

SECTION F

THE GEARBOX

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GENERAL DESCRIPTION

The gearbox has four forward speeds and one reverse. Top gear is obtained by direct drive, third and second by gears in constant mesh, and first and reverse by sliding spur gears.

A sliding joint of the reverse spline type is fitted to the rear end of the third motion shaft and is lubricated from the gearbox.

Section F.1

DISMANTLING THE THIRD MOTION SHAFT (Mainshaft)

Remove the following items in this order: baulk ring, top and third synchronmesh sleeve and hub, second baulk ring. If the synchronmesh sleeve is removed from the hub take care not to lose the three locating balls and springs that will be released in consequence.

Press down the third speed cone thrust washer locating plunger; rotate the thrust washer to align its splines with those on the shaft and remove the washer.

Withdraw the third speed gear and its splined bush.

Withdraw the bush interlocking washer to release the second speed gear with its bush and baulk ring.

Remove the rear thrust washer from the splines on the shaft and withdraw the first speed gear and second speed synchronizer; if it is necessary to slide the gear from the synchronizer take care not to lose the three balls and springs.

Tap up the locking washer and unscrew the rear retaining nut; withdraw the washer, speedometer drive gear and key, and the distance sleeve from the shaft.

Press the rear bearing and its housing from the shaft.

Section F.2

ASSEMBLING THE THIRD MOTION SHAFT (Mainshaft)

Assemble from the front end.

- (1) Locate the rear thrust washer on the front end of the splines, ground face to the front.
- (2) Push the longer phosphor-bronze bush up to the splines with the dogs towards the front. The bush is a tight fit on the shaft and must be immersed in warm oil to facilitate fitting. The oil hole in the bush must register with the hole in the shaft.
- (3) Fit the second speed baulk ring and gear onto the bush with the plain side of the gear towards the front.
- (4) Slide on the bush interlocking washer and the shorter-splined bush, locating the dogs of both

bushes in the interlocking washer. Immerse the bush in warm oil to facilitate fitting.

- (5) Insert the spring and plunger into the hole in the shaft.
- (6) Fit the third speed gear onto the bush with the cone towards the front.
- (7) Thread on the front thrust washer, machined face towards the gear, while holding down the plunger by means of a thin punch through the hole in the gear cone, and push the washer over it; turn the washer to allow the plunger to engage in one of the splines.
- (8) Fit the three springs and balls to the third speed synchronizer and, with the aid of special tool 18G223, push on the synchronizer sleeve (striking dog).
- (9) Push on the top and third gear synchronmesh assembly hub with its two baulk rings. The plain side of the hub faces the rear.

Assemble the following items from the rear:

- (1) Insert the three balls and springs in the second gear hub and, with the aid of special tool 18G222, push the synchronizer sleeve (striking dog) into position on the hub.
- (2) Fit the first speed gear and synchronmesh hub assembly and the baulk ring to the splines on the shaft.
- (3) Press the rear bearing into its housing and fit it to the shaft, the flange of the housing to the rear.
- (4) Push on the distance sleeve, speedometer drive gear, and key and secure with the lock washer and nut.

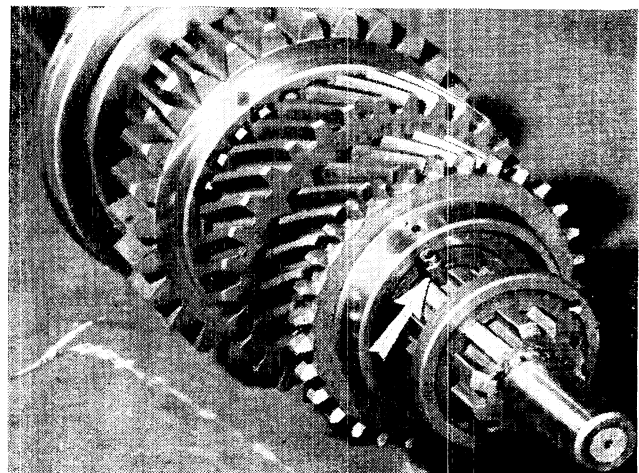


Fig. F.1

The arrow indicates the third speed thrust washer and locating peg

Section F.3

DISMANTLING THE LAYSHAFT GEAR

Extract one of the circlips from the layshaft gear and push out the bearing and distance tube assembly; there are three needle races and one distance tube spaced in the layshaft gear which are retained by a circlip at each end, two races being fitted at the front end and one at the rear.

