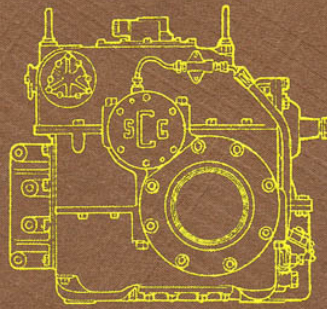


**TYPE RF28**  
**FINAL DRIVE UNIT**



**SERVICE**  
**MANUAL**



**SELF-CHANGING GEARS LIMITED**

**TYPE R.F.28**  
**FORWARD & REVERSE**  
**FINAL DRIVE UNIT**



**SELF-CHANGING GEARS LIMITED**  
**LYTHALLS LANE · COVENTRY · ENGLAND**  
TELEPHONE: COVENTRY 89081      TELEGRAMS: SELF-CHANGE, COVENTRY

# TYPE R.F.28 REVERSING UNIT

## CONTENTS

<b>DATA</b> ... ..	<b>Page 5</b>
<b>GENERAL DESCRIPTION</b> ... ..	<b>Page 5</b>
<b>LUBRICATION</b> ... ..	<b>Page 7</b>
<b>MAINTENANCE AND ADJUSTMENT</b> ... ..	<b>Page 8</b>
<b>OVERHAUL</b> ... ..	<b>Page 10</b>
<b>LIST OF PARTS</b> ... ..	<b>Page 17</b>

## LIST OF ILLUSTRATIONS

Fig. 1. Vertical Section along axis of Input Shaft ... ..	Page 4
Fig. 2. Oil Pump Assembly ... ..	Page 6
Fig. 3. View of Oil Pump and Base Plate ... ..	Page 6
Fig. 4. View of Oil Pump Located in Bottom Portion of Gearcase ... ..	Page 8
Fig. 5. Selector Mechanism ... ..	Page 9
Fig. 6. Sectional Elevation through Final Drive ... ..	Page 11
Fig. 7. View of Axle Mounted in Bottom Portion of Gearcase ... ..	Page 13
Fig. 8. View of Top Portion of Case and Piston ... ..	Page 14
Fig. 9. View of Input Bevel and Top Shaft Showing Location of Dog Shifting Fork ... ..	Page 14
Fig. 10. View of Complete Unit Mounted on Axle ... ..	Page 15
Fig. 11. Casing and Covers ... ..	Page 19
Fig. 12. Gears ... ..	Page 23

