SECTION I . . GEARBOX REMOVAL AND INSTALLATION

Preparation

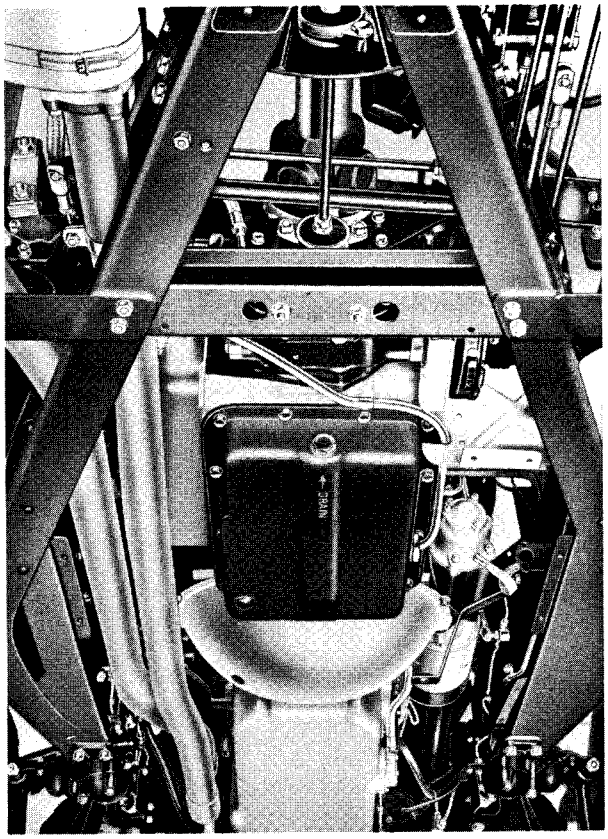
Before commencing removal of the automatic gearbox it is recommended that the front seats and carpets be removed to avoid soiling them when removing the cover to gain access to the bell housing top retaining bolts.

The gearbox is bolted directly to the engine crankcase and carries at its rear end the rear mounting for both engine and gearbox ; it is therefore necessary to provide support for the engine before attempting to remove the gearbox. To spread the load, a block of wood should be used between the support jack and the engine sump, (fig. 8).

It is also necessary to raise the car to give a clearance of at least 2 feet 6 inches between the bottom of the car frame and the floor, to permit the gearbox to be lowered and drawn out from under the car.

A cradle or support tray (Chapter 4) attached to a trolley jack is required to support the gearbox and draw it out from under the car.

Before commencing removal operations lock the Master switch in the OFF position.



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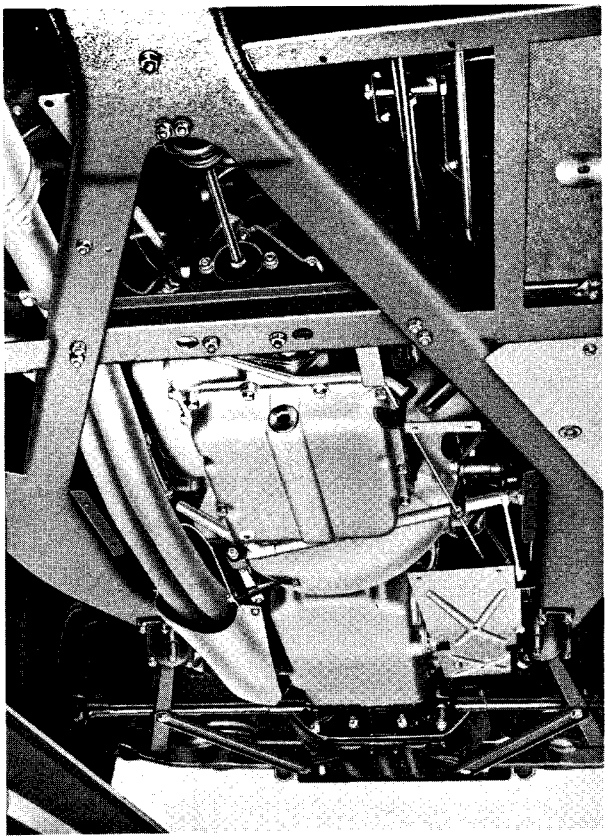

1953

Fig. I Undershields removed

REMOVAL

The gearbox and the chassis in the vicinity should be cleaned carefully and all tools used during the work of dismantling should be clean.

