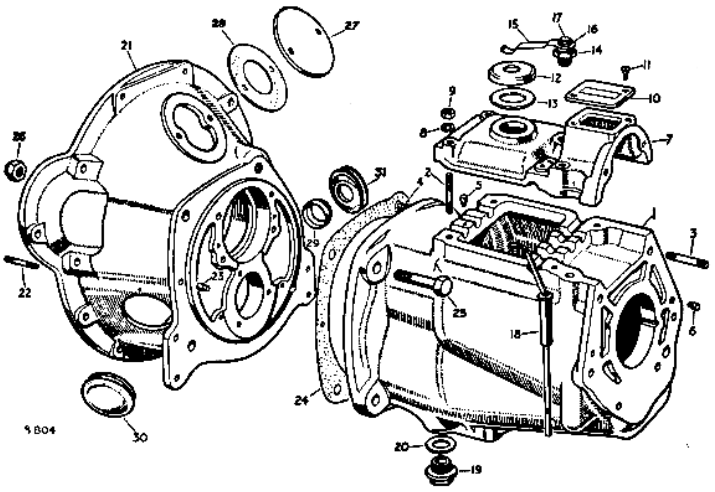
Section C

GEARBOX UNIT — ALL MODELS

INDEX

LIST OF ILLUSTRATIONS



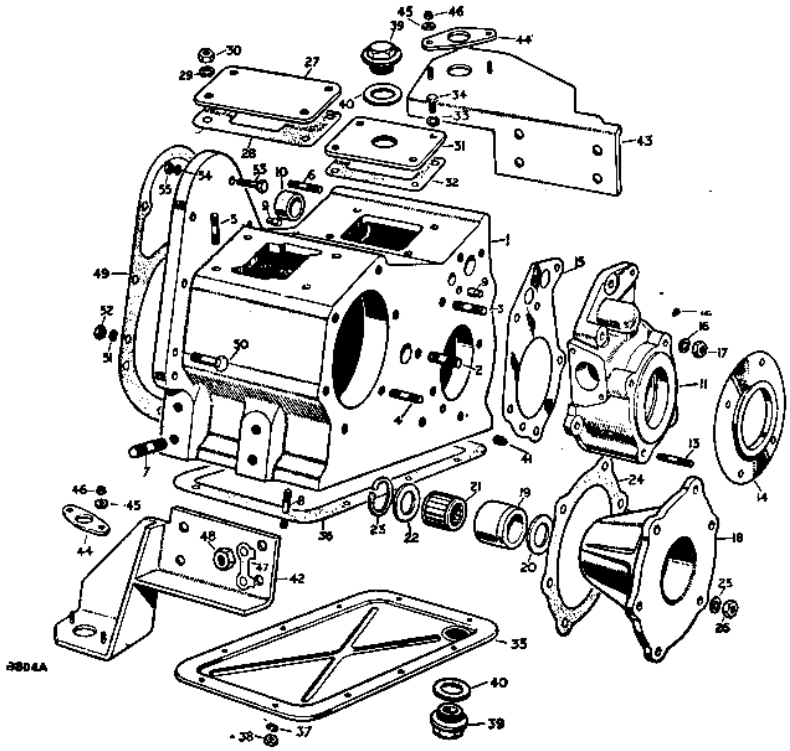


Fig. C-1—Layout of the gearbox unit casings

Key to Fig C-1

1 Gearbox casing assembly
2 Stud for top cover and gear change plate
3 Stud, short, for transfer casing
4 Stud for bell housing
5 Dowel locating top cover
6 Dowel locating transfer casing
7 Top cover for gearbox
8–9 Fixings for top cover
10 Inspection cover plate for selectors
11 Set screw fixing cover plate
12 Oil filler cap
13 Joint washer for cap
14 Plug for retaining spring
15 Retaining spring for cap
16–17 Fixings for spring
18 Oil level dipstick
19 Drain plug for gearbox
20 Washer for plug
21 Bell housing assembly
22 Stud for withdrawal race housing
23 Dowel locating gearbox
24 Joint washer bell housing to gearbox,
25–26 Fixings for gearbox casing
27 Top cover for bell housing
28 Rubber seal for top cover
29 Centre for dust cover
30 Grommet for bell housing hole
31 Grommet for bell housing shaft

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1 Transfer box casing assembly
2 Stud for intermediate shaft
3 Stud for speedometer housing, short
4 Stud for mainshaft housing
5 Stud for top cover plate
6 Stud, short, for transfer shaft housing
7 Stud for engine mounting
8 Stud for bottom cover
9 Dowel locating speedometer housing
10 Bush for shaft guide
11 Housing assembly for speedometer pinion
12 Insert for pinion
13 Stud for transmission brake
14 Mudshield for housing
15 Shim for speedometer pinion housing
16–17 Fixings for housing
18 Housing assembly, rear mainshaft bearing
19 Bush for housing
20 Retaining plate, inner
21 Bearing for mainshaft
22 Retaining plate, outer
23 Circlip fixing bearing
24 Joint washer for bearing housing
25–26 Fixings for housing
27 Cover plate for P.T.O. selector
28 Joint washer for cover plate
29–30 Fixings for cover plate
31 Cover plate for transfer gear change
32 Joint washer for cover plate
33–34 Fixings for plate
35 Cover plate, bottom, for transfer box
36 Joint washer for bottom cover
37–38 Fixings for cover
39 Plug, top and bottom
40 Joint washer for plug
41 Oil level plug
42 Rear mounting foot L.H.
43 Rear mounting foot R.H.
44 Adjuster for mounting foot
45 Plain washer } For
46 Self-locking nut } adjuster
47–48 Fixings for feet
49 Joint washer, transfer box to gearbox
50–52 Fixings for transfer box
53–55 Fixings for transfer box

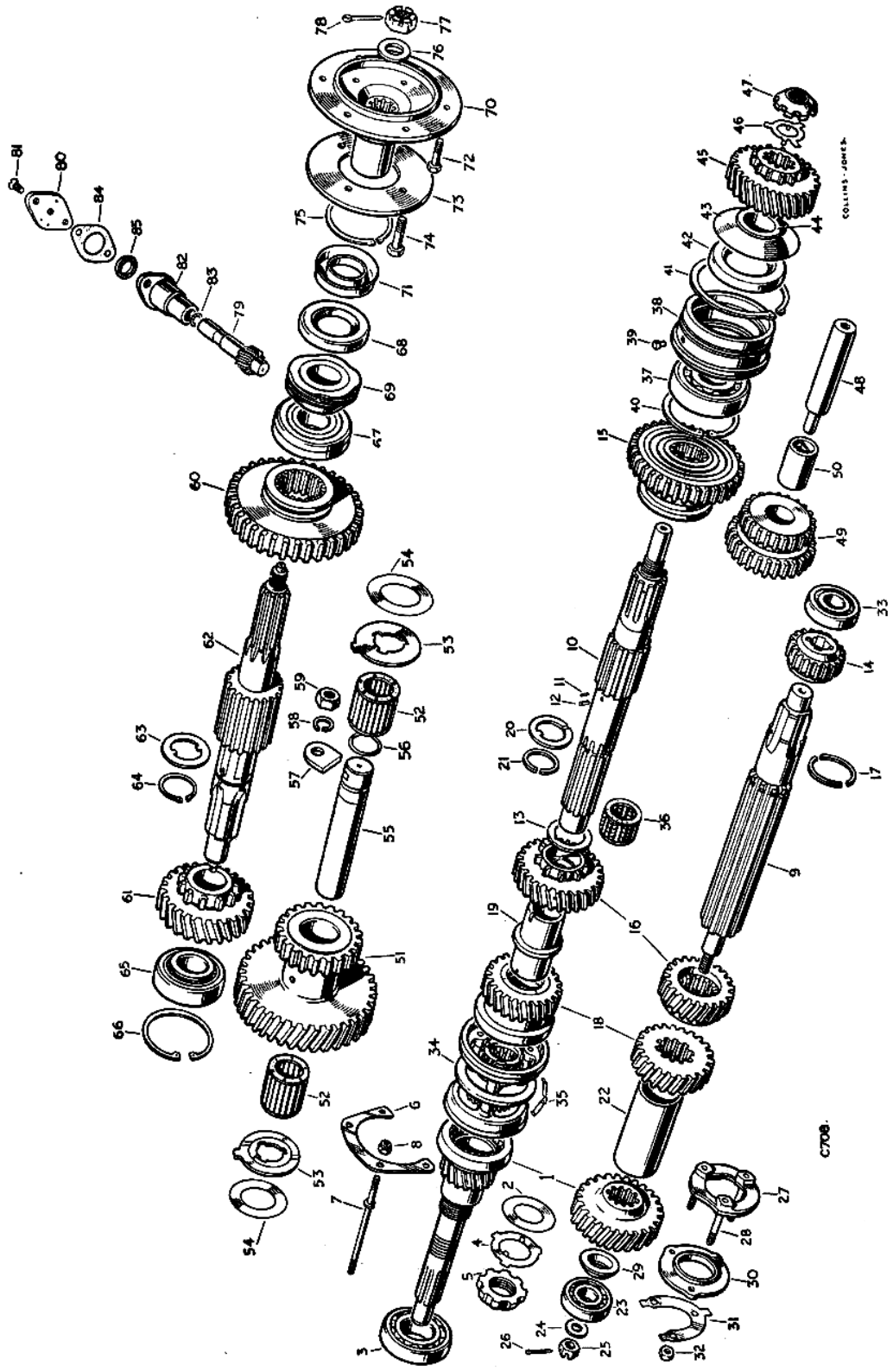
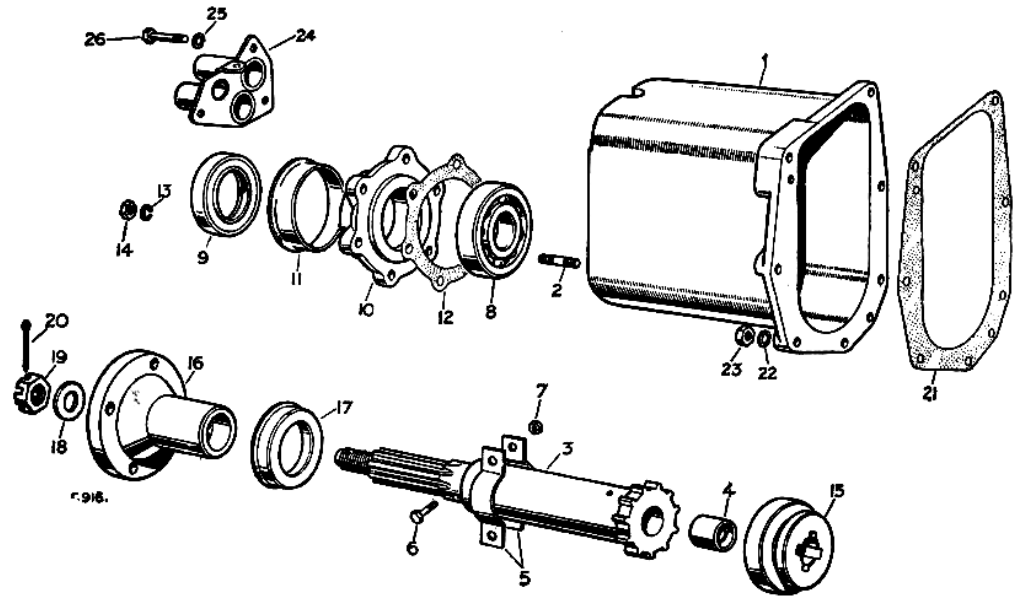


Fig. C-2—Layout of the gearbox units: shafts and gears.