Section F.4

ASSEMBLING THE LAYSHAFT GEAR

The following method for refitting the layshaft gear bearing assemblies is suggested.

Fit a circlip to the innermost groove in the gear.

Hold the shaft vertically in the vice; assemble a roller bearing on the shaft against the vice jaws and then slide the gear over the shaft and the bearing with the large gear downwards.

Remove the shaft from the vice and push the bearing into the gear against the circlip. Fit a circlip, the end roller bearing assembly, and the retaining circlip.

Slide the distance tube into the other end of the gear, followed by the other end bearing and circlip. Remove the gear from the shaft.

Section F.5

DISMANTLING AND ASSEMBLING THE FIRST MOTION SHAFT

Unlock and remove the securing nut and withdraw the locking washer.

Press the bearing from the shaft and remove the circlip from the bearing.

Reassembling

Fit the bearing to the shaft with the spring ring away from the gear. Replace the locking washer and tighten the retaining nut; bend over the locking washer to secure the nut.

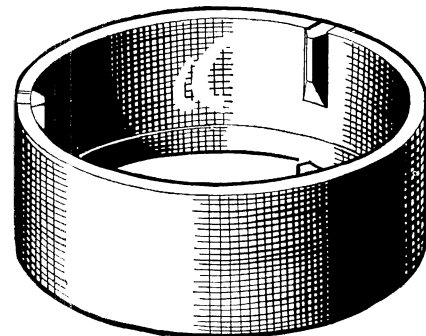
Section F.6

SPECIAL TOOLS

18G222. Synchronesh Unit Assembly Ring—Second Speed

Designed to facilitate the assembly of mated synchronizer and sleeve by enabling the springs and balls to be inserted quickly and easily.

18G223. Synchronesh Unit Assembly Ring—Third and Top



18G222

18G223

SECTION FF

THE GEARBOX

This Section is a Supplement to Section F

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Assembling	FF.4
Dismantling	FF.2
Extension	
Assembling	FF.5
Dismantling	FF.3
Gearbox side cover—modified	FF.6
Removing	FF.1
Tools—special End of Section

Section FF.1

REMOVING THE GEARBOX

Remove the power unit as in Section AA.5.

Unscrew the bolts securing the bell housing and withdraw the gearbox and rear extension. Take care to keep the box in line with the engine until the clutch shaft is free from the clutch.

Section FF.2

DISMANTLING THE GEARBOX

Remove the rear power unit mounting.

Unscrew the speedometer drive, but do not withdraw the pinion from the bush unless absolutely necessary, or damage to the oil seal may result on replacement.

Unscrew the set screws and remove the gear lever tower and joint washer.

Unscrew and remove the six bolts and the rear extension cover and joint washer. Remove the interlock arm and bracket from the aperture in the rear extension.

Unscrew the three countersunk screws and the seven hexagon-headed set screws holding the gearbox cover; remove the cover.

Remove the two nuts and six set screws securing the gearbox extension to the gearbox. Pull the extension from the gearbox, at the same time manœuvring the remote control shaft selector lever down and out from the selectors.

Cut the locking wire and unscrew the three change speed fork set screws. Release the three locknuts and slacken the fork locating screws.

Unscrew the two set screws and remove the shifter shaft locating block with shifter shafts from the gearbox; note the two dowels in the block. If the rods are withdrawn from the locating block take care to catch the three selector balls and springs.

Withdraw the forks from the box in the following order: reverse, top and third, and first and second.

Unscrew the clutch lever pivot nut; extract the pivot bolt and remove the lever with the thrust bearing.

Unscrew the nuts and remove the gearbox front cover complete with oil seal; note the bearing shims between the cover and the front bearing. Tap out the layshaft, allowing the gear unit to rest in the bottom of the box.

Unscrew the retaining set screw and remove the reverse shaft and gear.

Withdraw the third motion shaft (mainshaft) assembly to the rear.

Withdraw the first motion shaft and drive gear.

NOTE.—Retrieve the 18 spigot needle rollers. Lift out the layshaft gear unit and the two thrust washers.

FF.2

Section FF.3

DISMANTLING THE REAR EXTENSION

Remove the rear remote control rod selector arm set screw and withdraw the selector arm and key; unscrew the set screw at the forward end and remove the front remote control selector arm and key.

Withdraw the remote control rod from the rear extension.

To remove the oil seal from the extension use the special tool 18G389 and adaptor 18G389B (see Fig. FF.2).

Should it be necessary to remove the sliding joint bush, this must be drawn from the extension and not driven inwards.