If the work is being undertaken as a result of defective operation, a careful examination should be made for possible causes as the work proceeds. Refer to Chapter 2 for defect investigation.

Undershields

The undershields are retained by $\frac{1}{4}$ in. nuts and bolts and removal is straightforward. Remove also the servo protector shield.

Exhaust pipes

Remove the section of exhaust pipe running along the left hand side of the gearbox. Disconnect it at the manifold flange and at the silencer, undo the pipe steady brackets and remove downwards. The corrugated flange washers may fall out when the pipe section is removed ; if not they must be prised off the flanges On cars other than Wraith there are two exhaust pipes and it may be necessary to remove both to facilitate gearbox removal.

Control rods and brake servo motor

Besides the gearbox controls, there are a number of brake rods which must be disconnected to permit removal of the gearbox. Disconnect or remove them as described in the following paragraphs.

Remove gearbox throttle and selector levers from the shafts projecting from the gearbox side cover ; slacken the pinch bolts and draw the levers off the two concentric shafts. On left hand drive cars the levers and rods can then be tied out of the way without further disconnection.

On right hand drive cars the manual selector cross shaft running under the gearbox must also be removed.

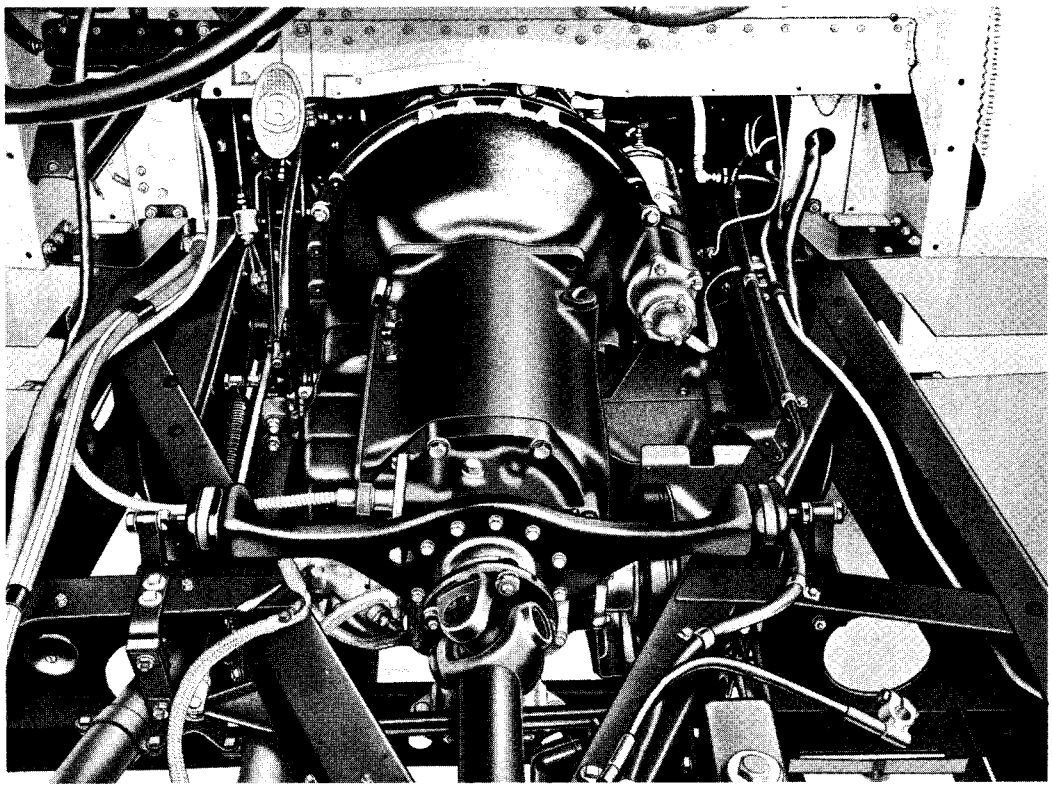

Fig. 2 1952 Gearbox in position

Disconnect at the points shown in fig. 5 then remove the flywheel lower cover with the control bracket attached to it.