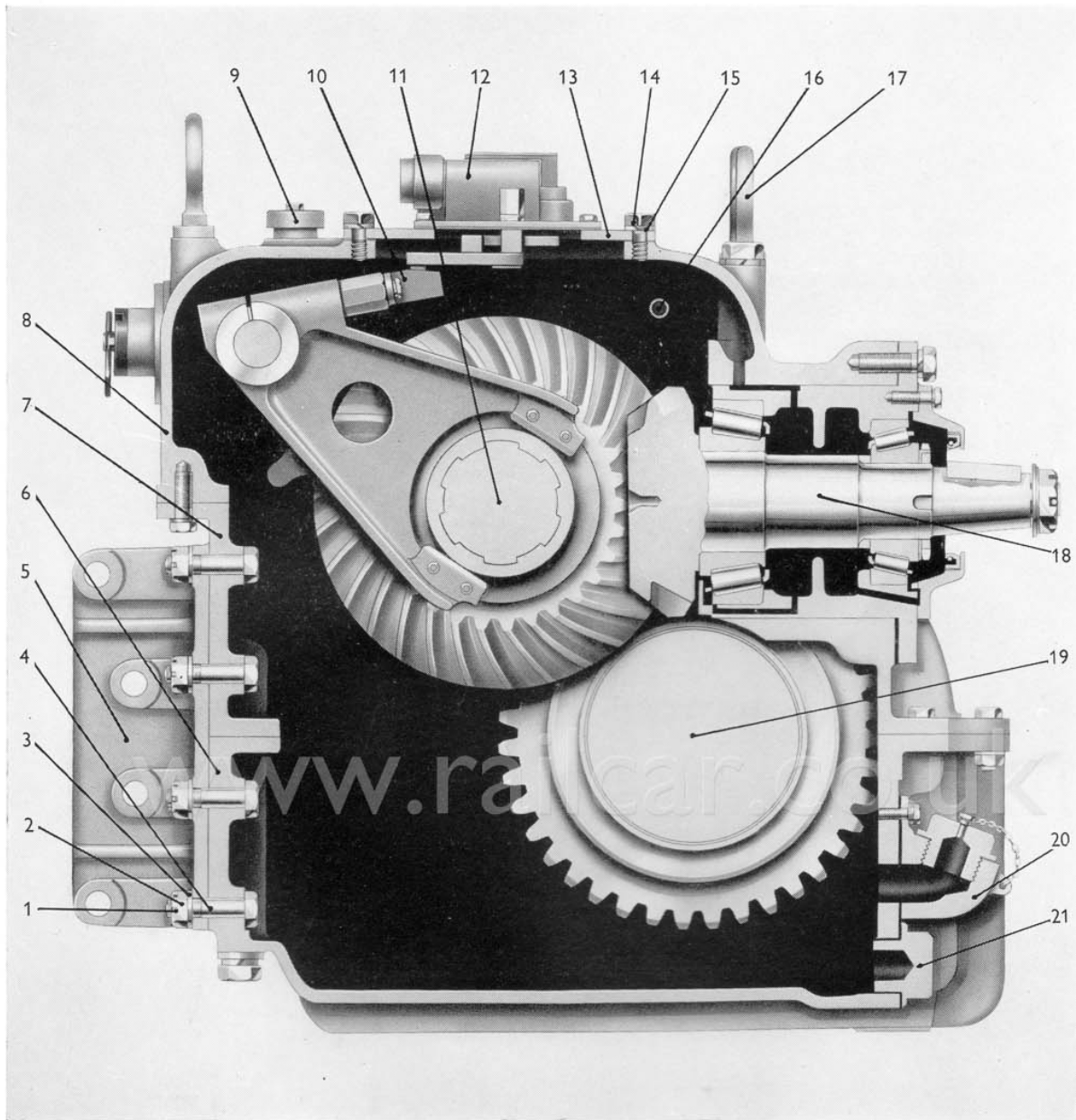


Fig. 1. VERTICAL SECTION ALONG AXIS OF INPUT SHAFT

- |                                   |                             |                            |
|-----------------------------------|-----------------------------|----------------------------|
| 1 Split Pin                       | 8 Gearcase (Top Portion)    | 15 Spring Washer           |
| 2 Slotted Nut                     | 9 Breather Body             | 16 Oil Distribution Pipe   |
| 3 Plain Washer                    | 10 Switch Operating Bracket | 17 Eyebolt                 |
| 4 Bolt                            | 11 Assembly of Top Shaft    | 18 Assembly of Input Bevel |
| 5 Torque Arm Bracket              | 12 Indicator Switch         | 19 Assembly of Axle        |
| 6 Gearcase (Bottom Portion)       | 13 Inspection Cover         | 20 Filler Spout            |
| 7 Gearcase (Intermediate Portion) | 14 Bolt                     | 21 Drain Plug              |

## **GEARBOX – DATA**

**(TYPE R.F.28)**

### **TYPE**

R.F.28 Railcar Reverse and Final Drive Unit.

### **LUBRICATION**

One Hobourn-Eaton Bi-directional type pump.

### **MAX. INPUT TORQUE**

3,000 ft. lbs.

### **OPERATION**

Pneumatic 60/75 lbs. per sq. in.

### **RATIO**

2 : 6.1 (other ratios available).

### **WEIGHT**

10 cwt. less axle.

## **GEARBOX – GENERAL DESCRIPTION**

This unit is specially designed for heavy duty rail traction purposes, and provides full reverse, enabling the vehicle to be driven in either direction at all speeds provided by the gearbox.

The casing is a steel casting made in three portions which are suitably dowelled to maintain accurate alignment. The forward and reverse gearing consists of a spiral bevel pinion (made integral with input shaft) meshed with two bevel wheels which are mounted on the top shaft and is carried in the top portion of the unit. The bevel wheels are free on the top shaft, the centre portion of which is splined carrying a sliding dog. This is engaged with either one or the other of the bevel wheels, depending upon the direction of drive required. A direction detector switch is incorporated to give positive indication that the sliding dog is fully engaged.

The bevel wheels are carried on adequately proportioned bearings which ensure accurate positioning. The top shaft pinion is keyed on the top shaft and is in constant mesh with a driving spur gear mounted on the axle. Taper and roller bearings are provided throughout the unit.

### **SELECTOR MECHANISM (See Fig. 5)**

The selector mechanism consists of a fork which fits into a groove in the sliding dog. The top end of the fork is fastened by means of set bolts (14) to a selector bar (15), which is moved to the required position by air pressure moving one of the two pistons (20) at each end of the selector bar (15). The bar is held in position by air pressure on the piston (20).

A neutral detent is provided in the selector bar (15) which should always be engaged by means of the manually operated neutral lock if the vehicle is being towed.

Should the main air supply fail at any time when forward or reverse is engaged, remove the top cover of the unit and with a suitable lever move the selector bar (15) into the neutral position, ensuring that the locking plunger (9) in the neutral lock mechanism is positively engaged before moving the vehicle.

