

Section B – CLUTCH UNIT – ALL MODELS

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ROVER PATTERN CLUTCH

Clutch unit

To remove Operation B/2

1. Remove the complete gearbox unit as detailed at Section C. If not already done, mark the cover plate and flywheel, so that on re-assembly the plate may be fitted in the same relative position, to preserve the original balance of the unit.
2. Release in rotation the eight self-locking nuts securing the clutch unit to the flywheel until the spring pressure is relieved; remove the nuts and remove the clutch unit (located by two dowels) and driven plate.

To strip Operation B/4

1. Suitably mark the cover plate, pressure plate and operating levers, so that they may be assembled in the same relative positions in order to preserve the original balance.
2. Remove the three operating lever springs.
3. Remove the operating levers and fulcrum pins.
4. Prise up the locking tabs and remove the six bolts securing the oil excluder plate; remove the oil excluder.
5. Remove the three split pins and curved washers from the driving bolts.
6. Using four nuts, pull down the clutch unit and driven plate evenly on to a flywheel or other suitable plate.
7. Withdraw the driving bolts and remove the operating links.

8. Remove the cover and driven plate from the flywheel

9. Remove the cups and springs from the cover.

10. Remove the pressure plate.

11. Remove the fibre inserts from the pressure plate.

To assemble Operation B/6

1. Clean all the components and lay them out for inspection.
2. Renew all parts which show damage or appreciable wear.
3. Examine the pressure plate for signs of scoring or burning and re-grind the pressure face as necessary. The limit for skimming the pressure plate is to .020 in. (0,5 mm) below the nominal thickness (i.e. .730 in. (18,6 mm) minimum overall thickness); if the plate still shows wear when ground to this dimension, it must be discarded and a new part used on assembly. As the leverage of the operating levers is 5 : 1, this 0.20 in. (0,5 mm) skim will reduce the travel of the withdrawal sleeve by $\frac{1}{16}$ in. (2,5 mm), which is the maximum figure allowable without causing serious shortening of the effective life of the clutch unit.

4. Examine the engine flywheel for signs of scoring or burning; if necessary, remove it from the vehicle as detailed in Section A, and re-grind the pressure face.

The clutch securing bolts and dowels must be removed from the flywheel before skimming, so enabling the entire face to be ground. The policy of grinding only within the bolts, so leaving a pronounced step in the face, is not

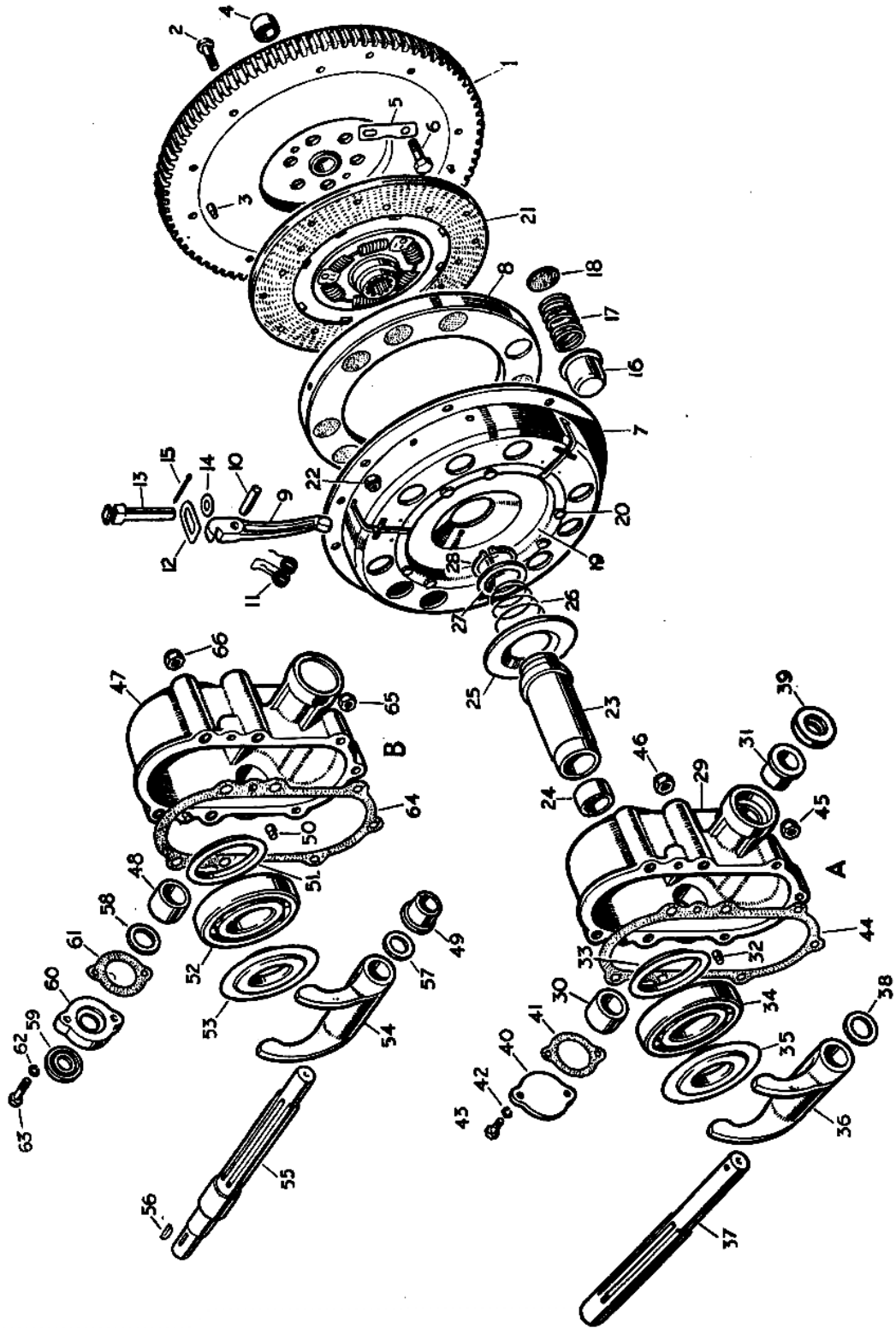


Fig. B-1—Layout of the clutch unit (Rover pattern)

Key to Fig. B-1

1	Flywheel				
2	Firing bolt fixing clutch to flywheel				
3	Dowel locating clutch unit				
4	Bush for primary pinion				
5	Locker	} Fixing flywheel to crankshaft			
6	Special bolt				
7	Clutch cover plate				
8	Pressure plate				
9	Operating lever				
10	Fulcrum pin for lever				
11	Return spring for lever				
12	Operating link for lever				
13	Driving bolt	} Connecting links to pressure plate			
14	Curved washer				
15	Split pin				
16	Retaining cup for clutch spring				
17	Clutch thrust spring				
18	Insert for clutch spring				
19	Oil excluder				
20	Set bolt fixing oil excluder				
21	Clutch driven plate				
22	Nut fixing clutch unit to flywheel				
23	Withdrawal sleeve				
24	Bush for sleeve				
25	Outer cup				
26	Spring for cup	} For clutch withdrawal sleeve			
27	Retaining washer				
28	Circlip	} For spring			
29	Withdrawal race housing				
30	Bush, large	} For cross-shaft			
31	Bush, small				
32	Dowel locating housing				
33	Oil drain ring				
34	Withdrawal thrust bearing				
35	Thrust ring for bearing				
36	Operating fork for clutch				
37	Cross-shaft for fork				
38	Thrust washer for cross-shaft				
39	Oil seal for cross-shaft				
40	Cover plate for cross-shaft				
41	Joint washer for cover plate				
42-43	Fixings for cover plate				
44	Joint washer for withdrawal housing				
45-46	Fixings for housing				
47	Withdrawal race housing				
48	Bush, large	} For cross-shaft			
49	Bush, small				
50	Dowel locating housing				
51	Oil drain ring				
52	Withdrawal thrust bearing				
53	Thrust ring for bearing				
54	Operating fork for clutch				
55	Cross-shaft for fork				
56	Woodruff key for cross-shaft				L.H.D. models
57	Thrust washer, inner	} For cross-shaft			
58	Thrust washer, outer				
59	Oil seal for cross-shaft				
60	Housing for oil seal				
61	Joint washer for housing				
62-63	Fixings for housing				
64	Joint washer for withdrawal housing				
65-66	Fixings for housing				

acceptable, as it results in the driven plate moving forward relative to the clutch cover, so reducing clutch life, and introducing the possibility of "clutch slip" at an early date. The limit for skimming over the whole face is to .030 in. (0,75 mm) below the nominal thickness (*i.e.* 1.063 in. (27 mm) minimum overall thickness); if the flywheel still shows wear when ground to this dimension, it must be discarded and a new part used on assembly.