Section FF.4

ASSEMBLING THE GEARBOX

Place the layshaft gear in the gearbox complete with the end-thrust washer but do not fit the layshaft; use dummy layshaft 18G471 to retain the thrust washers in position. Replace the first motion shaft and insert the 18 needle-roller bearings. Insert the third motion shaft assembly from the rear of the gearbox; enter the spigot in the needle rollers of the first motion shaft. Use the gasket fitted between the gearbox and the rear extension to position the dowel and bearing housing. Push the shaft right home. Fit the layshaft, lining up the cut-away portion of the front end with the locating groove in the front cover.

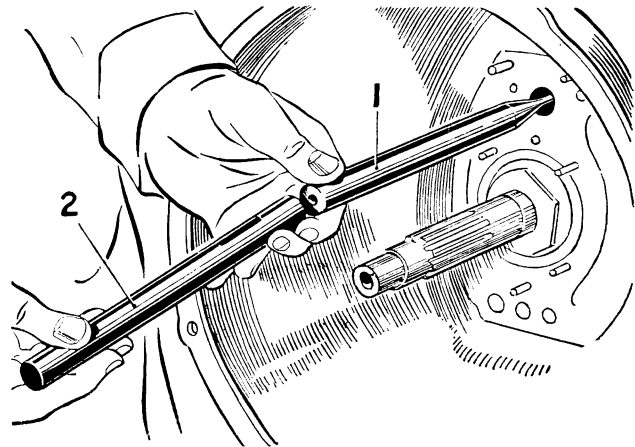
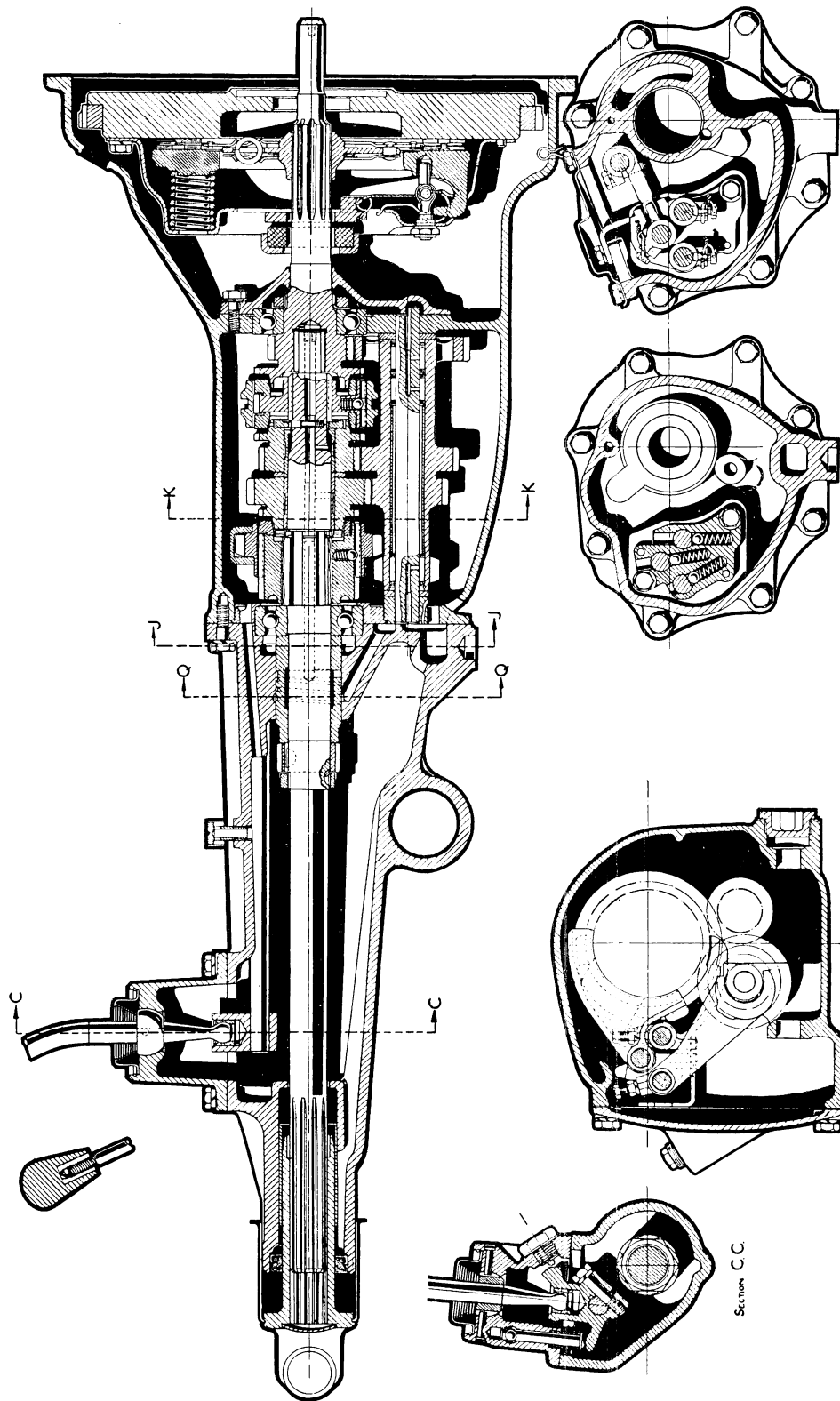