Key to Fig. C-2

1 Primary pinion and constant gear
2 Shield for primary pinion
3 Ball bearing for primary pinion
4–5 Fixings for bearing
6–8 Fixings for bearing
9 Layshaft
10 Mainshaft
11 Peg for 2nd gear thrust washer
12 Peg for mainshaft distance sleeve
13 Thrust washer for 2nd speed gear
14 1st speed layshaft gear
15 1st speed mainshaft gear
16 2nd speed layshaft and mainshaft gear
17 Split ring for 2nd speed layshaft gear
18 3rd speed layshaft and mainshaft gear
19 Distance sleeve for mainshaft
20 Thrust washer for 3rd speed mainshaft gear
21 Spring ring fixing 2nd and 3rd mainshaft gears
22 Sleeve for layshaft
23 Bearing for layshaft, front
24–26 Fixings for bearing to layshaft
27 Bearing plate assembly for layshaft
28 Stud for bearing cap
29 Distance piece for layshaft
30 Retaining plate for layshaft front bearing
31–32 Fixings for cap and bearing
33 Bearing for layshaft, rear
34 Synchronising clutch
35 Detent spring for clutch
36 Roller bearing for mainshaft
37 Ball bearing for mainshaft
38 Housing for mainshaft bearing, rear
39 Peg, housing to casing
40 Circlip, bearing to housing
41 Circlip, housing to casing
42 Oil seal for rear of mainshaft
43 Oil thrower for mainshaft
44 Distance piece, rear of mainshaft
45 Mainshaft gear for transfer box
46–47 Fixings for gear
48 Shaft for reverse gear
49 Reverse wheel assembly
50 Bush for reverse wheel
51 Gear, intermediate
52 Roller bearing for intermediate gear
53 Thrust washer for intermediate gear
54 Shim for intermediate gear
55 Shaft for intermediate gear
56 Sealing ring for intermediate gear
57 Retaining plate for shaft
58–59 Fixings for plate
60 Low gear wheel
61 High gear wheel
62 Output shaft, rear drive
63 Thrust washer for high gear wheel
64 Circlip fixing washer to shaft
65 Bearing for output shaft, front
66 Circlip fixing bearing to case
67 Bearing for output shaft, rear
68 Oil seal for output shaft
69 Speedometer worm complete
70 Flange for output shaft, rear drive
71 Mudshield for flange
72 Fitting bolt for brake drum
73 Retaining flange for brake drum bolts
74 Fitting bolt for propeller shaft
75 Circlip retaining bolts and flange
76–78 Fixings for flange
79 Speedometer pinion
80 Retaining plate for pinion
81 Screw fixing plate to housing
82 Sleeve for pinion
83 Sealing ring for sleeve
84 Joint washer for sleeve
85 Oil seal for pinion



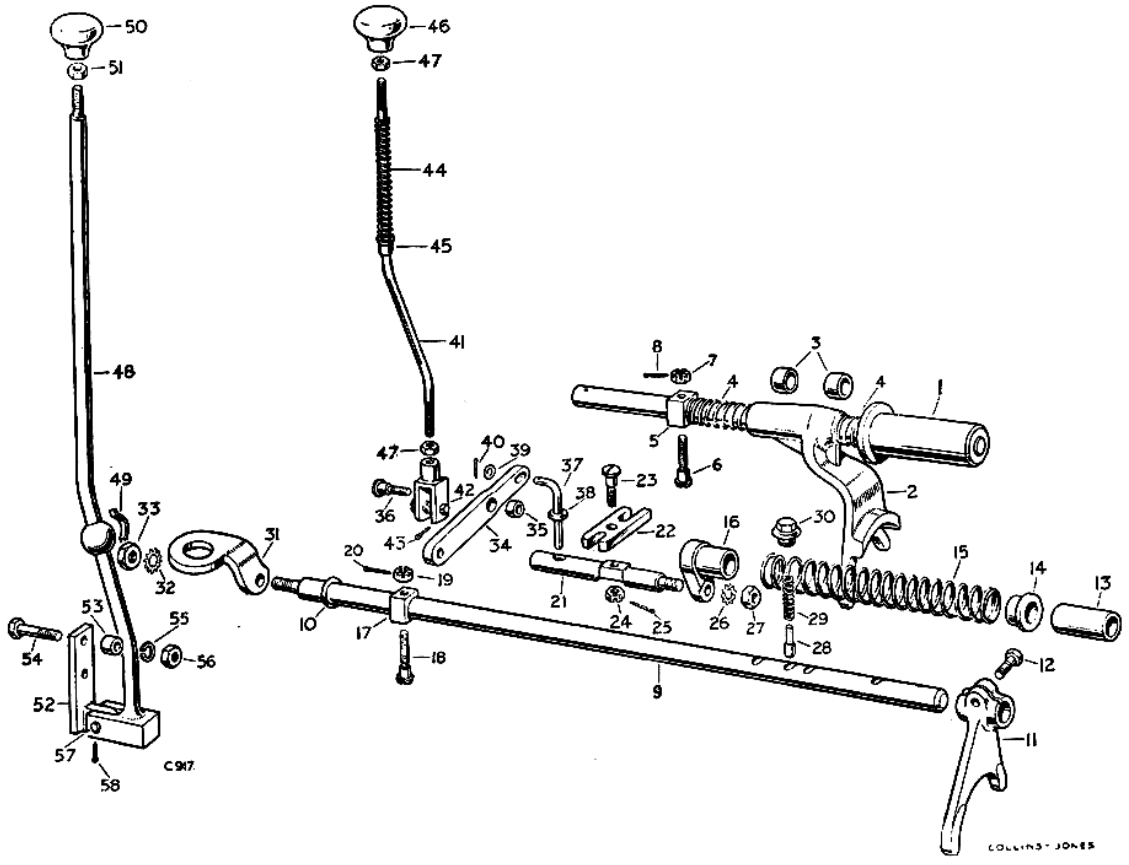


Fig. C-3—Layout of the gearbox unit: front wheel drive, transfer gear controls and front output shaft and housing

Key to Fig. C-3

1 Output shaft housing assembly
2 Stud for oil seal retainer
3 Front output shaft assembly
4 Bush for shaft
5 Oil thrower for output shaft
6–7 Fixings for oil thrower
8 Bearing for front output shaft
9 Oil seal for shaft
10 Retainer for oil seal
11 Mudshield for retainer
12 Joint washer for retainer
13–14 Fixings for retainer
15 Locking dog, four wheel drive
16 Flange for transfer shaft
17 Mudshield for flange
18–20 Fixings for flange
21 Joint washer for transfer housing
22–23 Fixings for housing
24 Dust cover plate for selector shafts
25–26 Fixings for dust cover

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1 Selector shaft, four wheel drive
2 Selector fork complete, four wheel drive
3 Bush for selector fork
4 Spring for selector fork
5 Block for selector shaft
6–8 Fixings for block
9 Selector shaft, transfer gear change
10 Sealing ring for transfer gear change shaft
11 Selector fork, transfer gear change
12 Set bolt fixing fork
13 Distance tube for transfer selector shaft
14 Locating bush for selector shaft spring
15 Spring for gear change selector shaft
16 Connector, gear change to pivot shaft
17 Block for selector shaft
18–20 Fixings for block
21 Pivot shaft for selector shafts
22 Coupling, selector shafts to pivot
23–25 Fixings for coupling
26–27 Fixings for pivot shaft
28 Plunger for transfer selector shaft
29 Spring for plunger
30 Plug
31 Link for selector shaft
32–33 Fixings for link
34 Lever assembly, four wheel drive
35 Bush for lever
36 Special bolt, lever to housing
37 Locking pin, four wheel drive lever
38 Sealing ring, four wheel drive locking pin
39–40 Fixings for locking pin
41 Selector rod, four wheel drive
42 Clevis complete for rod
43 Split pin for clevis
44 Spring for selector rod
45 Special bush for spring
46 Control knob for rod
47 Locknut for knob and clevis
48 Transfer gear change lever complete
49 Spring for transfer gear change lever
50 Knob for gear change lever
51 Locknut for knob
52 Bracket for gear change lever
53 Distance piece for bracket
54–56 Fixings for bracket
57–58 Fixings for gear lever

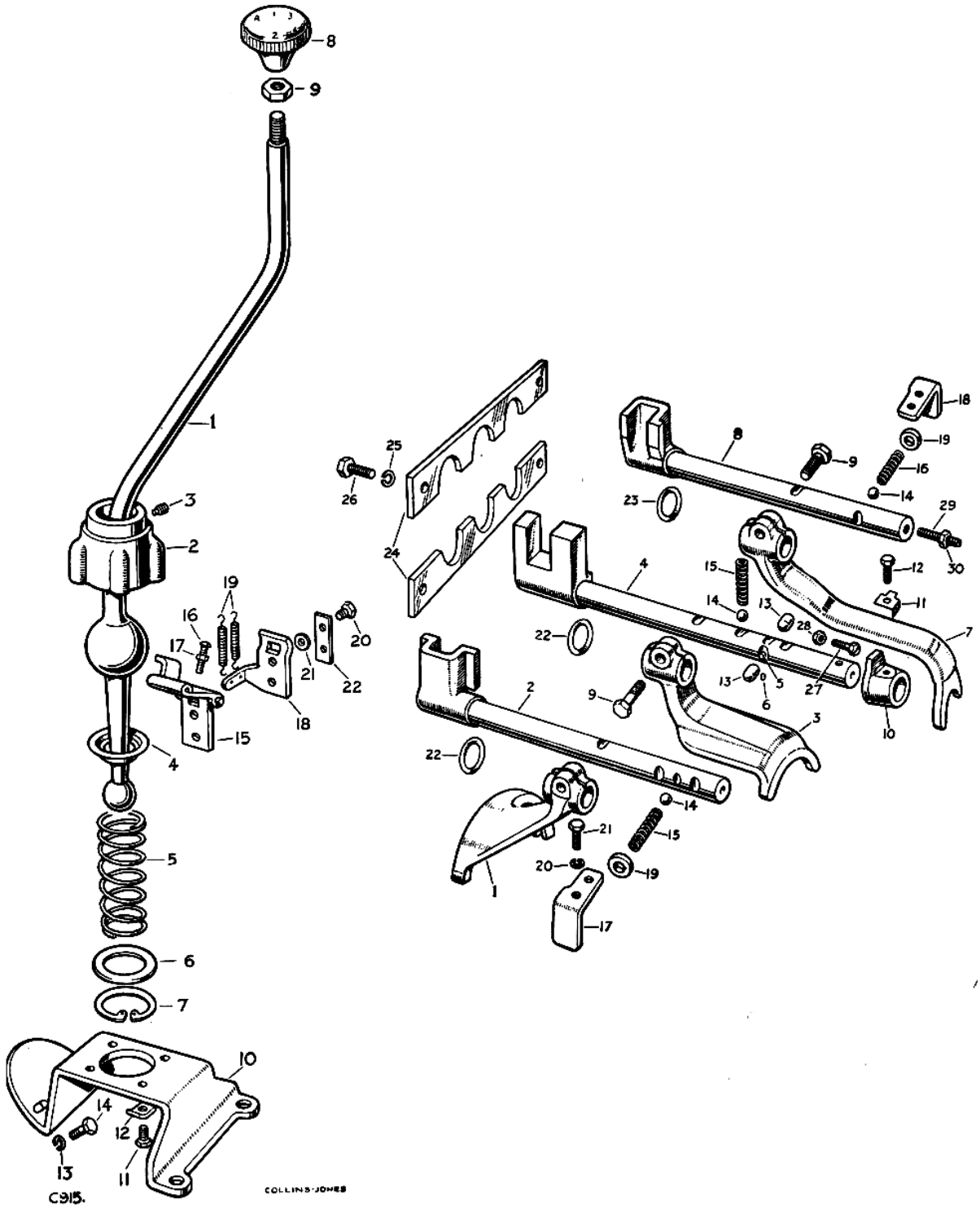

Fig. C-4—Layout of the gearbox unit: main gear change lever and selectors

Key to Fig. C-4

1 Gear change lever
2 Housing for lever
3 Locating pin for lever ball
4 Spherical seat for gear lever
5 Retaining spring for lever
6 Retaining plate for spring
7 Circlip fixing retaining plate
8 Knob for lever
9 Locknut for knob
10 Mounting plate for gear change
11–12 Fixings for housing
13–14 Fixings for mounting plate
15 Reverse stop hinge complete
16 Adjusting screw } For hinge
17 Locknut }
18 Bracket for reverse stop spring
19 Spring for reverse stop
20–22 Fixings for hinge and bracket