5. Examine the primary pinion spigot bush in the centre of the flywheel for excessive wear or damage, and renew it as necessary. The new bush must be a *press fit* in the flywheel; its bore should be .878 in. +.0005 and the diameter of the primary pinion .8745 in. —.0005; thus making the pinion an *easy fit* in the bush.
6. Replace the flywheel as detailed in Section A.
7. Check the clutch springs in accordance with the following specification, and renew them as necessary:—
 - Number of coils: $5\frac{1}{2}$
 - Free length: 1.554 in. (39,5 mm)
 - Solid height: 1.040 in. (26,4 mm)
 - Identification: Orange paint
 - Load: 130 lb. ± 4 (63 kg. $\pm 1,8$)
 - at Working length: 1.164 in. (29,6 mm)
8. Place the driven and pressure plates in position on a spare flywheel or other suitable plate.
9. Replace the fibre spring inserts and clutch springs in the recesses in the pressure plate; place the retaining cups over the springs.
10. Position the cover over the cups and pull it down evenly to the flywheel face by means of four nuts.
11. Insert the driving bolts and operating links.
12. Remove the unit from the flywheel and fit the curved washers and split pins on the driving bolts.

Note: Each split pin should be entered from the recess cut in the clutch cover, and then bent over from the pressure plate side.

13. Replace the oil excluder; secure it by means of six set bolts and turn up the locking tabs.
14. Replace the operating levers, fulcrum pins and return springs.

The clutch unit is now ready for alignment of the operating levers.

Clutch operating levers

To set

Operation B/8

To ensure satisfactory operation of the clutch withdrawal mechanism, it is essential that the thrust faces of the operating levers be set equidistant from the flywheel face.

When assembled in the vehicle, the lever faces must be 1.900 in. +.031 (48,3 mm +0,8) from the flywheel face, but when setting the levers in the way described below, *i.e.* using $\frac{3}{8}$ in. (9,5 mm) distance pieces in place of the driven plate, the levers must be set to a dimension of 1.729 in. $\begin{matrix} +.010 \\ -0,000 \end{matrix}$ (43,9 mm $\begin{matrix} +0,25 \\ -0,00 \end{matrix}$) from the flywheel face.

Owing to the number of accumulated tolerances affecting this dimension, it is unlikely that the setting will be correct on initial assembly, and the following method should be employed to check and rectify any inaccuracy present.

1. The equipment required comprises:—
 - (a) Clutch unit to be checked.
 - (b) A flywheel or other suitable plate.
 - (c) Surface plate.
 - (d) Scribing block.
 - (e) Setting gauge with steps at 1.729 in. (43,90 mm) and 1.739 in. (44,15 mm).

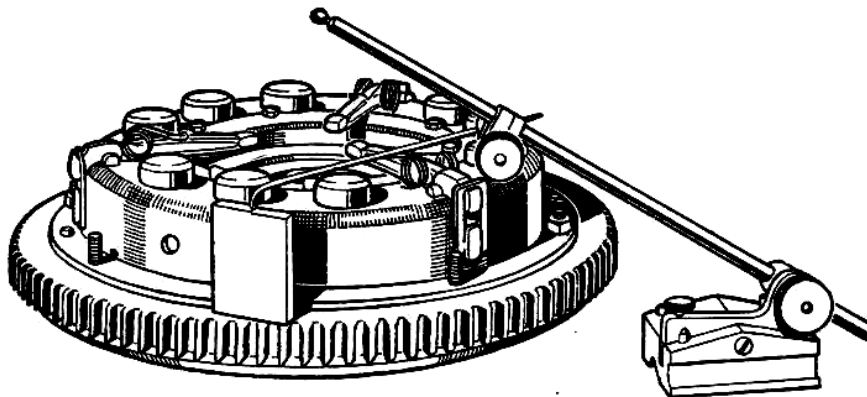


Fig. B-2—Setting the operating levers—Stage 2

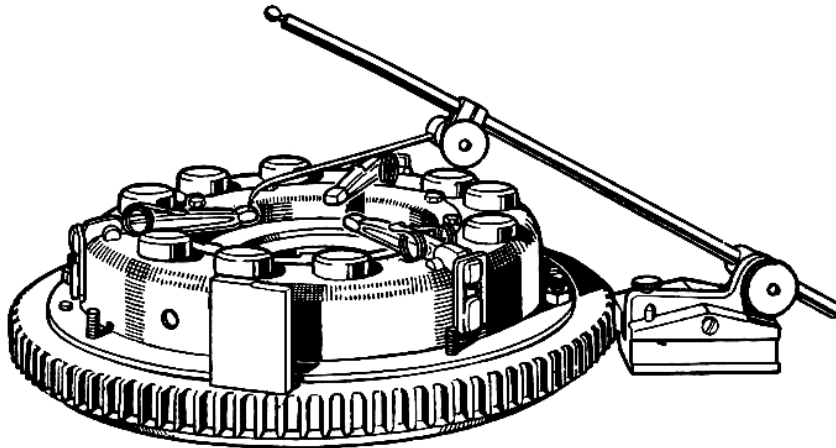


Fig. B-3—Setting the operating levers—Stage 3

This can be made from a piece of flat $\frac{1}{4}$ in. (6 mm) steel plate.

- (f) Three $\frac{3}{8}$ in. (9,5 mm) distance pieces; $\frac{3}{8}$ in. (9,5 mm) rollers would be suitable.
2. Bolt the clutch unit down to the flywheel with eight nuts, with the three distance pieces in place of the driven plate. The driven plate must not be used when setting the levers, as it has an allowable "run-out" of 0.10 in. (0,25 mm).
 3. Place the flywheel and clutch assembly on the surface plate and set the scribe to 1.729 in. (43,90 mm) from the flywheel face by using the gauge as in Fig. B-2.
 4. Check the heights of the three operating levers (Fig. B-3); those that do not lie between 1.729 in. (43,90 mm) and 1.739 in. (44,15 mm) must be brought into line as described below. The lever return spring must be in position each time a check is made; care should also be taken to ensure that the lever fulcrum pins are well seated in the cover plate.
 - (a) If the lever is too high:
 - (i) By selective assembly of levers, or
 - (ii) By filing a very small amount from the flat end of the slot in the operating link. As the ratio of the distances of the two ends of a lever from the fulcrum pin is roughly 5 to 1, it will be seen that the removal of .002 in. (0,05 mm) from the link will lower the operating face of the lever by approximately .010 in. (0,25 mm).
 - (b) If the lever is too low:—

This means that wear is present in the operating lever and/or link and the worn parts must be renewed.
 5. When the setting of all three levers is correct, remove the clutch unit from the flywheel after releasing the eight securing nuts in rotation until the spring pressure is relieved.

Driven plate

To reline

Operation B/10

1. Drill out the retaining rivets and remove the old linings; the rivets must not be punched out, as serious deformation of the plate would thereby result.
2. Rivet one new lining in position, using a blunt-ended centre punch to roll the rivet shanks securely against the plate.
3. Rivet the second lining on to the opposite side of the plate with the clearance holes over the rivet heads already formed in fitting the first facing.
4. Mount the plate on a suitable mandrel between centres and check for run-out as near the edge as possible; if the error is more than .010 in. (0,25 mm), press over the high spots until the plate is true within this figure.

Clutch unit

To replace

Operation B/12

1. Place the driven plate in position on the flywheel with the longer end of the central boss away from the engine.
2. Centralise the plate by means of a slave primary pinion or suitable dummy shaft which fits the splined bore of the plate hub and the spigot bearing in the flywheel.
3. Fit the clutch unit with the identification marking adjacent to that on the flywheel; secure it by means of the eight self-locking nuts; the nuts must be pulled down in rotation to prevent distortion of the unit.
4. Remove the centralising shaft.
5. Replace the gearbox assembly as detailed in Section C.
6. Check and adjust the clutch pedal free movement.

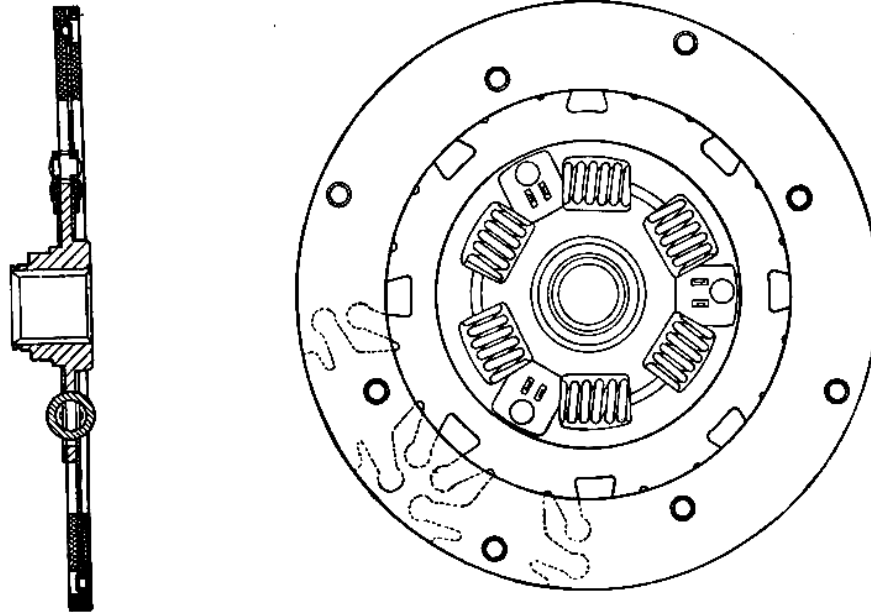


Fig. B-4—Clutch driven plate (Rover pattern)

BORG AND BECK PATTERN CLUTCH Clutch unit

To remove Operation B/14

1. Remove the complete gearbox unit. Section C. If not already done, mark the cover plate and flywheel, so that on reassembly the plate may be fitted in the same relative position, to retain the original balance of the unit.
2. Release in rotation the self-locking nuts securing the clutch unit to the flywheel, until the spring pressure is relieved; remove the clutch unit and drive plate.