Fig. FF.1

Using tool 18G471 as a pilot when installing the layshaft

1. Pilot.
2. Layshaft.

THE GEARBOX AND REMOTE CONTROL IN SECTION



SECTION Q.Q.

SECTION J.J.

SECTION K.K.

SECTION C.C.

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KEY TO THE GEARBOX COMPONENTS

No.	Description	No.	Description	No.	Description
1.	Casing—gearbox.	56.	Key—lever.	107.	Housing—bearing.
2.	Stud—front cover.	57.	Lever—selector—rear.	108.	Peg—locating.
3.	Plug—drain.	58.	Bush—lever.	109.	Distance piece—speedometer gear.
4.	Stud—gearbox extension.	59.	Clip for bush.	110.	Nut for shaft and speedometer gear.
5.	Plug—blanking.	60.	Set screw for rear lever.	111.	Lock washer for nut.
6.	Washer for plug.	61.	Spring washer for screw.	112.	Gear—speedometer drive.
9.	Cover—front.	62.	Key—lever.	113.	Key—gear.
10.	Joint—cover.	63.	Fork—first and second speed.	114.	Pinion—speedometer drive.
11.	Nut for front cover stud.	64.	Screw—fork locating.	115.	Bush—pinion.
12.	Spring washer for stud.	65.	Shaft—first and second speed fork.	116.	Oil seal—pinion.
13.	Cover—side.	66.	Ball for shaft.	117.	Ring—oil seal retaining.
14.	Joint—cover to casing.	67.	Spring for ball.	118.	Joint—pinion bush to rear cover.
15.	Set screw for cover.	68.	Fork—third and fourth speed.	119.	Gear—first speed.
16.	Spring washer.	69.	Locknut.	120.	Gear—second speed.
17.	Countersunk screw for cover.	70.	Shaft—third and fourth speed fork.	121.	Synchronizer—second speed.
18.	Shakeproof washer.	71.	Fork—reverse.	122.	Ball—synchronizer.
19.	Extension—gearbox.	72.	Spring washer.	123.	Spring for ball.
20.	Bush for extension.	73.	Shaft—reverse fork.	124.	Baulk ring—second speed gear.
21.	Oil seal assembly.	74.	Block—locating—shafts.	125.	Bush—second speed gear.
22.	Plug—filler and level.	75.	Set screw for block to casing.	126.	Gear—third speed.
23.	Joint—extension to gearbox.	76.	Spring washer for screw.	127.	Baulk ring—third and fourth gear.
24.	Nut for stud for extension to gearbox.	77.	Selector—first and second gear.	128.	Bush—third speed gear.
25.	Set screw for extension to gearbox.	78.	Screw—locating—selector.	129.	Ring—interlocking—second and third gear bushes.
26.	Spring washer for studs and set screws.	79.	Selector—third and fourth gear.	130.	Coupling—sliding—third and fourth speed.
27.	Plug—taper—gearbox extension.	80.	Screw—locating—selector.	131.	Synchronizer—third and fourth speed gear.
28.	Cover—side—extension.	81.	Selector—reverse.	132.	Ball—synchronizer.
29.	Joint—cover.	82.	Spring washer.	133.	Spring for ball.
30.	Set screw for cover.	83.	Screw—locating—selector.	134.	Layshaft.
31.	Spring washer.	84.	Plunger—reverse selector.	135.	Gear unit—layshaft.
32.	Breather assembly.	85.	Spring for plunger.	136.	Bearing—needle-roller—layshaft (outer) assembly.
37.	Tower—change speed lever.	86.	Bolt for plunger.	137.	Bearing—needle-roller—layshaft (inner) assembly.
38.	Dowel for tower.	87.	Dowel for plunger.	138.	Spring ring for needle roller.
39.	Joint—tower.	88.	Ball for plunger.	140.	Distance piece—bearing.
40.	Set screw for tower.	89.	Spring for ball.	141.	Thrust washer—front.
41.	Spring washer.	90.	Arm—interlock with plate assembly.	142.	Thrust washer—rear.
42.	Plug.	93.	Shaft—first motion.	143.	Shaft—reverse.
43.	Joint—plug.	94.	Nut for shaft.	144.	Screw—locking—shaft.
44.	Lever—change speed.	95.	Lock washer for nut.	145.	Lock washer for screw.
45.	Knob—lever.	96.	Bearing—ball—shaft.	146.	Gear—reverse.
46.	Rubber—knob.	97.	Spring ring for bearing.	147.	Bush.
47.	Snug—lever ball.	98.	Shim for bearing.	148.	Bolt—gearbox to mounting plate.
48.	Spring washer.	99.	Rollers—needle—shaft.	149.	Nut for bolt.
49.	Spring—lever ball.	100.	Shaft—third motion.	150.	Spring washer for bolt.
50.	Cover—spring.	101.	Restrictor—oil.	151.	Screw—starter to engine.
51.	Clip for cover.	102.	Thrust washer—front.	152.	Spring washer for screw.
52.	Shaft—remote control.	103.	Thrust washer—rear.		
53.	Lever—selector—front.	104.	Peg for front thrust washer.		
54.	Set screw for front lever.	105.	Spring for peg.		
55.	Spring washer for screw.	106.	Bearing—rear—third motion shaft.		

