

- (c) Withdraw the two roller bearings and distance piece. It will be necessary to use a puller for the bearings.
- (d) Remove the fan shaft from the cowl.
- (e) Press the oil seal out of the fan centre.

Examine the bearings and the oil seal in accordance with GEN O 050 and VEH A 163-3.

26. Reassembly:-

- (a) Fit the oil seal to the fan centre.
- (b) Place the bearing shaft through the fan centre with its bolting flange at the back.
- (c) Lay the fan on a bench with the bearing shaft vertical and place a flat block of wood, or metal, under the shaft.
- (d) With a suitable piece of tube drive the roller bearings on to the shaft (not forgetting the distance pieces).
- (e) Replace the centre bolt, tighten the nut and replace the split pin.
- (f) Replace the bearing hub and the layrub coupling, tighten the screws and turn over the tab washers.
- (g) Insert the fan assembly into the cowl, line up the threaded holes of the bearing shaft flange with the six holes in the cowl centre, replace and tighten the screws.

Fan balancing (Fig. 14)

27. Should the fan blades become damaged, but repairable, the fan should be given a static balance test after repair. Do not remove metal from the blades to balance the fan. Holes should be drilled and tapped on the 'light' side and brass plugs screwed in to the tappings. The plugs should be just proud each side of the blade to allow for peening over and finally smoothing down with a file. Centre punching the plugs to key them in, is not recommended due to the softness of the aluminium blades; 1/8 inch to 3/8 inch diameter brass rod will be found suitable for balance plugs. Finally chuck the fan in a suitable lathe and if necessary skim the blade tips to prevent fouling of the cowl. Only the smallest amount necessary should be machined off otherwise the efficiency of the fan will be impaired.

Workshop special tools

28. LV3/RR FV 143211 Extractor, coolant pump bearing.

TRANSMISSION

FLUID FLYWHEEL

(Remove the gearbox, see para 35).

29. Dismantling, Figs. 15, 16 and 17:-

- (a) Remove the circlip from the rear casing oil seal housing and the washer adjusting. Drain the oil.
- (b) Remove the six studs securing the oil seal housing, insert three extractor screws and draw off the seal housing.

