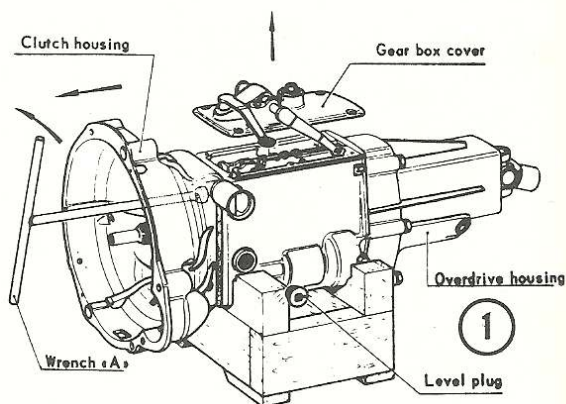
APPLICATION: Model 403 until June, 1960

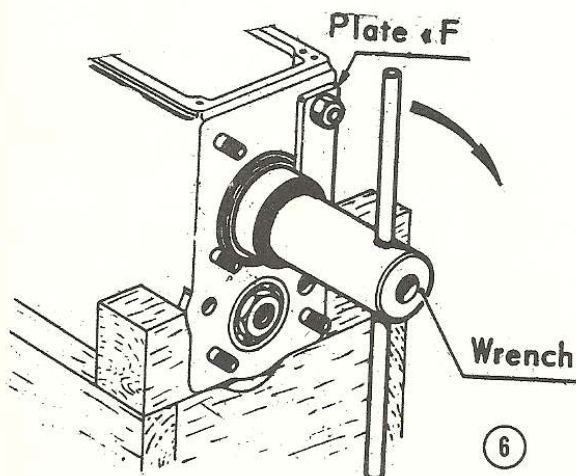
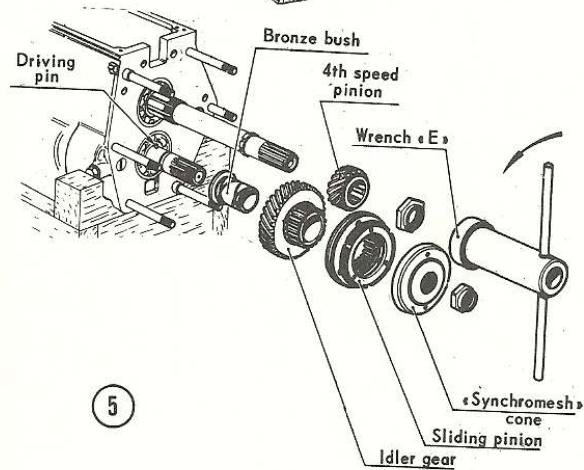
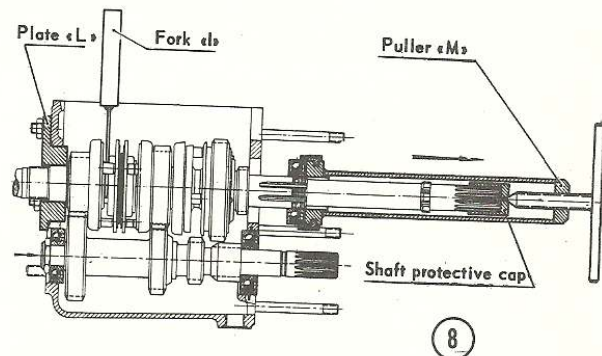
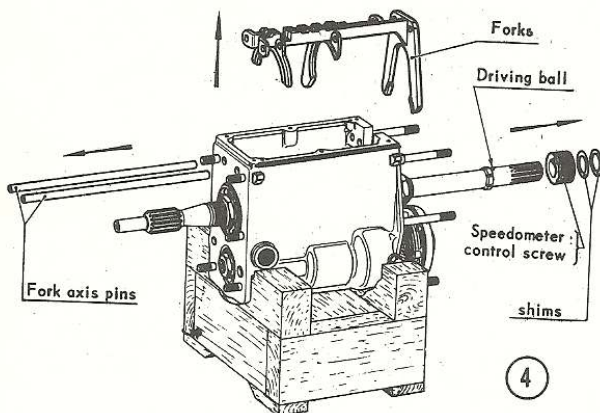
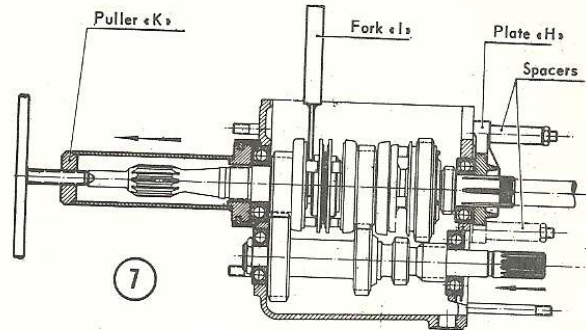
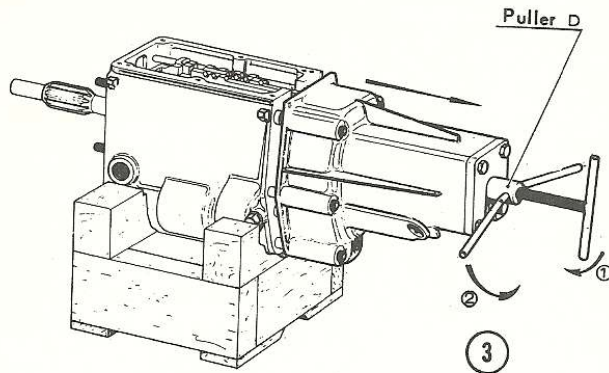
DISASSEMBLING

① Remove the clutch housing and the transmission cover.

② Engage two speeds, such as 2nd and reverse, and then remove the Allen screw from the universal joint. Pull off the joint. Remove the speedometer control socket assembly.

③ Remove the six overdrive housing nuts and washers, and then pull off the housing.



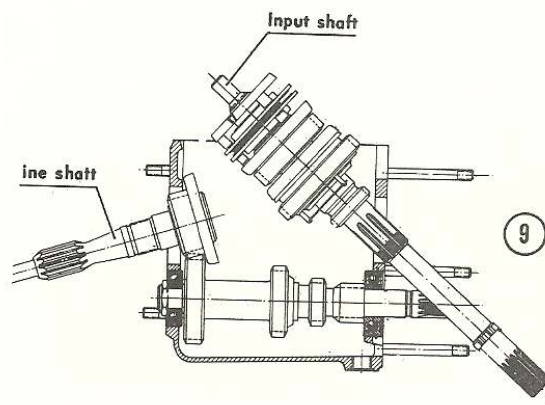


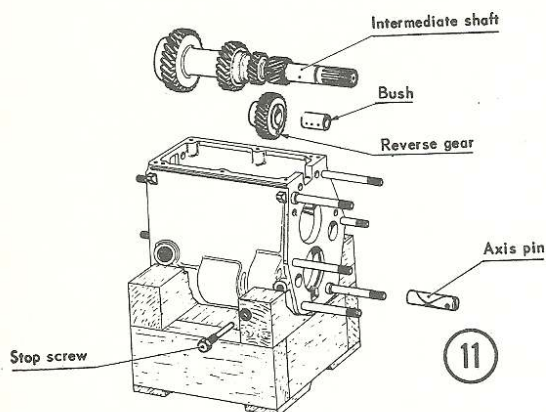
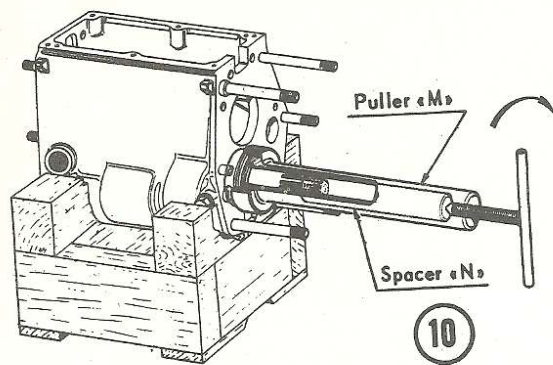
④ Remove the speedometer drive gear and shims, the shift shafts, and the shifter forks.

⑤ Unlock the 4th speed gear and idler pinion nuts. Remove the 4th speed idler pinion locknut and the 4th speed idler assembly. Remove the bronze bushing and the driving shaft (driving pin). Remove the 4th speed pinion locknut, and then pull off the gear.

⑥ Install plate "F" to support the front of the transmission, and then remove the clutch shaft locknut. *NOTE: This nut has a left-hand thread.* Remove support plate "F".

⑦ Install fork "I", being careful not to force it into position and thereby distort the synchronizer bars. Install plate "H" to hold the rear assembly in place, and then remove the cluster gear shaft rear bearing snap ring. Use a wooden mallet to tap the end of the cluster gear shaft so as to free the clutch shaft retainer. Pull off the clutch shaft bearing.

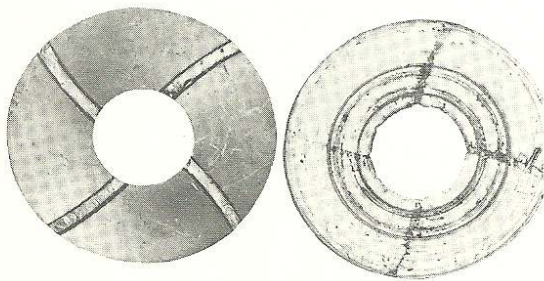




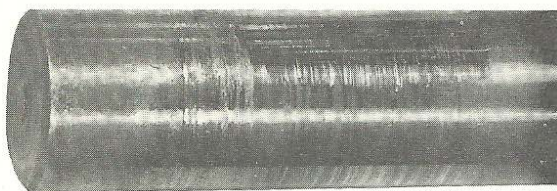
⑧ Remove plate "H" and install plate "L". Remove the rear bearing snap ring from the cluster gear shaft. Use a wooden mallet to tap the front end of the cluster gear shaft in order to free the center bearing groove from the mainshaft. Pull off the mainshaft rear support bearing, and then remove the deflector ring and shims.

⑨ Disconnect the mainshaft (input shaft) from the clutch shaft (engine shaft), and then remove the mainshaft and clutch shaft from inside the case. **CAUTION:** Avoid forcing the clutch shaft synchronizer cone while removing the mainshaft or you will distort it.

⑩ Pull off the cluster gear support bearing.



Thrust washers should be replaced when worn as they determine end play. This new washer (left) is for comparison with a worn one.



Shaft wear is evidenced by galling and scoring.



Ball and roller bearings should be checked for pitted surfaces, which will cause noisy operation.

⑪ Remove the cluster gear shaft assembly (intermediate shaft), with the front bearing in place. Remove the reverse gearing lock screw (stop screw), and then pull out the shaft (axis pin), bushing, reverse gear, and bushing (bush). Remove the 2nd speed idler pinion.

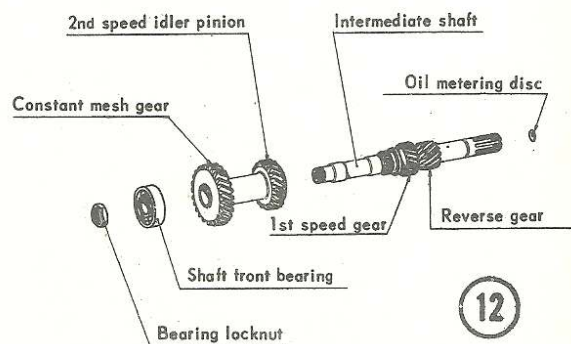
CLEANING AND INSPECTING

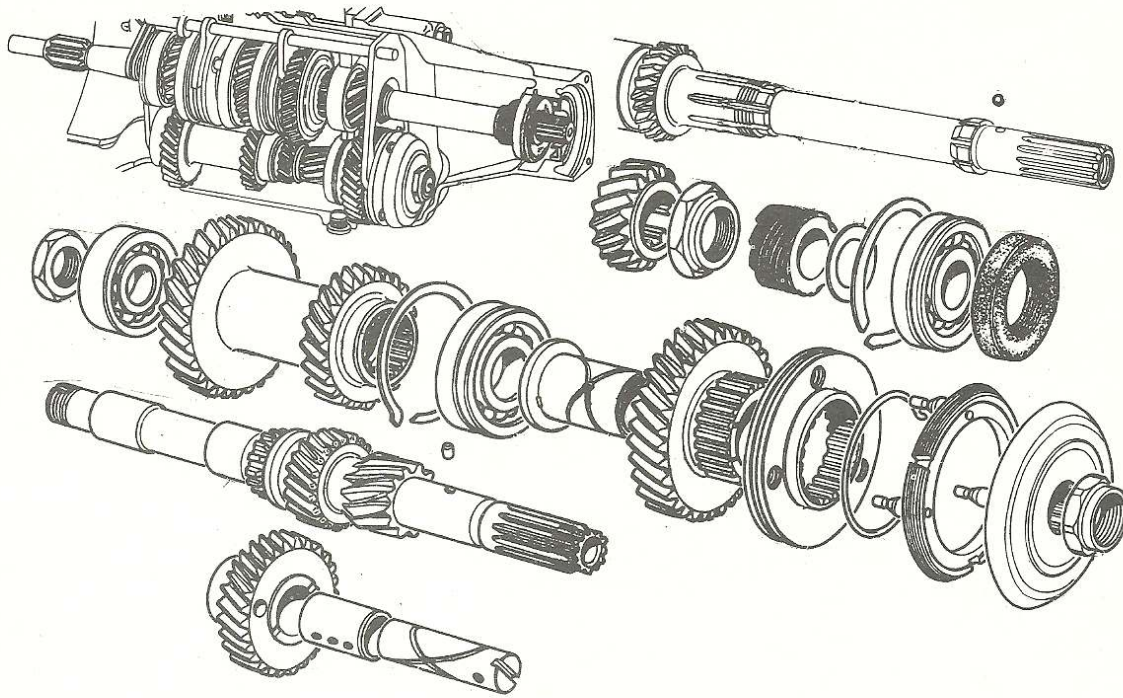
Wash the bearings in clean solvent and blow dry. **CAUTION:** Don't spin the bearings with compressed air or they will be damaged. After a thorough cleaning, lubricate the bearings with light engine oil to prevent rusting. Turn the lubricated bearings slowly through your fingers to feel for roughness and excessive play.

Wash the transmission, clutch, and extension case with cleaning solvent and blow dry. Inspect the case for cracks or burrs which might hinder the proper seating of a snap ring. Dress off any burrs with a fine-cut mill file.

Clean the gears thoroughly and replace any that are worn or damaged.

Check the bushings in the case for excessive wear. The proper clearance between the shafts and bushings is 0.002"–0.004" (0.05–0.10 mm.).





Exploded view of the C-2 transmission used on early 403 models.

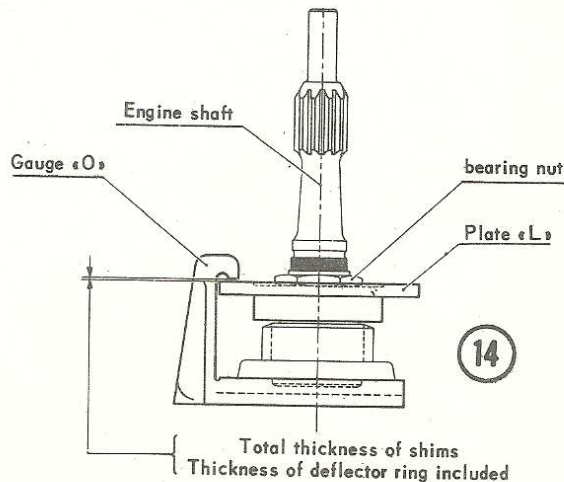
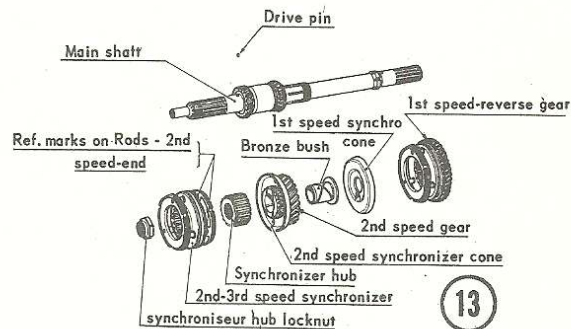
Check the synchronizer cones for wear or looseness in the clutches. If the cones are damaged in any way, it will be necessary to replace the clutch assembly and rings.

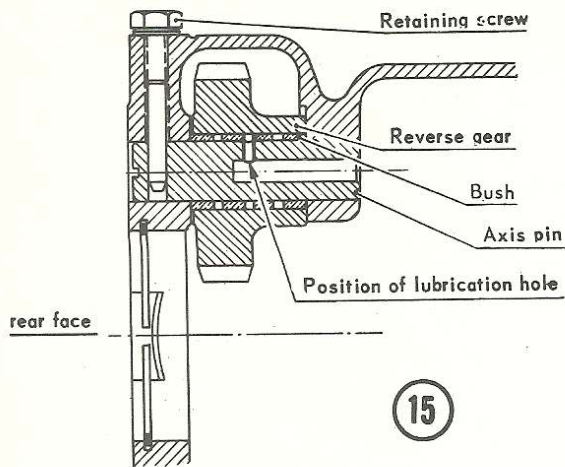
ASSEMBLING

(12) Assemble the cluster gear (intermediate shaft) by installing the 2nd speed idler pinion gear, bearing, and locknut. Install a new washer at the rear end, convex side out.