1 Selector fork, 3rd and 4th speed
2 Shaft for fork, 3rd and 4th speed
3 Selector fork, 1st and 2nd speed
4 Shaft assembly for fork, 1st and 2nd speed
5 Interlocking pin
6 Peg fixing interlocking pin
7 Selector fork, reverse
8 Shaft for fork, reverse
9 Set bolt fixing forks to shafts
10 Stop for 2nd speed
11–12 Fixings for stop
13 Interlocking plunger
14 Steel ball for selectors
15 Selector spring, forward
16 Selector spring, reverse
17 Retaining plate L.H. } For selector springs, side
18 Retaining plate R.H. }
19 Rubber grommet }
20–21 Fixings for retaining plates
22 Seal for selector shafts
23 Cork seal for reverse shaft
24 Retaining plate for sealing ring
25–26 Fixings for retaining plate
27 Set bolt } In cover for 2nd gear stop
28 Locknut }
29 Adjustable stop for reverse selector shaft
30 Locknut for stop

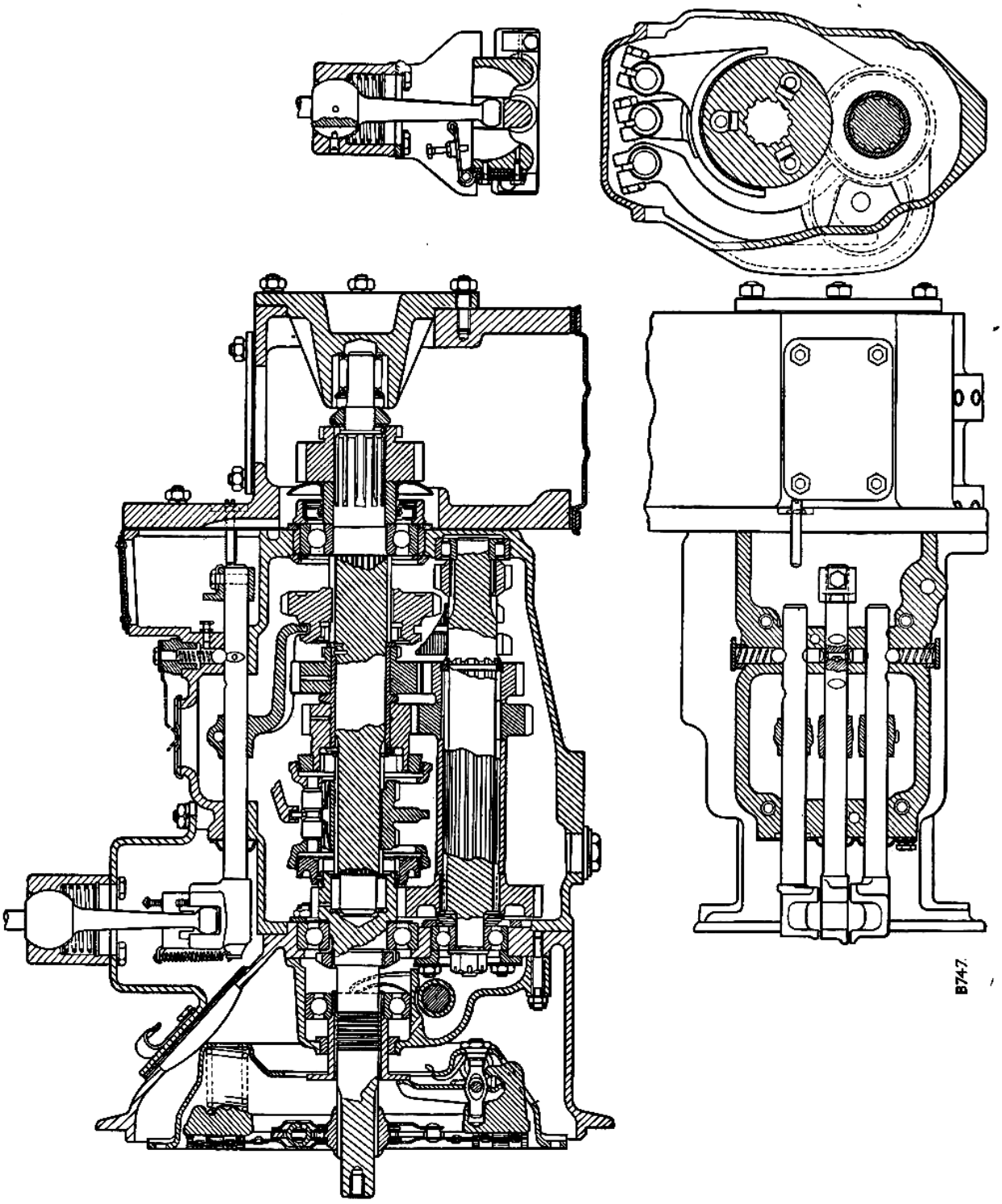

Fig. C-5—Cross-section of gearbox unit: elevation

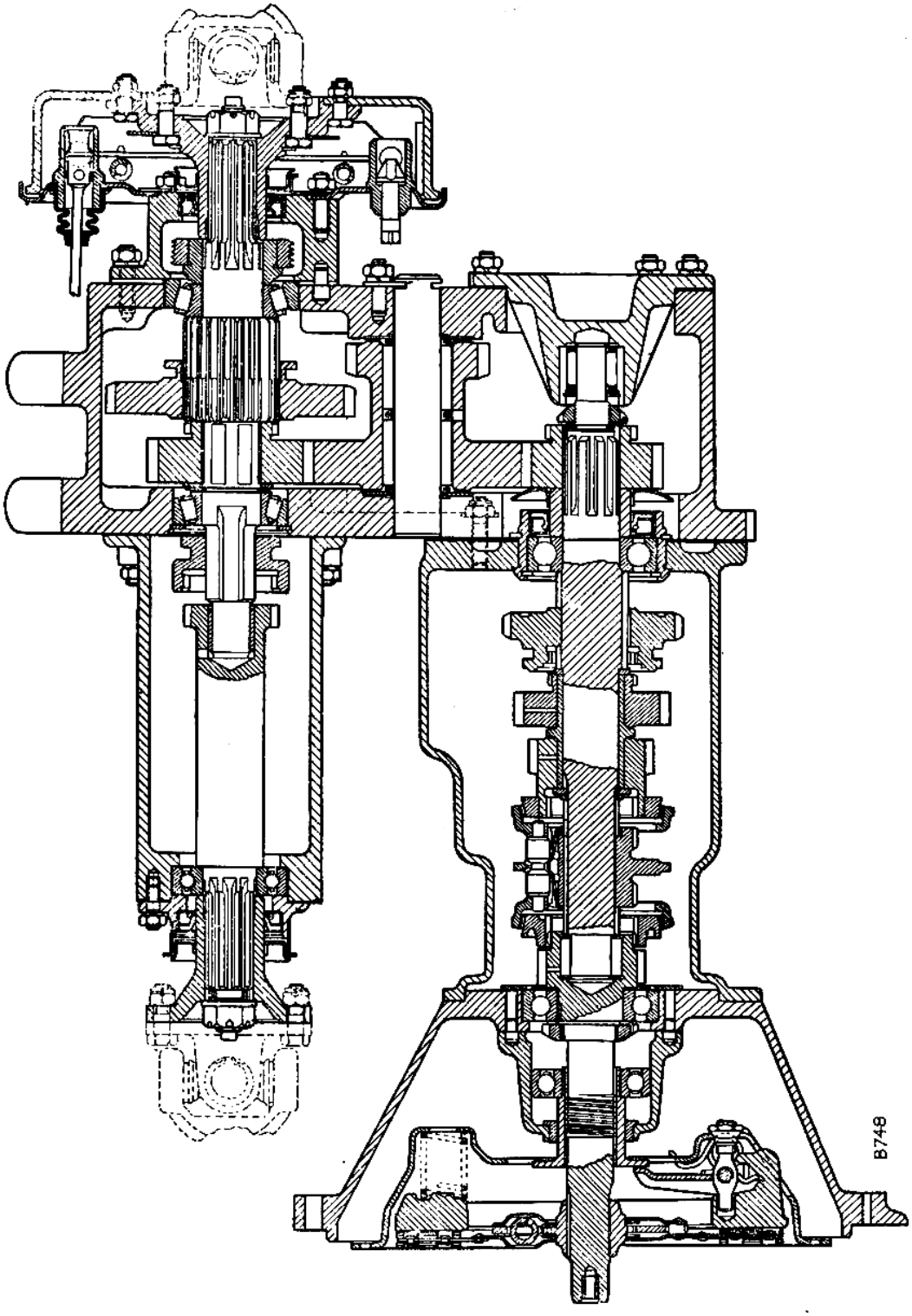

Fig. C-6—Cross-section of gearbox unit with dog clutch controlling front-wheel drive plan.

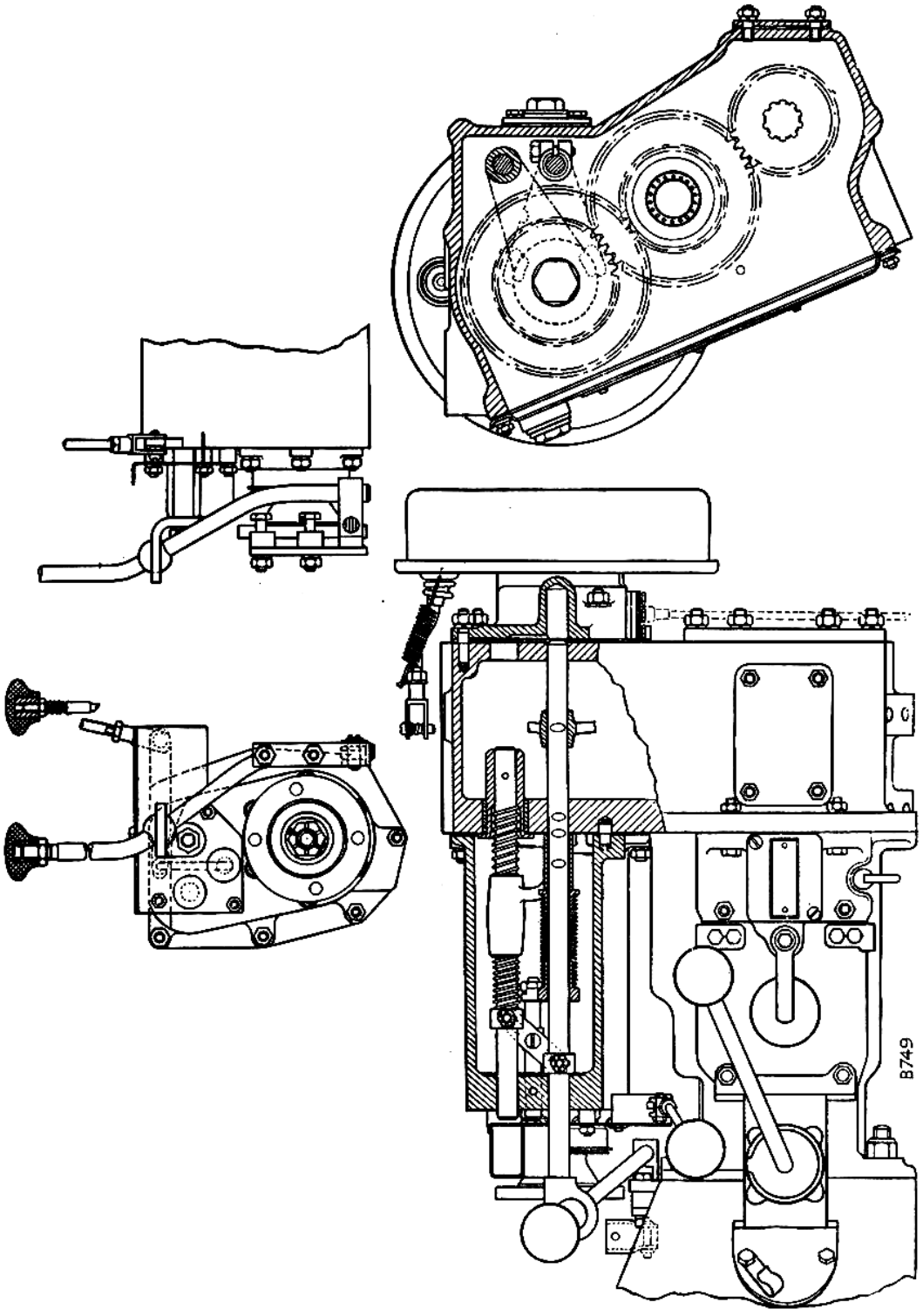

Fig. C-7—Cross-section of gearbox unit: controls.