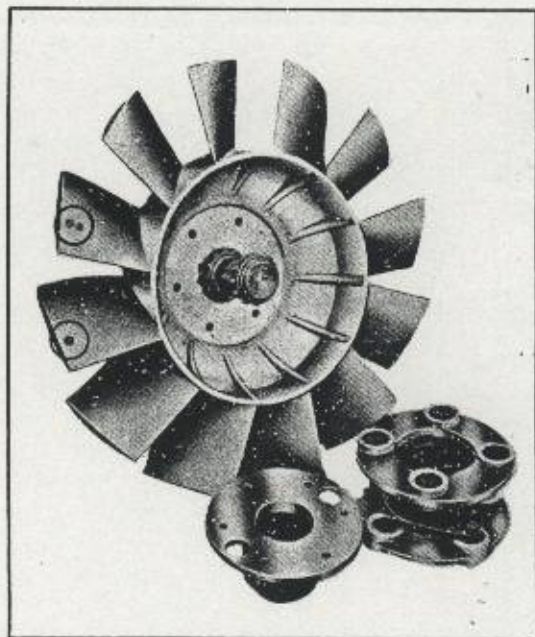


FIG. 14 - FAN BALANCING -
SHOWING BRASS PLUGS

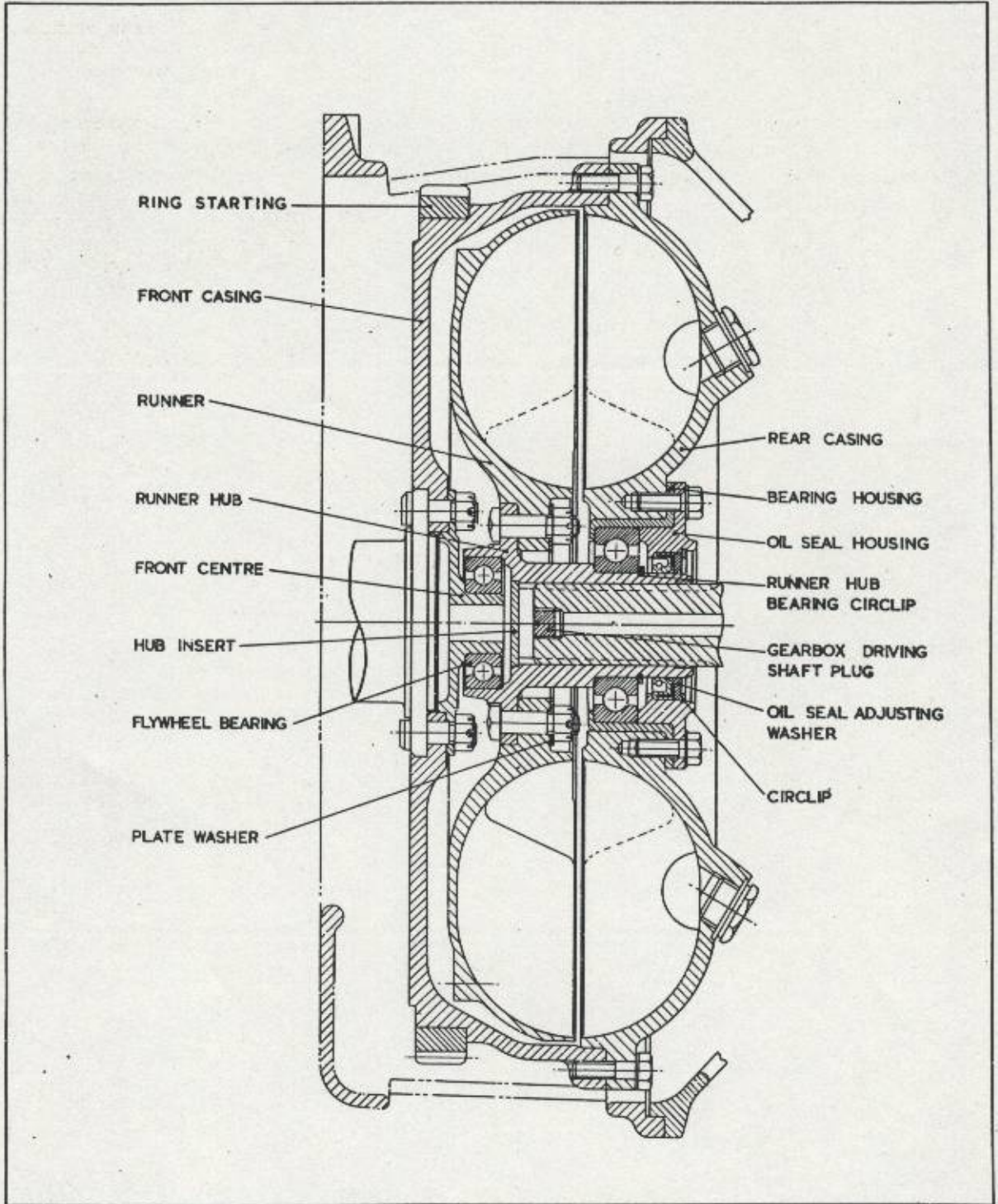


FIG. 15 - FLUID FLYWHEEL - GENERAL ARRANGEMENT

- (c) Remove the inner circlip locating the rear bearing. Remove the screws securing the rear casing and extract the casing complete with runner and hub using three 5/16 U.N.C. screws.
- (d) Remove the rear bearing and housing from the rear casing.
- (e) Remove the split pins and nuts to separate the flywheel runner from the runner hub. This exposes the whole of the fluid flywheel assembly.

30. Reassembly:-

Replace in the reverse order noting the following points:-

- (a) When the oil seal is being replaced, ensure that the circlip groove has no protruding sharp edges or burrs, as this will damage the oil seal on entry. It is advisable to run a half-round scraper around the inside of the housing. Soak the new oil seal in oil OM-13 and insert wet.
- (b) Washers adjusting oil seals are available in three sizes, 0.120, 0.130 and 0.145 inch. Select the washer which, when fitted with the circlip, will give a slight nip to the seal.
- (c) When mating the front and rear casings, renew the paper joint and use jointing compound on both sides.
- (d) Use jointing compound on the following face joints: front casing to crankshaft, oil seal housing and rear bearing housing.