Fit the reverse gear and shaft; tighten the set screw and secure with the locking washer.

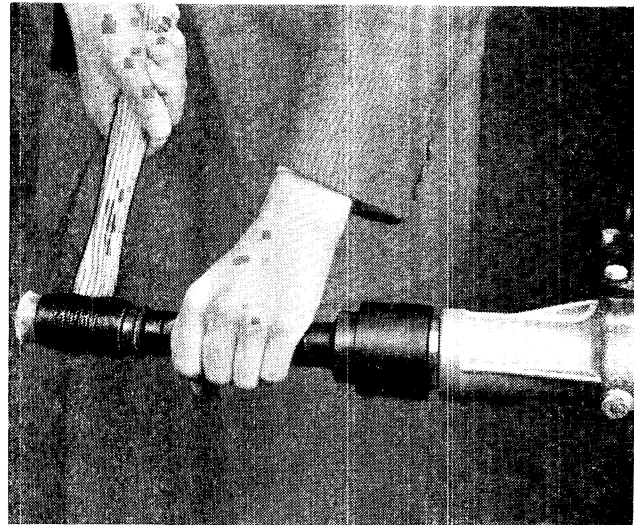
Refit the front end cover, replacing the bearing shims that were removed on dismantling.

Refit the clutch lever and fork.

Position the gear change forks in the gearbox in the following order: first and second, third and top, reverse.

Bolt the shifter shaft locating block to the rear face of the gearbox; replace the balls and springs and push the shifter shafts through the block into their respective change speed forks. Insert, tighten, and lock the three locating screws.

Position the selectors on the rear end of the shifter shafts; insert, tighten, and wire up the set screws.



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Fig. FF.3

Installing a new oil seal assembly with special tools 18G134 and 18G134N

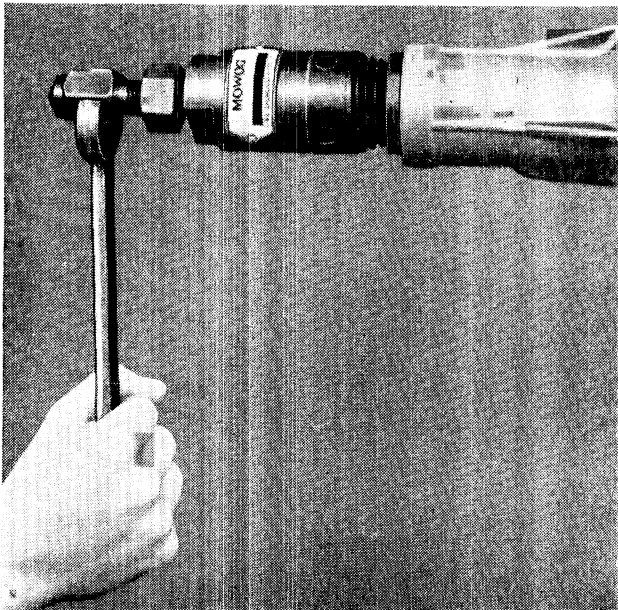
Section FF.5

ASSEMBLING THE REAR EXTENSION

Fit the rear extension oil seal, using service tool 18G134 with its adaptor 18G134N.