1948-53 models

Freewheel components (gearbox in position)
To renew Operation C/2
(Gearboxes numbered prior to 16102314 and 16131688)

1. Position the vehicle over a pit or raise it as high as possible with a high-lift jack.
2. Remove the transfer box drain plug and drain off the oil into a suitable receptacle.
3. Place the transfer gear change lever in the low position, *i.e.*, to the rear.
4. Remove the front propeller shaft (see Section D).
5. **R.H.D. models only.** Remove the clutch return spring, from the front end first. Withdraw the split pin and remove the clevis pin connecting the operating rod to the lever on the clutch cross-shaft. Withdraw the split pin and remove the joint pin and two washers securing the cross-shaft to the connecting tube on the clutch shaft. Slide the cross-shaft through the bushes as far as possible towards the chassis side member.
6. Slacken the locknut and remove the freewheel control pivot and eyebolt complete from the output shaft housing.
7. Draw out the freewheel operating rod.
8. Remove the special nut and shakeproof washer securing the transfer control link to the selector shaft and slide the link up the transfer gear change lever.
9. Withdraw the split pin and remove the castle nut and plain washer securing the front axle driving flange; carefully remove the flange, avoiding damage to the oil seal.
10. Remove the plug and joint washer from the left-hand side of the output shaft housing and withdraw the transfer selector spring and ball.
11. Remove the seven nuts and spring washers securing the output shaft housing and carefully remove the housing, complete with joint washer, forward and down below the chassis.
    Note: On gearboxes numbered 860001 to 861988, it is essential that the locking dog remains in the output shaft housing, otherwise it will prevent the unit clearing on removal.
12. Remove the seven nuts and spring washers securing the freewheel housing to the transfer casing; the two upper nuts can be conveniently reached through the seat box centre panel aperture.
13. Slacken the rear engine and gearbox unit mounting bolts.
14. Lever the gearbox unit slightly upwards to allow the bottom freewheel housing boss to clear the chassis and remove the housing, complete with joint washer, in a similar manner to the output shaft housing.
15. Remove the freewheel components as required and rebuild the unit.
16. Re-assemble by reversing the sequence of operations detailed for removal, paying attention to the following points:—
17. Prior to fitting the freewheel housing, ensure that the freewheel operating shaft, guide and spring work freely in the transfer casing.
18. Prior to replacing the output shaft housing, place a suitable guide thimble over the end of the transfer selector shaft, to prevent damage to the oil seal.
19. Check the operation of the transfer and freewheel controls.
20. Refill the transfer box with oil of the correct grade.

1948-53 models

Four-wheel drive mechanism (gearbox in position)
To remove Operation C/4
(Gearboxes numbered 16102314 and 16131688 onwards)

1. Position the vehicle over a pit or raise it as high as possible with a high-lift jack.
2. Remove the transfer box drain plug and drain off the oil into a suitable receptacle.
3. Remove the front propeller shaft (see Section D).
4. **R.H.D. models only.** Remove the clutch return spring, from the front end first. Withdraw the split pin and remove the clevis pin connecting the operating rod to the lever on the clutch cross-shaft. Withdraw the split pin and remove the joint pin and two washers securing the cross-shaft to the connecting tube on the clutch shaft. Slide the cross-shaft through the bushes as far as possible towards the chassis side member.
5. Remove the yellow knob, locknut, spring and bush from the front-wheel drive control rod.
6. Remove the red knob and locknut from the transfer lever.
7. Remove the R.H. floorboard.
8. Withdraw the split pin and remove the castle nut and plain washer securing the front axle driving flange; carefully remove the flange complete with dust seal, avoiding damage to the oil seal.
9. Remove the special nut and shakeproof washer securing the transfer control link to the selector shaft; remove the split pin and spring-loaded clevis pin and remove the transfer lever.
10. Remove the dust cover from the front of the output housing by removing the three nuts, spring washers and distance pieces.

11. Remove the front-wheel drive control lever assembly by withdrawing the special pivot screw.

12. Remove the seven nuts and spring washers securing the output housing to the transfer box (this action also releases an earth lead). Slacken the gearbox mountings and lift under the left-hand support. Withdraw the output housing complete with output shaft, front-wheel drive dog clutch, the dog clutch selector shaft and fork and a joint washer, clear of the chasis cross-member. Withdraw the dog clutch selector shaft and dog clutch from the rear of the housing. Remove the top cover plate from the transfer box, hold in low transfer and remove the output housing upwards through the floorboard aperture. Leave the transfer selector shaft and link in position protruding from the transfer box.

13. Remove the split pin, castle nut and special screw from the transfer selector shaft and remove the block.

14. Slide the following parts from the transfer selector shaft:—

    (*a*) Link, link pin and connector assembly.

    (*b*) Spring.

    (*c*) Spring locating bush.

    (*d*) Distance tube.

15. Detach the link from the link pin by removing the special screw, castle nut and split pin.

    Note: The connector should not be removed from the link pin unless absolutely necessary, as difficulty will be experienced in effecting correct alignment on re-assembly.

16. Remove the output shaft from the output housing.

17. Remove the split pin, castle nut and special screw from the dog clutch selector shaft and remove the block.

18. Slide the two springs and selector fork from the dog clutch selector shaft.

19. If necessary, remove the two bushes from the selector fork boss.

20. If necessary, remove the spigot bush from the rear end of the output shaft.

21. Remove the six nuts and spring washers securing the oil seal retainer to the front face of the output housing and remove the retainer complete with oil seal and joint washer.

22. If necessary, remove the oil seal from the retainer.

23. If necessary, withdraw the output shaft front bearing from the output housing.

1948-53 models

Four-wheel drive mechanism (gearbox in position)

To replace **Operation C/6**

(Gearboxes numbered 16102314 and 16131688 onwards)

1. If necessary, replace the output shaft front bearing in the output housing. The bearing must be a **push fit** on the shaft and a **light drive fit** in the housing.

   Renew the shaft, bearing and housing as necessary.

2. If removed, fit a new oil seal in the retainer with its knife edge inwards.

3. If removed, replace the spigot bush in the rear end of the output shaft, pressing it in flush with the face of the shaft. The bush must be reamed in position to .875 in. (22,22 mm) giving .001 in. to .002 (0,02 mm to 0,05) clearance on the transfer box output shaft.

4. If removed, renew the two oilite bushes in the dog clutch selector fork boss; the bushes must be pressed in flush with the end faces of the boss and must have .001 in. to .002 clearance on the selector shaft.

5. Check the two dog clutch selector springs in accordance with the following data and renew as necessary:—

   Free length: 2.750 in. (69,5 mm)
   Solid length: .640 in. (16 mm)
   Maximum load: 13 lb. (5,8 kg)
   Rate: 6⅛ lb./in. (2,7 kg)

6. Check the transfer selector shaft spring in accordance with the following data and renew as necessary:—

   Free length: 7.156 in. (182,7 mm)
   Length in position: 3.875 in. (98,4 mm)
   Load in position: 24 lb. (10,8 kg)
   Rate: 7.31 lb./in. (3,2 kg).

7. Replace the oil seal retainer on the output housing and secure with six nuts and spring washers.

8. Fit the two springs and selector fork (crank to the rear) over the dog clutch selector shaft.

9. Replace the block on the selector shaft and secure by means of the special screw, castle nut and split pin.

10. If the connector has been detached from the link pin, replace it with the hole for the locking peg vertical and the cutaway on the link pin underneath; ensure that the connector is square with the pin and secure lightly with the nut and shake-proof washer.
11. Secure the link to the link pin by means of the special screw, castle nut and split pin. The threaded end of the screw must be downwards and the shorter end of the link towards the transfer selector, with the longer arm of the jaw at the opposite end to the rear.
12. Slide the following parts on the transfer selector shaft:—
    (*a*) Distance tube.
    (*b*) Spring locating bush with its smaller diameter to the front.
    (*c*) Spring.
    (*d*) Compress the spring and fit the link and connector assembly until the block is over the hole in the shaft. Fit the special screw from the bottom, through the coupling jaw, block and selector shaft and secure with the castle nut and split pin.
13. Fit the dog clutch over the splines on the transfer box output shaft.
14. Fit the dog clutch selector shaft assembly into the bush in the transfer box, ensuring that the link engages the screw correctly.
15. Fit the output housing joint washer. If necessary, tighten the connector on the link pin.
16. Place the housing over the selector shafts (from the top). Before pushing the housing home, select two-wheel drive in high transfer gear (through the transfer box) and fit the output shaft over the transfer box shaft and through the housing. Secure with the seven nuts and spring washers, picking up the earth lead under one of the nuts.
17. Complete the assembly by reversing the sequence of removal operations.
18. Adjust the front-wheel drive rod to ensure efficient extraction and replacement of the locking peg; it is important to avoid the spring becoming coilbound as under such conditions the operation appears correct, but the peg is not extracted sufficiently to engage four-wheel drive.
19. Check the whole assembly for correct operation.

1948-53 models

Main gear change lever

To overhaul **Operation C/8**

On vehicles numbered 860001 to 861500, the main gear change lever is bolted to the gearbox cover panel, while on later vehicles it is secured directly to the gearbox unit. The overhaul operations differ extensively between the two patterns.

Vehicles numbered 860001 to 861500

1. Remove the gearbox cover panel, complete with the gear change lever and reverse stop, from the vehicle.
2. Remove the five bolts, spring washers and nuts securing the gear change lever to the cover and lift off the lever, complete with shim plates, which should be preserved.
3. Remove the knob and locknut from the lever.
4. Remove the five bolts, anti-rattle springs and nuts securing the ball retainers to the lever and remove the upper (small) and lower (large) ball retainers.
5. Remove the two bolts, spring washers and nuts securing the reverse stop housing to the gearbox cover and remove the housing, spring retainer plate and shim plates, which should be preserved.
6. Remove the detent ball spring, detent ball, plunger and spring from the housing.
7. Renew any worn components.
8. Fit the plunger and spring, detent ball and spring in the reverse stop housing and hold them in position with the retainer plate. Secure the housing and retainer to the cover plate, complete with the shim plates, by means of the two bolts, spring washers and nuts. It may be necessary, at a later stage, to adjust the thickness of shim plates to allow ease of operation of the reverse stop unit; the plates are available .128 in. and .036 in. thick.
9. Fit the upper and lower ball retainers to the gear change lever and secure tham with the five bolts, anti-rattle springs and nuts.
10. Replace the locknut and knob on the lever.
11. Fit the complete gear change lever to the gearbox cover panel, together with the shim plates, and secure it by means of the five bolts, spring washers and nuts. After fitting the unit in the vehicle, it may be necessary to adjust the thickness of shim plates, to ensure that the lever selector makes good contact, but does not "bottom" in the gearbox selectors; the plates are available .128 in. and .036 in. thick.
12. Replace the complete gearbox cover panel in the vehicle and check the operation of the gear change lever and reverse stop; adjust the shims as necessary.

Vehicles numbered 861501 onwards

1. Remove the freewheel control ring or front wheel drive control knob, locknut and spring; remove the knobs and locknuts from the main and transfer gear change levers.
2. Remove the brake pedal rod and pad (see Section H).
3. Remove the clutch pedal and pad (see Section B).
4. Remove the left-hand and right-hand toe plates (see Section R).