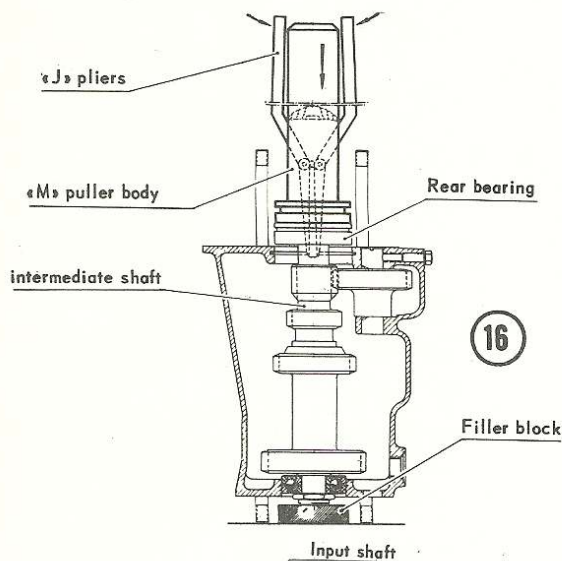
(13) Assemble the mainshaft by installing the 1st speed synchronizer cone, drive pin, 2nd speed gear bronze bushing, 2nd speed gear, and synchronizer cone. Make sure that the cone bears firmly against the gear. Install the 2-3 synchronizer hub, using a new nut. Torque the locknut to 36-44 ft-lbs (5-6 m/kg.). Lock the nut in place in the grooves of the shaft. Check the 2nd speed gear for the correct side play, which should be 0.014"-0.022" (0.35-0.55 mm.). Install the 2-3 synchronizer, with the index marks on the bars facing the 2nd speed gear. Replace the 1st-reverse sliding gear.

(14) To assemble the clutch shaft (engine shaft), install the bearing nut. Make sure that the synchronizer cone makes perfect contact with the gear. The correct distance between the 3rd speed synchronizer cone and the face of the transmission case is 1.870" (47.5 mm.). A gauge is available to determine the total thickness of shims that is needed between the bearing and the back face of the gear to obtain this specified distance.

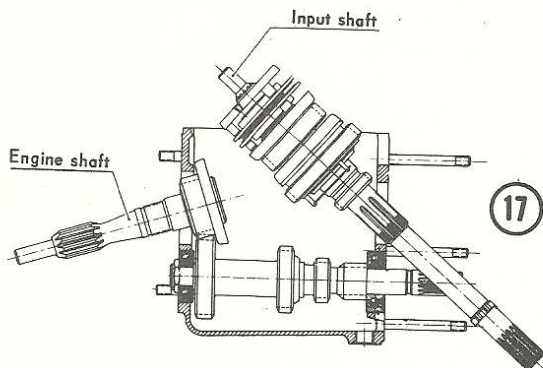




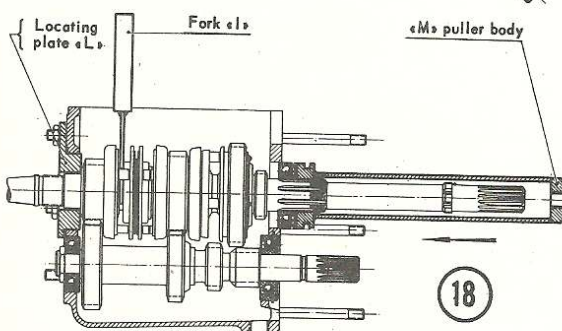
15



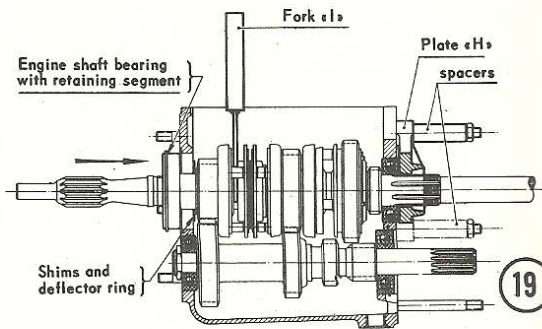
16



17



18



19

15 Install the reverse gear with its bushing. Slip in the shaft (axis pin) and lock it with the retaining bolt.

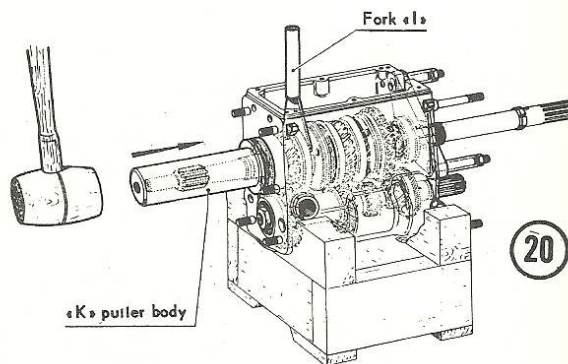
16 Insert the cluster gear assembly from inside the case, while positioning the front bearing in its housing. Remove the snap ring and install the rear bearing (bearing groove facing the outside).

17 Insert the clutch shaft (engine shaft) and mainshaft (input shaft) assemblies into the transmission. Engage the mainshaft front end into the socket on the clutch shaft (main engine shaft).

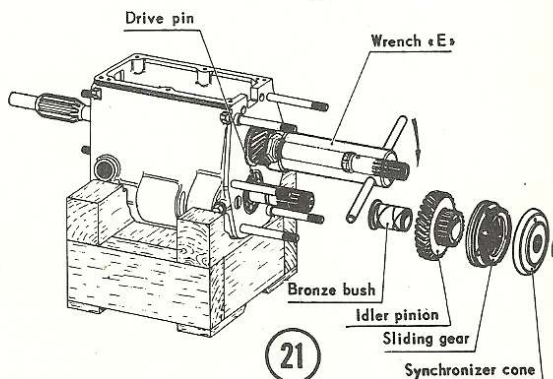
18 Install fork "I" between the 3rd speed gear and the 2-3 hub. Replace the center bearing, using the body of the puller as shown, with the bearing groove facing the outside of the case.

19 Install the center bearing backing plate "H" with its shims. Install the shims and deflector ring on the clutch shaft, and then insert the lock ring (retaining segment).

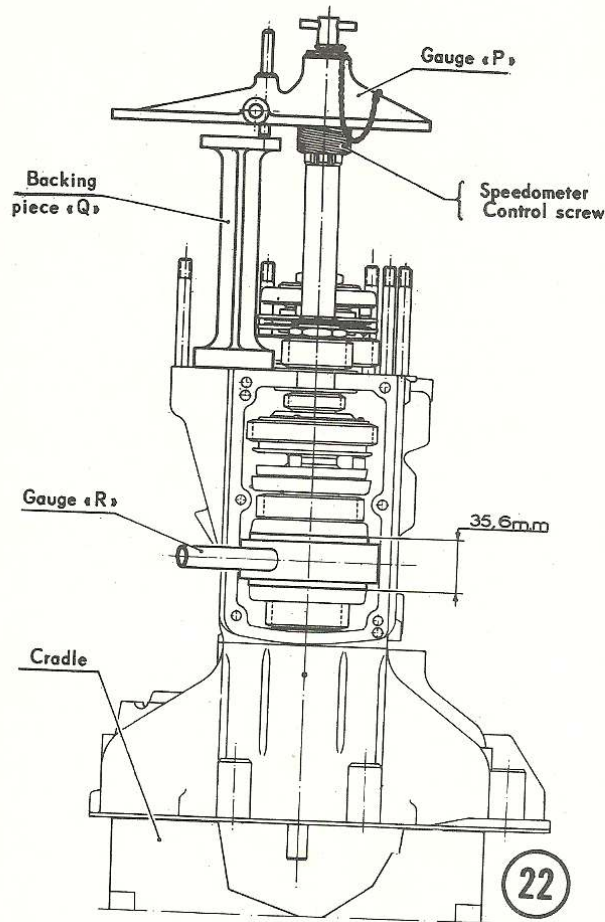
20 Drive the bearing into place, engage two



20

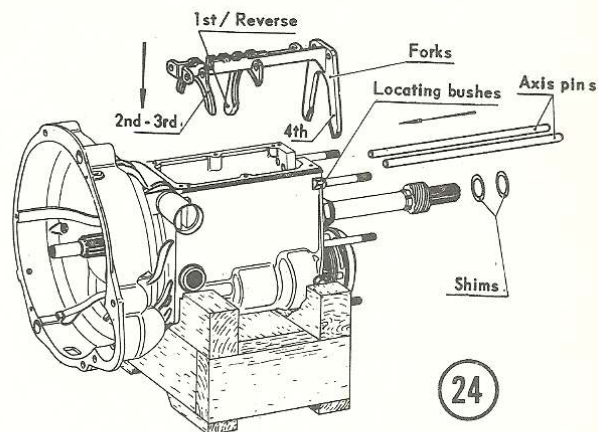
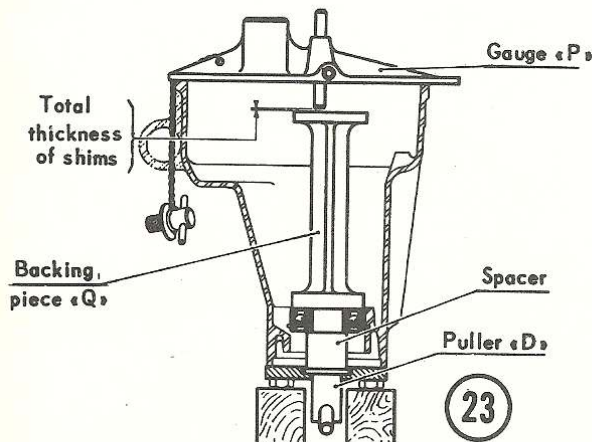


21



speeds, and replace the clutch shaft retaining nut. Tighten the nut and lock it.

21 Install the 4th speed gear, using a new nut. On later-model cars, it is necessary to heat the gear to 212° F. (100° C.) in an oil bath to assist in assembly. Tighten the nut and safety it by punching marks into the two grooves. Replace the bronze bushing and its retaining pin. Install



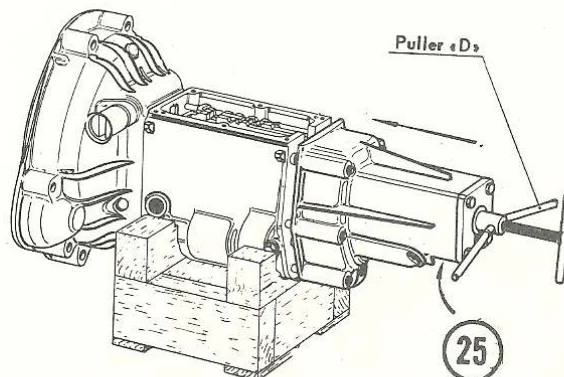
the 4th speed idler pinion assembly. Torque the retaining nut to 35-45 ft-lbs (5-6 m/kg) on shafts without the milled slots. On shafts with milled grooves, torque the nut to 15-22 ft-lbs (2-3 m/kg). Lock the nut in the grooves. Install the clutch bell housing, using a paper gasket. Replace the speedometer drive gear.

22 To determine the thickness of shims needed on the end of the mainshaft, behind the speedometer drive gear, to obtain 1.401" (35.6 mm.) between the 2-3 synchronizer cones, it is necessary to use gauge "P" on the case as shown.

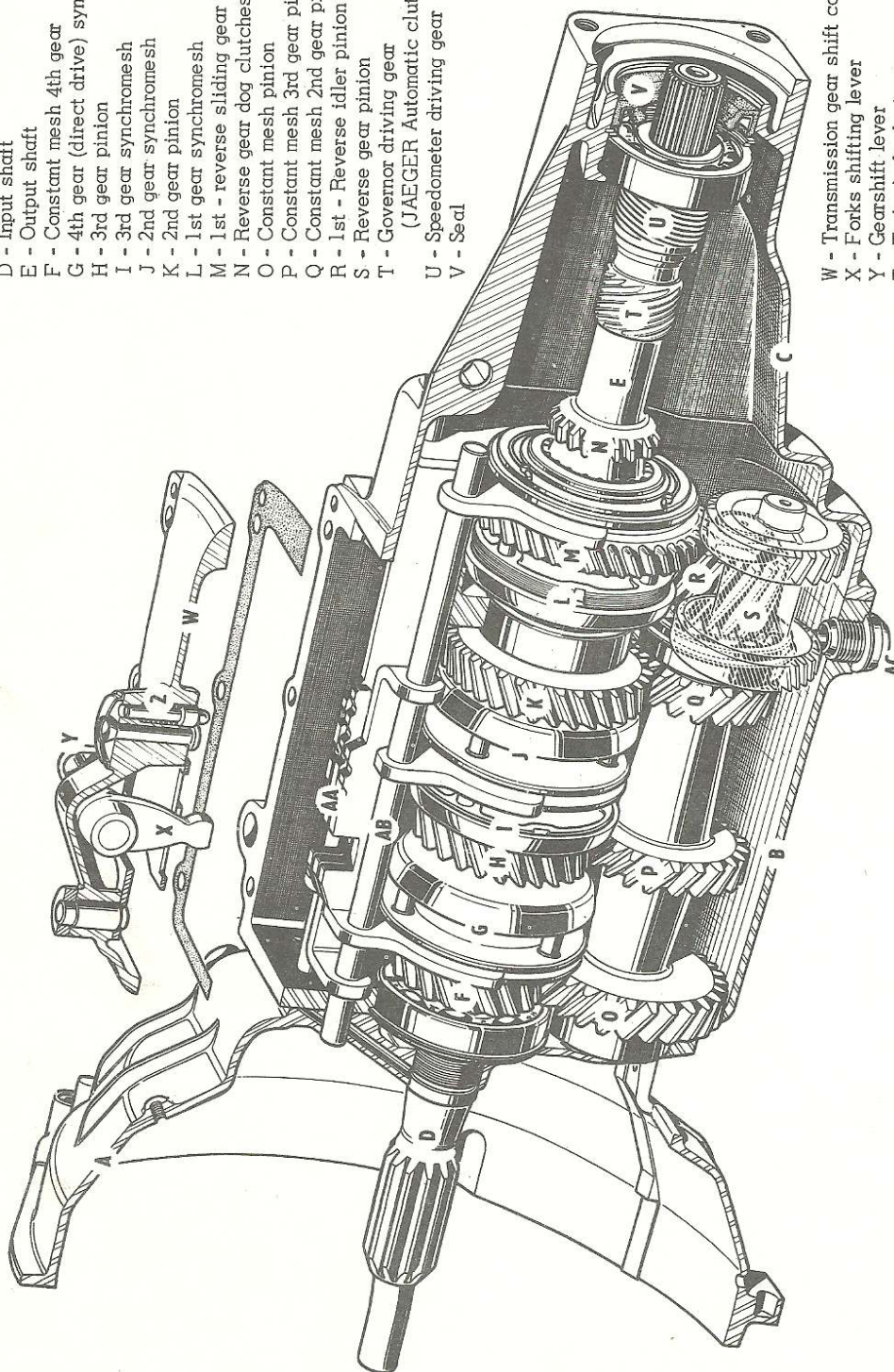
23 After setting the gauge "P" in the case, move it to the overdrive housing and measure the total thickness of shims that are needed.

24 Install the determined amount of shims on the end of the mainshaft, install the selector forks, and insert the fork shafts (axis pins).

25 Make sure that the locating dowels are in place in the rear face of the case, and then install the overdrive housing. Use Permatex No. 1 between the surfaces to prevent oil leaks. Replace the overdrive housing nuts. Shift the gears to neutral and replace the speedometer driven gear. Replace the universal joint and lock the bolt. Install the cover, using a new gasket and Permatex No. 1.