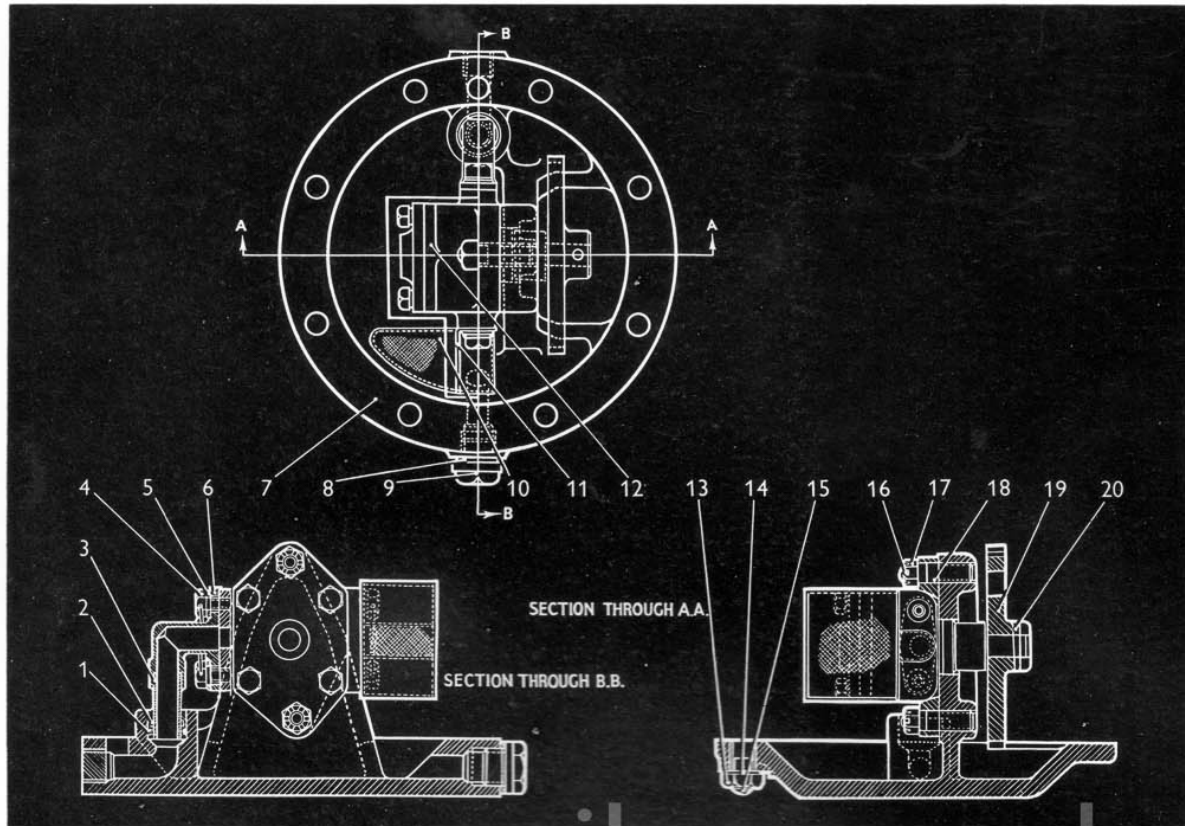


Fig. 2. OIL PUMP ASSEMBLY

- 1 'O' Ring for Bush
- 2 Bush
- 3 Oil Delivery Pipe
- 4 Bolt
- 5 Washer
- 6 Oil Pump Elbow
- 7 Oil Pump Bracket
- 8 Drain Plug Washer
- 9 Drain Plug
- 10 Oil Filter
- 11 Mounting Plate
- 12 Oil Pump
- 13 Nut
- 14 Washer
- 15 Stud
- 16 Split Pin
- 17 Slotted Nut
- 18 Stud
- 19 Pump Gear
- 20 Taper Pin