OIL SEAL**31. Renewal:-**

- (a) Drain the oil and remove the screws securing the oil seal housing. Using the extractor holes in the housing flange (5/16 UNF), remove the housing complete with circlip, adjusting washer and oil seal. Remove the circlip from the housing and tap out the adjusting washer and oil seal.
- (b) Examine the runner centre for scoring at the position of the oil seal and for worn bearings. The latter can be ascertained by spinning the centre and listening for any sound of roughness. There should be less than 0.002 inch movement at the centre when moved from side to side. Should the centre be scored or the bearings worn, renew in accordance with paras 32 and 33.
- (c) With the centre and bearings satisfactory, thoroughly clean the oil seal housing. Ensure that the circlip groove is free from burrs, dip the new seal in oil OM-13 and press into position within the housing. Clean the flange of the bearing housing and coat with jointing compound.
- (d) Refit the oil seal housing, taking care not to damage the oil seal as it passes over the centre spigot. Replace screws and tighten evenly.
- (e) Replace the adjusting washer and circlip. Replace the oil.
- (f) Before replacing the engine, check over the points listed in para 7.

RUNNER CENTRE AND BEARINGS**32. Removal:-**

- (a) Drain the oil from the fluid flywheel.
- (b) Remove the screws securing the rear casing and using extractor bolts (5/16 UNC), remove the rear casing complete with runner.
- (c) Remove the oil seal housing complete with oil seal, adjusting washer and circlip.
- (d) Remove the bearing circlip, support the outer flange of the casing on wooden blocks and tap the runner centre through the bearing.
- (e) Support the bearing housing at its rear flange and tap the bearing out of the housing. No attempt should be made to remove the housing from the rear casing. The housing is pressed into the casing and then machined to receive the bearing. Should the bearing housing be defective, renew the rear casing complete.

- (f) Remove the eight bolts, nuts and plate washer, securing the centre to the runner. Drive the centre from the runner and extract the front bearing from the centre. Should the bearing remain on the front centre, pull the bearing from the spigot in situ; DO NOT remove the centre from the flywheel.

33. Replacement:-

Replace in the reverse order to removal noting the following points:-

- (a) When fitting the centre to the runner, press the centre into place carefully and do not allow to tilt or metal sheared from the edge of the counterbore may fall between the mating faces and throw the centre out of alignment.
- (b) Check that the insert is in place in the runner centre. The inserts are rolled into place during production and tested to 80 lb/sq.in.
- (c) With a scraper, give a slight lead to the leading edge of the oil seal housing beyond the circlip groove.
- (d) Having fitted the runner assembly to the rear casing and before fitting the oil seal, hold the rear casing in a vice and spin the runner. It should rotate quite freely.
- (e) Three thicknesses of adjusting washers are available for the oil seal, 0.120, 0.130 and 0.130 and 0.145 inch. Fit the washer that gives a slight nip to the oil seal with the circlip in place.
- (f) Use a new joint for the rear casing and coat the flanges with jointing compound. Immediately prior to fitting the oil seal housing, coat the bearing housing flange with jointing compound. Jointing compound should not be used on the oil seal.

Starting ring

34. Renewal:-

Proceed as for sub-para 29(a) to (e), remove split pins, nuts and flywheel bearing front centre. Remove flywheel.

- (a) Remove the six securing screws from the starting ring, heat slightly around the ring and tap off.
- (b) The replacement rings are 0.010 inch interference fit with the casing. Heat in boiling water for a few minutes, drop over the casing and allow to cool. Ensure that the ring is against the shoulder.
- (c) When cold, drill and tap new holes mid-way between the existing holes and refit securing screws. Screw in securely and as a precaution against unscrewing, lightly mark with a centre punch at the position of the screwdriver slot.
- (d) When replacing the front casing to the flywheel flange carefully line up the off centred (2^o) bolt hole with the corresponding holes in the flange. This ensures that the T.D.C. marking is in its correct position relative to the crankshaft.