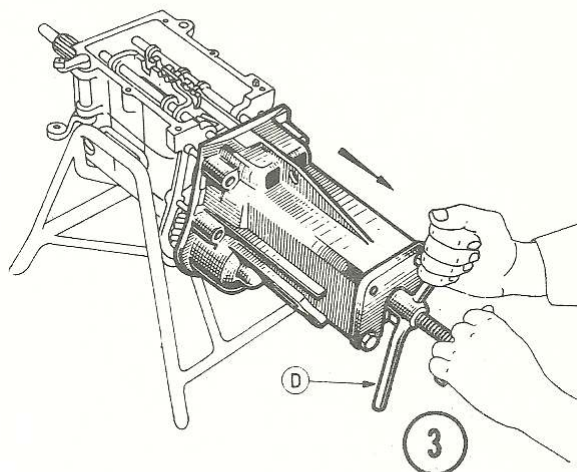
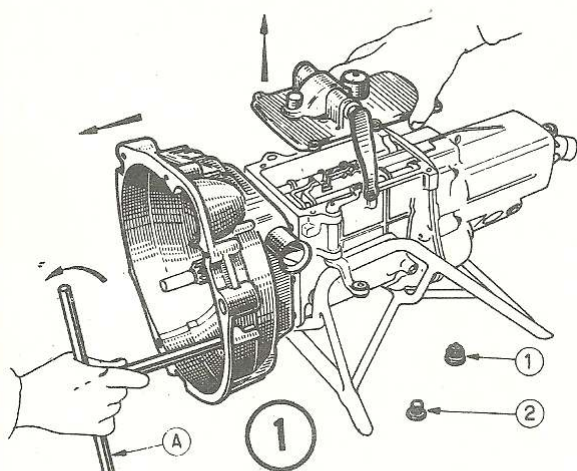


- A - Bell housing
- B - Transmission case
- C - 1st reverse gear extension housing
- D - Input shaft
- E - Output shaft
- F - Constant mesh 4th gear
- G - 4th gear (direct drive) synchromesh
- H - 3rd gear pinion
- I - 3rd gear synchromesh
- J - 2nd gear synchromesh
- K - 2nd gear pinion
- L - 1st gear synchromesh
- M - 1st - reverse sliding gear
- N - Reverse gear dog clutches
- O - Constant mesh pinion
- P - Constant mesh 3rd gear pinion
- Q - Constant mesh 2nd gear pinion
- R - 1st - Reverse idler pinion
- S - Reverse gear pinion
- T - Governor driving gear
(JAEGER Automatic clutch only)
- U - Speedometer driving gear
- V - Seal



- W - Transmission gear shift cover
- X - Forks shifting lever
- Y - Gearshift lever
- Z - Fork shafts lock pin
- AA - Forks
- AB - Fork shafts
- AC - Drain plug (magnetic)

Sectioned view of the fully synchronized C-3 transmission used on the late 403 models and all 404 models.



OVERHAULING A C-3 TYPE TRANSMISSION

APPLICATION: Model 404 and 403 since June, 1960

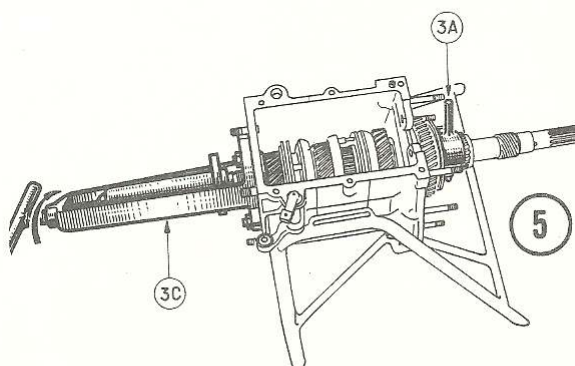
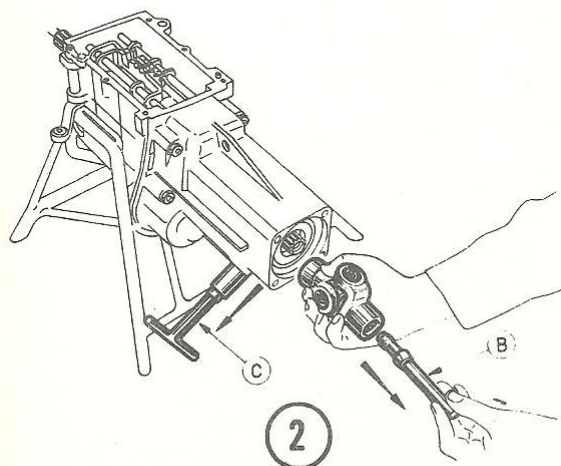
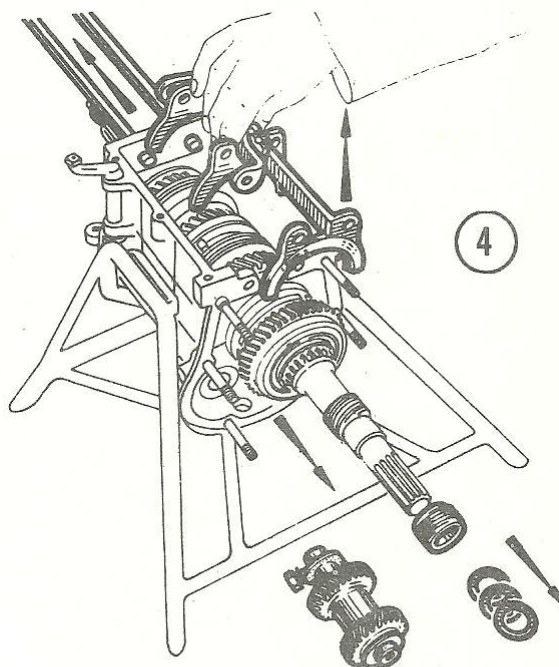
DISASSEMBLING

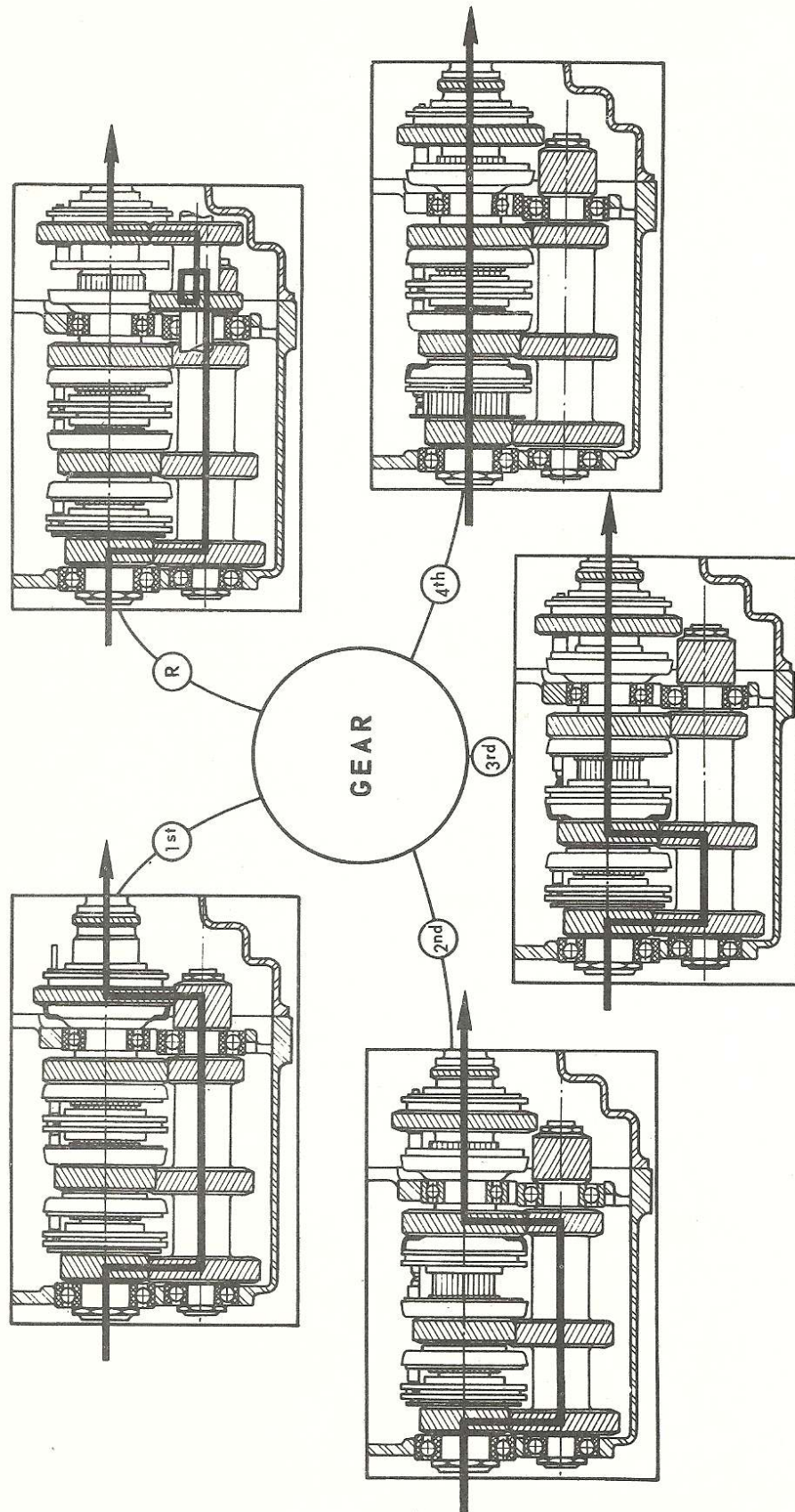
① Remove the bell housing and the transmission cover.

② Engage two gears, fourth and reverse, to keep the universal joint from turning while you thread out the Allen-headed screw holding the universal joint to the mainshaft. Remove the speedometer drive sleeve lock screw and withdraw the speedometer driven gear.

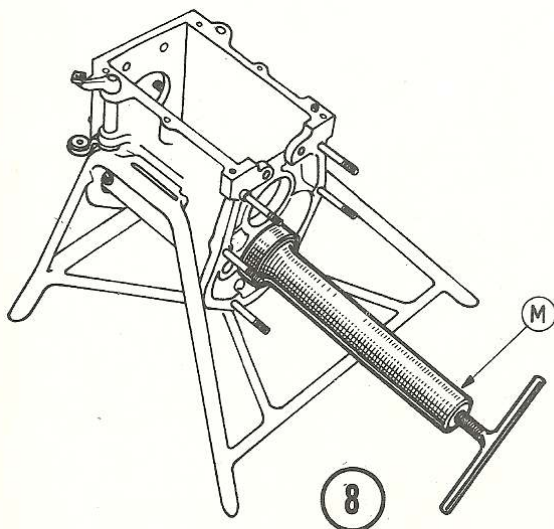
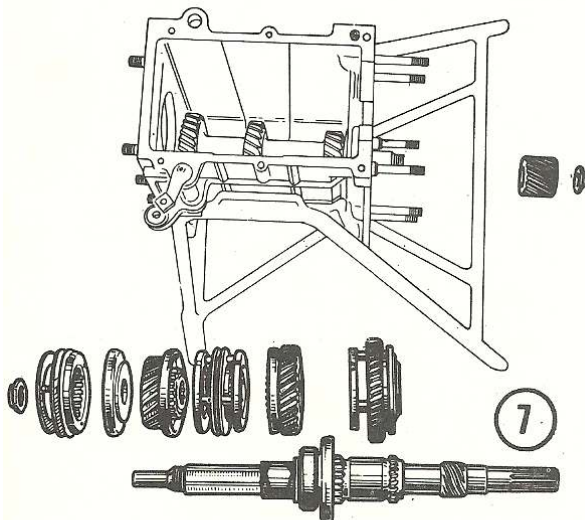
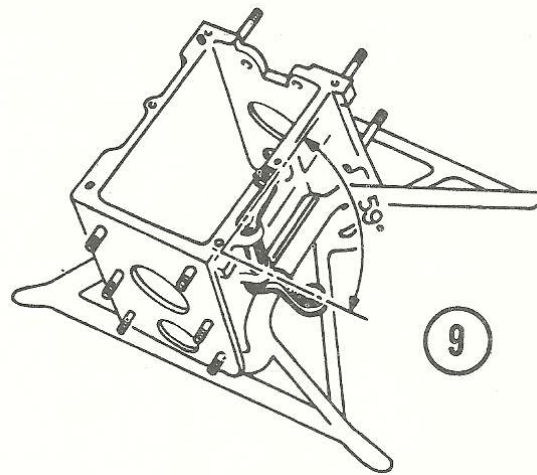
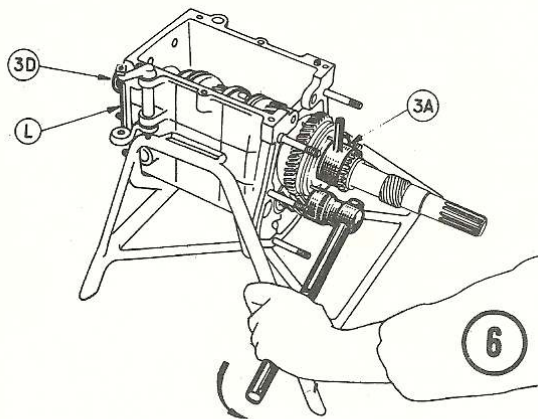
③ Remove the six rear housing retaining nuts and washers, pull off the rear housing, and catch the bronze washer which is located between the rear bearing and the oil seal.

④ Remove the adjustment shims and the speedometer drive gear from the mainshaft. Remove the reverse idler pinion shaft lock screw, the shaft, the reverse idler pinion, and the washers. Remove the selector fork rails and the selector forks.





Flow of power through the five shifting positions of the fully synchronized C-3 transmission.



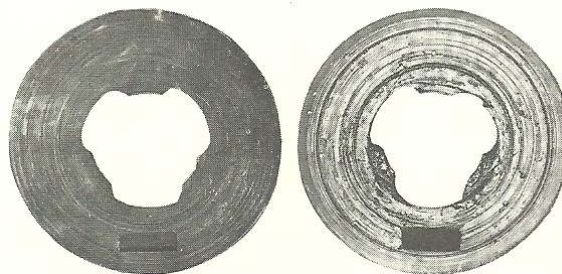
⑤ Keeping first and fourth gears engaged (clamp 3A is especially designed for this purpose), pull out the clutch shaft assembly.

⑥ Keeping the fourth gear dog engaged, slide the second speed gear into mesh, and then loosen the pinion locknut on the mainshaft. Unlock and remove the first gear pinion locknut from the intermediate shaft, and then remove clamp 3A.

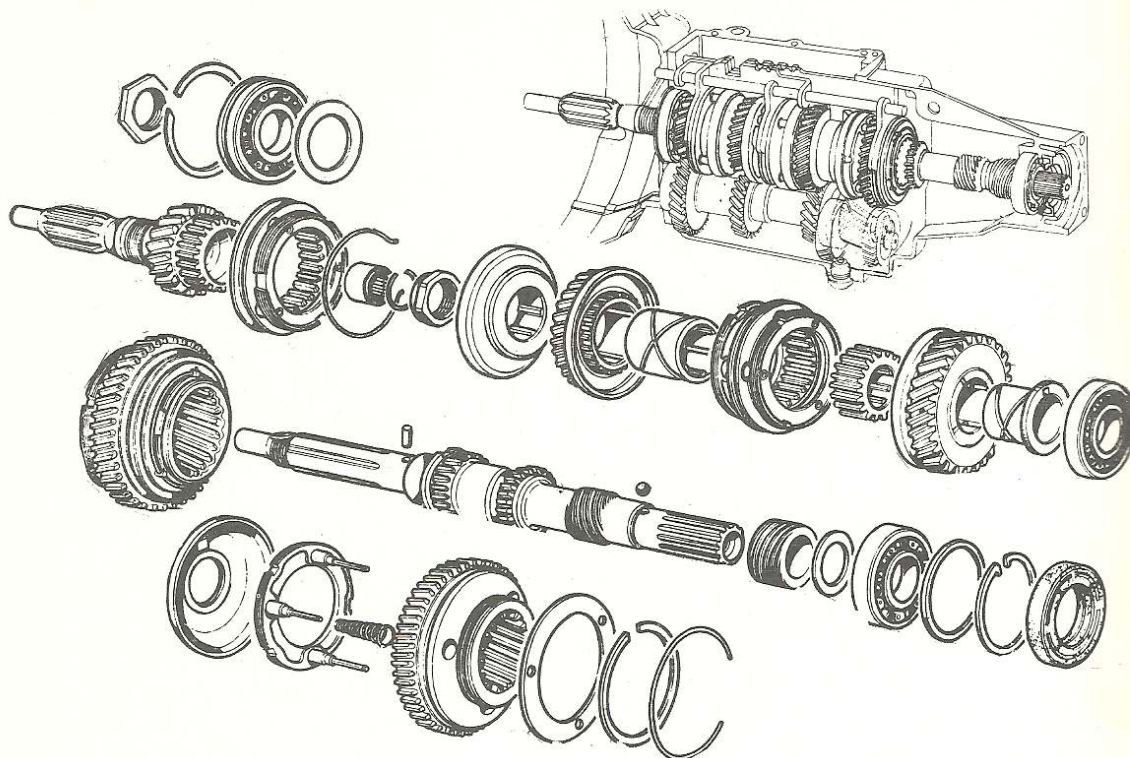
⑦ Remove the first gear drive pinion synchronizer. Drive out the mainshaft while keeping fourth gear engaged. Disassemble the mainshaft in this order: fourth gear synchronizer and cone, third gear pinion and bushing, second-and-third gear synchronizer and hub, and second gear pinion. The second gear pinion shoulder bushing, the center bearing, and the first gear synchronizer cone will remain on the mainshaft.

⑧ Disengage the bearing snap ring from the cluster gear shaft, push the shaft toward the rear until it clears the bearing groove, and then pull out the rear bearing. Push the front bearing toward the rear and take the cluster gear shaft out from inside of the case.