Locate the remote control rod in the rear extension.

Fit the front and rear selector levers to the remote control rod; note that they are secured and located by keys and set screws.



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Fig. FF.2

Removing a rear oil seal assembly with special tools 18G389 and 18G389B

Fit the rear extension to the gearbox, locating the control rod selector arm in the shifter rod selectors.

Fit the interlock arm to the rear extension and refit the cover.

Bolt the gear lever tower to the rear extension.

Place the two halves of the brass gear lever snug on the lower end of the lever and secure with the circlip. Fit the lever to the tower and secure it with the cover, spring, and circlip.

Replace the side cover, using a new joint as necessary. Fit the speedometer drive gear assembly, drain plug, and breather.

Fill with oil to Ref. A (page P.2) to the level of the filler plug threads.

Section FF.6

MODIFIED GEARBOX SIDE COVER

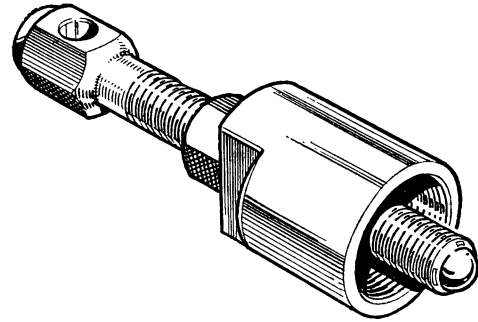
From Gearbox No. 3525 a modified gearbox side cover (Part No. 1H3309) is fitted, having the filler plug boss placed 4 in. (102 mm.) rearwards and nearly $\frac{1}{2}$ in. (12 mm.) higher than on the original side cover. This is to bring the oil filler to a more accessible position.

The new side cover is interchangeable with the old provided that a hole is cut in the appropriate position in the gearbox tunnel of the body. The original $\frac{5}{8}$ in. BSP tapered filler plug will also fit the new assembly.

SPECIAL TOOLS

18G389. Oil Seal Remover (basic tool)

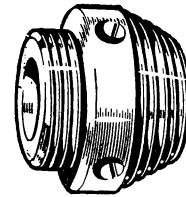
This basic tool together with the appropriate adaptor is essential for removing the gearbox extension oil seal easily without damage and without removing the gearbox from the vehicle. The appropriate adaptor for use with the basic tool is supplied separately.



18G389

18G389B. Oil Seal Remover—Adaptor

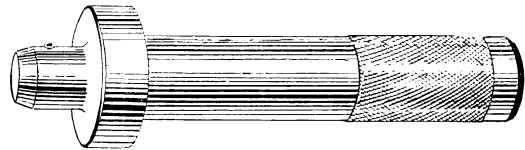
Used in conjunction with basic tool 18G389 it screws into the end of the oil seal and withdraws it without damage to the rear extension.



18G389B

18G134. Oil Seal Replacer Adaptor—Handle

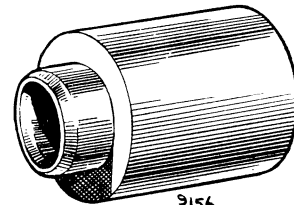
Used with adaptor 18G134N it enables oil seals to be fitted to the gearbox extension without removal from the vehicle.



18G134

18G134N. Oil Seal Replacer—Adaptor

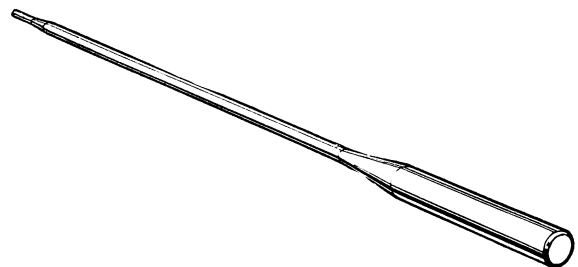
For the correct and easy replacement of the gearbox extension oil seal. Use in conjunction with 18G134.



18G134N

18G471. Dummy Layshaft

A pilot for lining up the gears and retaining the thrust washers in position prior to inserting the layshaft proper, it being necessary to drop the laygear for the first motion shaft to be inserted.



18G471