5. Remove the gearbox cover.
6. Detach the two springs from the reverse stop hinge. Prise up the locking tabs and remove the two set bolts, lockplate and two plain washers securing the reverse stop to the reverse selector; remove the reverse stop hinge (complete with adjusting screw and locknut) and the spring bracket.
7. Remove the two set bolts, spring washers and distance pieces securing the gear change lever mounting plate to the bell housing and the two nuts and spring washers securing the plate to the gearbox top cover; remove the mounting plate and gear change lever complete.
8. Prise up the locking tabs and remove the four set bolts and lockers securing the gear change lever housing to the mounting plate; remove the plate.
9. Remove the circlip from the lever housing and draw out the spring retaining washer, spring and spherical seat; withdraw the gear lever from the housing. If necessary, remove the lever ball locating pin from the housing.
10. Renew any worn components.
11. Replace the lever ball locating pin in the housing (if removed on stripping) and secure it by "staking".
12. Fit the gear change lever in the housing; replace the spherical seat, spring and retaining washer and secure the whole with a circlip.
13. Fit the housing to the mounting plate and secure it by means of four lockers and set bolts.
14. Fit the mounting plate to the gearbox unit; secure it by means of two spring washers and nuts at the gearbox top cover and two set bolts and spring washers at the bell housing aperture.
15. Fit the reverse stop hinge and spring bracket to the reverse selector and secure them by means of two plain washers, one lockplate and two set bolts (the plain washers should be fitted under the lockplate). Replace the two reverse stop springs.
16. Adjust the reverse stop as described below.
17. Replace the gearbox cover.
18. Replace the left-hand and right-hand toe plates (see Section R).
19. Replace the clutch pedal rod and pad (see Section B).
20. Replace the brake pedal rod and pad (see Section H).
21. Replace the freewheel control ring or front wheel drive control knob, locknut and spring; replace the locknuts and knobs on the main and transfer gear change levers.

1948-53 models

Reverse stop

To adjust **Operation C/10**

1. The screw and locknut on the reverse stop hinge should be adjusted so that:
   (*a*) the hinge rides easily up the gear lever when reverse gear is selected, and
   (*b*) appreciable resistance is felt on moving the gear lever to the reverse gear position.
2. This adjustment should be carried out on any gearbox removed for attention, before the gearbox cover is fitted.
3. It can also be carried out at any time after:
   (*a*) detaching the access panel from the right-hand side of the gearbox cover on vehicles fitted with a freewheel control ring, or
   (*b*) selecting reverse gear and sliding the access panel up the front wheel drive control rod.

1948-53 models

Gearbox dipstick (lower oil level)

To modify **Operation C/12**

All main gearboxes numbered prior to 16102100 and 16131500 have an oil capacity of 4 pints (2,5 litres); the oil capacity is reduced to 2½ pints (1,5 litres) on later gearboxes to counteract the possibility of oil passing along the primary pinion and giving rise to clutch slip.

Early gearboxes should be so modified at overhaul as follows:—

1. Make a new "H" mark on the dipstick ½ in. (12,7 mm) below the existing mark, *i.e.*, 5$\frac{7}{32}$ in. (148,5 mm) below the handle flange; obliterate the original mark.
2. Alternatively, discard the original dipstick and rebuild the gearbox with a new dipstick, Part No. 235242.

1948-53 models

Transfer box (lower oil level)

To modify **Operation C/14**

All 1948 to mid-1950 transfer boxes have an oil capacity of 6 pints (3,5 litres); the oil capacity is reduced on later gearboxes to 4½ pints (2,5 litres) to counteract the tendency for oil to pass from the transfer box to the main gearbox. Early transfer boxes should be modified at overhaul as follows:—

1. The oil level should be lowered by $\frac{7}{8}$ in. (22 mm). Mark off the new position for the level plug on the rear face of the transfer box by scribing a line vertically downwards from the centre of the lower right-hand stud securing the centre power take-off cover plate. Mark off a point 2¼ in. (57 mm) below the centre of the stud.
2. Drill a $\frac{3}{16}$ in. (5 mm) hole at this point and tap ¼ in. Whit.
3. Fit a suitable ¼ in. Whit. set bolt (½ in. (13 mm) long) and fibre washer to act as a plug.
4. Clean out all swarf from the transfer box.

5. Ensure that an oil flinger is fitted in front of the transfer drive gear on the rear of the gearbox mainshaft (see Fig. C-2).

1948-53 models

Gearbox only

To remove **Operation C/16**

1. Disconnect the battery.
2. Remove the hood or hard top, for convenience in working.
3. Remove the centre inspection panel from the seat box.
4. Remove the hand brake lever and linkage (see Section H).
5. Remove the freewheel control ring or the front wheel drive control knob, locknut and spring; remove the knobs and locknuts from the main and transfer gear change levers. (Transfer lever knob only on vehicles numbered 860001 to 861500.)
6. Remove the brake pedal rod and pad (see Section H).
7. Remove the clutch pedal rod and pad (see Section B).
8. Remove the left-hand and right-hand toe plates (see Section R).
9. Remove the gearbox cover. On vehicles numbered 860001 to 861500, the main gear change lever assembly will be removed with the cover.
10. Remove the petrol tank and tool locker lids, by detaching the eight bolts, spring washers and nuts securing the hinges to the back rest panel.
11. Remove the five bolts, spring washers and nuts securing the top fixing angle on the seat box to the back rest panel.
12. Remove the six set bolts, spring and plain washers securing the side fixing angles to the seat box.
13. Remove the two bolts, spring washers and nuts securing the floor sills to the dash.
14. Remove the seat box complete.
15. Remove the rear axle propeller shaft (see Section D).
16. Disconnect the front axle propeller shaft and rear power take-off propeller shaft (if fitted), at the gearbox end in both cases.
17. **R.H.D. models only.** Remove the clutch return spring, from the front end first. Withdraw the split pin and remove the clevis pin securing the clutch operating rod to the cross-shaft lever. Withdraw a split pin and washer and tap out the joint pin connecting the cross-shaft to the connecting tube. Slide the cross-shaft clear of the bell housing, towards the chassis side member.
18. **L.H.D. models only.** Remove the clutch return spring, from the front end first. Withdraw the split pin and remove the clevis pin securing the clutch operating rod to the clutch shaft lever.
19. Disconnect the speedometer cable at the gearbox end either by removing the bolt, spring washer and nut securing the cable to the pinion bush on the drive housing or by detaching the retaining plate and three set bolts and spring washers securing the cable to the drive housing; withdraw the cable clear of the gearbox.
20. Remove the self-locking nuts from the two rear engine and gearbox unit bearer bolts and withdraw the bolts; the bearer rubbers, washers and shims may normally be left in position in the vehicle.

    Note: It may be necessary to remove the right-hand bearer from the transfer casing, as in some cases it will not clear the hand brake bell crank lever.
21. Remove the thirteen nuts and plain washers securing the bell housing to the engine flywheel housing.
22. Place a jack under the rear end of the engine and raise it approximately $\frac{1}{2}$ in. (12 mm) above its normal position; this will enable the bell housing flange to clear the chassis cross-member and also prevent any strain being taken on the primary pinion shaft.
23. Place a suitable sling round the gearbox unit, raise it upwards and to the rear and remove the unit from the vehicle.

1948-53 models

Gearbox only

To replace **Operation C/18**

1. Replacement of the gearbox unit is effected by reversing the sequence of operations detailed for removal.
2. Should the engine and gearbox unit mounting rubbers, etc., have been disturbed, they should be fitted as shown at Fig. C-8. The nip on the pads is adjusted by the addition or removal of shims on the top of the central distance tube; it should be checked on replacement and adjusted as necessary. The correct setting is with the top shim approximately $\frac{1}{16}$ in. (1,5 mm) below the top face of the upper rubber pad.

   On early 1952 models onwards, the rear mounting brackets are adjustable laterally, to facilitate alignment with the mounting rubbers.
3. Refill the main gearbox and transfer box with oil of the correct grade.
4. Adjust the transmission brake as described in Section H.

1948-53 models

Gearbox unit

To strip **Operation C/20**

Operation C/20 details the differences which will be found on 1948-53 gearboxes. See following pages for main gearbox and transfer box strip and reassembly.

Gearboxes numbered prior to 16102314 and 16131688

1. Mount the gearbox unit on a suitable stand.
2. Remove the drain plugs (and joint washers) from the bottom of the main gearbox casing and transfer casing and drain off the oil into a suitable receptacle.

Remove the controls as follows:

3. **Gearboxes numbered 861501 onwards.** Remove two spring washers and nuts at the main gearbox top cover and two set bolts, spring washers, cover plate and rubber seal at the bell housing and lift off the main gear change lever assembly. Strip the assembly.

   Remove the reverse stop hinge unit.
4. **Gearboxes numbered 860001 to 861500.** Remove the two nuts, spring washers and distance pieces (or cover plate and rubber seal) securing the bell housing inspection cover and remove the cover.
5. Remove the transfer gear change cover plate and joint washer from the transfer casing; this is secured either by four set screws or four set bolts and spring washers.
6. Remove the special screw, spring washer and nut securing the freewheel control pivot to the eye-bolt in the front of the output shaft housing; remove the pivot and eyebolt (complete with locknut).
7. Remove the special nut and shakeproof washer securing the transfer selector link to the front of the selector shaft.
8. Remove the split pin and clevis pin securing the transfer gear change lever to the bracket on the bell housing; remove the lever complete with link.
9. Remove the two bolts, spring washers, distance pieces and nuts securing the transfer lever bracket to the bell housing and remove the bracket.
10. Remove the return spring for the freewheel lever; remove the spring anchor from the output shaft housing by withdrawing the set bolt, spring washer and distance piece. Remove the freewheel lever guide by removing the two set bolts and spring washers securing it to the output shaft housing. Remove the special screw and distance piece securing the freewheel lever to the output shaft housing and remove the lever complete with the operating wire or rod.
11. Remove the plug and joint washer from the left-hand side of the output shaft-housing and withdraw the transfer shaft selector spring and ball.
12. Remove the front axle drive flange and dust shield from the output shaft, by removing the split pin, castle nut and plain washer.
13. Withdraw the freewheel operating rod from the output shaft housing.
14. Remove the seven nuts and spring washers securing the output shaft housing to the free-wheel housing and withdraw the housing complete with joint washer. If necessary, remove the output shaft and selector shaft oil seals from the housing.
15. **Gearboxes numbered 861989 onwards.** The output shaft front bearing will remain on the output shaft protruding from the freewheel housing. Withdraw the bearing from the shaft.
16. **Gearboxes numbered 860001 to 861988.** The front portion of the output shaft ("transfer shaft") will be retained in the output shaft housing. Remove the circlip retaining the front bearing in the housing and drive out the transfer shaft and bearing from the housing; withdraw the bearing from the shaft. Remove the distance washer, locking dog and distance piece from the output shaft in the freewheel housing.

Remove the freewheel unit as follows:

17. Remove the seven nuts and spring washers securing the freewheel housing to the transfer casing and withdraw the housing complete with joint washer. Withdraw the spring guide and freewheel operating spring from the transfer casing.
18. Remove the pinch bolt securing the freewheel operating fork to the operating shaft and remove the fork and shaft.
19. Remove the freewheel locking dog.
20. Remove the circlip retaining the output shaft rear bearing in the freewheel housing; drive out the output shaft and freewheel assembly from the housing.
21. Remove the circlip securing the rear bearing to the output shaft and withdraw the bearing.
22. **Gearboxes numbered 860001 to 861988.** If necessary, remove the bush from the front bore of the output shaft.
23. Remove the spring ring and retaining plate securing the inner member to the outer member. Remove the inner member complete with the fixed cam roller shoes (which can be removed if necessary by removing the securing set screws), nine graded rollers, three free cam roller shoes and three shoe springs. Remove the pilot bearing from the outer member.
24. Prise up the tab washers and remove the six set bolts and two locking plates securing the free-wheel outer member to the output shaft.
25. If necessary, remove the operating shaft bush from the freewheel housing.