⑨ Whenever the gear shift lever has been removed, it is necessary to mark the lower lever for correct position. **CAUTION:** *Incorrect adjustment of this lever will cause trouble in shifting.* The correct angle made by the two levers must be 59°.



Thrust washers should always be replaced when worn as they determine end play of the gears. This worn washer (right) is for comparison with a new one.



Exploded view of the C-3 transmission used on later 403 models and all 404 models.



Synchronizer rings wear on the cone surface and should be replaced when there is any sign of wear.



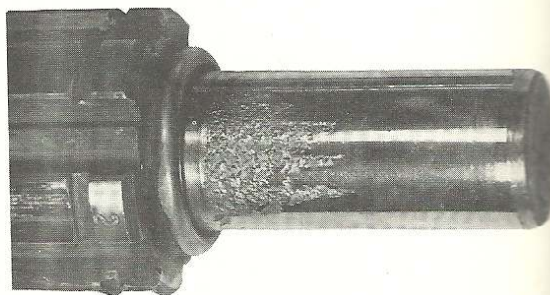
Ball bearings pit in the races and on the shaft mounting surfaces. This causes noisy operation.

CLEANING AND INSPECTING

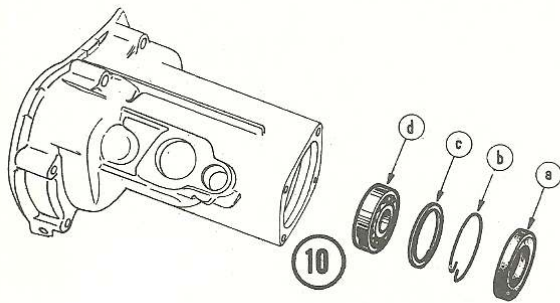
Clean all parts with solvent and blow dry. Check the case for cracks or burrs that may cause improper seating of a snap ring or gasket surface. Dress off all burrs with a smooth mill file.

Wash the bearings in clean solvent and allow to drain. Dip the bearings in clean oil and slowly turn them through your fingers to see that they have no rough spots and no excessive play.

Check the gear teeth for spalling, the rollers for pits, the washers for wear, and the synchronizer cones for damage.



Galling results from a defective roller bearing. Check all shafts for this kind of damage.



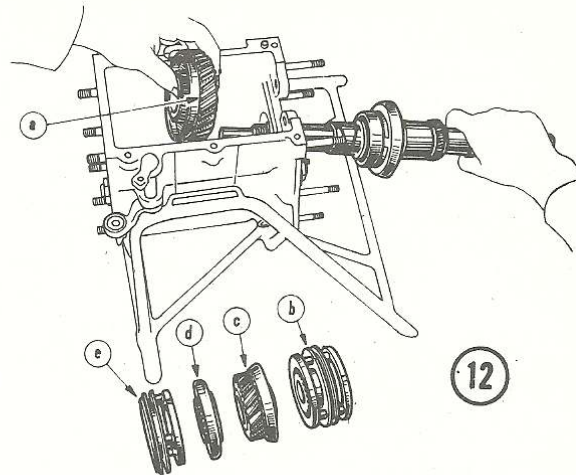
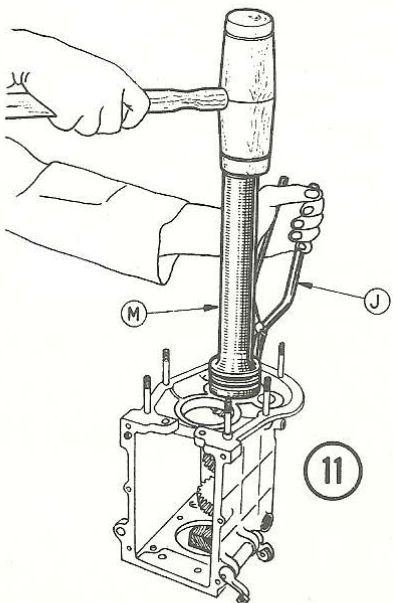
ASSEMBLING

⑩ To replace the rear bearing, install the bearing (d), adjustment shim (c) and lock ring (b). Drive in a new oil seal (a).

⑪ Insert the cluster gear shaft, while driving the front bearing into its housing. Install the rear bearing with its groove facing outward, and then install the bearing lock ring.

⑫ Slide the first gear pinion onto the cluster shaft splines. Hold it in position with the nut tightened finger-tight. Bring the mainshaft into position, rear end first, and install the gears in this order: second gear pinion (a), second-and-third gear synchronizer and hub (b), third gear pinion and bushing (c), fourth gear pinion (d), and its synchronizer (e). Move the shaft forward, until the center bearing has entered its housing. Temporarily screw a new nut on finger-tight to hold the assembly in position.

⑬ Install the first-reverse sliding gear. Engage first and second gears. Torque the first gear pinion-to-intermediate shaft nut to 50 ft-lbs (7.0 m/kg). Stake it to both milled portions to lock it. Torque the mainshaft nut to 20 ft-lbs (2.7 m/kg).

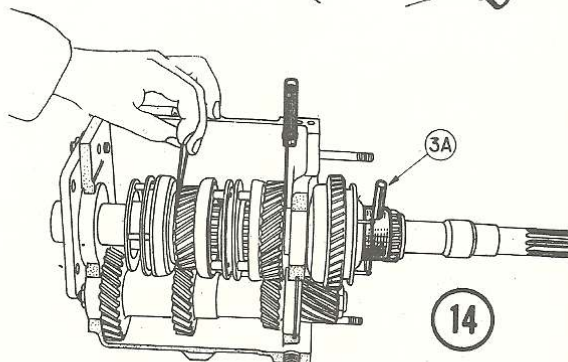
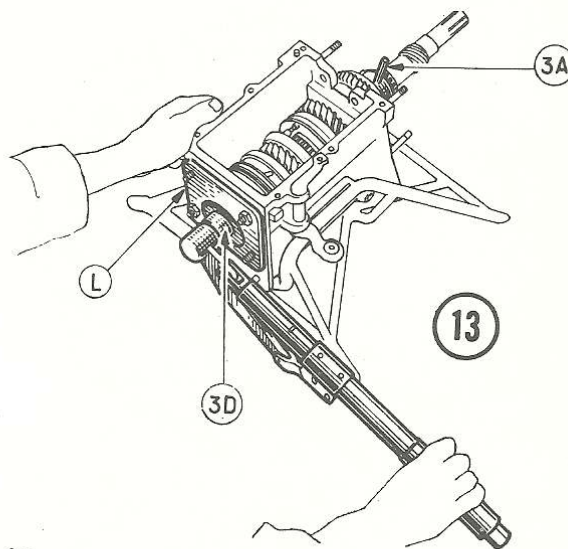


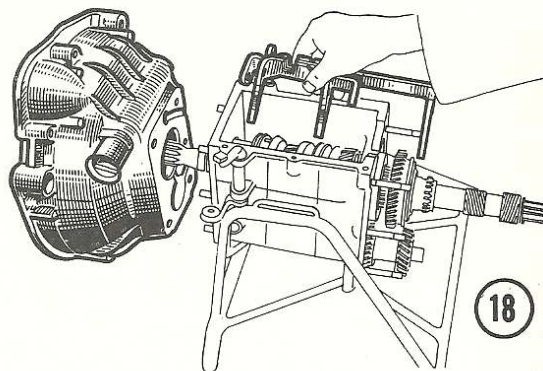
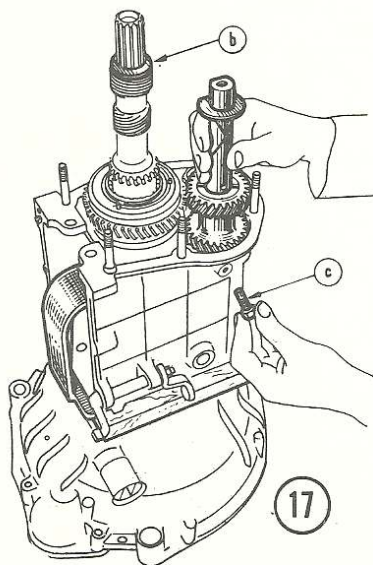
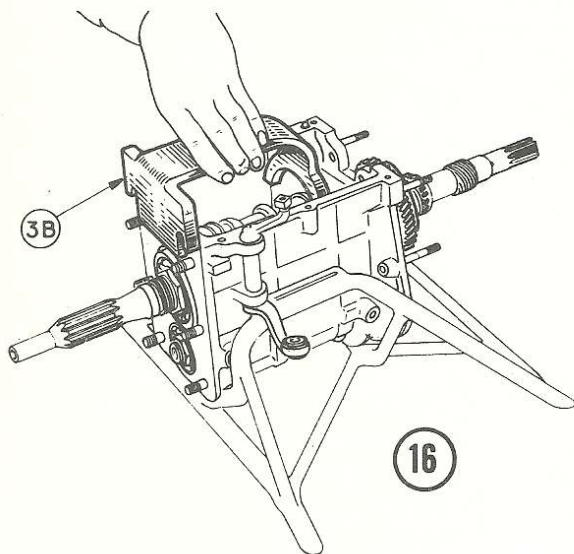
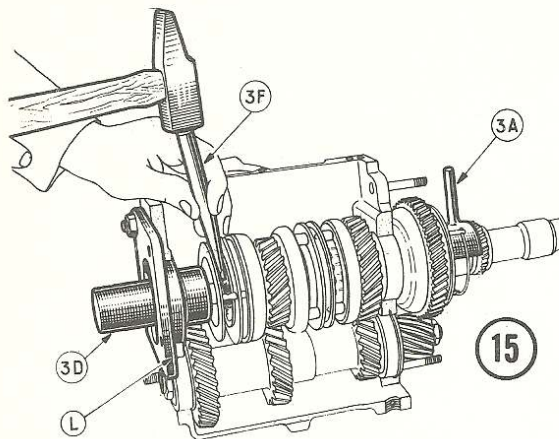
⑭ Use a feeler gauge to check the clearance between the second gear pinion and the pinion bushing shoulder, which should be between 0.012"–0.024". The same clearance must exist between the third gear pinion and the fourth speed gear.

⑮ When the proper clearance is established, stake the locknut to the two milled grooves.

⑯ Install the clutch shaft and tap it into position until the lock ring seats in its recess.

⑰ Install the reverse idler pinion, washers, and



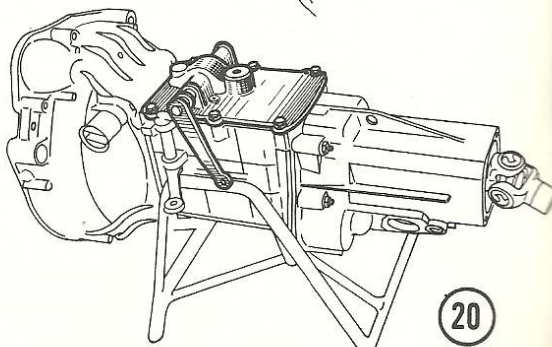
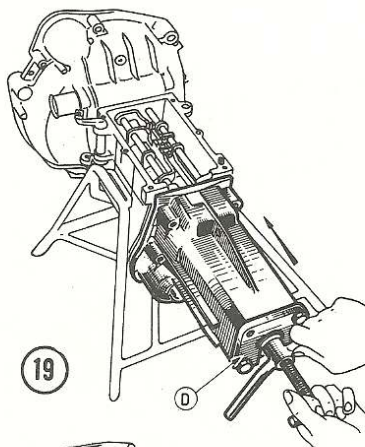


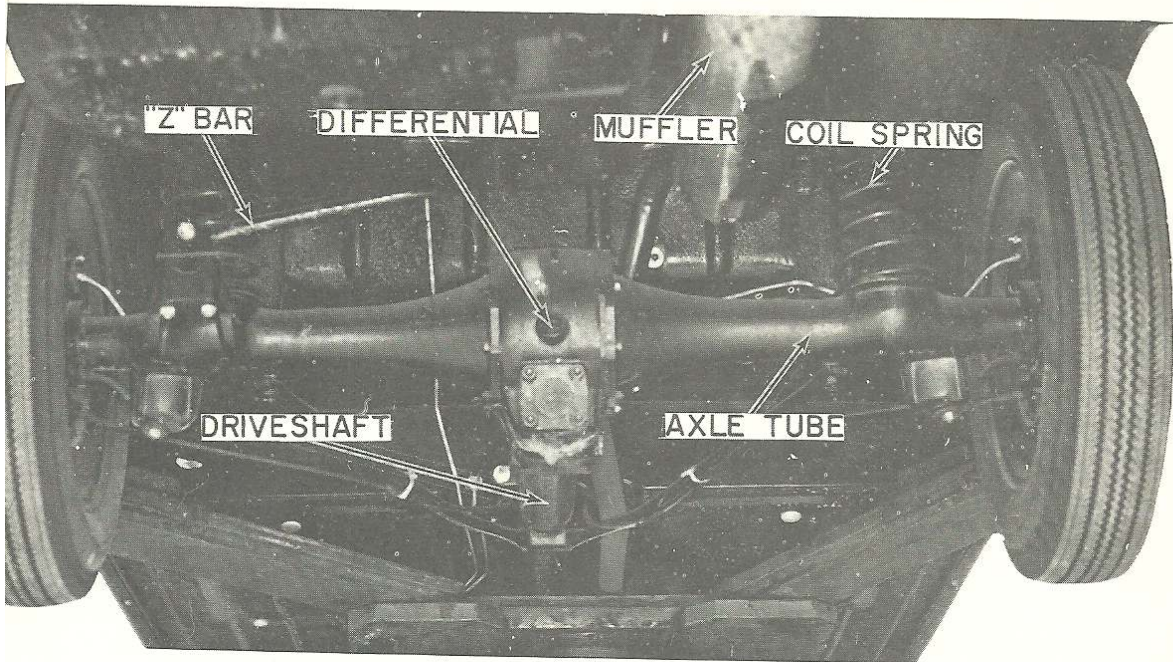
shaft, securing the shaft by means of the lock-screw (c).

(18) Install the selector forks and the fork shift rails. Install the clutch bell housing with a new gasket between the parts. Check the face of the transmission for the correct positioning of the locating rings.

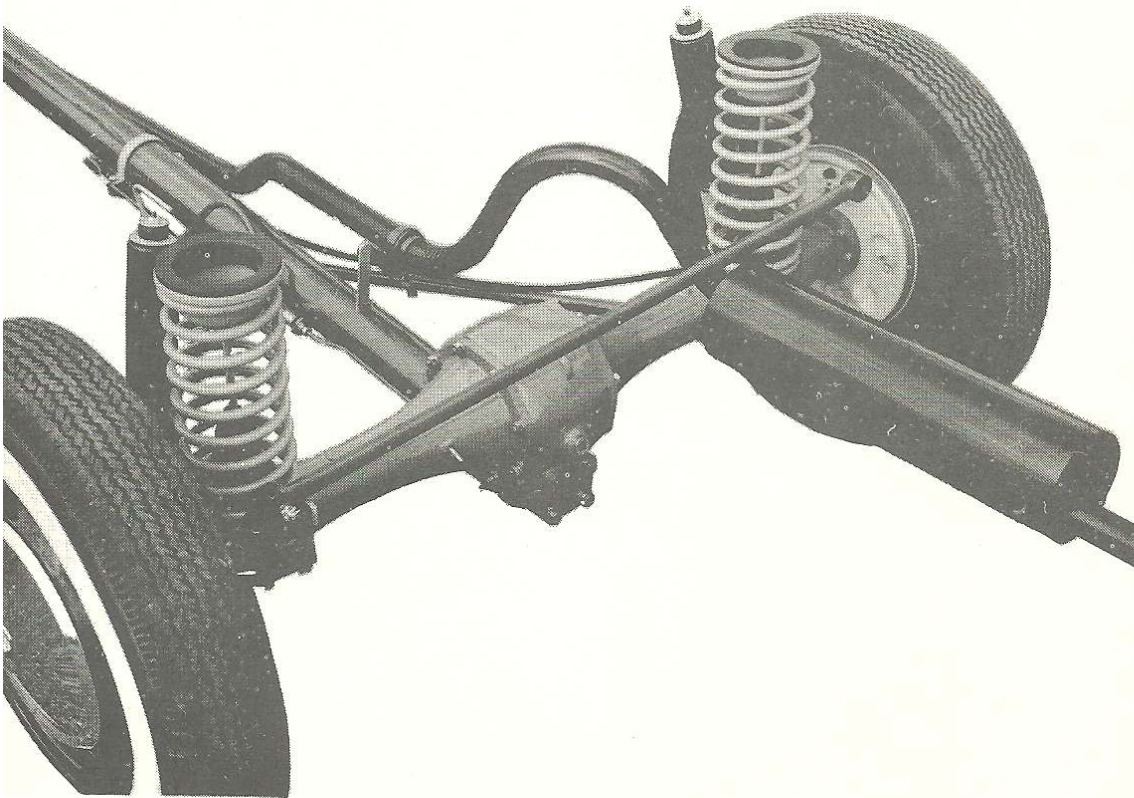
(19) Install the rear housing, using Permatex on the gasket. Torque the retaining nuts to 15 ft-lbs (2.0 m/kg). Install the universal joint with the lubricated bronze washer in position. Engage any two gears, and torque the Allen-headed screw to 50 ft-lbs (6.9 m/kg). Loosen it, and then re-torque it to 10 ft-lbs (1.4 m/kg). Shift the gears into neutral and install the speedometer drive assembly.