Remove the ride control operating rod and lever ; on left hand drive cars undo the 2 B.A. nut and bolt and remove the bracket complete.

On right hand drive cars, disconnect the operating rod from the lever at the base of the steering column and from the bracket at the front end of the fore-and-aft tie rod.

Remove the brake rods and servo motor by disconnecting at the clevis pins remote from the servo motor and unscrewing each rod from its servo motor fork end, (fig. 4) then unscrew the servo motor central retaining bolt.

On left hand drive cars the foot brake transverse rod must be removed and the rod running forward to the servo motor must be disconnected at its rear clevis pin and screwed out of the forward fork end.

On right hand drive cars remove the rod by disconnecting at the servo and screwing out of the pedal lever fork end.

Disconnect the servo motor drag links from the lever behind the hydraulic brake cylinder, remove the servo motor central bolt and withdraw the servo assembly with its friction washer.

Speedometer cable and ride control oil pipes

Disconnection from the gearbox is straightforward. Also disconnect from the gearbox the earthing strip in the vicinity of the ride control oil pipe.

Propeller shaft

Disconnect the propeller shaft at the gearbox and centre flanges, then loosen the Jubilee clip retaining

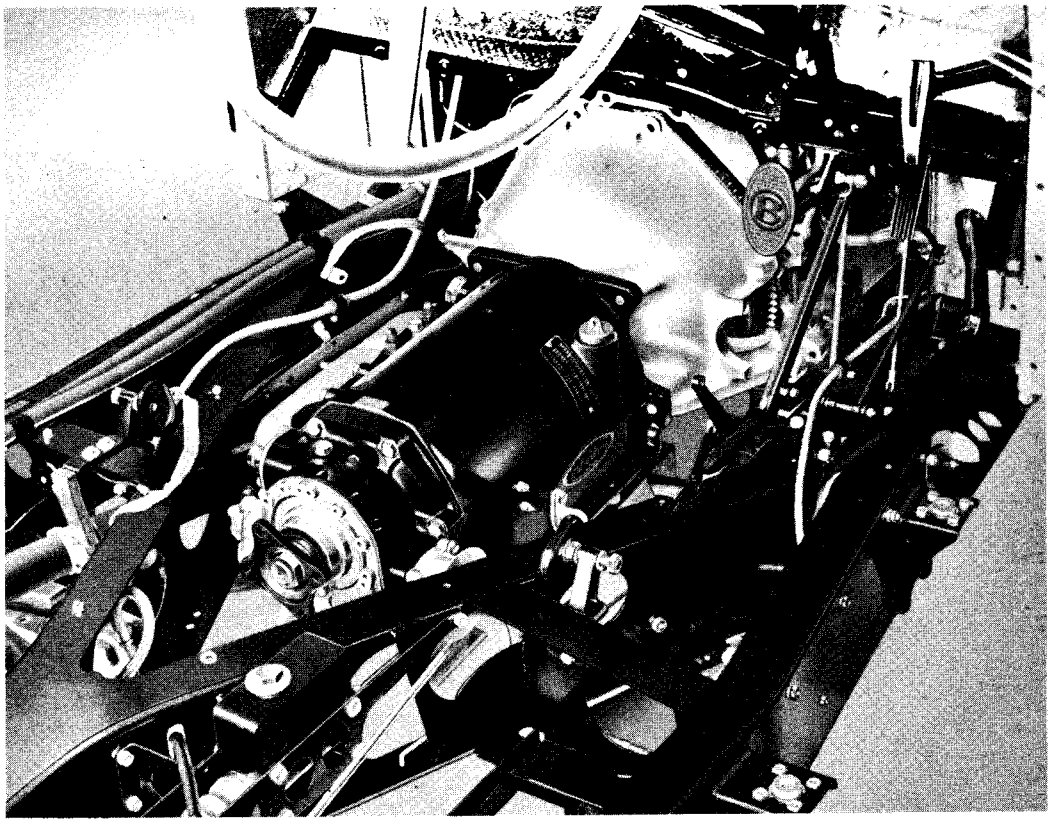

Fig. 3 1953 Gearbox disconnected

the centre bearing and slide the shaft rearwards as shown in fig. 6. Disconnection of the gearbox flange can be left until dismantling of the gearbox rear mounting.