Gearboxes numbered 16102314 and 16131688 onwards

26. Mount the gearbox unit on a suitable stand.
27. Remove the drain plugs (and joint washers) from the bottom of the main gearbox casing and transfer casing and drain off the oil into a suitable receptacle.

Remove the controls as follows:

28. Remove two spring washers and nuts at the main gearbox top cover and two set bolts, spring washers, cover plate and rubber seal at the bell housing and lift off the main gear change lever assembly. Strip the assembly.

    Remove the reverse stop hinge unit.

29. Remove the transfer gear change cover plate and joint washer from the transfer casing (four set bolts and spring washers).
30. Remove the plug and joint washer from the top of the transfer casing and withdraw the transfer shaft selector spring and plunger.
31. Withdraw the split pin and remove the castle nut and plain washer securing the front axle driving flange; carefully remove the flange complete with dust seal, avoiding damage to the oil seal.
32. Remove the special nut and shakeproof washer securing the transfer control link to the selector shaft; remove the split pin and spring-loaded clevis pin and remove the transfer lever.
33. Remove the dust cover from the front of the output housing, by removing the three nuts, spring washers and distance pieces.
34. Remove the front wheel drive control lever assembly by withdrawing the special pivot screw. Remove the split pin and plain washer securing the locking peg to the lever. Disconnect the operating rod from the lever (spring-loaded clevis). If necessary, press out the bush from the lever.
35. Remove the seven nuts and spring washers securing the output housing to the transfer box (this action also releases an earth lead). Withdraw the output housing complete with output shaft, front wheel drive dog clutch, the dog clutch selector shaft and fork and a joint washer. Leave the transfer selector shaft and link in position protruding from the transfer box.
36. Remove the split pin, castle nut and special screw from the transfer selector shaft and remove the block.
37. Slide the following parts from the transfer selector shaft:—
    (*a*) Link, link pin and connector assembly.
    (*b*) Spring.
    (*c*) Spring locating bush.
    (*d*) Distance tube.
38. Detach the link from the link pin by removing the special screw, castle nut and split pin.

    Note: The connector should not be removed from the link pin unless absolutely necessary, as difficulty will be experienced in effecting correct alignment on re-assembly.
39. Remove the output shaft, dog clutch selector shaft and dog clutch from the output housing.
40. Remove the split pin, castle nut and special screw from the dog clutch selector shaft and remove the block.
41. Slide the two springs and selector fork from the dog clutch selector shaft.
42. If necessary, remove the two bushes from the selector fork boss.
43. If necessary, remove the spigot bush from the rear end of the output shaft.
44. Remove the six nuts and spring washers securing the oil seal retainer to the front face of the output housing and remove the retainer complete with oil seal and joint washer.
45. If necessary, remove the oil seal from the retainer.
46. If necessary, withdraw the output shaft front bearing from the output housing.

Gearboxes numbered prior to 16102314 and 16131688

Assemble the freewheel unit as follows:

1. Fit the freewheel outer member to the front output shaft and secure it with two lockplates and six set bolts.
2. Place the inner member pilot bearing in the outer member.
3. Fit the inner member, complete with three fixed cam roller shoes, in the bearing; place the nine graded rollers in position and fit the free cam roller shoes and springs.
4. Fit the toothed retaining plate in the outer member and secure it with a circlip.
5. If necessary, press a new operating shaft bush into the freewheel housing and ream it to .625 in.
6. Fit the output shaft rear bearing into the freewheel housing and secure it with a circlip. The bearing must be a **push** fit in the housing.
7. Fit the freewheel assembly into the freewheel housing and press the output shaft through the bearing. The shaft must be a **light press** fit in the bearing. Secure the shaft with a circlip.
8. **Gearboxes numbered 860001 to 861988.** If necessary, renew the oilite bush in the front bore of the output shaft. The bush is a **drive** fit in the shaft; the front (transfer) shaft should be an **easy** fit in the bush bore.
9. Push the freewheel operating shaft through the bush in the freewheel housing, with the spring to the front. Fit the freewheel selector fork on the shaft and secure it with the pinch bolt.

10. Place the locking dog in mesh with the fork and slide the shaft along, so that the freewheel is in the "fixed" position. Ensure that the splines on the inner member and locking dog are in alignment.
11. Slide the freewheel operating spring over the operating shaft guide and fit the guide into the bushes in the transfer casing. Compress the spring and secure it by means of a small peg pushed through the hole in the guide.
12. Fit the complete freewheel, together with a joint washer, to the transfer casing, locating it on two dowels; secure with seven nuts and spring washers.
13. Release the operating spring by removing the peg from the guide and check the freewheel unit for ease of operation.
14. **Gearboxes numbered 861989 onwards.** Drive the output shaft front bearing on to the output shaft until it abuts the shoulder. The bearing must be a **drive** fit on the shaft.
15. **Gearboxes numbered 860001 to 861988.** Fit the transfer shaft bearing in the output shaft housing and secure it with a circlip. The bearing must be a **drive fit** in the housing. Drive the transfer shaft through the bearing until it abuts the shoulder. The shaft must be a **drive** fit in the bearing.

    Replace the distance piece, locking dog and distance washer on the output shaft protruding from the freewheel housing.
16. If necessary, renew the output shaft and selector shaft oil seals in the output shaft housing.
17. Fit a suitable protection thimble over the end of the transfer operating shaft.
18. Fit the complete output shaft housing, together with a joint washer, to the freewheel housing; locate the dowel and secure with seven nuts and spring washers. Remove the thimble.
19. Insert the freewheel operating rod through the seal in the housing and enter it into the operating shaft.
20. Examine the outer diameter of the front axle drive flange for damage which may have caused failure of the original oil seal and rectify or renew the flange as necessary. Fit the flange and dust shield to the output shaft and secure it with a plain washer, castle nut and split pin.
21. Replace the transfer change selector ball and spring in the boss on the left-hand side of the output shaft housing and secure them with a plug and joint washer.

Assemble the controls as follows:

22. If necessary, renew the bush and operating wire in the freewheel operating lever and fit the complete lever to the output shaft housing by means of the special screw; the distance piece should be placed between the lever and the housing.
23. Replace the lever guide and secure it to the top of the housing with two set bolts and spring washers.
24. Secure the lever return spring anchor to the housing by means of a set bolt and spring washer, with the distance piece between the anchor and the housing.
25. Replace the lever return spring.
26. Fit the transfer lever bracket to the bell housing, securing it by means of two bolts, spring washers and nuts, with the distance pieces between the bracket and bell housing.
27. Replace the transfer selector link on the transfer gear change lever.
28. Fit the link over the end of the selector shaft and secure the lever to the bracket by means of a clevis pin and split pin. Secure the link to the selector shaft with a special nut and shakeproof washer.
29. Screw the pivot eyebolt, complete with locknut, into the tapping in the front face of the output shaft housing. Fit the pivot to the eyebolt by means of a special screw, spring washer and nut.
30. Check the operation of the transfer gear change and freewheel controls, adjusting the eyebolt and pivot as necessary, so that:
    (*a*) With the transfer change lever right forward, high transfer gear is engaged and the freewheel operating rod is pushed to the rear, *i.e.*, the freewheel is "free". In this position the freewheel lever should engage the slot in the operating rod.
    (*b*) With the transfer change lever pulled halfway back, the transfer box should be in neutral. The freewheel operating rod should be retained in the free position by means of the lever.
    (*c*) With the transfer change lever right back, low transfer gear is engaged; the freewheel should remain free. When the control wire is pulled or the knob is depressed, so disengaging the lever from the operating rod, the rod should move forward to set the freewheel in the fixed position.
    (*d*) On returning to high transfer gear, the freewheel rod should be forced to the free position as at paragraph (*a*).
31. When the controls have been adjusted correctly, complete the assembly as follows:
32. Replace the transfer gear change cover plate and secure it by means of either four set screws or four set bolts and spring washers.
33. **Gearboxes numbered 861501 onwards.** Assemble the main gear change lever. Fit the lever assembly, cover plate and rubber seal to the gearbox unit, securing them by means of two set bolts and spring washers at the bell housing and two nuts and spring washers at the gearbox top cover.

    Fit and adjust the reverse stop hinge.
34. **Gearboxes numbered 860001 to 861500.** Fit the bell housing inspection cover and secure it and the cover plate and rubber seal with two spring washers and nuts.

35. Fill the main gearbox and transfer casing with oil of a suitable grade.

    The gearbox unit is now ready for installation in the vehicle.

Gearboxes numbered 16102314 and 16131688 onwards

Assemble the controls as follows:

36. If necessary, replace the output shaft front bearing in the output housing. The bearing must be a **push fit** on the shaft, and a **light drive fit** in the housing. Renew the shaft, bearing and housing as necessary.

37. If removed, fit a new oil seal in the retainer with its knife edge inwards.

38. If removed, replace the spigot bush in the rear end of the output shaft, pressing it in flush with the face of the shaft.

    The bush must be reamed in position to .875 in.

39. If removed, renew the two oilite bushes in the dog clutch selector fork boss; the bushes must be pressed in flush with the end faces of the boss and must have .001 to .002 in. clearance on the selector shaft.

40. Check the two dog clutch selector springs in accordance with the following data and renew as necessary:—

    Free length: 2.750 in.
    Solid length: .640 in.
    Maximum load: 13 lb.
    Rate: 6⅛ lb./in.

41. Check the transfer selector shaft spring in accordance with the following data and renew as necessary:—

    Free length: 7.156 in.
    Length in position: 3.875 in.
    Load in position: 24 lb.
    Rate: 7.31 lb/in.

42. Replace the oil seal retainer on the output housing and secure with six nuts and spring washers.

43. Fit the two springs and selector fork (crank to the rear) over the dog clutch selector shaft.

44. Replace the block on the selector shaft and secure by means of the special screw, castle nut and split pin.

45. If the connector has been detached from the link pin, replace it with the hole for the locking peg vertical and the cutaway on the link pin underneath; ensure that the connector is square with the pin and secure lightly with the nut and shakeproof washer.

46. Secure the link pin by means of the special screw, castle nut and split pin. The threaded end of the screw must be downwards and the shorter end of the link towards the transfer selector, with the longer arm of the jaw at the opposite end to the rear.

47. Replace the transfer shaft selector spring and plunger and secure with the plug and joint washer.

48. Slide the following parts on to the transfer selector shaft:—
    (*a*) Distance tube.
    (*b*) Spring locating bush with its smaller diameter to the front.
    (*c*) Spring.
    (*d*) Compress the spring and fit the link and connector assembly until the block is over the hole in the shaft. Fit the special screw from the bottom, through the coupling jaw, block and selector shaft and secure with the castle nut and split pin.

49. Fit the dog clutch over the splines on the transfer box output shaft.

50. Fit the dog clutch selector shaft assembly into the bush on the transfer box, ensuring that the link engages the screw correctly.

51. If they have been separated, the position of the connector and link should now be adjusted as follows:—

52. (*a*) The most efficient method of carrying out this operation is to use a dummy output housing with a large aperture in the side through which the connector securing nut can be tightened. Place the dummy housing over the selector shafts and locate the link pin by means of a suitable peg. Tighten the connector securing nut and remove the housing.
    (*b*) If a dummy housing is not available, the actual output housing can be used to align the selectors by sliding it over the shafts back to front. (*Note:* The transfer casing must be detached from the main gearbox, to enable the output housing to clear the bell housing.) Tighten the connector nut with the link in alignment with the two selector shafts. By this method, the locking peg hole in the link pin is not necessarily vertical, a fact which will only appear when the assembly is complete; for this reason the use of a dummy housing is to be preferred.

53. Fit the output housing joint washer.

54. Fit the output shaft in its housing and slide the housing over the selector shafts. Select two-wheel drive in high transfer gear (through the aperture in the transfer casing) and push the housing home; secure with the seven nuts and spring washers.

55. If necessary, renew the bush in the front wheel drive control. Connect the operating rod to the lever and secure the locking peg by means of the plain washer and split pin.