(20) Replace the cover, using Permatex No. 3. Check that all gears engage and operate freely. Fill with 1½ quarts of SAE 40 engine oil.

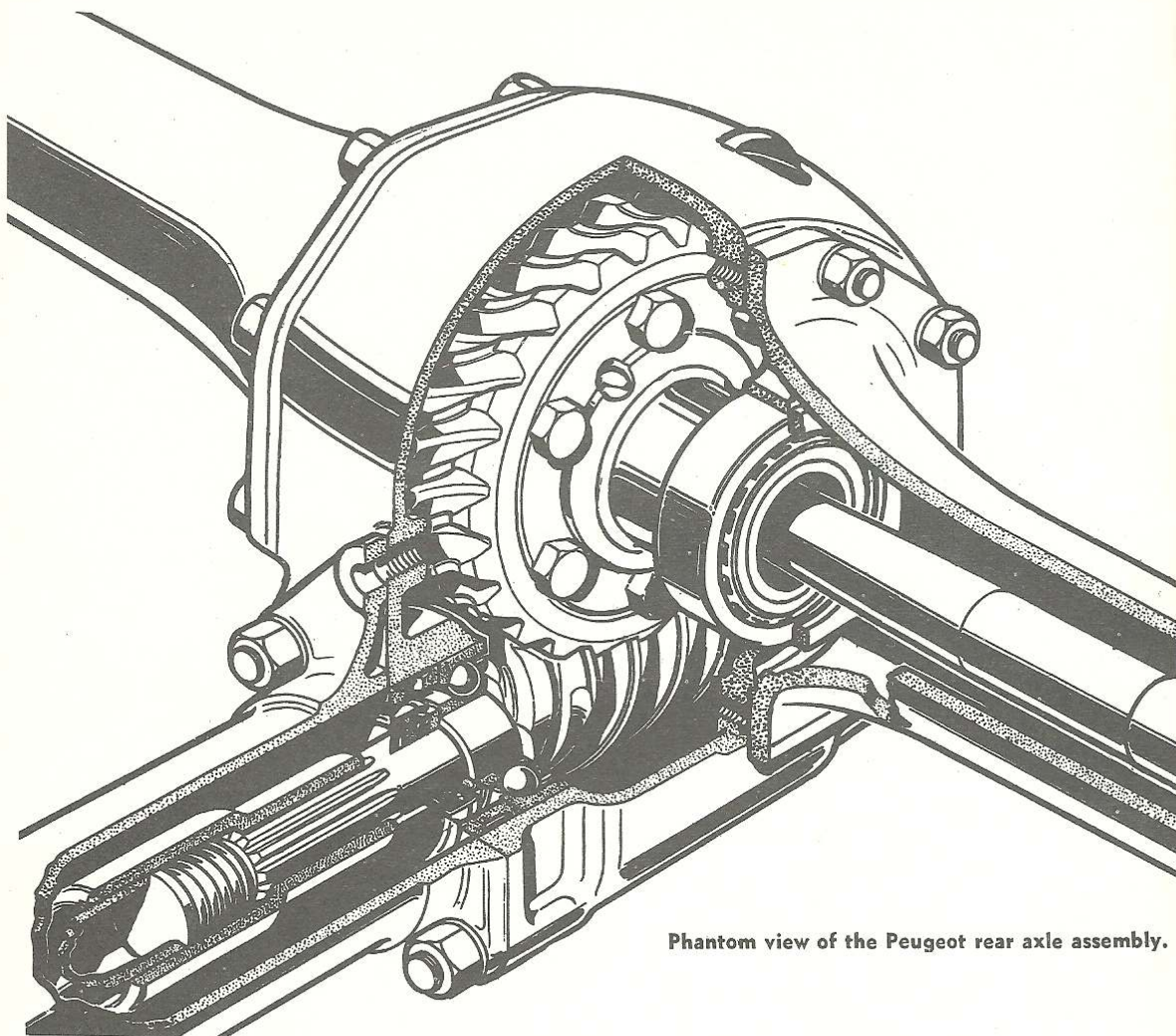




Details of the rear axle assembly.



Rear drive mechanism with the body removed.

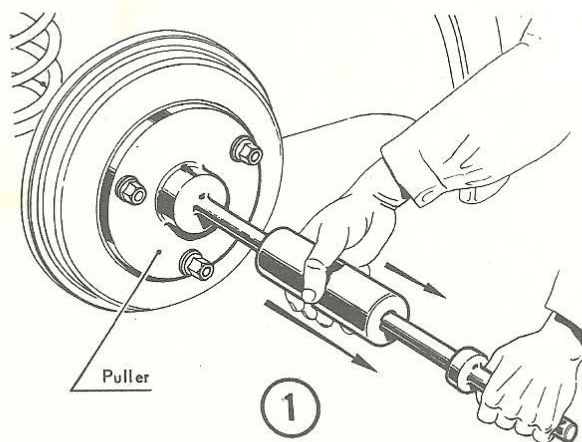


Phantom view of the Peugeot rear axle assembly.

OVERHAULING THE DIFFERENTIAL

DISASSEMBLING

① Remove the wheels, and then pull off the drum and axle assemblies. **CAUTION:** Mark the wheels and drums for proper reassembly purposes.

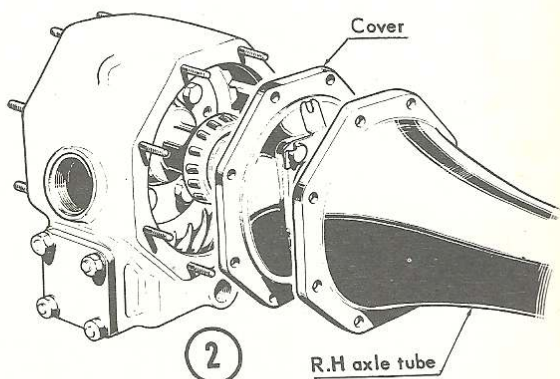


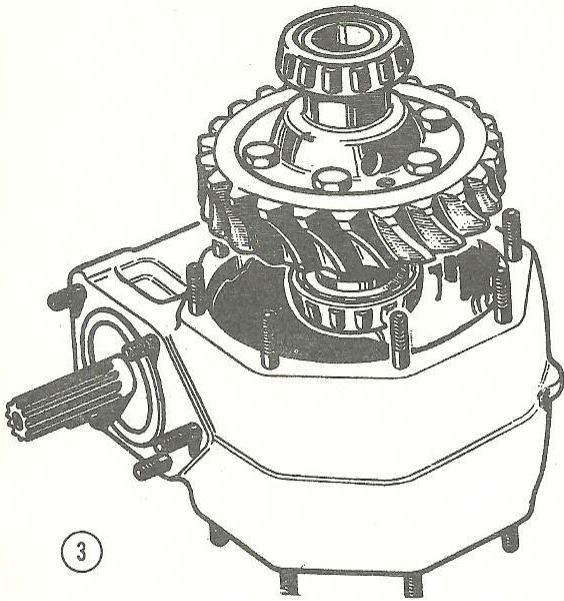
in order to maintain the dynamic and static balance. Remove the torque tube and driveshaft assembly.

② Unbolt the left-side axle tube and use a wooden mallet to remove it. Unbolt the right-side axle tube and remove it. Remove the axle cover.

③ Turn the housing over and remove the differential assembly.

④ Remove and discard the differential bolts.





New bolts must be used on assembly. Separate the housing from the gear, and then remove the side and pinion gears.

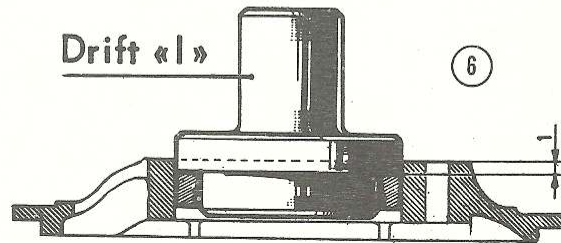
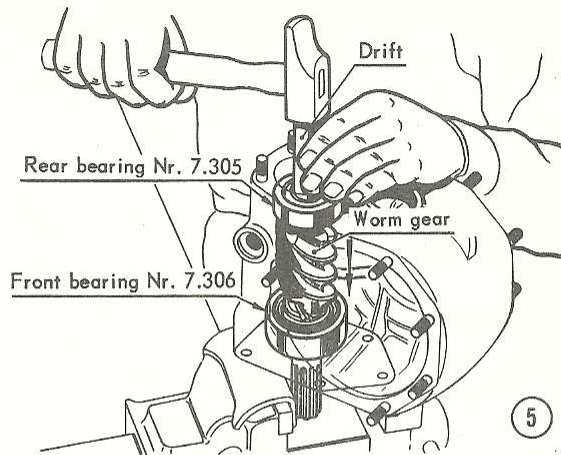
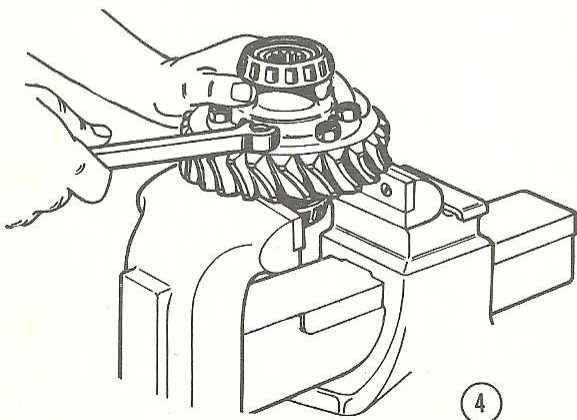
⑤ Remove the seal and stop from the front end of the worm gear and the plug from the rear end. Remove the axle worm gear from the housing by dipping the housing in boiling water, and then securing it in a vise, with the splines facing down. Drive the rear of the worm gear down, using a soft drift.

CLEANING AND INSPECTING

Clean all parts in solvent and blow dry. Do not spin the bearings with compressed air or you will damage them. After cleaning, lubricate the bearings with light oil to prevent rusting. Turn the lubricated bearings through your fingers slowly to feel for roughness and excessive play.

Check the case and mounting plates for burrs, which might cause leaks. Dress off all burrs with a mill file.

Check the gear teeth surfaces for evidence of galling, scoring, and damage.

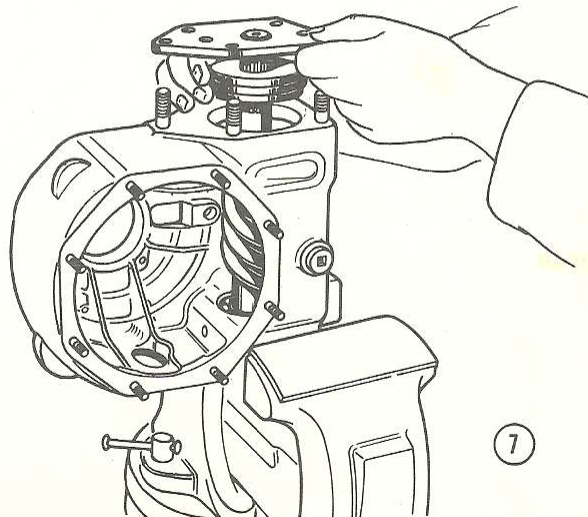


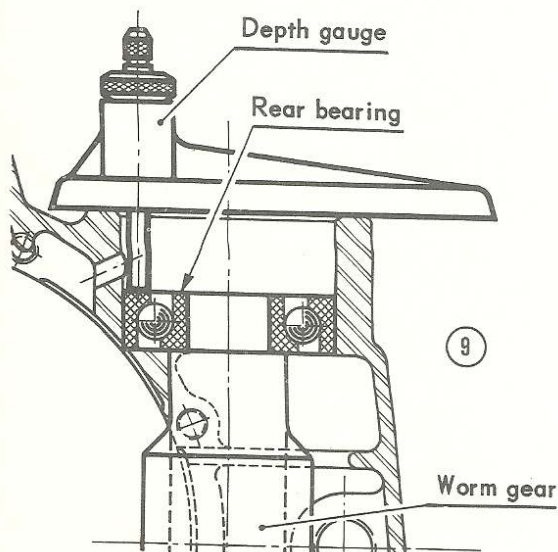
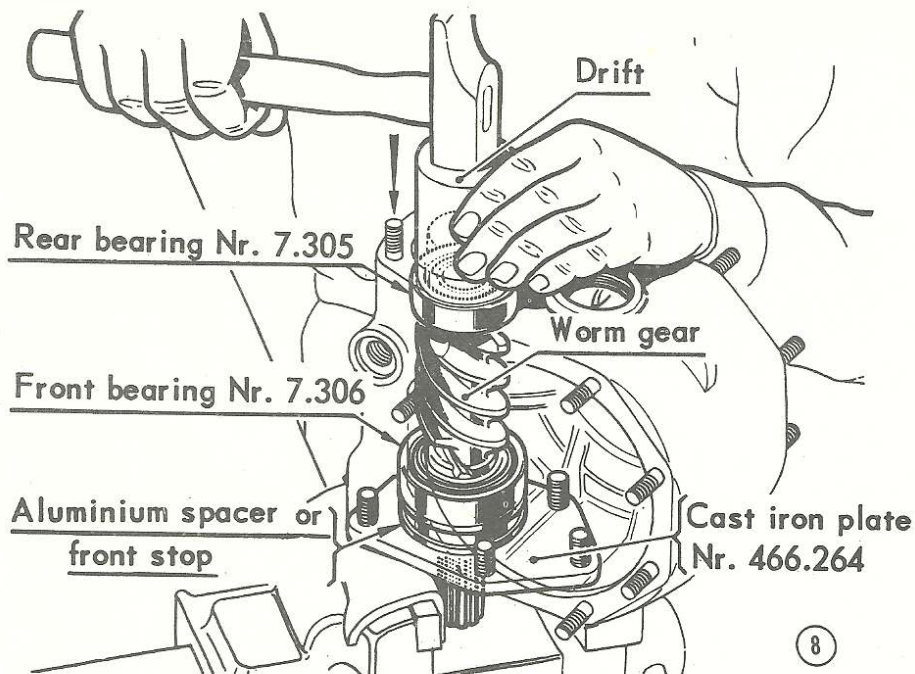
ASSEMBLING

⑥ Install the tapered cone in each bearing support, approximately 0.040" (1.0 mm.) from the outer face.

⑦ Position the axle housing in a vise, with the filler plug facing down. Insert the assembled worm gear into the housing. Hold the worm gear in position, install front stop No. 466,634, and clamp it in place with plate No. 466,264. **CAUTION:** Handle the plate with care as it is fragile. Tighten two diagonally opposed bolts.

⑧ Turn the housing over and gently tap on the outer race to drive the assembly towards the front



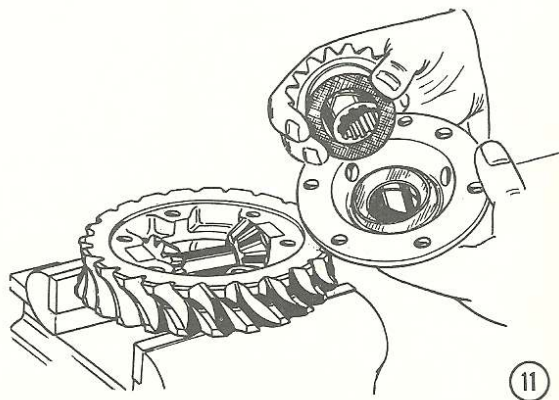
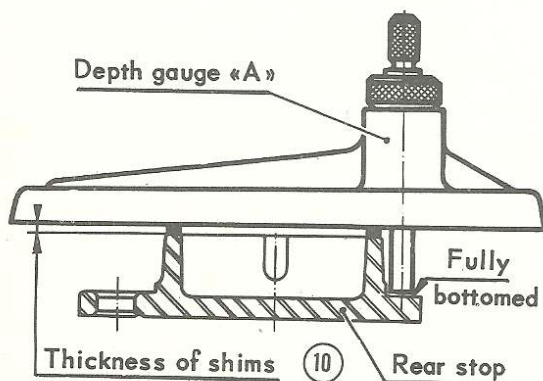


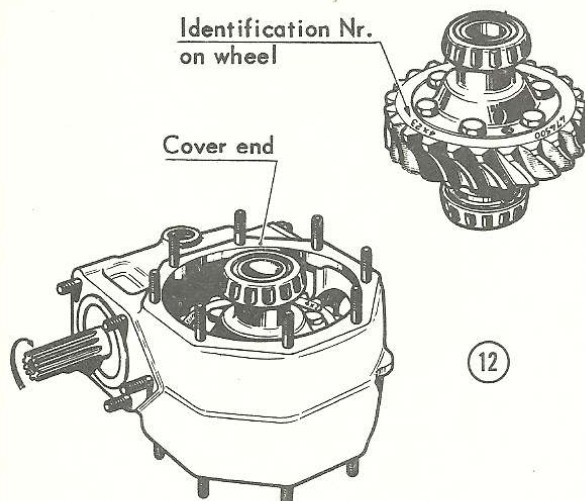
of the case. Check to see that the worm gear rotates freely, but without end play.