Note: The release lever adjustment nuts are correctly set and locked when the clutch is assembled, and should not be altered unless the clutch has been dismantled and new parts fitted. Interference with this adjustment would throw the pressure plate out of position and result in clutch judder.

To refit Operation B/16

1. Place the driven plate in position on the flywheel with the longer end of the central boss away from the engine.
2. Centralise the plate by means of a slave primary pinion.
3. Fit the clutch unit with the identification marking adjacent to that on the flywheel; pull down the securing nuts a turn at a time by diagonal selection to prevent distortion of the unit.
4. Remove the centralising shaft.

5. Replace the gearbox assembly. Section C.
6. Adjust clutch pedal free movement. Operation B/44.

To strip Operation B/18

1. Suitably mark the cover plate, pressure plate lugs and release levers, so that they may be assembled in the same relative position, in order to retain the original balance.
2. Place the cover assembly under a press with the pressure plate resting on wooden blocks, so arranged that the cover can move downwards when pressure is applied. Place a block of wood across the top of the cover, resting on the spring bosses.
3. Press the cover downwards and remove the release lever adjusting nuts; slowly release the pressure to prevent the clutch springs from flying out.
4. Lift off the cover.
5. Remove each release lever by holding the lever and eyebolt between fingers and thumb, so that the inner end of the lever and the threaded end of the eyebolt are as near together as possible, keeping the release lever pin in position in the lever. Lift the strut over the ridge on the lever and remove the eyebolt from the pressure plate.

To assemble Operation B/20

1. Clean all the components and lay them out for inspection.

2. Renew all parts which show damage or appreciable wear.

3. A very slight smear of high melting-point grease should be applied to the following parts during assembly:—

Release lever pins, contact faces of struts, eyebolt seats in cover, drive lug sides on the pressure plate and the plain end of the eyebolts.

4. Examine the pressure plate for signs of scoring or burning, and regrind the pressure face as necessary. The minimum thickness is 1.531 in. (38,90 mm). The thickness of the plate is measured from the pressure face to the underside of one of the operating lugs. Discard the plate if it still shows signs of wear when ground to this dimension. Serious shortening of the effective life of the clutch unit will result if the limit for regrinding is exceeded.

Note: The thickness of the pressure plate must always be measured from the underside of the same operating lug and the amount skimmed off the plate stamped on the side of the lug in question.

5. Examine the engine flywheel for signs of scoring or burning; if necessary remove it from the vehicle (Section A) and regrind the face, removing a maximum of .030 in. (0,76 mm).

The clutch securing bolts and dowels must be removed from the flywheel before skimming, so enabling the entire face to be ground. The policy of grinding only within the bolts, so leaving a pronounced step in the face, is not acceptable, as it results in the driven plate moving forward relative to the clutch cover so reducing clutch life and introducing a possibility of clutch slip at an early date. If the flywheel still shows signs of wear when ground it must be discarded and a new part used on assembly.

6. Examine the primary pinion spigot bush in the centre of the flywheel for excessive wear or damage and renew as necessary. The new bush must be a press fit in the flywheel: the bore should be .878 in. +.0005, and the diameter of the primary pinion .8745 in. —.0005, thus making the pinion an easy fit in the bush.
7. Refit the flywheel and tighten the bolts to 50 lb/ft (6,9 mkg).
8. Check the clutch springs in accordance with the data given and renew as necessary.
9. Assemble the release lever eyebolt and lever pin; holding the threaded end of the eyebolt and the inner end of the lever as close together as possible. With the other hand, insert the strut in the slots in the pressure plate lug and insert the plain end of the eyebolt in the hole in the pressure plate. Move the strut upwards into

the slots in the pressure plate lug and over the ridge on the short end of the lever, and drop it into the groove formed in the latter. Fit the other two release levers in a similar manner.

10. Place the pressure plate on the wooden blocks under the press and arrange the thrust springs in a vertical position on the plate, seating them on the bosses provided. Lay the cover over the assembled parts, ensuring that the anti-rattle springs are in position and that the tops of the thrust springs are directly under the seats in the cover. Also ensure that the machined portions of the pressure plate lugs are under the slots in the cover and that the parts marked before dismantling are in their correct relative positions.
11. Place the block of wood across the cover, resting it on the spring bosses, and compress the cover, guiding the eyebolts and pressure plate lugs through the holes in the cover.
12. Screw the adjusting nuts on the eyebolts and operate the clutch a few times by means of the press, to ensure that the working parts have settled into their correct positions.
13. Adjust the operating levers as detailed below.

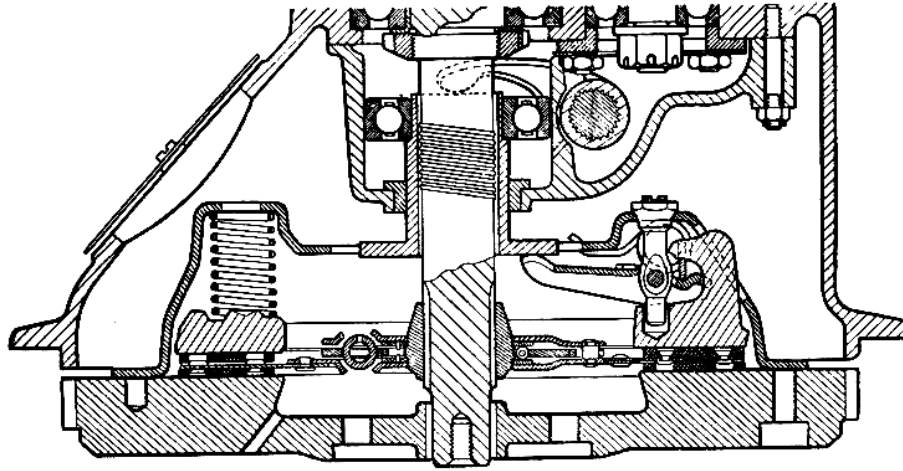
Clutch operating levers

To adjust

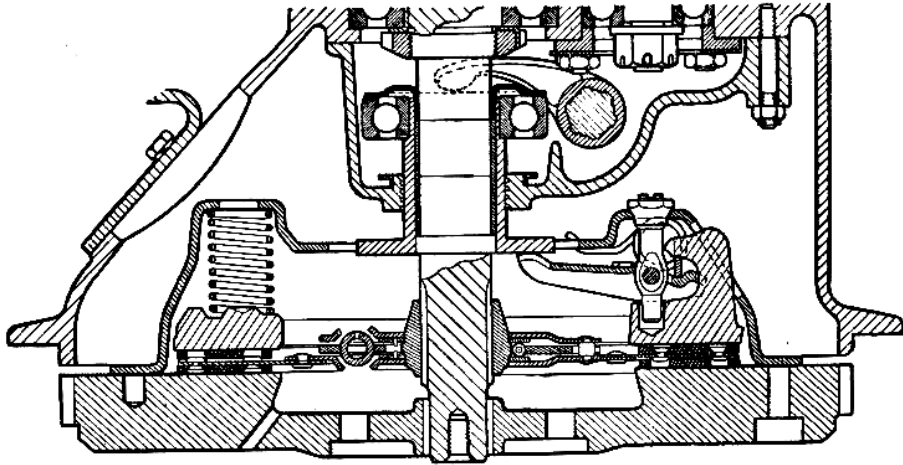
Operation B/22

Note: This adjustment must be carried out before the clutch is refitted to the engine, and will always be necessary after complete stripping of the unit, or if any new part has been fitted.