Rear mounting

In addition to the rear mounting, the gearbox is located at its rear end by a fore-and-aft tie rod and a transverse torque reaction bracket (fig. 7).

On left hand drive cars a chassis frame stiffening tube, retained by two $\frac{7}{16}$ in. bolts under the front universal joint, must be removed before disconnecting the tie rod and reaction bracket ; the rear mounting transverse support bracket cannot be removed until the gearbox and engine unit has been raised slightly.

Remove the fore-and-aft tie rod by removing the two $\frac{5}{16}$ in. nuts and spring washers securing the tie rod flange to the gearbox ; then remove the three set-screws, washers and nuts securing the tie rod rear bracket to the cruciform gusset.

Remove the tie rod and bracket and collect the triangular packing piece fitted under the bracket. The nuts on the tie rod itself should not be disturbed.

On some chassis with rivetted frames, the tie rod is retained at the rear end by a flange bolted to a transverse bracket integral with the frame.

Remove the torque reaction bracket by slackening the inner nut on each end of the bracket to remove the oval rubbers from their retaining cups ; disconnect from the gearbox by removing the seven retaining set-screws ; allow the bracket to rest on the chassis.

Disconnect the gearbox rear mounting from its support bracket by removing the two $\frac{5}{16}$ in. nuts, spring washers and bolts. The nuts are accessible through holes in the bracket.

At this stage of removal the engine should be supported using a block of wood interposed between the jack and the sump. Place the jack just forward of the flywheel cover and raise it sufficiently to take the