⑨ To determine the thickness of shims needed to reduce the end play to zero, use a depth gauge to measure the distance between the bearing and the top of the case.

⑩ Place the depth gauge on the rear stop and measure the space between the top of the stop and surface of the gauge. Install the proper number of shims and replace the rear stop. Use Permatex No. 1, without a gasket. Check that the worm gear rotates freely. Remove the temporary stop plate at the bottom of the worm and install the front stop plate, using sealing compound and a seal ring.

⑪ To assemble the differential, install the side gears and thrust washers. Position one side shell on the worm wheel, aligning the holes with those in the block support bosses. Install the spider gears, spacers, and shaft. Replace the outer shell. Install



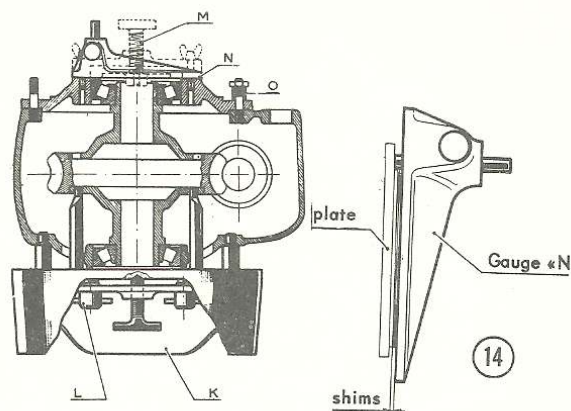
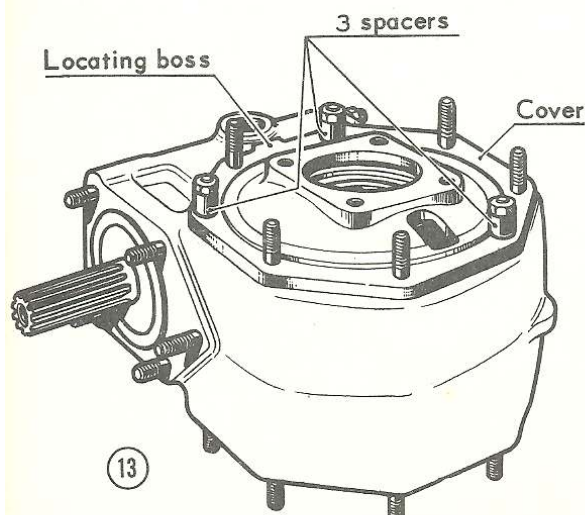


new bolts and torque them to 40–44 ft-lbs (5.5–6.0 m/kg). The differential should rotate freely. Lock the nuts by peening metal into a castellation.

⑫ To install the differential in the case, hold the housing as shown, and then install the worm wheel with the identification number facing up. Make sure that the worm wheel is correctly installed by rotating the worm gear.

⑬ Install the top cover, using a paper gasket coated with sealer. Make sure that one of the oil inlet holes is facing down (towards the drain plug). Temporary spacers should be used to hold the cover in place until the right-side axle tube is installed.

⑭ A gauge is required to centralize the worm wheel with relation to the worm gear. To use this gauge, align the two holes in the shells with the holes in the axle housing. Install fixture "K" with both plungers bearing on the worm wheel. Install clamp "L" to press and hold the fixture securely to the housing. Turn the assembly upside down,

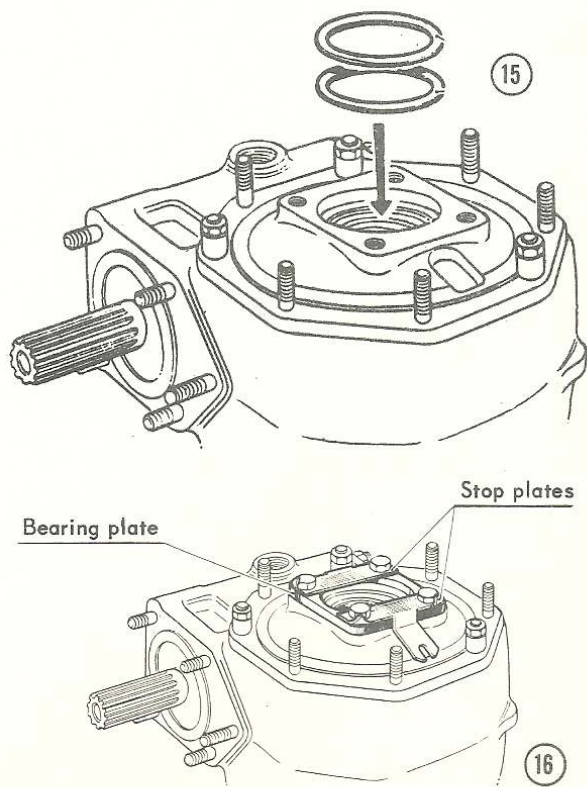


with fixture "K" resting on its legs. Install clamp "M", slip the bearing outer race on the roller ring (but without forcing it). Use a depth gauge "N" to determine the thickness of shims necessary to hold the worm wheel in the proper position. Hold the adjusted depth gauge against the bearing plate and measure the distance, which will be the amount of shims required.

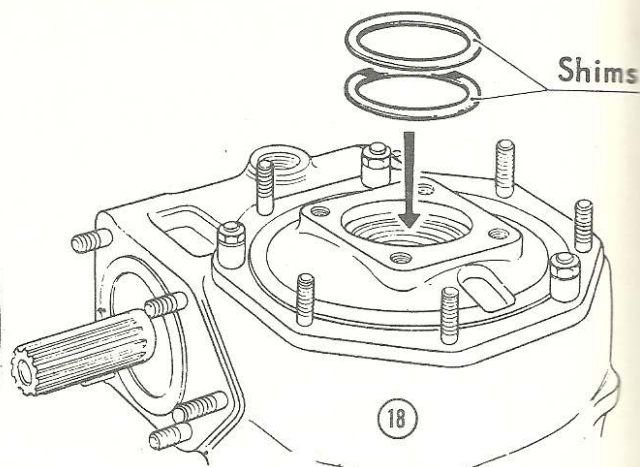
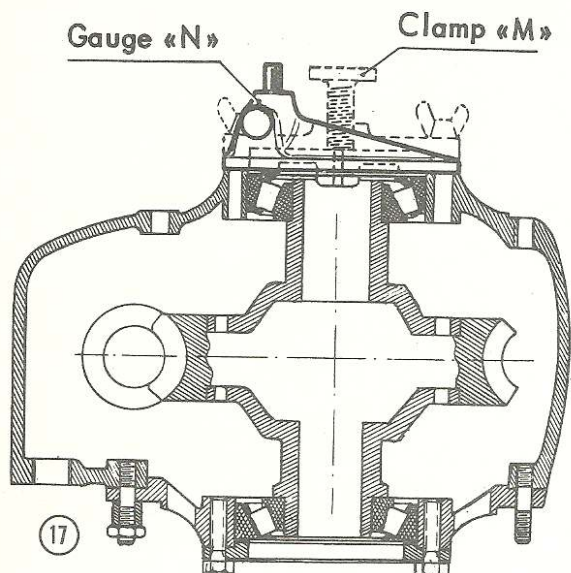
⑮ Remove the clamp "M" and install the shims.

⑯ Install the bearing plate and both sheet metal stop plates. Torque the bolts to 21–25 ft-lbs (3.0–3.5 m/kg). Lock the bolts.

⑰ Turn the assembly over so that it rests on the cover. Remove clamp "L" and fixture "K". Install clamp "M" and push the bearing outer race on the roller ring, but without forcing it. Use gauge "N" as was done previously to determine the

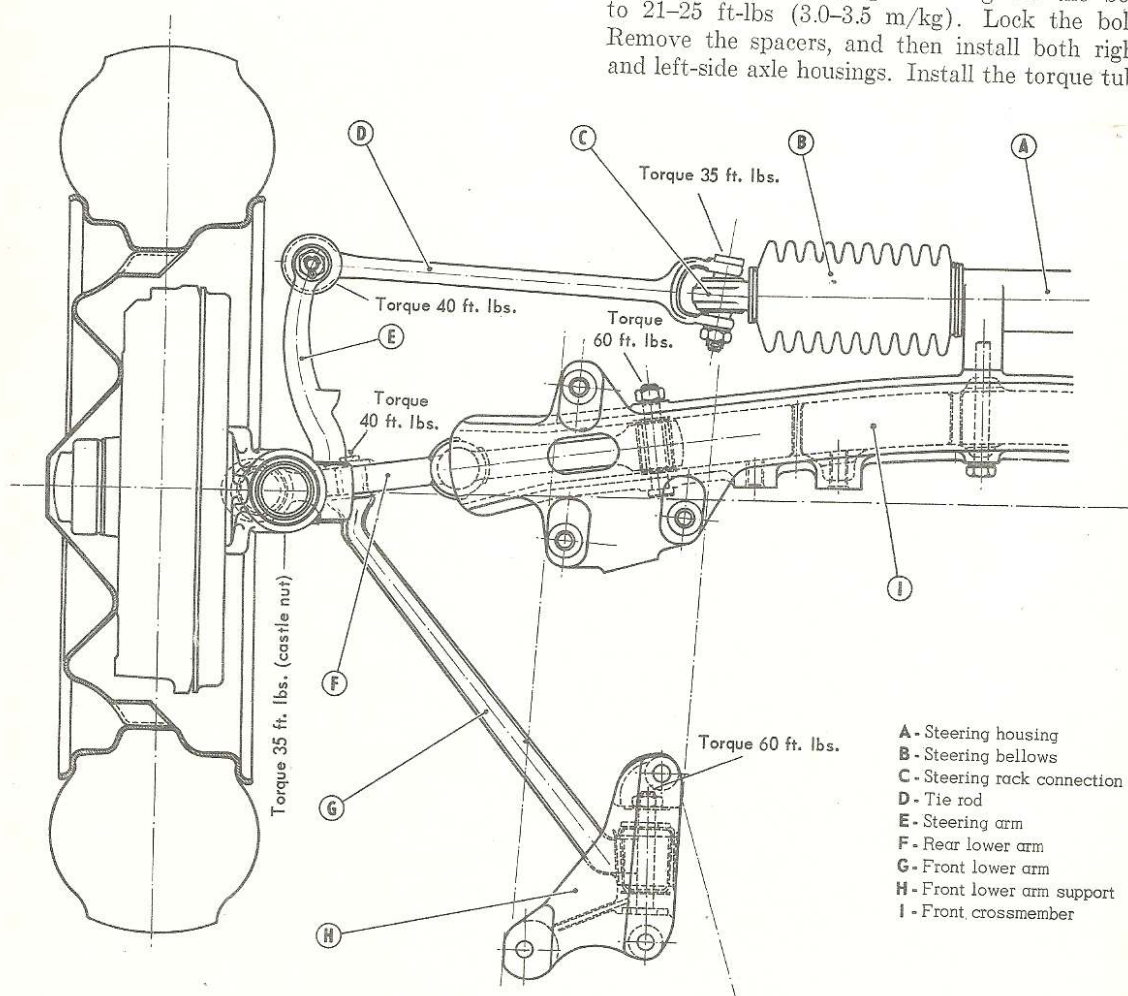


82 Rear Axle Service



thickness of shims necessary to reduce the play to zero.

⑱ Remove clamp "M" and install the required number of shims. Install the bearing plate and both sheet metal stop plates. Tighten the bolts to 21-25 ft-lbs (3.0-3.5 m/kg). Lock the bolts. Remove the spacers, and then install both right- and left-side axle housings. Install the torque tube.



Plan view of the front axle for the 404 model.

7

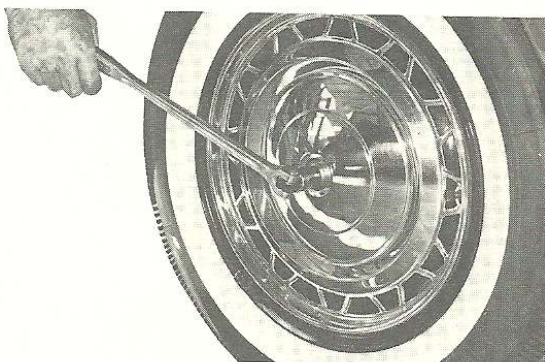
Running Gear Service

FRONT SUSPENSION

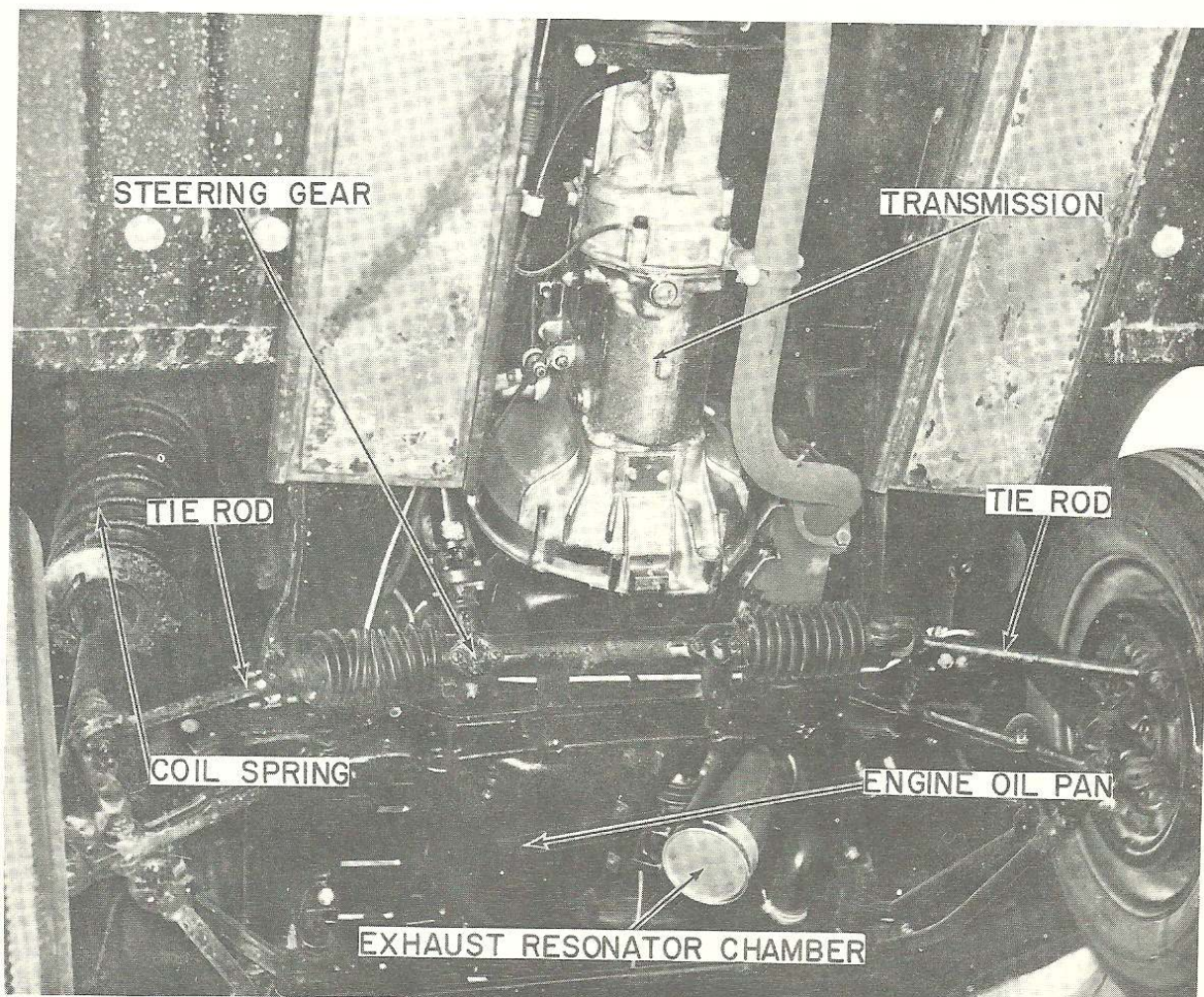
The front wheel suspension is designed about the familiar long-and-short arm suspension. The 403 model uses a transverse leaf-type spring in place of the lower arms. The 404 model uses coil springs.

Toe-in is the only front end angle that is adjustable. It is necessary to replace bent parts to re-establish the correct angles in the event of a collision.