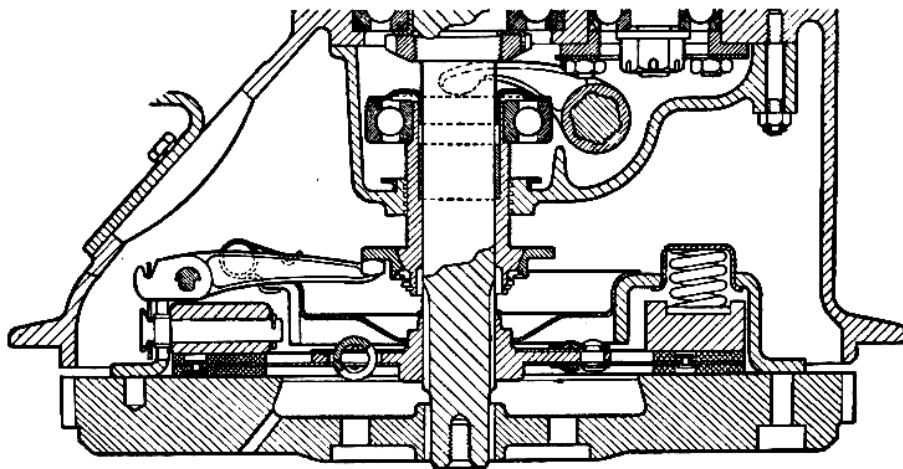
1. The setting of the clutch release levers is checked, using $\frac{3}{8}$ in. (9,5 mm) distance pieces in place of the driven plate. The levers must be adjusted to a dimension of 1.655 in. (42 mm) from the flywheel face, with a maximum of .010 in. (0,25 mm) difference in height between the three levers. (Fig. B-7.)
2. Place the three distance pieces on the flywheel in place of the driven plate.
3. Fit the cover assembly to the flywheel by tightening all six securing nuts a turn at a time by diagonal selection, until the unit is fully secured.
4. Place the flywheel and clutch assembly on a surface plate and set the scribe to 1.655 in. (42 mm) from the flywheel face using gauge Part No. 262754. Check the height of each operating lever and adjust as necessary, by turning the adjustment nut until the top of the lever is exactly level with the scribe. Adjust the two other levers in a similar manner.
5. Secure the adjusting nuts by staking.



C
Borg & Beck pattern.
(Gearboxes numbered 06106829
(R.H.D.) and 06112987
(L.H.D.) onwards).



B
Borg & Beck pattern.
(Gearboxes numbered 06100201
to 06106828 (R.H.D.) and
06112986 (L.H.D.)).



A
Rover pattern.

Fig. B-6—Cross-section of the clutch unit

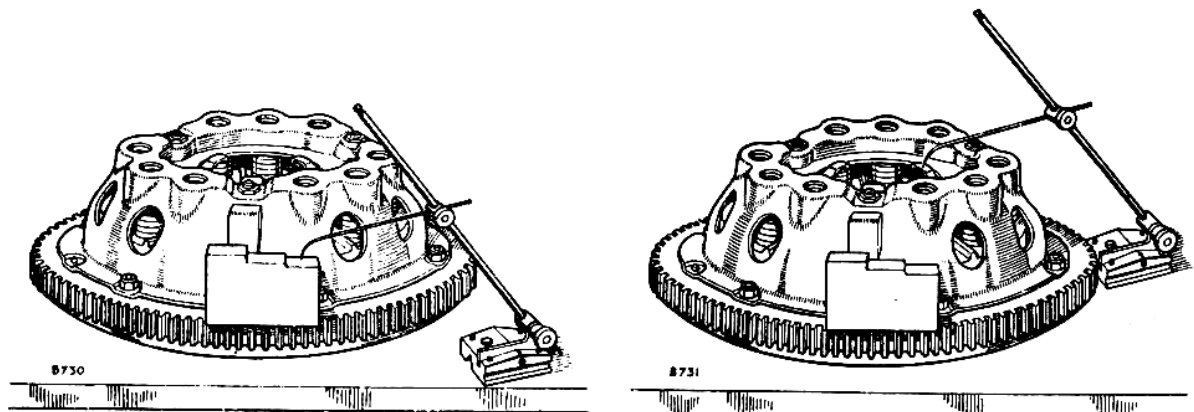


Fig. B-7—Setting the operating levers.

6. Slacken the securing nuts a turn at a time by diagonal selection, and remove the clutch unit from the flywheel.
7. Remove the distance pieces.

Driven plate

To reline

Operation B/24

1. Drill out the retaining rivets, using a $\frac{5}{16}$ in. (4 mm) drill inserted through the clearance hole in the opposite lining; each rivet attaches one facing only. The rivets must not be punched out, as serious deformation of the plate would thereby result.
2. Thoroughly examine the segments for cracks; renew as necessary.
3. Place one facing in position with the countersunk holes coinciding with the ones located on the crown or longer side of each segment.
4. Insert the rivets with their heads in the countersunk holes of the facing and roll the shanks over securely against the segments. If a rolling tool is not available, a blunt-ended centre punch will prove satisfactory.
5. Secure the second facing on the opposite side of the plate in a similar manner, matching the countersunk holes with the remaining holes in the segments. The rivet heads should always face outwards.
6. Mount the plate on a suitable mandrel between centres and check for run-out as near the edge as possible; if the error is more than .010 in. (0,25 mm), press over the high spots until the plate is true within this figure.

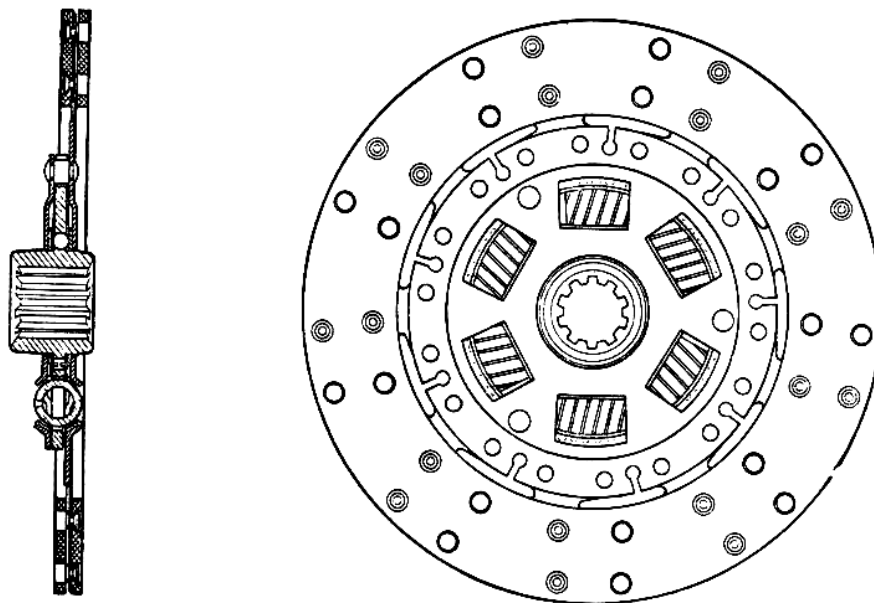


Fig. B-8—Driven plate. Borg and Beck type.

Withdrawal mechanism

Three types of clutch withdrawal mechanism have been used on Land-Rover; they are illustrated at Fig. B-10.

Throughout the overhaul instructions which follow, reference is made to the different types as follows:—

Type A. Fitted to all vehicles equipped with Rover pattern clutch, *i.e.*, gearboxes numbered 860001 to 06100200.

Type B. Fitted to vehicles with Borg & Beck clutch having gearboxes numbered 06100201 to 06106828 (R.H.D.) and 06112986 (L.H.D.).

Type C. Fitted to vehicles with Borg & Beck clutch having gearboxes numbered 06106829 (R.H.D.) and 06112987 (L.H.D.) onwards.

In addition, dust-proofing grommets are fitted to each end of the clutch withdrawal shaft on all gearboxes numbered 06101573 (R.H.D.) and 06104469 (L.H.D.) onwards; these components will also be found on a number of earlier vehicles which have been modified subsequently.

To remove **Operation B/26**

1. Remove the gearbox assembly. Section C.
2. **L.H.D. models only.** Remove the clutch operating lever from the withdrawal cross-shaft by removing the retaining set bolt, spring washer and plain washer. Remove the woodruff key from the cross-shaft.
3. Where applicable, remove the blanking grommets from the bell housing.
4. Where applicable, remove the bolt, nut, plain washer, split pin and spring ring retaining the grommet on the other side of the bell housing; remove the grommet from the bell housing.
5. Remove the clutch withdrawal unit from the bell housing.

To strip (R.H.D. models) **Operation B/28**

1. Remove the cross-shaft cover plate.
2. Drive out the cross-shaft from right to left, thus releasing the withdrawal fork and a thrust washer.

Note: Late 1955 models onward have a thrust spring fitted in the bore of the operating fork.

This spring is removed with the operating fork and does not affect stripping procedure.

3. If necessary, remove the oil seal from the withdrawal housing.
4. If necessary, press off the grommet centre from the housing.

5. Remove the bearing from the withdrawal sleeve and remove the sleeve from the front of the housing.

6. **Rover pattern clutch only.** Remove the circlip from the front of the sleeve, thus releasing the retaining washer, spiral spring and outer cup.

To strip (L.H.D. models) **Operation B/30**

1. Remove the oil seal housing grommet centre and joint washer from the withdrawal housing.
2. If necessary, remove the oil seal from its housing.
3. Remove the outer thrust washer from the cross-shaft and withdraw the shaft, thus releasing the withdrawal fork and inner thrust washer.

Note: Late 1955 models onward have a thrust spring fitted in the bore of the operating fork.

This spring is removed with the operating fork and does not affect stripping procedure.