56. Replace the control lever assembly and secure with the pivot screw.

57. Replace the dust cover and secure by means of three nuts, spring washers and distance pieces.

58. Replace the transfer lever and secure with the spring-loaded clevis pin and split pin. Secure the lever to the selector shaft by means of the control link, special nut and shakeproof washer.

59. Examine the outer diameter of the front axle drive flange for damage which may have caused failure of the original oil seal and rectify or renew the flange as necessary. Fit the flange and dust shield to the output shaft and secure it with a plain washer, castle nut and split pin.
60. Check the transfer gear change and dog clutch controls for correct operation and adjust as necessary.

    Adjust the front wheel drive control rod to ensure efficient extraction and replacement of the locking peg; when the gearbox is installed in the vehicle, it is important to avoid the spring becoming coilbound, as under such conditions the operation appears correct, but the peg is not extracted sufficiently to engage four-wheel drive.
61. Replace the transfer gear change cover plate and secure it by means of four set bolts and spring washers.
62. Assemble the main gear change lever.

    Fit the lever assembly, cover plate and rubber seal to the gearbox unit, securing them by means of two set bolts and spring washers at the bell housing and two nuts and spring washers at the gearbox top cover.

    Fit and adjust the reverse stop hinge.
63. Fill the main gearbox and transfer casing with oil of a suitable grade.

    The gearbox unit is now ready for installation in the vehicle.

1954-58 models

Gearbox and transfer box assembly

To remove — **Operation C/22**

1. Remove the hood, hard top or cab, for convenience in working.
2. Remove the front wheel drive control knob, locknut and spring; remove the knob and locknut from the transfer gear change lever.
3. Remove the floor board assembly and gearbox cover. Section R.
4. Remove the seat box complete. Section R.
5. **L.H.D. models only.** Remove the hand brake lever and linkage. Section H.
6. **R.H.D. models only.** Remove the hand brake rod and the expander rod from the relay lever.
7. Disconnect the front axle propeller shaft, rear axle propeller shaft and rear power take-off propeller shaft (if fitted), at the gearbox end.
8. **L.H.D. models only.** Remove the clutch cross-shaft rod from the connecting tubes.
9. **R.H.D. models only.** Disconnect the universal joint sleeve from the clutch relay shaft and the cross-shaft from the connecting tube. Slide the universal joint sleeve together with the rubber dust cover along the cross-shaft and remove the cross-shaft complete with universal joint sleeve and rubber dust cover.
10. Disconnect the speedometer cable at the gearbox and withdraw the cable clear of the gearbox. Disconnect the earth lead at the transfer box.
11. Remove the gearbox unit bearer bolts, top bearer rubbers, washers, shims and distance tubes.
12. Place a suitable sling around the gearbox unit, raise it approximately 1 inch (25 mm).
13. Place a jack under the rear end of the engine; this prevents any strain being taken on the primary pinion shaft.
14. Withdraw the gearbox unit and remove it from the vehicle.

To refit — **Operation C/24**

1. Reverse the removal procedure.
2. The nip on the gearbox unit mounting rubber pads is adjusted by the addition or removal of shims on the top of the central distance tube.

    The correct setting is with the top shim approximately 1/16 in. (1,5 mm) below the top face of the upper rubber pad.

    Note: The rear mounting brackets are adjustable laterally, to facilitate alignment with the mounting rubbers.
3. If necessary, refill the main gearbox, 2½ pints (1,5 litres) and transfer box, 4½ pints (2,5 litres) with oil.
4. Adjust the transmission brake. Section H.
5. Adjust the four-wheel drive control rod. Operation C/48.

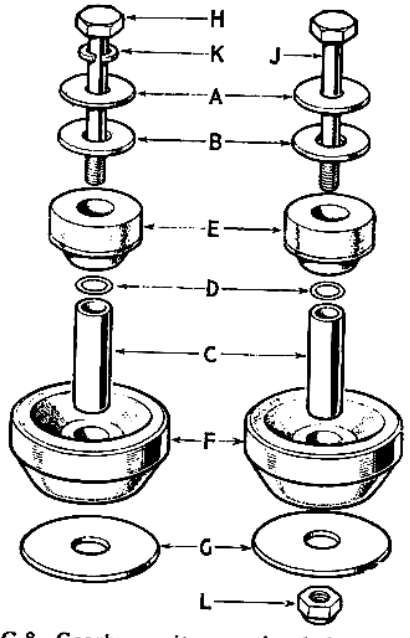

Fig. C-8—Gearbox unit mounting bolts and pads.

A—Plain washer (upper)
B—Rubber washer
C—Distance tube
D—Shim
E—Top rubber
F—Bottom rubber
G—Plain washer (lower)
H—Front bolt
J—Rear bolt
K—Spring washer
L—Self-locking nut

All models

Main gearbox

To remove **Operation C/26**

1. For removal procedure, see Operations C/16 and C/22.

To strip **Operation C/28**

1. Mount the gearbox on a suitable stand.
2. Drain off the gearbox and transfer box oil.
3. Remove the main gear change lever assembly, then the reverse stop hinge. Operation C/50.
4. Remove the transfer box and front output shaft housing complete. Operation C/34.

Dismantle the main gearbox as follows:

5. Disconnect the connecting tube from the clutch cross-shaft.
6. Remove the dust-proofing grommets from the bell housing apertures.
7. Remove and strip the clutch withdrawal unit from the bell housing, Section B.
8. Remove the oil filler cap and joint washer from the gearbox top cover.
9. Remove the filler cap retaining clip.
10. Remove the plug retaining the 1st/2nd speed selector spring in the top cover and withdraw spring.

    Note: To prevent the selector ball falling into the gearbox, with the top cover removed, pack the hole with grease.

11. Remove the retaining plates for the side selector springs, the rubber grommets and the 3rd/4th and reverse selector springs.
12. Remove the selector cover plate from the gearbox top cover.
13. Remove the selector shaft end cover securing set bolts.
14. Remove the gearbox top cover, together with the upper selector end cover. Remove the two selector balls and locking plunger from the gearbox and the 1st/2nd speed selector ball from the top cover. Remove the 2nd gear stop from the top cover.
15. Select 1st gear (centre selector to rear); remove the reverse gear selector by lifting and turning the selector shaft one quarter of a turn to the left. Move the 1st/2nd speed selector to the neutral position and remove it; remove the 3rd/4th selector. Remove the lower selector end cover.
16. Withdraw the reverse selector fork and the sealing ring from the shaft.
17. Remove the 2nd speed stop from the end of the 1st/2nd selector shaft. Withdraw the selector fork and the sealing ring from the shaft.
18. Withdraw the 3rd/4th selector fork and the rubber sealing ring from the shaft.
19. Remove the castle nut from the front of the layshaft. (To lock the shaft for nnt removal, select top and 2nd speeds simultaneously.)

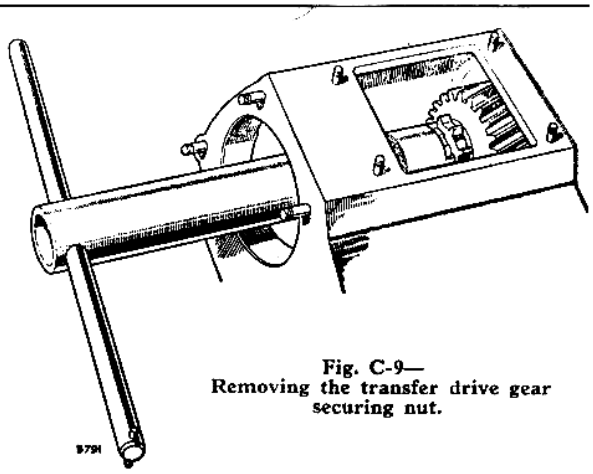

Fig. C-9—
Removing the transfer drive gear securing nut.

20. Remove the nut at the rear of the mainshaft retaining the transfer drive gear. Withdraw the gear and distance piece and oil flinger from the mainshaft.
21. Remove the bell housing complete with joint washer, tapping the layshaft out of the front bearing, so that it remains in the gearbox. Remove the needle roller bearing from the front end of the mainshaft. Remove the constant gear and conical distance piece from the bell housing.
22. Remove the layshaft front bearing retaining plate.
23. Remove the layshaft bearing plate; press out the layshaft front bearing, remove the pinion bearing retaining plate. Press out the primary pinion and bearing from the bell housing. Remove the nut securing the primary pinion bearing; press the bearing and shield off the pinion shaft. (The nut has a left-hand thread.)
24. Remove the synchronising clutch unit from the mainshaft and then withdraw the layshaft complete from the gearbox and strip it as follows:
25. Remove the distance sleeve. Remove the 3rd and 2nd speed gears. Remove the split ring retaining the 2nd speed gear. Press off the rear bearing and 1st speed gear.
26. Drive out the mainshaft complete from the rear and strip it as follows:
27. Remove the 1st speed gear. Prise out the spring ring inside the 3rd speed gear cone and discard it; remove the 3rd speed gear thrust washer and gear. Remove the distance sleeve and 2nd speed gear. Remove the peg locating the distance sleeve and withdraw the located 2nd speed gear thrust washer.
28. Remove the circlip retaining the mainshaft rear bearing housing to the rear face of the gearbox casing. Tap out the peg-located bearing housing complete from the rear. Remove the oil seal from the housing. Remove the circlip retaining the bearing in the housing and press out the bearing.
29. Drive out the reverse gear shaft from inside the gearbox; the gearbox casing must be warmed to facilitate this operation. Remove the reverse

gear and, if necessary, press out the bush from the gear.

30. To remove the outer race of the layshaft rear bearing from the gearbox casing, proceed as follows:

    Make a plunger (preferably from hardwood) about 12 in. (300 mm) long and approximately 1 11/16 in. (43,50 mm) in diameter, i.e. to just fit into the outer race. Stand the gearbox casing on end and fill the race housing with thick oil, insert the plunger and tap it down sharply. In most cases the oil will force the outer ring upwards out of the casing; if necessary, the gearbox casing may be warmed to facilitate removal of the race.

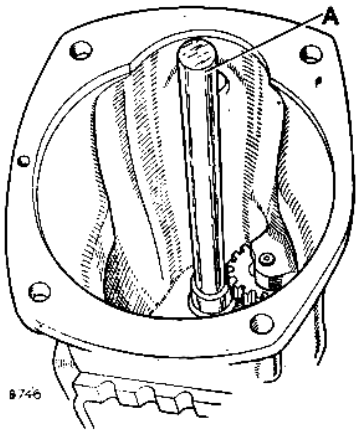

Fig. C-10—Removing layshaft rear bearing outer race.
A—Plunger.

To assemble **Operation C/30**

1. Wash all the component parts thoroughly and lay them out for inspection. Renew all lockwashers, split pins, spring rings and joint washers.
2. Check all the bearings for wear and damage, and renew them as necessary.
3. Check all the gears for damage marks and rectify or renew them as necessary. The constant, 2nd and 3rd speed gears are only supplied in mated pairs; all other gears may be replaced singly.
4. Examine the casing for signs of damage or cracks and renew it as necessary. A casing may also be scrap as a result of excessive wear in a bearing bore; such wear will be obvious during the course of assembly.
5. Press the layshaft rear bearing outer race into the gearbox casing with the lipped edge to the rear. It must be a *drive fit*. It may be necessary to warm the casing to assist in this operation.

    1948-53 models

    Press the layshaft rear bearing outer race into the gearbox casing with the lipped edge to the rear. It must be a *drive fit*. It may be necessary to warm the casing to assist in this operation.
6. If necessary, renew the reverse gear bush, bell out its extremities and ream it in position to .812 in. (20 mm). The bush should be a *press fit* in the gear. Place the reverse gear (with the smaller wheel to the rear) in position in the gearbox and drive the shaft through the gearbox casing and the gear. It will be necessary to warm the casing to assist in this operation. The shaft must be a *drive fit* in the casing.