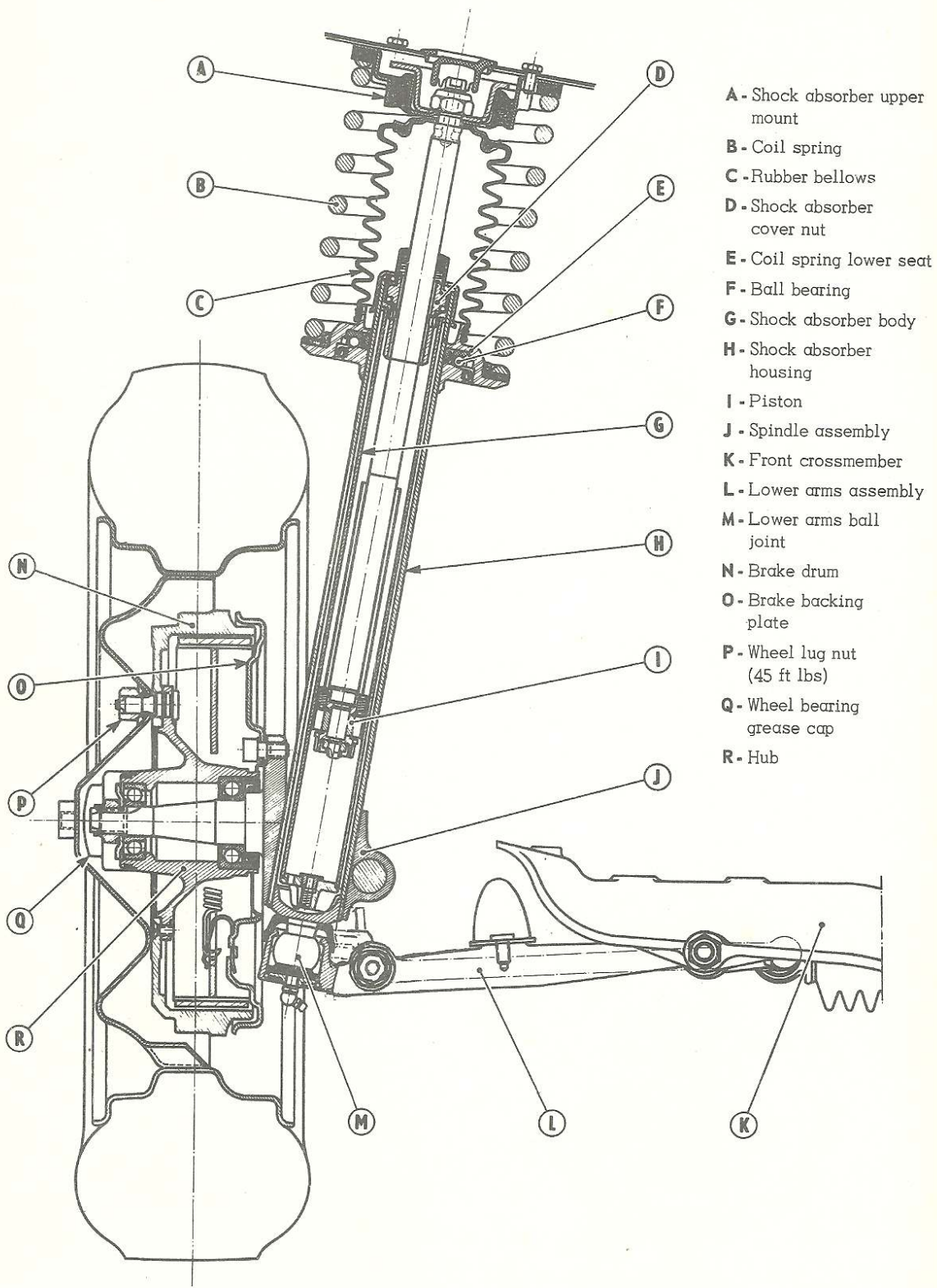
The wheels and drums are balanced both statically and dynamically at the factory and must be marked before disassembly so that they can be replaced properly for balance.



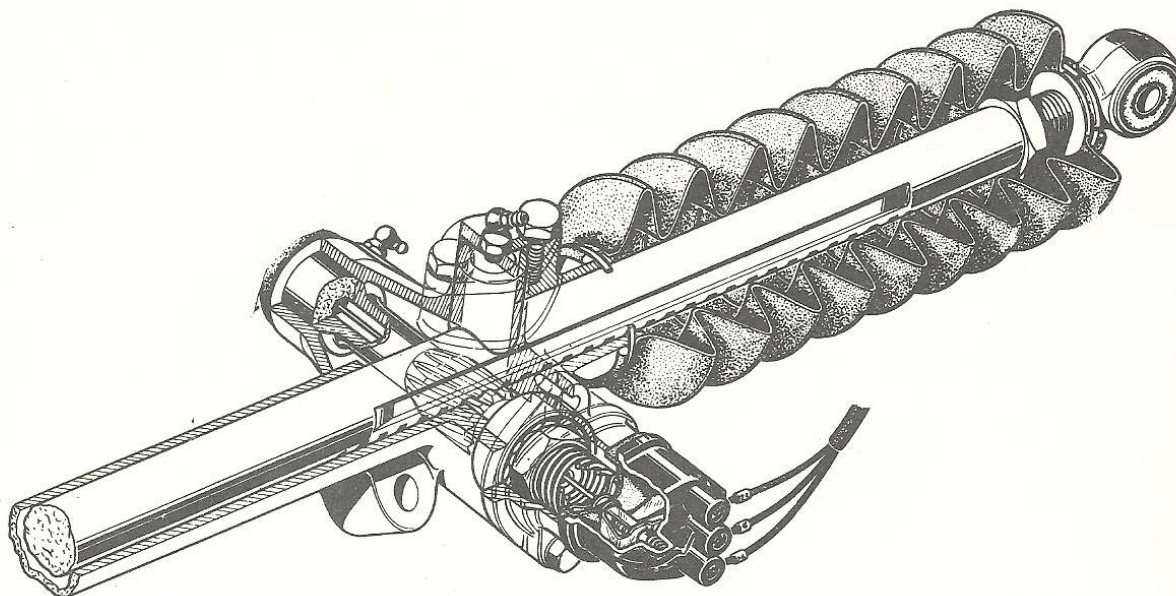
The hub caps are removed by means of a retaining bolt in the center.



Details of the front suspension of the 404 model.



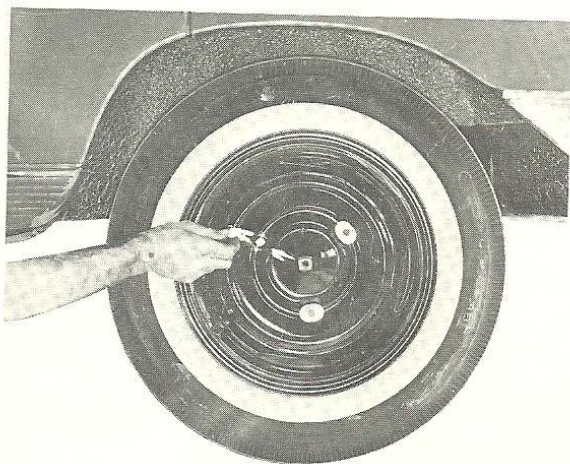
Sectioned view through the front suspension of the 404 model.



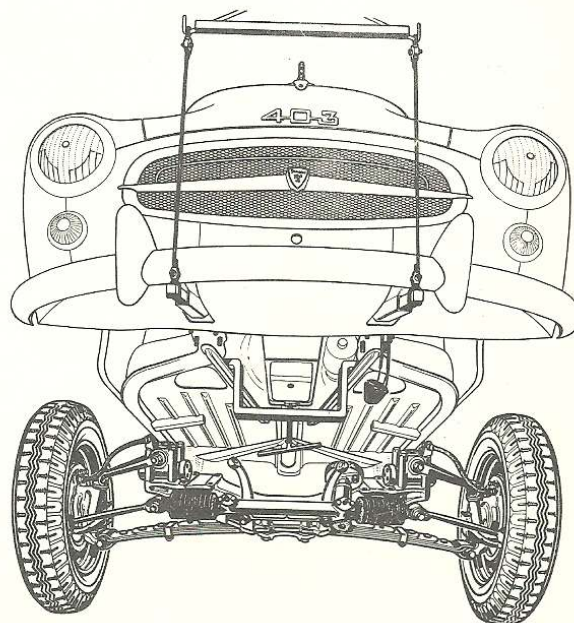
Phantom view of the steering gear assembly used on the 403 model.

STEERING GEAR

The steering gear is the rack-and-pinion type so commonly found on European cars. Both models use steering gear units that are similar in construction, but differing in minor details. The center tie rod is unconventionally positioned over the clutch housing in the 404 model. Toe-in is adjusted by turning the right and/or left tie rod(s) in or out of the rack ends.

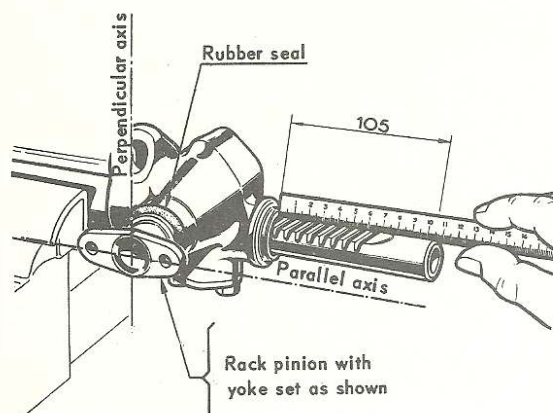


Always mark the wheel, drum, and one mounting bolt with chalk before removing it, because the wheels have been dynamically and statically balanced at the factory and marking them helps to mount them properly in order to preserve that balance.

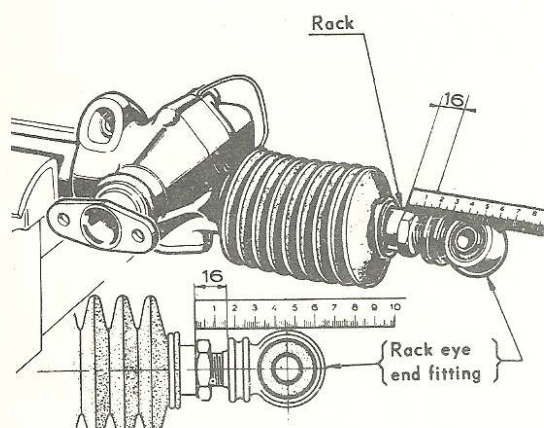


Front suspension details for the 403 model. Note how the body is lifted from the suspension in order to service it.

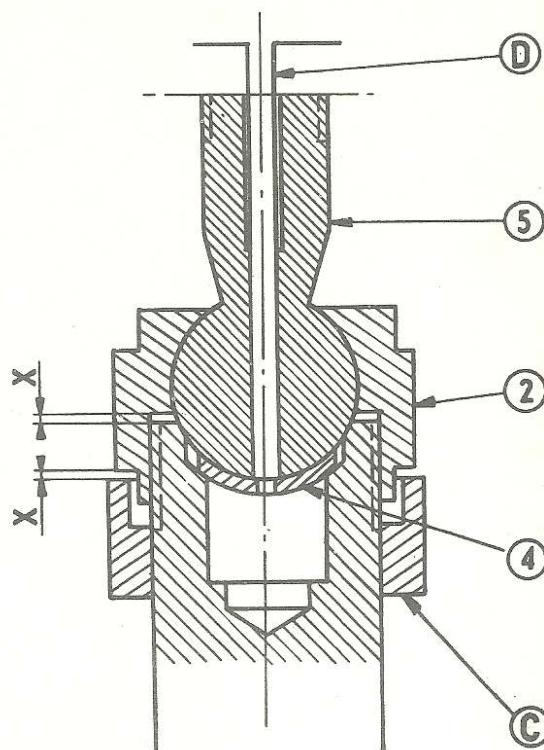
86 Steering Gear



The rack should extend out of the housing 2.795" (105 mm.) for the 403 model steering gear assembly.



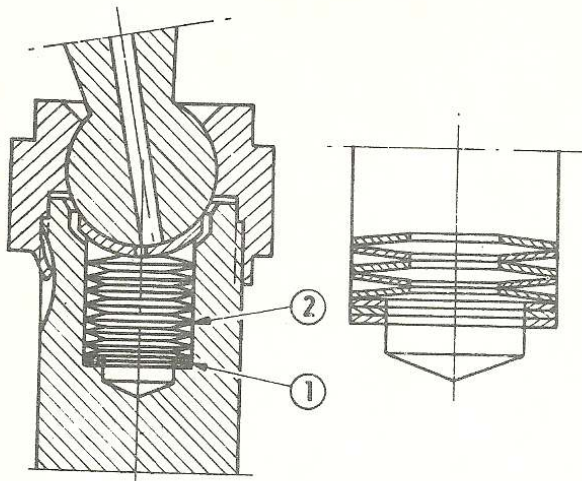
The tie rod end should extend out $\frac{5}{8}$ " (16 mm.) from the end of the rack for the 403 model.



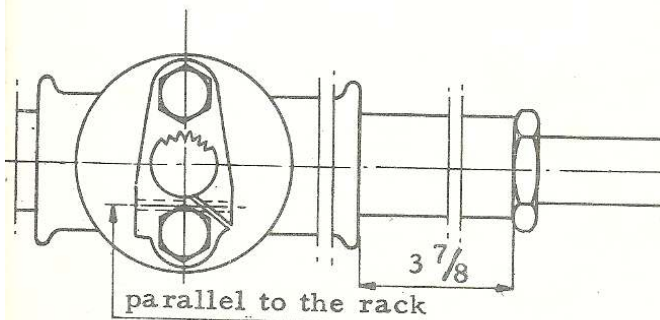
The 404 model steering gear uses a flexible ball joint at one end, and this must be adjusted so that the clearance at "X" is 0.002" (0.05 mm.) free by means of shims positioned under the ball (4) as shown in the next illustration.

WHEEL ALIGNMENT SPECIFICATIONS—PEUGEOT

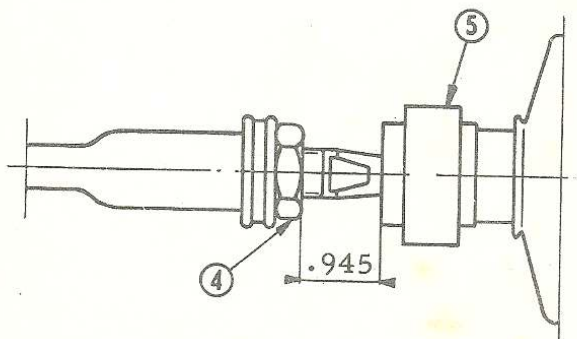
MODEL	CASTER (Degrees)	CAMBER (Degrees)	STEERING AXIS INCLINATION (Degrees)	TOE-IN		TOE-OUT ON TURNS (Degrees)	
				In.	Mm.	Inner Wheel	Outer Wheel
403	P2	P $\frac{1}{6}$	P10	$\frac{3}{64}$ - $\frac{1}{8}$	1-3	17 $\frac{1}{2}$	20
404	P2	P $\frac{1}{2}$	P9 $\frac{1}{2}$	$\frac{1}{8}$	2	20	24



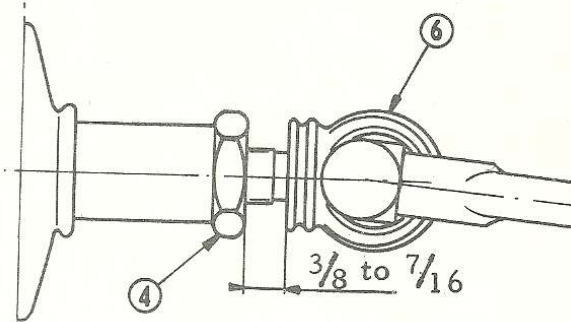
After determining the shim needed to obtain 0.002" (0.05 mm.) free play, install this shim (1) in the end of the rack, and then install 13 Belleville washers (2) as shown at the right. When properly assembled, the ball should move in the joint without difficulty, and without any end play.



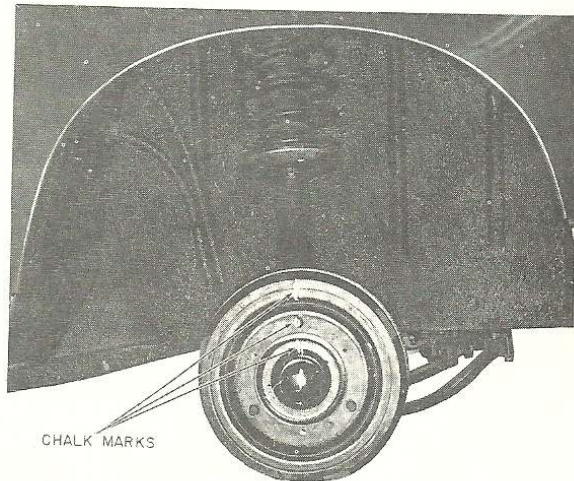
When assembling the 404 steering gear, slide the rack into the housing, letting the right side of the rack extend out of the housing $3\frac{7}{8}$ " (100 mm.).