4. Remove the bearing from the withdrawal sleeve and remove the sleeve from the front of the housing.
5. **Rover pattern clutch only.** Remove the circlip from the front of the sleeve, thus releasing the retaining washer, spiral spring and outer cup.

To overhaul **Operation B/32**

1. If necessary, renew the two small flanged oilite bushes in the right-hand cross-shaft bore of the housing. The bushes must be a *light drive fit* in the housing bore. Renew the cross-shaft if badly worn.

Note: On L.H.D. models only, it is necessary to drive out the cross-shaft cap before the outer bush can be extracted. The cap should be a *light drive fit* in the withdrawal housing.

2. If necessary, renew the large oilite bush in the left-hand cross-shaft bore of the housing. The bush must be a *drive fit* in the housing bore; press the bush in flush with the outer face of the housing.
3. **Rover pattern clutch and early Borg & Beck type clutch only.** If it is loose or damaged, renew the oil drain ring in the withdrawal housing and secure the new part by "centre-popping". At the same time it is well to ensure that the oil scroll machined in the housing is not damaged; a faulty scroll may result in oil reaching the driven plate and so give rise to clutch slip.
4. **Late type Borg & Beck clutch only.** If necessary, renew the oilite withdrawal sleeve bush in the housing. The bush must be a *drive fit* in the housing. The bush should be a *sliding fit* in the housing.

fit on the sleeve. Renew the sleeve if a greater clearance than this is obtained in a new bush.

Ensure that the oil scroll machined on the primary pinion is not damaged; a faulty scroll may result in oil reaching the driven plate and so give rise to clutch slip.

5. **Rover pattern clutch and early Borg & Beck type clutch only.** If necessary, renew the oilite bush(es) in the withdrawal sleeve. The bush(es) must be a *press fit* in the sleeve and a clearance of .0015 in. to .0017 in. must be observed on the primary pinion.

Note: Two bushes are fitted in gearboxes numbered 860001 to 860913 and in all gearboxes fitted to early Borg & Beck type clutches.

6. **Rover pattern clutch only.** Check that the outer cup slides freely on the sleeve; correct as necessary.
7. Renew the thrust bearing if badly worn or damaged. The bearing must be a *light drive fit* on the sleeve; renew the parts as necessary.

To assemble (R.H.D. models) Operation B/34

1. **Rover pattern clutch only.** Fit the outer cup, spiral spring and retaining washer to the front of the withdrawal sleeve and secure them with a circlip.
2. Replace the withdrawal sleeve in the housing; fit the thrust bearing.
3. Fit the oil seal in the cross-shaft bore, with its knife edge inwards.
4. Fit the grommet centre over the housing.
5. Place the withdrawal fork and thrust washer in position in the housing and slide in the cross-shaft from left to right. The hole in the outer end of the shaft should be horizontal when the fork is in contact with the bearing.
6. Refit the cover plate and joint washer.

To assemble (L.H.D. models) Operation B/36

1. Replace the withdrawal sleeve in the housing; fit the thrust bearing.
2. Place the withdrawal fork and inner thrust washer in position in the housing and slide in the cross-shaft from the left.

Late type Borg & Beck clutches. When the rear face of the thrust bearing is set to $\frac{1}{16}$ in.— $\frac{1}{8}$ in. from the joint face of the housing and the fork is resting against the bearing, the hole in the shaft should be horizontal (Fig. B-9).

Rover pattern clutches and early Borg & Beck type clutches only. The key slot in the shaft should be uppermost when the fork is in contact with the bearing.

3. Replace the outer thrust washer on the shaft.

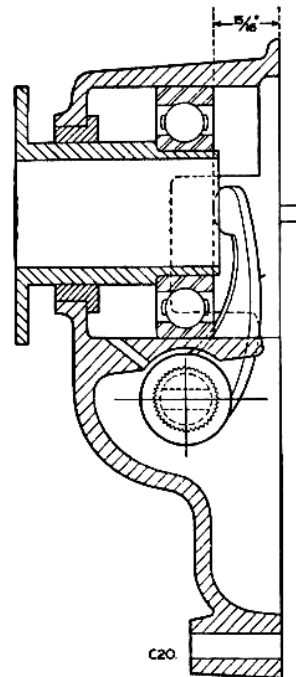


Fig. B-9—
Setting
withdrawal shaft.
Late type Borg
and Beck clutch

4. Fit the oil seal in its housing, with the knife edge inwards.
5. Replace the oil seal housing, joint washer and grommet centre.

To refit

Operation B/38

1. Refit the withdrawal unit (together with a joint washer).
2. Replace the open grommet over the operating end of the cross-shaft and stick it to the centre and bell housing with a suitable adhesive.
3. Replace the blanking grommet in the other side of the bell housing and stick it with a suitable adhesive.

L.H.D. models with Rover pattern or early Borg & Beck type clutch. Fit the Woodruff key in the cross-shaft and replace the clutch operating lever; secure it by means of a set bolt, plain and spring washers.

4. Replace the gearbox assembly. Section C.
5. Adjust the clutch pedal free movement. Operation B/44.

Clutch Pedal Unit

To remove 1948-53 models

Operation B/40

1. Remove the pad and rod from the pedal lever by withdrawing the pinch bolt; this action will also release the pedal stop. Lift off the rubber grommet and the felt pad.
2. Remove the cotter securing the pedal lever to the spindle and withdraw the lever.