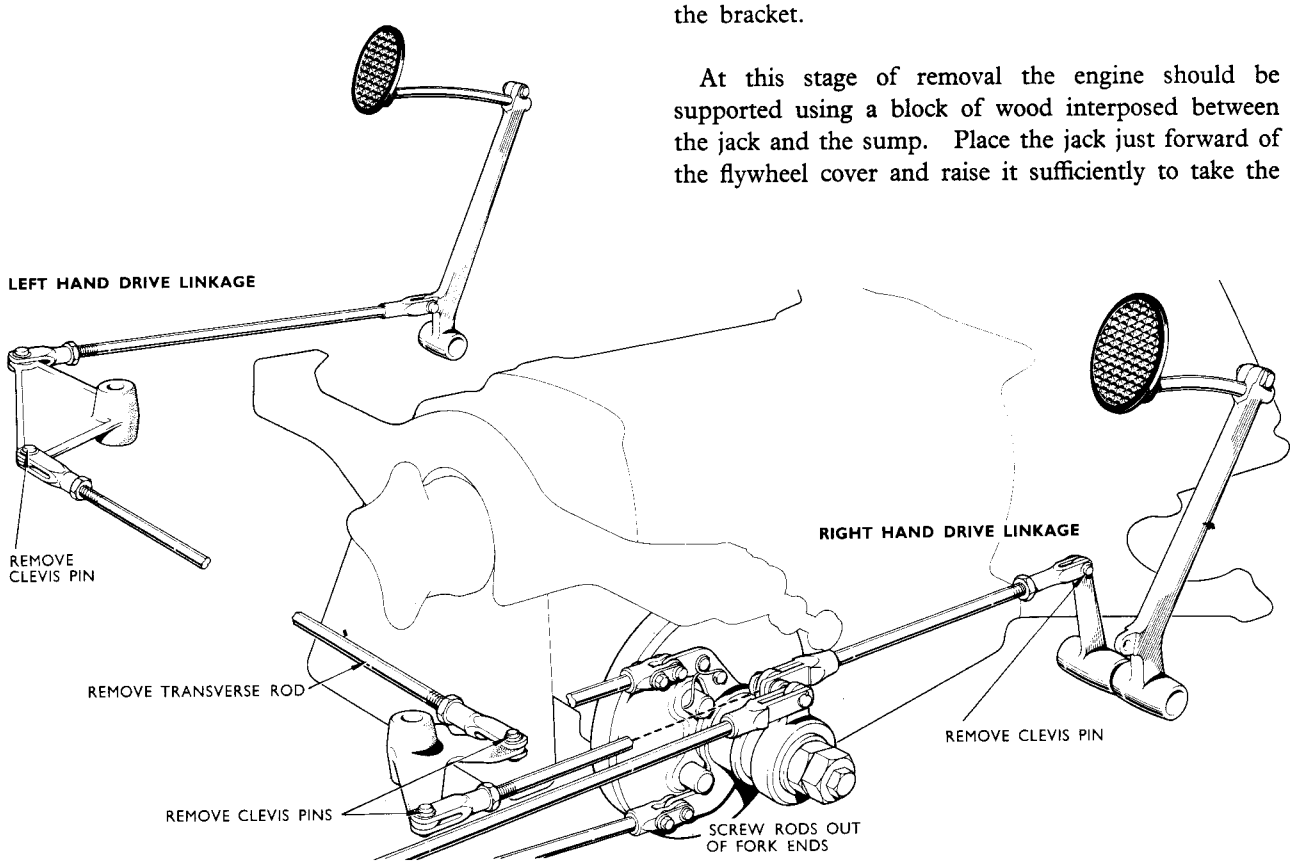

Fig. 4 Brake rod disconnection points

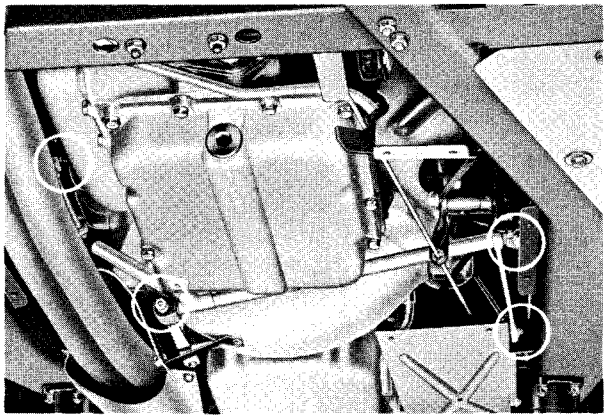

Fig. 5 Selector cross-shaft disconnection points

load off the gearbox rear support bracket, which can then be disconnected from the chassis frame by removing four nuts, spring washers and bolts. Remove the bracket.

If the oil has not already been drained from the gearbox and fluid coupling, it should be done at this stage.

Remove the drain plug from the rear of the sump and collect the oil in a clean receptacle.

Remove the flywheel lower cover, retained by six set-screws, then rotate the flywheel to bring the torus cover drain plug to its lowest position and remove the plug to drain the fluid coupling.

Before the final operation of disconnecting the gearbox from the engine, the gearbox should be supported in the cradle attached to the lifting platform of a trolley jack as shown in fig. 8.

Fluid coupling and bell housing

The starter motor must be removed before disconnecting the two halves of the bell housing and the torus cover from the flywheel.

First remove the L.T. lead from the forward end of the starter motor, then undo the four set-screws securing the " U " brackets and withdraw the starter complete. Remove also the blanking plate from the alternative starter position on the opposite side of the bell housing.

On 1952 cars remove the 4 nuts on the starter motor drive cover, draw aside the bonding strip and withdraw the engaging mechanism, distance piece and gaskets rearwards, then remove the starter motor forwards.

Next, disconnect the torus cover from the flywheel by removing the thirty securing setscrews and, if fitted, the dowel cover strips and numbered balance weights.

Disconnect the two halves of the bell housing by removing eight set-screws. To gain access to the top set-screws move aside the cover from the front floor board.

The dipper switch is attached to the cover, which is retained by seven set-screws. After removal of the set-screws the cover can be eased away sufficiently to gain access without removing the switch. There may be two, or four set-screws which can be removed from behind the cover.