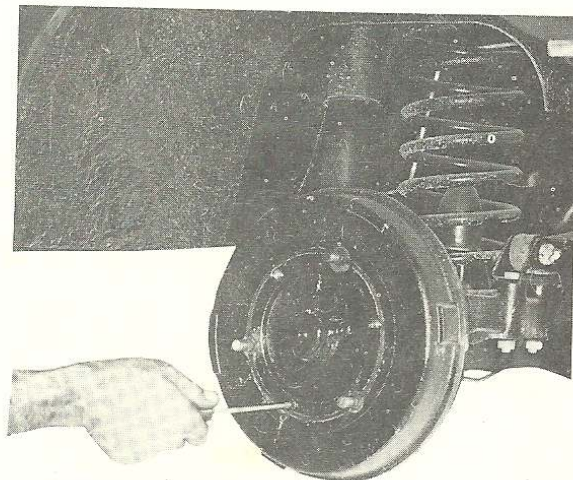
When installing the left tie rod on the 404 model, the distance between the locknut (4) and the cover nut (5) should be 0.945" (24 mm.).



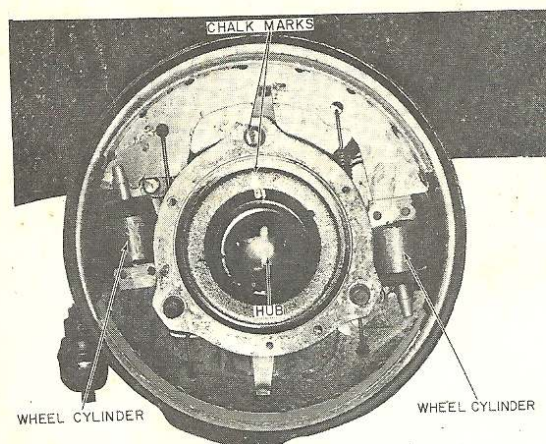
Install the eye nut (6) so that there is a distance of $\frac{3}{8}$ "- $\frac{7}{16}$ " (9.5-11.0 mm.) between it and the locknut (4).



Be sure to mark the drum and hub with chalk for proper assembly in order to preserve the balance.



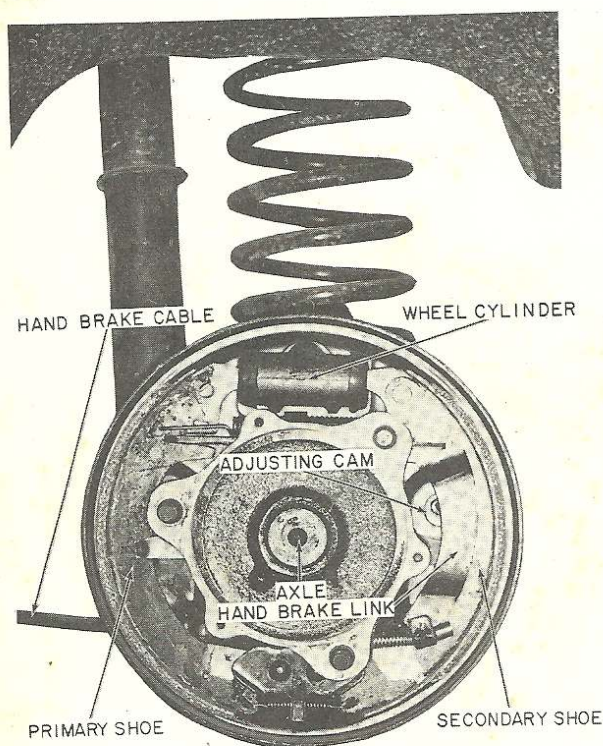
The drums can be removed from the hubs by taking out the three taper-headed screws.



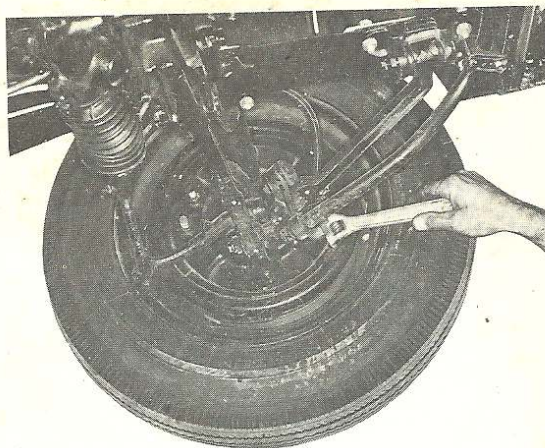
Details of the front wheel brakes.

BRAKES

The braking system is the conventional drum-type with mechanically-actuated linkage at the rear wheels for the parking brakes. The front wheel brakes are actuated by two single-piston hydraulic cylinders per wheel; the rear units have a double-piston cylinder arrangement.



Details of the rear wheel brakes.



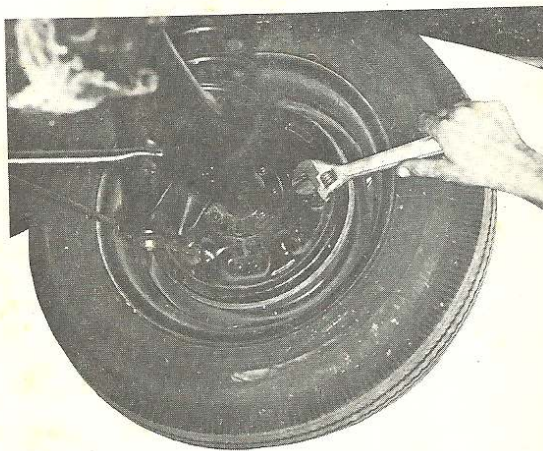
Adjusting the front wheel brakes. Turn each adjuster in the direction that the wheel turns, and then back it off until the wheel is just free. Be sure to depress the brake pedal once to recheck for free wheel rotation.

ADJUSTING THE SERVICE BRAKES

Both front and rear wheel brake shoes are adjusted by turning a cam to move the shoe closer to the drum. To tighten the adjustment, turn each cam in the direction of wheel rotation, and then back it off slightly until the wheel is free. Depress the brake pedal a few times and then recheck at each wheel for free turning.

ADJUSTING THE HAND BRAKE

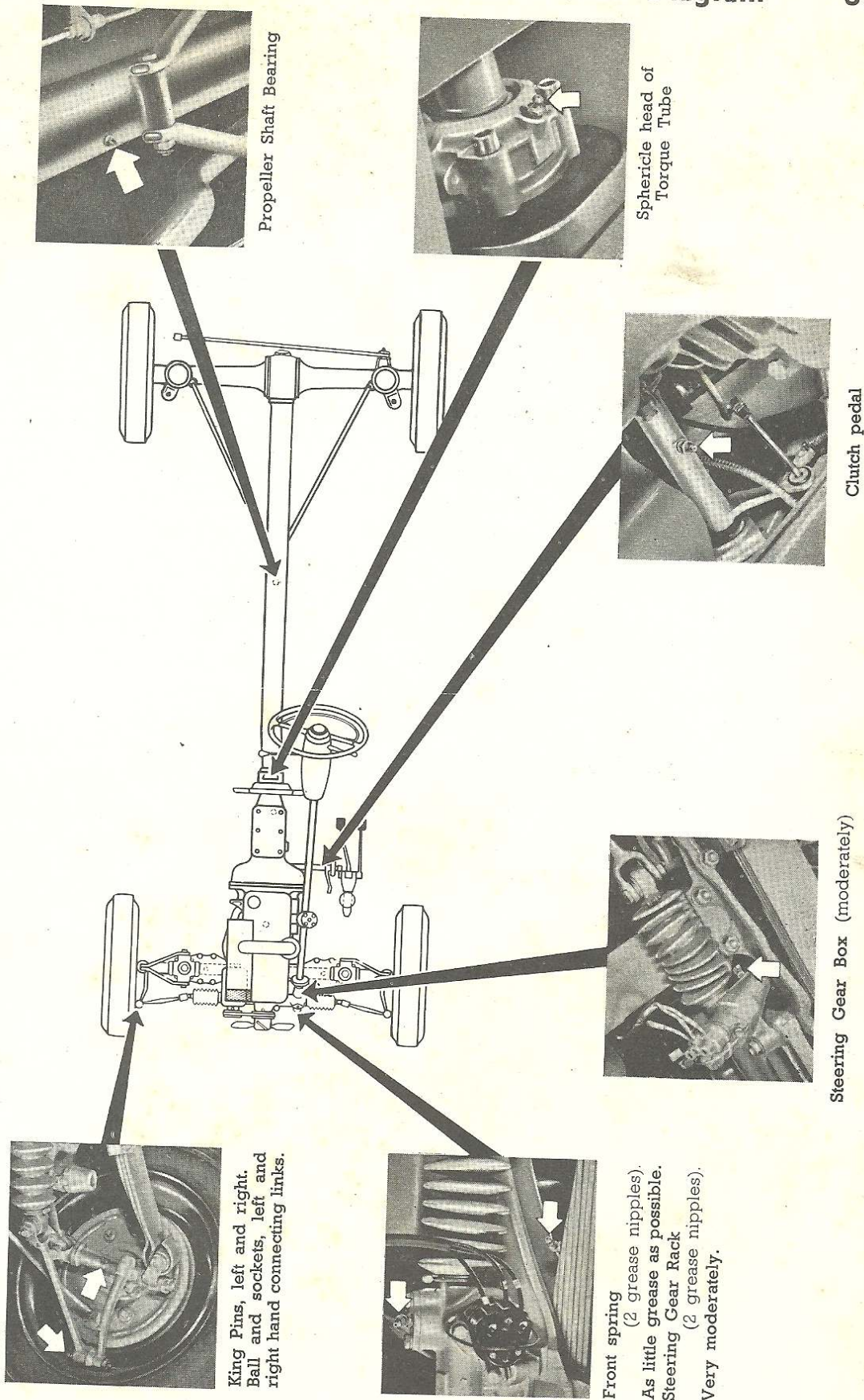
Normally, adjusting the service brakes will restore the hand brake to proper operation. If the hand brake adjustment is too loose after adjusting the service brakes, it can be adjusted at the equalizing yoke. After relining a set of service brakes, it may be necessary to slack off on the adjusting nut to restore proper hand brake operation.



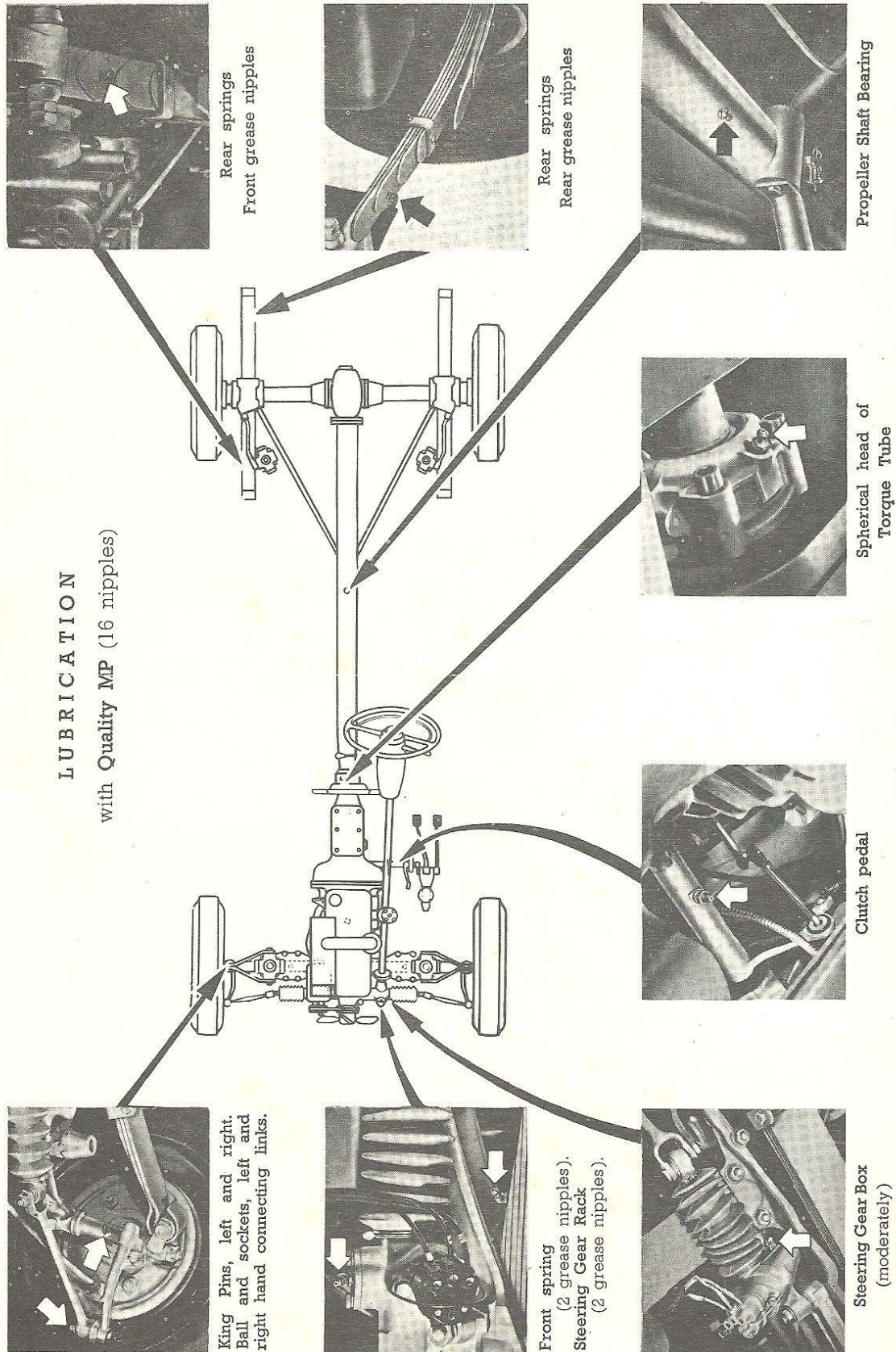
Adjusting the rear wheel brakes. Turn each adjuster in the direction that the wheel turns, and then back it off until the wheel is just free. Be sure to depress the brake pedal once to recheck the wheel for free rotation.

LUBRICATION

with Quality MP (12 nipples)



Lubrication diagram for the 403 model. Lubricate the illustrated points with chassis lubricant every 1,800 miles.



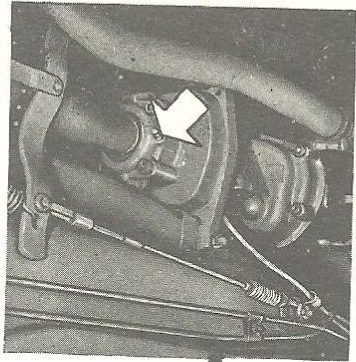
Lubrication diagram for the 403-U model (Station Wagon). Lubricate the illustrated points with lubricant every 1,800 miles.

LUBRICATE UNDER PRESSURE
with MULTIPURPOSE GREASE
(11 fittings)

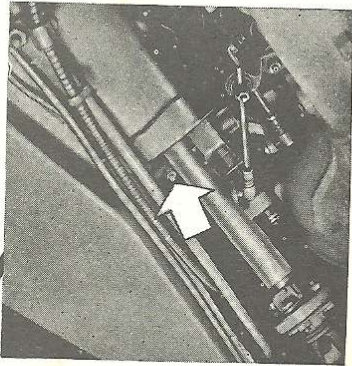
R.H. Connecting Link
Ball and Socket
R.H. Ball Joint



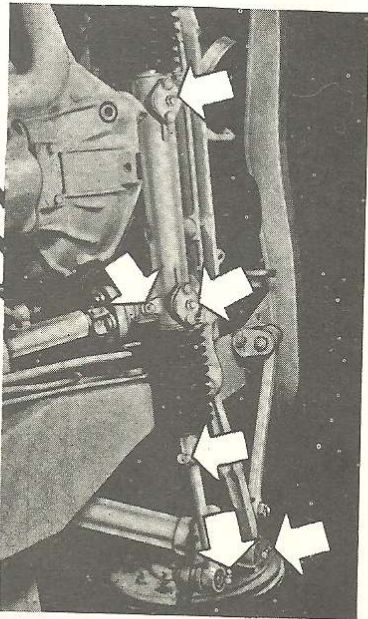
Torque Tube
Sphere



Clutch Pedal Shaft



L.H. connecting Link
Ball and Socket
(2 fittings)
Steering Box
(sparingly)



Steering Gear Rack
(2 fittings)

L.H. Ball Joint

Lubrication diagram for the 404 model. Lubricate the illustrated points with chassis lubricant every 2,000 miles.

GLENN'S

Peugeot

REPAIR AND TUNE-UP GUIDE

by Harold T. Glenn

This is a comprehensive repair and tune-up manual for PEUGEOT products.

It is for the car owner interested in making his own repairs to save money, for the professional mechanic employed exclusively in servicing this company's products, and for the sportscar enthusiast who wants to squeeze that extra ounce of performance from his engine.

This Guide is organized around the familiar units of the automobile: the engine, fuel system, electrical system, and running gear. The first chapter deals with conventional troubleshooting, without specialized equipment, to enable you to isolate the trouble before beginning any disassembly. It will help you to pinpoint the trouble so that you will know what to look for as you disassemble the unit. Therefore, it will save time when making repairs.

This Guide contains comprehensive tables and specifications, wiring diagrams, and exploded views of most of the mechanical and electrical units used on PEUGEOT cars.

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