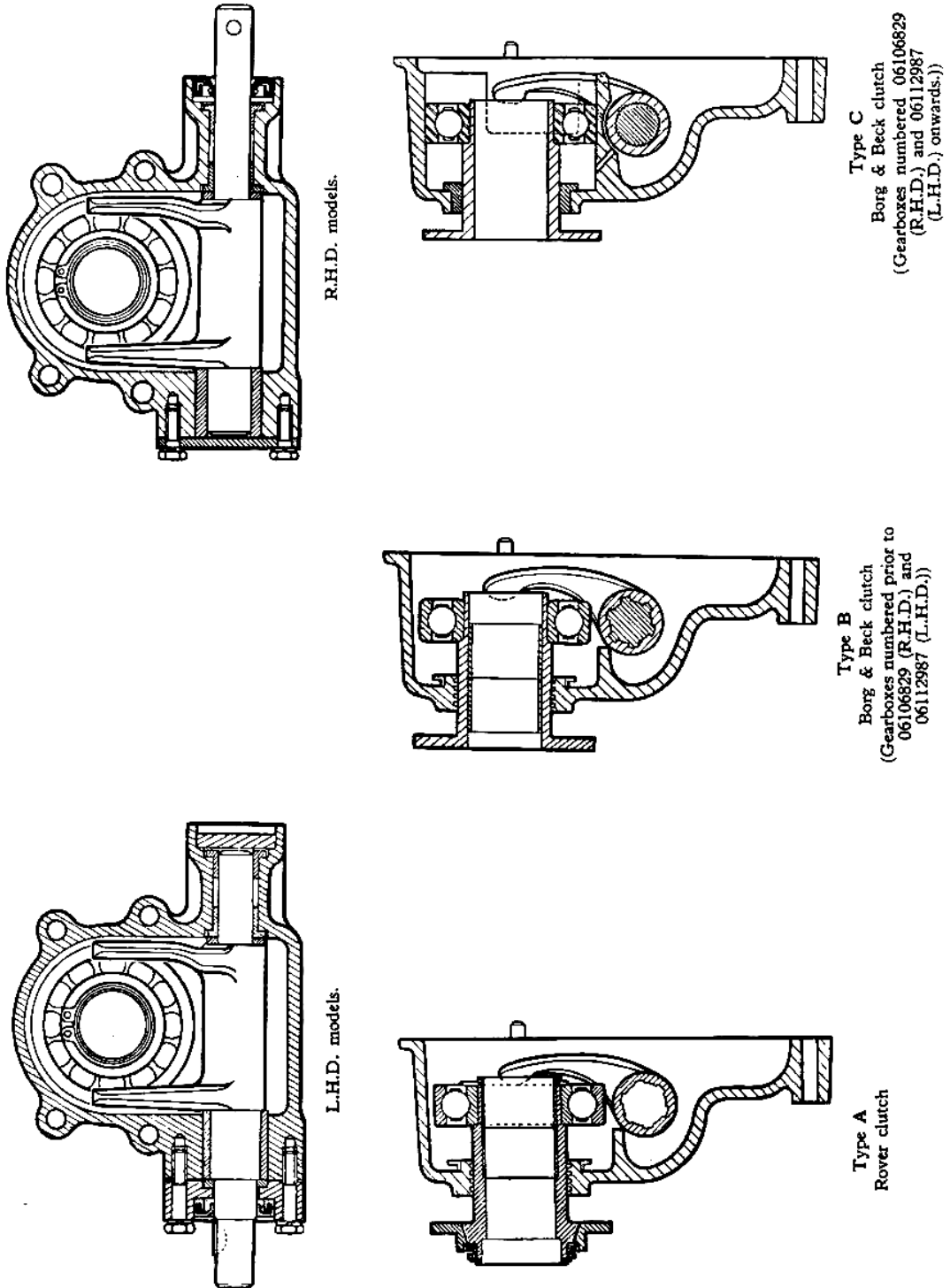
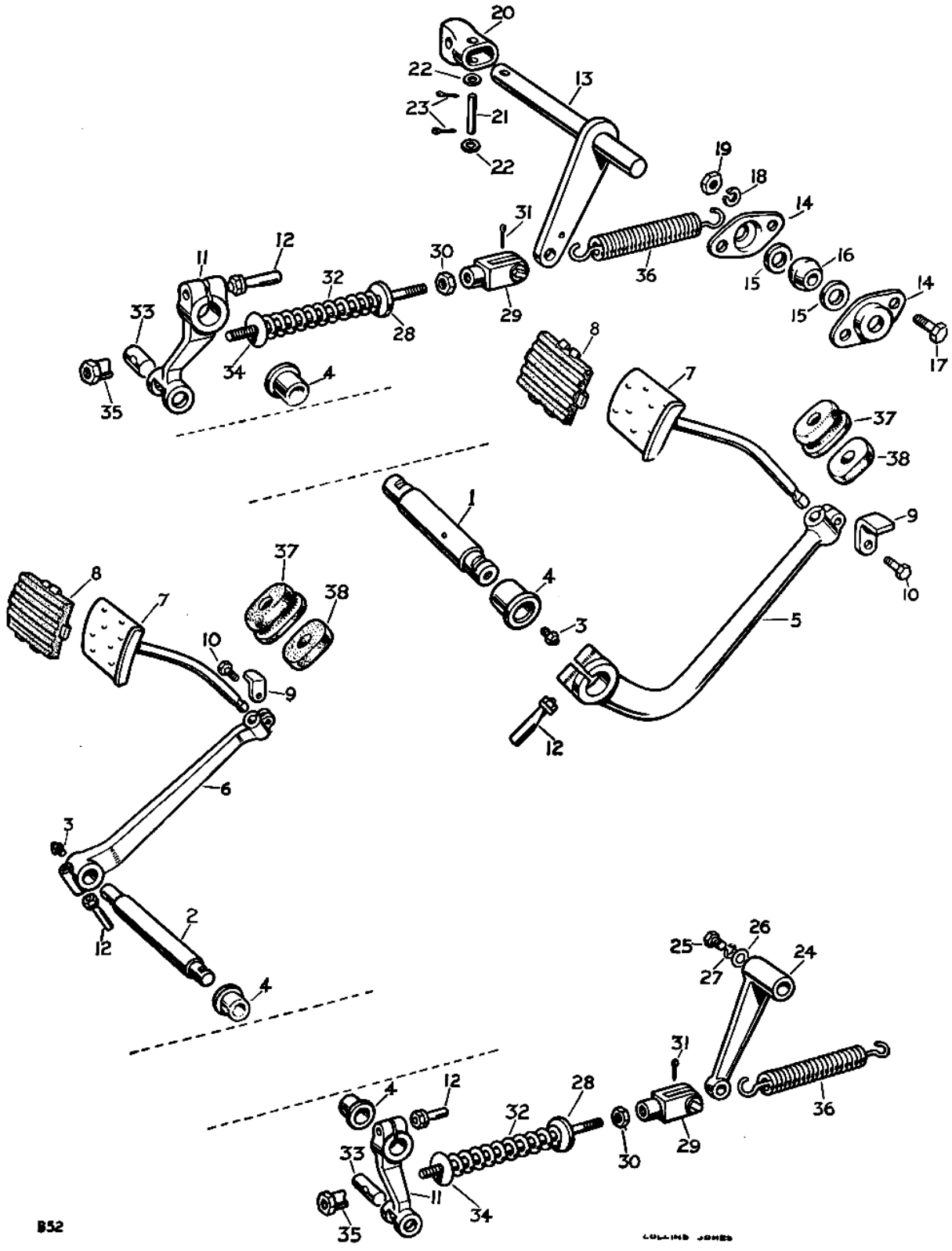


Fig. B-10—Cross-section of the withdrawal mechanism



B52

COLLINS JONES

Fig. B-11—Layout of the clutch pedal and linkage, 1948-53 models

Key to Fig. B-11

1 Clutch pedal shaft, R.H.D. models	20 Connecting tube for cross-shaft	} R.H.D. models
2 Clutch pedal shaft, L.H.D. models	21 Pin	
3 Grease nipple for shaft	22 Plain washers	
4 Bushes for pedal shaft	23 Split pins	
5 Pedal lever, R.H.D. models	24 Operating lever for withdrawal shaft	} L.H.D. models
6 Pedal lever, L.H.D. models	25-27 Fixings for operating lever	
7 Clutch pedal rod and pad	28 Operating rod	
8 Rubber pad for pedal (extra equipment)	29 Clevis	} Fixing rod to withdrawal or cross-shaft lever
9 Clutch pedal stop	30 Locknut	
10 Bolt fixing rod and stop to lever	31 Split pin	
11 Operating lever	32 Spring for operating rod	
12 Cotter fixing lever	33 Trunnion	} Fixing rod to operating lever
13 Cross-shaft and lever	34 Plain washer	
14 Housing for cross-shaft bearing	35 Adjusting nut	
15 Felt ring for bearing housing	36 Return spring for clutch	
16 Spherical bearing for cross-shaft	37 Rubber grommet	} For clutch pedal rod
17-19 Fixings for bearing housing	38 Felt washer	

3. Remove the adjusting nut from the operating rod, pull the operating lever clear of the rod and withdraw the trunnion from the lever fork.
4. Remove the cotter securing the operating lever to the pedal spindle and withdraw the lever.
5. Remove the oil nipple from the spindle.
6. Tap out the spindle from the chassis frame.

1954-58 models

1. Remove the pad and rod from the clutch and brake pedal levers. Lift off the rubber grommets and felt pads.
2. Disconnect the clutch and brake pedal return springs and the stop light operating spring.
3. Remove the operating rod from the lever on the cross-shaft.
4. Remove the brake pedal from the operating rod.
5. Remove the grease nipple.
6. Remove the circlip securing the brake and clutch pedal levers to the spindle and remove both bronze thrust washers and pedal levers.
7. Remove the top locknut and adjusting nut from the clutch operating rod, pull the pedal lever clear of the rod and withdraw the trunnion from the clutch pedal lever fork.
8. If necessary, remove the bush from the clutch pedal lever.
9. Withdraw the pedal spindle from the chassis side member.

To refit

Operation B/42

1948-53 models

1. The diameter of the pedal spindle should be .935 in.—.001 and the internal diameter of the two flanged oilite bushes in the chassis frame .938 in.—.0005, thus giving a clearance of .0025 in. to .004. If the spindle has excessive play in the bushes, they should be renewed as necessary and reamed in position.

1954-58 models

2. The pedal lever bush is a *press fit* in the lever and a *sliding fit* on the pedal spindle. If the spindle has excessive play in the bush, they should be renewed as necessary, reaming the bush in position to the dimension given in the data.

All models

3. Reverse the removal procedure.

Note: Fit grease nipple to spindle first, then position the spindle so that the nipple points downwards.
4. Adjust pedal free movement. Operation B/44.
5. Lubricate with appropriate oil at grease nipple.

To adjust

Operation B/44

1. Slacken the locknut and screw out the stop bolt (A) until the free movement is correct.
2. Secure with the locknut. This action will alter the position of the pedal pad, which can be reset by means of the adjustment provided on the clutch linkage.
3. Slacken the outer locknuts (B) and rotate the inner adjusting nuts (C), both in the same direction, until the pedal is set in a convenient position.
4. Tighten the adjusting nuts and distance pieces against the joint pin and secure with the locknuts.

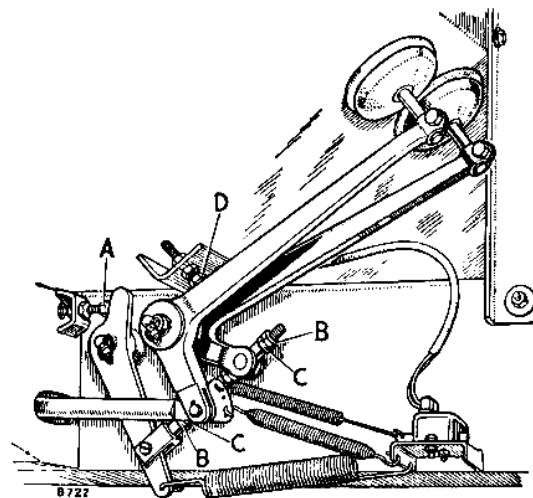


Fig. B-12—Clutch adjustment, 1954-58 models

A—Clutch pedal stop bolt. B—Locknuts.
C—Adjusting nuts. D—Brake pedal stop bolt.