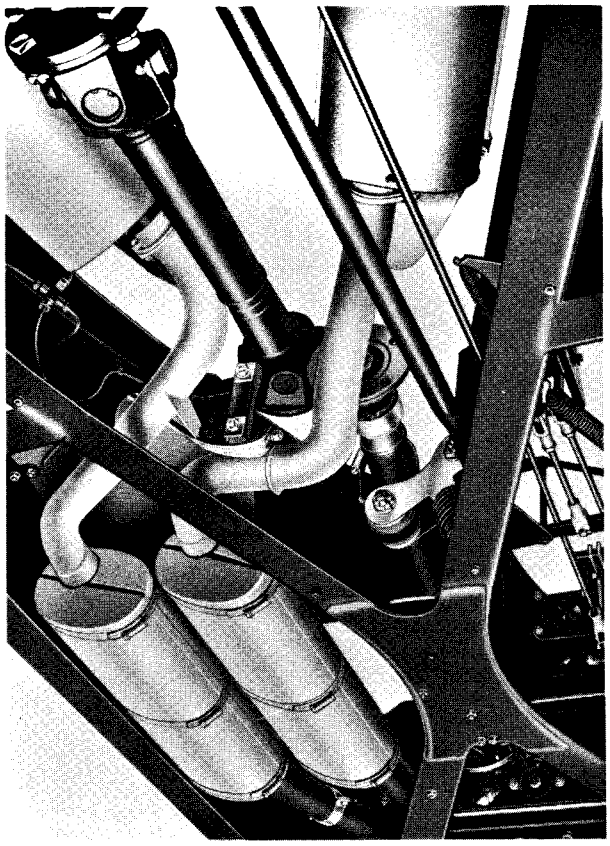

Fig. 6 Disconnecting propeller shaft

Finally, drive out the dowel bolts, one each side of the bell housing, and the gearbox is ready for removal.

Lower both engine and gearbox approximately 1½ inches, (38 m.m.) keeping the weight equally on both jacks, then ease the trolley jack gently rearwards to clear the spigot from its bearing in the flywheel. When it is clear, lower the gearbox and draw out from under the car.

CHANGING A GEARBOX OR ENGINE

A replacement gearbox is supplied without its fluid coupling and bell housing. This is because the fluid coupling torus cover is fitted to the flywheel for crankshaft balancing purposes and because the two halves of the bell housing are machined together as matched casings.

When fitting a replacement gearbox therefore, the rear half bell housing, the torus cover and the driving and driven torus members must be transferred from the old gearbox to the new unit as described in Section 2, before installing in the car.

If the gearbox is being retained in the car but a replacement engine is fitted, the front half of the bell housing, secured to the engine by eight bolts, must be transferred from the old engine to the new one, but it is important that the torus covers be retained with their respective flywheels.

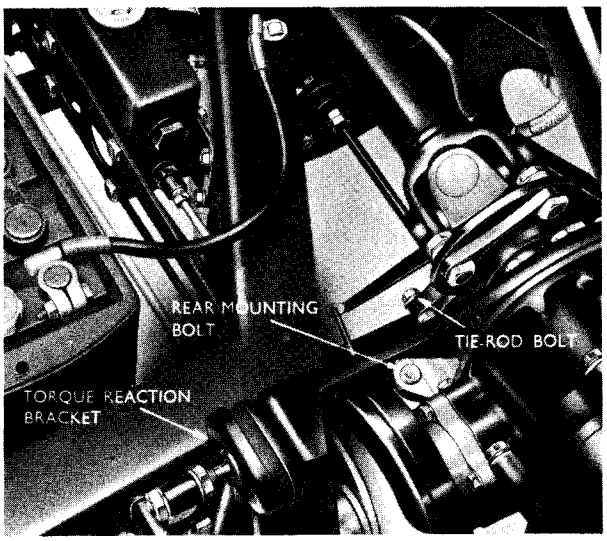

Fig. 7 Rear mounting disconnection points

Flywheel assemblies vary in that some are fitted with an inertia ring, some are fitted with a separate starter ring and others have a starter ring integral with the flywheel.

The need to maintain a balanced assembly requires that the parts of the flywheel assembly are not separated, but should it be necessary to renew a part such as the starter ring, a replacement may be fitted provided that vibration characterisitics prove satisfactory on engine and road test.

If roughness is present, the engine must be returned to a service station for rebalancing.

ASSEMBLING

Preparation

When the fluid coupling has been assembled to the gearbox as described in Section 2, the flywheel and torus cover must be positioned with the dowels and dowel holes horizontal.

When an inertia ring is fitted, the dowels are attached to the ring, the dowel holes being in the flywheel ; other assemblies have the dowels in the flywheel.

To ensure correct balance, the torus cover can only be fitted to the flywheel in one position, one dowel being of larger diameter than the other. Check, by measuring the dowel pins and holes, that these are positioned to match up correctly.