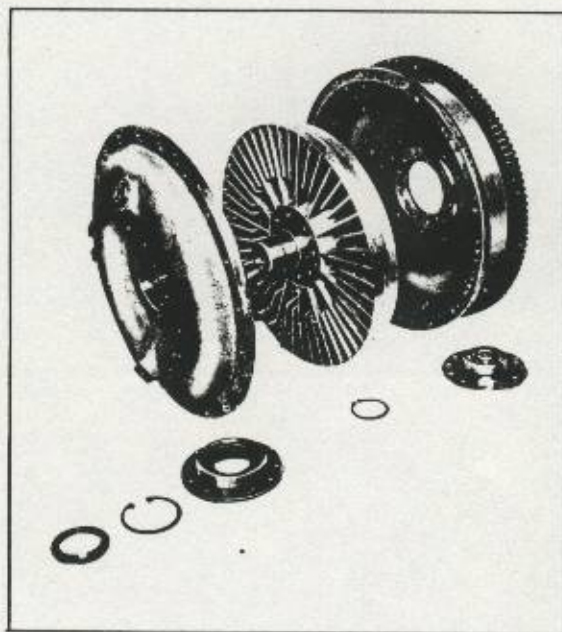


FIG. 16 - FLUID FLYWHEEL -
REAR

GEARBOX AND TRANSFER BOX

35. Removal:-

- (a) Remove the front and rear roof plates.

- (b) Remove the gunner's seat, wireless set baseplate, gearbox coverplate and bracket.
- (c) Remove the air cleaner.
- (d) Disconnect the battery leads, remove batteries and battery boxes.
- (e) Remove the battery leads, clamps, and wireless set bearer bracket.
- (f) Remove the floor sideplates and crew seats.
- (g) Disconnect and remove fuel filter outlet pipe.
- (h) Remove the LH front propeller shaft tunnel.
- (j) Disconnect the gear selector rod at the gearbox.
- (k) Remove the RH propeller shaft tunnel.
- (l) Disconnect all four propeller shaft couplings at the transfer case bevel boxes.
- (m) Disconnect the LH front propeller shaft at the front end and remove from the hull (this is necessary as it cannot be moved to one side as in the case of the other three).
- (n) Remove the clip and fuel line from the gearbox. Loop up the cables which pass over the bell housing.
- (o) Disconnect the gear change rod at the gearbox and the forward and reverse rod at the transfer case.
- (p) Remove the engine steady brackets.
- (q) Remove the transfer case mounting bracket caps, lift the unit slightly at the gearbox end and pack up the engine for support.
- (r) Remove the gearbox bell housing nuts (the two bottom nuts can be removed with a ring spanner).
- (s) Sling the gearbox assembly, slide it clear of the flywheel and lift out through the top of the fighting compartment.

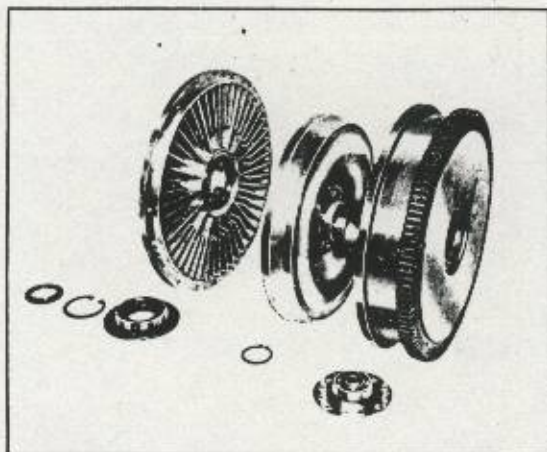


FIG. 17 - FLUID FLYWHEEL -
FRONT

36. Replacement:-

- (a) Examine the fluid flywheel for leaks at the oil seal, see para 31.
- (b) Lower the gearbox in through the top of the fighting compartment, line up the splines of the input shaft and push in until the gearbox front plate meets the gearbox support plate, tighten the nuts.
- (c) Remove the packing from under the engine and lower the gearbox end into the trunnion bearers, replace and tighten the caps.
- (d) Replace the engine steady brackets and re-set the rubber pads. Reconnect the forward and reverse rod, the gear change rod and the gear selector rods.
- (e) Replace the cables and fuel line over the bell housing and secure them with their clips.
- (f) Replace the LH front propeller shaft and couple up all four shafts at the transfer box output bevel boxes. Refit the front propeller shaft tunnels.
- (g) Replace the fuel lines to the filter. Refit the floor sideplates and crew seats.
- (h) Replace the battery leads, wireless set bearers, battery boxes and batteries. Reconnect the batteries.
- (j) Replace the gearbox coverplate, wireless baseplate, air cleaner and gunner's seat. Connect the air cleaner hose and refit the front and rear roof plates.