Clutch linkage

To remove

Operation B/46

1948-53 L.H.D. models

1. Remove the adjusting nut from the operating rod, pull the operating lever clear of the rod, and withdraw the trunnion from the lever fork.
2. Remove the spring from the operating rod.
3. Remove the return spring, from the chassis cross-member first.
4. Withdraw the split pin and remove the joint pin securing the operating rod to the lever on the cross-shaft.
5. Remove the set bolt, plain and spring washers securing the cross-shaft lever, and withdraw the key-located lever.

1954-58 L.H.D. models

1. If necessary, remove the floor board. Section R.
2. Disconnect the clutch return spring.
3. Remove the operating rod from the relay lever.

4. Remove the top locknut and adjusting nut from the clutch operating rod, pull the rod clear of the pedal lever and remove the trunnion from the clutch pedal lever fork.
5. Remove the connecting tube from the end of the relay inner rod.
6. Remove the circlip and steel thrust washer from inner end of relay shaft and withdraw the complete relay shaft assembly from the chassis side member.
7. Remove distance piece from the relay shaft and tap out pin securing lever to relay shaft.
8. Withdraw inner rod from relay shaft.
9. If necessary, remove bush from relay shaft.
10. If necessary, remove bushes from chassis side member.
11. Remove the grease nipple from the relay lever.
8. Remove the connecting tube from the cross-shaft.
9. Remove the universal joint sleeve from the relay shaft and lever.
10. Remove relay lever and shaft from right-hand side of chassis side member and universal joint sleeve steel thrust washer and cross-shaft from the left-hand side.
11. If necessary, remove bushes from chassis side member.
12. Remove the grease nipple from the relay lever and shaft.

To remove **Operation B/48**
1948-53 R.H.D. models

1. Remove the adjusting nut from the operating rod, pull the operating lever clear of the rod and withdraw the trunnion from the lever fork.
2. Remove the spring from the operating rod.
3. Remove the return spring, from the chassis cross-member first.
4. Withdraw the split pin and remove the joint pin securing the operating rod to the lever on the cross-shaft.
5. Remove a split pin, plain washer and connecting pin securing the connecting tube to the end of the cross-shaft protruding from the bell housing.
6. Withdraw the split housing from the right-hand chassis side member by removing the two retaining bolts, spring washers and nuts.
7. Remove the cross-shaft and lever complete with two felt seals and the self-lubricating spherical bush.

1954-58 R.H.D. models

1. If necessary, remove the floor board. Section R.
2. Remove brake pedal return spring, stop light operating spring and clutch pedal return spring.
3. Remove the brake pedal lever from the operating rod.
4. Slacken locknut and remove brake operating rod.
5. Remove the clutch operating rod from the relay lever.
5. Remove top locknut and adjusting nut from the operating rod, pull the rod clear of the pedal lever and remove the trunnion from the clutch pedal fork.
7. Push clutch relay shaft dust excluder along the cross-shaft towards bell housing.

To refit **Operation B/50**
1948-53 models

1. Check the clutch return spring in accordance with the following specification and renew it as necessary:—Load 50 lb. (23 kg) at 2.5 in. (38 mm) extension.
2. Check the operating rod spring in accordance with the following specification, and renew it as necessary:—Load required to compress spring 1 in. (25 mm): 33 lb. (15 kg).
3. **R.H.D. models only.** Renew the felt seals as necessary; grease the spherical bush.
4. Replace the linkage by reversing the sequence of removal operations.
5. Adjust the pedal free movement.

1954-58 models

1. Check clutch return spring and renew as necessary. Load 15 lb. (6,75 kg) at .84 in. (21,3 mm) extension.
2. The relay shaft should be a *sliding fit* in its bushes; they should be renewed as necessary, and reamed in position to the dimension given in the data.
3. **L.H.D. models only.** The relay inner rod should be a *sliding fit* in the bush in the relay shaft. They should be renewed as necessary, and the bush reamed in position to the dimension given in the data.
4. Replace the linkage by reversing the removal procedure.
 On R.H.D. models the joint pin in the universal joint sleeve should be vertical when the relay lever is against its stop, and on L.H.D. models the hole in the relay inner rod should be horizontal when the lever is against its stop.
5. Adjust pedal free movement. Operation B/44.
6. Adjust brake pedal operating rod. Section H.
7. Lubricate at grease nipple with appropriate oil.

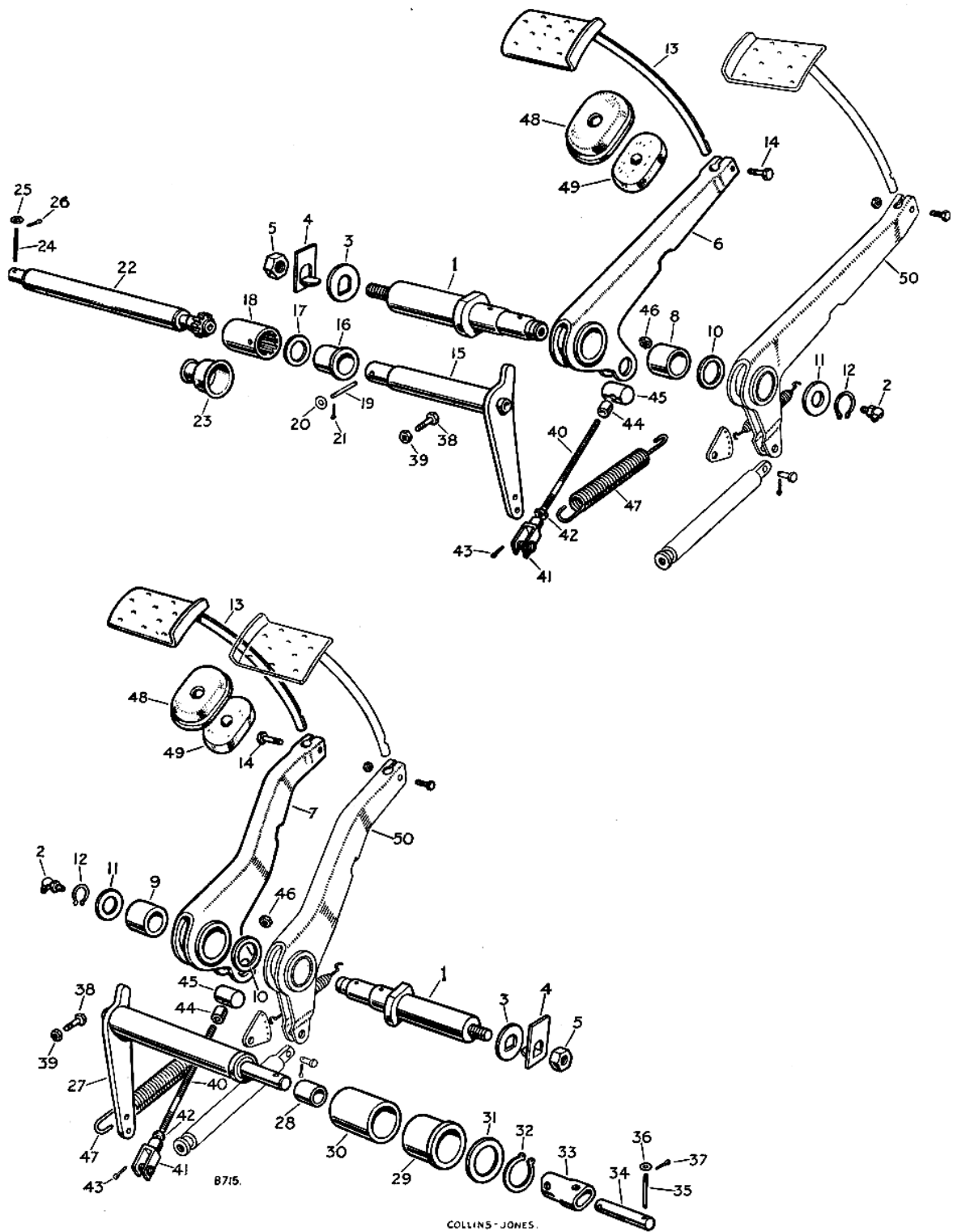


Fig. B-13—Layout of the clutch pedal and linkage, 1954-58 models

Key to Fig. B-13

1 Shaft for clutch and brake pedal	27 Clutch relay shaft	} L.H.D.
2 Grease nipple for shaft and pedal	28 Bush for relay shaft, small	
3-5 Fixings for pedal shaft	29 Bush for relay shaft, large	
6 Pedal lever for clutch—R.H.D.	30 Distance tube for relay shaft	
7 Pedal lever for clutch—L.H.D.	31 Thrust washer for cross-shaft	
8 Bush for clutch pedal lever—R.H.D.	32 Circlip fixing cross-shaft	
9 Bush for clutch pedal lever—L.H.D.	33 Connecting tube for clutch	
10 Thrust washer for pedal	34 Cross-shaft rod for clutch, centre	
11-12 Fixings for pedal lever	35-37 Fixings for centre rod	
13 Clutch pedal rod and pad	38 Stop bolt for clutch relay	
14 Set bolt fixing rod to lever—R.H.D.	39 Locknut for bolt	
15 Clutch relay shaft	40 Operating rod for clutch	
16 Bush for relay shaft	41-43 Fixings for rod	
17 Thrust washer for universal joint sleeve	44-46 Fixings for rod	
18 Universal joint sleeve	47 Return spring for clutch	
19-21 Fixings for sleeve	48 Rubber grommet	} For clutch pedal rod
22 Cross-shaft for clutch	49 Felt washer	
23 Dust cover for cross-shaft	50 Brake pedal assembly	
24-26 Fixings for cross-shaft to clutch fork		