Place the gearbox torque reaction bracket in position across the chassis frame. Prepare the engine flywheel to receive the gearbox by carefully cleaning the flywheel joint face and inspecting for faults which might prevent a good seal ; fit a new flywheel gasket to the flywheel using a light smear of Duckham's Keenol grease.

Mount the gearbox in the support cradle on the trolley jack and position it under the car. Wipe the torus cover flange clean and check again that the dowels and holes are correctly positioned.

Connecting the gearbox front end

Ensure that the support jack is correctly placed under the engine, then raise the gearbox to line up the gearbox

main shaft with its spigot bearing and the dowels.

Ease the gearbox forward and enter the dowel bolts of the bell housing halves, the spigot into the flywheel spigot bearing and the torus cover dowels. Ensure that the flywheel gasket is not disturbed, then tighten the bell housing dowel bolts evenly and firmly.

Fit two bolts into horizontally opposed holes of the torus cover and flywheel, and tighten them carefully and evenly, checking that the dowels enter without undue pressure.

Fit all bell housing and torus cover bolts before final tightening of the initially fitted bolts. If balancing weights are fitted, they should be fitted with the torus cover bolts, paying particular attention to the numbered markings stamped on each weight and the torus cover.

Torque load all bolts to the poundage given in the Summary of Repair Data at the beginning of this chapter.

The gearbox and engine can now be manoeuvred as a unit to assemble the rear mounting and the jack may be removed from beneath the engine.

Assembling the rear mounting

Ensure the gearbox is raised sufficiently to permit assembly of the rear transverse mounting bracket to the car frame, then lower the gearbox on to the bracket and fit the two set-screws, spring washers and nuts to secure the gearbox to the mounting bracket. The trolley jack may then be lowered and moved out from under the car.

Fit the torque re-action bracket to the rear of the gearbox and fit the oval rubbers in their caps. Tighten