    1948-53 models

    If necessary, renew the reverse gear bush and ream it in position to .812 in. (20,63 mm). Place the reverse gear (with the smaller wheel to the rear) on its shaft and drive the shaft into the gearbox casing. It may be necessary to warm the casing to assist in this operation. The shaft must be a *drive fit* in the casing.
7. Press the mainshaft rear bearing into the bearing housing until it abuts the flange in the housing bore; the bearing must be a *press fit* in the housing. Secure the bearing with a circlip.
8. Smear the outer diameter of the oil seal with jointing compound and press it into the other end of the housing, with the knife edge inwards.
9. Fit the location peg in the bearing housing and push the complete housing into the gearbox casing from the inside, until the housing flange abuts the casing. The housing must be a *push fit* in the casing; secure the housing with a circlip.

    1948-53 models

    Fit the location peg in the bearing housing and push the complete housing into the gearbox casing from the inside, until the housing flange abuts the casing. The housing must be a *push fit* in the casing. Secure the housing with a circlip at the rear face of the casing.

Mainshaft

10. If removed, replace the rear thrust washer. Do not fit the large bush locating peg at this stage.
11. Slide on the mainshaft bush with the large locating slot to the rear, together with the second speed gear, synchromesh cone to the rear.
12. Place the third speed gear on the bush with the gear wheel against the shoulder, and secure with the second thrust washer and the old spring ring.
13. While pressing the third speed gear hard against the bush shoulder, the end-float of the second speed gear, measured between the gear and the bush shoulder, should be .004 to .007 in. (0,10-0,17 mm).

    The third speed gear end-float should be the same, measured with the second speed gear pressed hard against the bush shoulder.

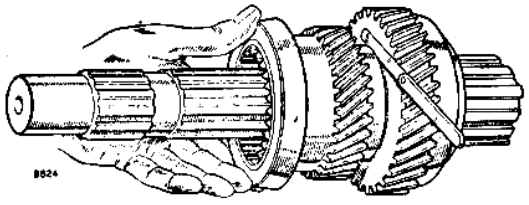

Fig. C-11—Measuring mainshaft gear end-float.

Section D – PROPELLER SHAFTS – ALL MODELS

INDEX

LIST OF ILLUSTRATIONS

Propeller shaft (front and rear axle drives)

Wear on the thrust faces of the bearings can be located by testing the lift in the joint, either by hand or with the aid of a length of wood suitably pivoted.

Any circumferential movement of the shaft relative to the flange yokes indicates wear in the roller bearings or the splined joint.

Lubricant may seep from the bearings after a lengthy period of service, owing to failure of the bearing seals.

If an oil leak is severe, or is neglected, failure of the needle roller bearings may result.

If any of these defects are apparent, the complete shaft should be removed from the vehicle and rectified as described.

To remove **Operation D/2**

1. Disconnect the propeller shaft from the differential input flange.
2. Disconnect the propeller shaft from the transfer box output flange.
3. Withdraw the propeller shaft complete.

Propeller shaft (rear power take-off drive)

To remove **Operation D/4**

See Section T.

To strip **Operation D/6**

1. Unscrew the dust cap and withdraw the sliding joint from the splined shaft.

   Dismantle each universal joint as follows:

2. Clean the enamel and dirt from the four circlips and the tops of the bearing races.
3. Remove the circlips.
4. Hold the joint in the left hand with one of the splined sleeve (or shaft) yoke lugs uppermost and tap the radius of the yoke lightly with a soft-nosed hammer.

   The top bearing should then begin to emerge from the yoke. (Fig. D-2.)

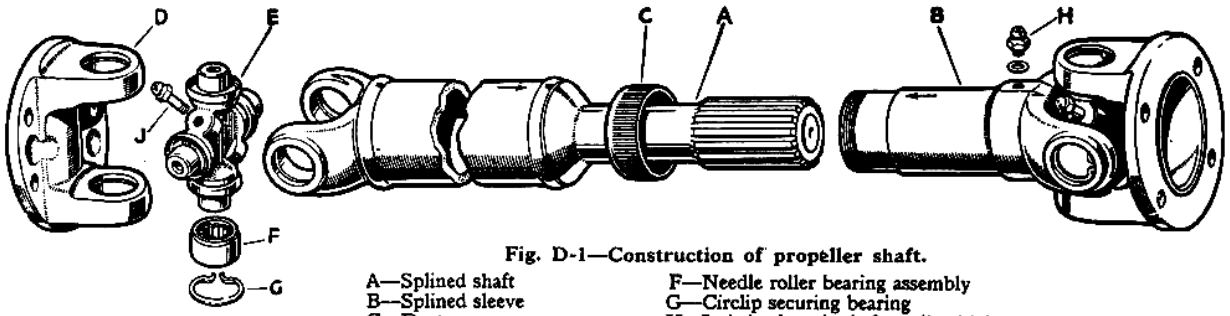

Fig. D-1—Construction of propeller shaft.

A—Splined shaft
B—Splined sleeve
C—Dust cap
D—Flange yoke
E—Journal spider
F—Needle roller bearing assembly
G—Circlip securing bearing
H—Lubrication nipple for splined joint
J—Oil nipple for universal joint

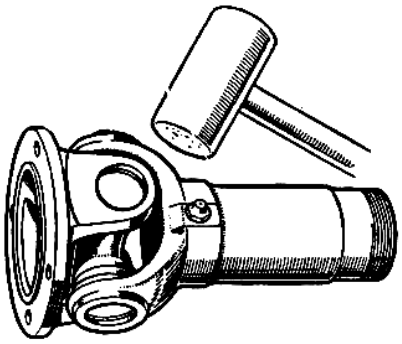

Fig. D-2—Removing a yoke bearing. Stage 1.

5. Turn the joint over and withdraw the bearing. (Fig. D-3.)

   Always remove a bearing downwards, to avoid dropping the needle rollers. It may be necessary to tap the bearing race from the inside with a small drift; in such cases, care should be taken to prevent damage to the bearing race.

6. Repeat these operations for the opposite bearing.

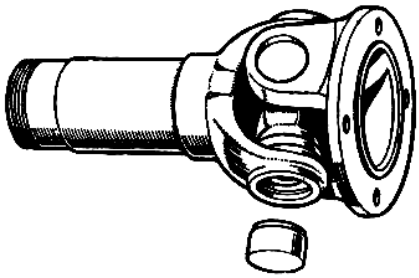

Fig. D-3—Removing a yoke bearing. Stage 2.

7. The splined sleeve (or shaft) yoke can now be removed (Fig. D-4).

8. Rest the flange yoke on a short piece of tubing of suitable diameter (slightly larger than the bearing race) and drive out the two remaining bearings, using a brass drift Fig. D-5).

9. Wash all the parts and lay them out for inspection.

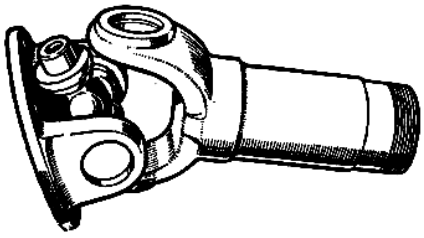

Fig. D-4—Removing the splined sleeve or shaft.

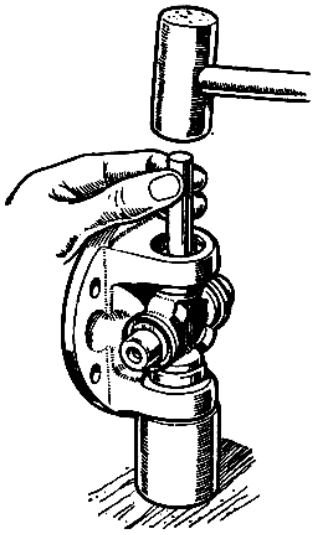

Fig. D-5—Removing the flange yoke.

To assemble **Operation D/8**

The parts most likely to show signs of wear after long usage are the bearing races and the spider journals. Should looseness in the fit of these parts, load markings or distortion be observed, they must be renewed complete, as oversize journals or bearing races are not supplied. Replacement journal assemblies comprise a spider complete with cork oil seals and four bearings.

The other parts likely to show signs of wear are the splined sleeve yoke and splined shaft. A total of .004 in. (0,1 mm.) circumferential movement, measured on the outside diameter of the splines, should not be exceeded. If wear beyond this limit has taken place, a new propeller shaft complete must be fitted.

1. Assemble the needle rollers in the bearing races, if necessary using a smear of vaseline to retain them in place. About half fill the races with oil (S.A.E. 140).

2. Insert the journal in the flange yoke holes and, using a brass drift slightly smaller in diameter than the hole in the yoke, lightly tap the first bearing into position.

   It is essential that the bearing races be a *light drive fit* in the yoke trunnions. In the event of wear taking place in any of the eight yoke cross holes, rendering them oval, a new propeller shaft complete must be fitted.

3. Repeat the operation for the other three bearings comprising the universal joint, and assemble the other joint similarly.

4. Replace the circlips and ensure that they are firmly located in their grooves. If the joint appears to bind, tap the ears slightly with a soft-nosed hammer.

5. Liberally smear the splines of the sliding joint and splined shaft with oil and replace the joint on the shaft, making sure that the arrows marked on the splined sleeve yoke and shaft are in line (Fig. D-1).
6. Screw up the dust cap as far as possible by hand.

Centre bearing assembly (rear power take-off drive—109 only)

To strip **Operation D/10**

1. Remove the rear driving flange from the front shaft.
2. Drift off the flange from the splined shaft.
3. Hold the centre bearing housing firmly in a vice and drift the shaft, complete with the bearing and dust plate, from the housing. Remove the two Woodruff keys from the shaft.
4. Press the centre ball bearing and dust plate off the shaft.
5. Wash all the parts and lay them out for inspection.

To assemble **Operation D/12**

1. Reverse the stripping procedure.
2. Insert the bolts securing the front and rear propeller shafts together, in the rear flange, before fitting the flange on the splined shaft.
3. The centre ball bearing must be a *light drive fit* on the shaft; if a new bearing is loose on the shaft, the complete shaft must be renewed.
4. The centre ball bearing must be a *press fit* in the housing; if a new bearing is loose in the housing, the complete housing must be renewed.

Propeller shaft (front and rear axle drives)

To refit **Operation D/14**

1. Wipe the faces of the transfer box and differential flanges clean.
2. Replace the propeller shaft and ensure that the register engages and that the joint faces bed down correctly all round.
3. Secure the propeller shaft, sleeve end, to the transfer box output flange. Tighten the nuts evenly.
4. Secure the propeller shaft to the differential input flange (with the nuts behind the input flange). Tighten the nuts evenly.

Propeller shaft (rear power take-off drive)

To refit **Operation D/16**

1. See Section T.

DEFECT LOCATION

Symptom, Cause and Remedy

A—VIBRATING PROPELLER SHAFT

1. Balance marks out of alignment—*Check alignment of balance marks on the splined sleeve yoke and shaft.*
2. Worn splines—*Renew.*
3. Shaft out of balance—*Tighten the securing nuts; renew the shaft if still out of balance.*

B—UNIVERSAL JOINTS NOISY

1. Lack of lubrication—*Lubricate or renew bearings.*
2. Securing nuts loose—*Tighten.*
3. Worn bearings or worn spline—*Renew.*

GENERAL DATA

86 and 88 in.	
Type: Hardy Spicer needle bearing	
Tubular shaft—	
diameter	.... 2 in. (50,8 mm.)
wall thickness	.... $\frac{3}{32}$ in. (2,4 mm.)
Overall length (face to face in neutral position)—	
Front axle drive	.... 23.812 in. (654 mm.)
Rear axle drive	.... 21.812 in. (554 mm.)

107 and 109 in.	
Type: Hardy Spicer needle bearing	
Tubular shaft—	
diameter	.... 2 in. (50,8 mm.)
wall thickness	.... $\frac{3}{32}$ in. (2,4 mm.)
Overall length (face to face in neutral position)—	
Front axle drive	.... 23.812 in. (654 mm.)
Rear axle drive	.... 42.812 in. (1,087 m.)