DEFECT LOCATION

Symptom, Cause and Remedy

A—GRABBING CLUTCH

1. Incorrect release lever adjustment—*Adjust.*
2. Oil on the clutch lining—*Renew.*
3. Worn clutch plates or flywheel—*Renew.*
4. Clutch plate hub sticking on the pinion shaft—*Free off the clutch plate and check for wear and distortion. Check the pinion shaft for wear.*
5. Worn or binding operating levers—*Wear on levers usually indicates a binding withdrawal race thrust bearing. Free off bearing and renew levers.*
6. Worn or glazed linings—*Renew.*
7. Broken or weak pressure springs—*Renew.*
8. Sticking clutch pedal—*Free off the pedal and check for damaged or bent parts. Check the return spring.*
9. Damaged or deteriorated engine mountings, or engine loose in chassis frame—*Re-tighten or renew.*

B—SLIPPING CLUTCH

1. Weak or broken pressure springs—*Renew.*
2. Worn clutch linings—*Renew and check plates for scoring.*
3. Incorrect clutch adjustment—*Adjust.*
4. Oil on the linings—*Renew. Remove drain plug from flywheel housing at regular intervals. Rectify the oil leak.*
5. Warped clutch plate—*Renew.*
6. Scored or damaged pressure plate—*Skim or renew.*
7. Binding withdrawal lever—*Free off the lever and check for wear. Examine the clutch linings, plates and springs for wear or damage and the flywheel for scoring. Renew as found necessary.*
8. Binding clutch pedal mechanism—*Rectify or renew.*
9. Insufficient free movement on the clutch pedal—*Adjust.*
10. Riding clutch—*In the hands of the operator.*
11. Fractured clutch plate—*See Item C (5).*

C—DRAGGING OR SPINNING CLUTCH

1. Oil on the clutch linings—*Remove flywheel housing drain plug at regular intervals. Renew; if necessary rectify oil leak.*
2. Incorrect lever adjustment—*Examine and adjust.*
3. Incorrect pedal adjustment—*Adjust.*
4. Dust or other foreign matter in the clutch—*Clean and renew.*
5. Bent clutch plate—*Ascertain reason for damage, check the remainder of the clutch and renew the plate. A plate may be distorted due to the weight of the gearbox being allowed to hang on the clutch plate during erection. When fitting a new plate, take the weight of the gearbox with a jack or by other suitable means.*
6. Clutch plate hub binding on the pinion shaft—*Rectify or renew.*
7. Primary pinion bush binding—*Rectify.*
8. Clutch withdrawal sleeve sticking—*Rectify and examine all mating surfaces for scoring and wear.*
9. Warped clutch pressure plate and clutch cover—*Renew.*
10. Clutch facings too thick—*Renew.*
11. Broken clutch linings—*Renew. Examine the pressure plate, clutch cover, etc., for distortion and damage.*

D—RATTLING CLUTCH

1. Weak or broken operating lever return spring—*Renew.*
2. Damaged pressure plate—*Ascertain the reason for the damage and rectify. Recondition or renew.*
3. Broken pedal return spring—*Renew.*
4. Pinion shaft or clutch plate splines worn—*Renew.*
5. Worn primary pinion bush—*Renew.*
6. Unequal contact of operating levers—*Adjust.*
7. Incorrect free play in pedal lever—*Adjust.*
8. Damaged clutch plate, loose or broken springs; warped clutch plate—*Renew.*
9. Worn parts in the withdrawal mechanism—*Renew.*
10. Excessive backlash in the transmission—*Rectify.*
11. Normal wear in clutch—*Renew.*

E—SQUEAKING CLUTCH

1. Primary pinion bush binding—*Rectify and renew.*
2. Primary pinion bush turning in the flywheel—*Renew.*

F—VIBRATING CLUTCH OR CLUTCH JUDDER

1. Incorrect clutch balance—*Renew.*
2. Clutch pressure plate incorrectly fitted—*Refit.*
3. Loose engine mountings—*Tighten.*
4. Worn propeller shaft universal joints—*Rectify.*
5. Loose flywheel—*Tighten. Check run-out on flywheel.*
6. Oil or other foreign matter on the clutch lining—*Remove flywheel housing drain plug at regular intervals. Renew.*
7. Contact area of friction faces not evenly distributed—*Rectify or renew.*
8. Bent splined shaft or buckled driven plate—*Renew and check for damage.*
9. Pressure plate out of parallel with flywheel face—*Rectify.*

G—STIFF CLUTCH OPERATION

1. Dry or damaged linkage parts—*Lubricate and renew, if necessary.*
2. Clutch pedal spindle dry—*Lubricate.*
3. Pedal fouling on the floor board—*Rectify.*

H—CLUTCH TICKS OR KNOCKS

1. Clutch plate hub splines worn—*Rectify and renew.*
2. Worn primary pinion bush—*Renew.*

J—FRACTURED CLUTCH PLATE

1. See item C (5)—*Rectify and renew.*

K—EXCESSIVE LINING WEAR

Produced by overloading or by slipping clutch—*In the hands of the operator.*

DATA: Rover pattern clutch

Clutch unit:		Thrust race	.... Ball bearing
Type	.... Single dry plate: spring drive, self-centralising	Number of thrust springs	.... 9 (colour: orange)
Diameter	.... 9 in. (230 mm)	Spring poundage	.... 130 lb ± 4 (63 kg ± 1,8) each
Total area of lining	.... 64.8 sq. in. (418 cm ²)		
Thickness of plate (new)	.... .330 in. (8,4 mm)	Clutch pedal:	Free movement
Thickness of plate fully worn210 in. (5,3 mm)		

DATA: Borg & Beck type clutch

Clutch:		Withdrawal mechanism:	
Type	.... Single dry plate, spring drive, self-centralising	Clearance of bush on cross-shaft	.... .002 to .004 in. (0,05 to 0,10 mm)
Thrust race:		Fit of oilite withdrawal sleeve bush in housing	.... Zero to .002 in. (zero to 0,05 mm) interference
Type	.... Ball bearing	Clearance of bush on sleeve	.... .003 to .007 in. (0,08 to 0,18 mm)
Thrust springs:		Fit of thrust bearing on sleeve	.... Zero to .0005 in. (zero to 0,013 mm) interference
Number off	.... 9	Clutch pedal unit:	
Free length (Petrol models)	.... 2.680 in. (68 mm)	Pedal free movement	.... $\frac{3}{4}$ in. (20 mm) measured at pedal pad
Free length (Diesel models)	.... 2.688 in. (68,2 mm)	Clearance of bush on pedal spindle	.... .001 to .002 in. (0,01 to 0,06 mm)
Working length	.... 1.688 in. (43 mm)	Bush: reamed bore	.... L.H.D.: $\frac{7}{8}$ in. (22 mm)
Load at working length (Petrol models)	.... 120-130 lb. (54,5-59 kg)	Bush: reamed bore	.... R.H.D.: 1 in. (25 mm)
Load at working length (Diesel models)	.... 135-145 lb. (61,3-65,8 kg)	Clutch linkage	
Identification (Petrol models)	.... Cream paint	L.H.D. models:	
Identification (Diesel models)	.... Yellow paint	Fit of relay shaft bushes in chassis	.... .001 to .003 in. (0,02 to 0,09 mm) interference
Pressure plate:		Clearance of bushes on relay shaft	.... .003 to .004 in. (0,09 to 0,10 mm)
Re-grinding limit	.... .010 in. (0,25 mm) under-size	Fit of bush in relay shaft	.... .001 to .002 in. (0,02 to 0,06 mm) interference
Minimum thickness	.... 1.531 in. (38,90 mm)	Clearance of bush on inner rod	.... .002 to .003 in. (0,05 to 0,09 mm)
Operating levers:		R.H.D. models:	
Height from flywheel face using $\frac{3}{8}$ in. (9,5 mm) distance piece in place of the driven plate	.... 1.655 in. (42 mm)	Fit of relay shaft bushes in chassis	.... .001 to .002 in. (0,03 to 0,07 mm) interference
Driven plate:		Clearance of bushes on relay shaft	.... .002 to .004 in. (0,05 to 0,10 mm)
Diameter	.... 9 in. (230 mm)	Clutch return spring	.... Load 15 lb. (6,75 kg) at .84 in. (21,3 mm) extension
Thickness of plate, new	.... .330 in. (8,4 mm)		
Maximum permissible wear	.... .120 in. (3,1 mm)		
Identification (Petrol models)	.... Red and violet springs		
Identification (Diesel models), springs	.... 3 off—Buff and light green 3 off—Light grey and violet		