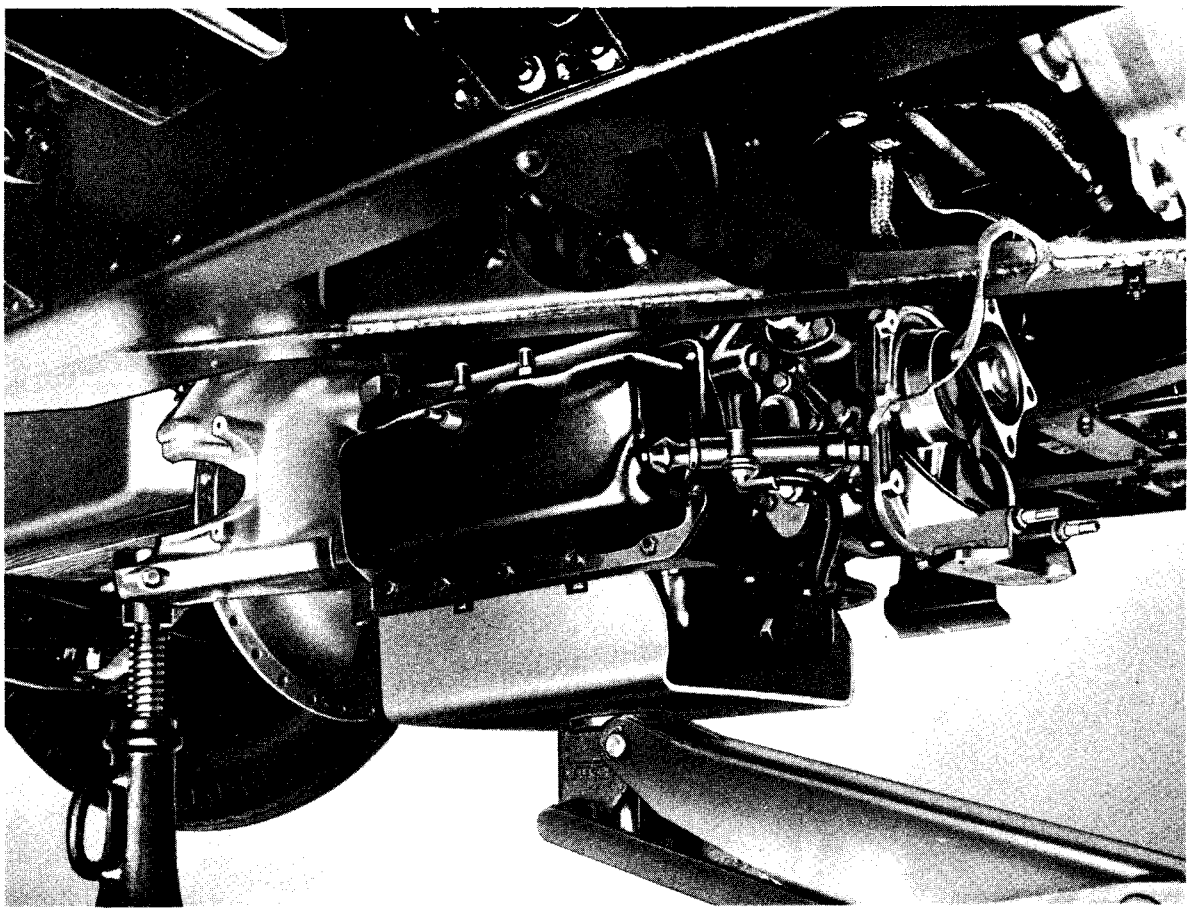

Fig. 8 Supporting gearbox and engine

the inner nuts on the brackets. If the outer nuts have been disturbed, slacken back all the nuts and tighten the inner nuts evenly two full turns beyond the point at which the rubbers were felt to be nipped. Lock by tightening the outer nuts.

Fit the fore-and-aft tie rod and bracket with the triangular packing piece under the bracket at the rear end.

On left hand drive cars fit the chassis frame stiffening tube to the chassis, under the front universal joint.

Propeller shaft

The gearbox output drive flange and propeller shaft centre bearing should be connected up in the reverse order to removal. Ensure that the centre bearing, shown disconnected in fig. 6, is centrally positioned when connected up.

Brake rods and servo motor

Assembly of the brake rods is straightforward (fig. 4) after fitting the servo motor ; take care to fit the friction washer with its inner chamfer towards the gearbox and to locate the driving pins before tightening the centre retaining bolt. Check the adjustment of the servo motor as described in Section J of the car workshop manual.

Ride control unit and speedometer drive

Fit the flexible oil pipe with the pipe swung over to clear the exhaust pipe, thus eliminating the danger of a burnt flexible section of pipe. Loosen the unions at both ends of the pipe if necessary, to achieve this without straining the pipe.

Assembly of the ride control linkage is straightforward as also is the fitting of the speedometer drive and the earthing strip, both of which can be connected at this stage.

The ride control system should be primed as described in Chapter 2 and checked for leaks after connecting the gearbox control linkage as described later.

Starter motor

Refit the starter motor in the reverse order to removal. Ensure that a joint washer is fitted on each side of the distance piece of 1952 starter motors. Fit the blank to the opposite side of the bell housing of a 1953 gearbox.

Throttle and selector controls

Attention is drawn to the following points when connecting the controls.

1. The pinch bolts securing the levers to the concentric shafts projecting from the gearbox side cover should be torque loaded to the poundage given in the Summary of Repair Data at the beginning of this Chapter.

2. The control joints should be greased on assembly and should be free without excessive backlash before the controls are checked and adjusted as described in Chapter 2.

3. Check the starter and reverse light switches during the control check.

4. The final check of control setting is the road test of change points described in Chapter 2 ; minor adjustments to the rod connected to the gearbox throttle lever may be necessary.

The rod should be lengthened if there is slipping on up-change or if kickdown change is delayed or cannot be obtained. Slipping on up-change will be most noticeable during the 2–3 change.

The rod should be shortened if up-changes are harsh or occur late with light throttle or if kick down changes can be obtained at less than full throttle.

Road test

Before setting out on road test fill up the gearbox as described in Chapter 2 and run the engine with the control lever in N for a few minutes to check the underside of the gearbox for leaks.

The method of assessing gearbox performance is given in Chapter 2 and if, despite adjustment of the controls as previously described, correct automatic changes are not obtained, it may be necessary to remove the sump and adjust the bands as described in Sect.6.

When the automatic gear changes are obtained satisfactorily, make a final check for oil leaks, top up the gearbox oil level and fit the undershields.