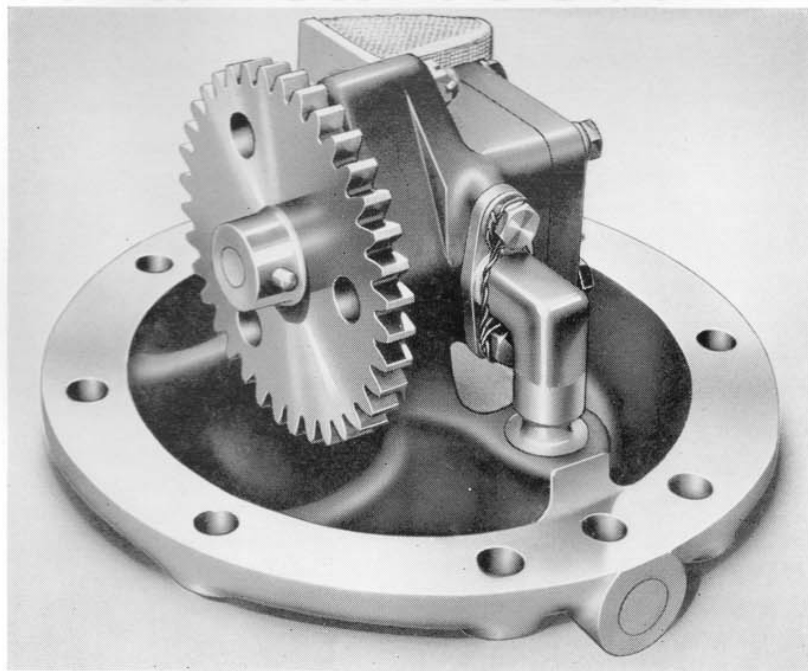


Fig. 3. VIEW OF OIL PUMP AND BASE PLATE

## LUBRICATION

(See Figs. 2 and 6)

The lubrication of the whole of the unit is carried out by a rotary type bi-directional pump situated in the bottom portion of the case. The pump is driven by means of a gear (Fig. 2, Item 19) which engages with a driving gear on the axle (Fig. 6, Item 34). The oil is pumped from the sump and is fed into an oil distribution pipe situated in the top portion of the casing. The oil distribution pipe has drilled holes so placed as to deliver oil jets on to the bevel gears, at the same time lubricating the bearings by means of oil ways in the casings and covers.

The base lubricant should be 100% mineral oil of high quality possessing a high resistance to oxidation and a natural viscosity index of not less than 90.

When tested by I.P. 114/55T the increase in acidity of the oil must not be greater than 0.1 milligramme KOH/gramme, the total acidity after oxidation must not exceed 0.2 milligramme KOH/gramme.

In order to meet this clause and ensure satisfactory operation in service it is advised that oxidation inhibitors are included in the formulation.

The oil must also contain additives against corrosion and preferably in addition it should contain additives against frothing and must be consistent with the requirements of a high quality turbine lubricant.

The viscosity of the lubricant shall also conform to the following requirements.

Redwood No. 1	CLIMATE		
	Arctic	Temperate	Tropical
Viscosity at 140°F	120-210	200-280	277-330

### OIL CHANGES

First change 1,000 then every 30,000 miles.  
This applies also to reconditioned gearboxes.  
Oil capacity 5 galls.

### OIL PUMP (See Fig. 2)

The oil pump is of the rotary type and because of its simple and robust construction it can be depended on to give trouble free service. Only if difficulty is experienced with maintaining the oil pressure should the pump be dismantled, and the parts inspected for excessive wear and damage. Parts of the reversible pump are not interchangeable, and therefore should the pump fail an entirely new replacement pump should be fitted.

### REMOVAL OF OIL PUMP (See Fig. 2)

Drain the oil from the sump. Remove the nuts (13), spring washers (14), and withdraw oil pump assembly from the gearcase. Tap clear the tapered pin (20) and withdraw the pump gear (19). Remove pump elbow (6), oil filter (10), split pin (16), and slotted nuts (17). Remove the oil pump (12) from oil pump bracket (7).

### REPLACEMENT OF OIL PUMP (See Fig. 2)

Fit the new oil pump (12) in position on the oil pump bracket (7), secure with slotted nuts (17) and split pins (16). Using bolts (4), secure in position the oil filter (10), and pump elbow (6), locking the bolts (4) with a suitable wire. Press home the pump gear (19), and secure with tapered pin (20). Replace the pump assembly into the bottom portion of the gearcase securing with spring washers (14) and nuts (13).

## MAINTENANCE & ADJUSTMENT

(See Fig. 5)

The oil level of the unit should be checked weekly by removing plug from oil filler spout and topped up if necessary. External oil pipes should be examined periodically for leaks.

An occasional examination should be carried out on the air pistons (20). Examine the piston seals (1) and replace if worn or cracked. Normally the selector mechanism, pistons, selector bar, etc., can be removed and replaced without effecting the clearances of the sliding dog, but the following check can be made to ensure the correct clearances before replacing the cylinders. This clearance is measured between the air cylinder (3) and cylinder cap (22). To adjust the selector bar (15) to give correct engagement of the sliding dog, slide the dog shifting fork assembly (13) together with sliding dog into engagement as far as possible, and

whilst retaining them in this position, fit an air cylinder cap (22) piston (20) together with adjuster screw (18).

The adjuster screw is held by locknut (17), and split pin (19). Check that there is then a clearance of  $\cdot015''/\cdot020''$  between the air cylinder (3) and cylinder cap (22). The cylinder cap can then be fitted. Repeat the operation on the other side to check that the same clearance exists there also.

When new piston seals are being fitted or the pistons are removed for examination, cylinder liners, seals and pistons should be oiled before being replaced, preferably with 'OILDAC' Achesens's Colloidal Graphite. If the gearbox has been standing without use for some time, the pistons should be withdrawn and parts oiled as described above.

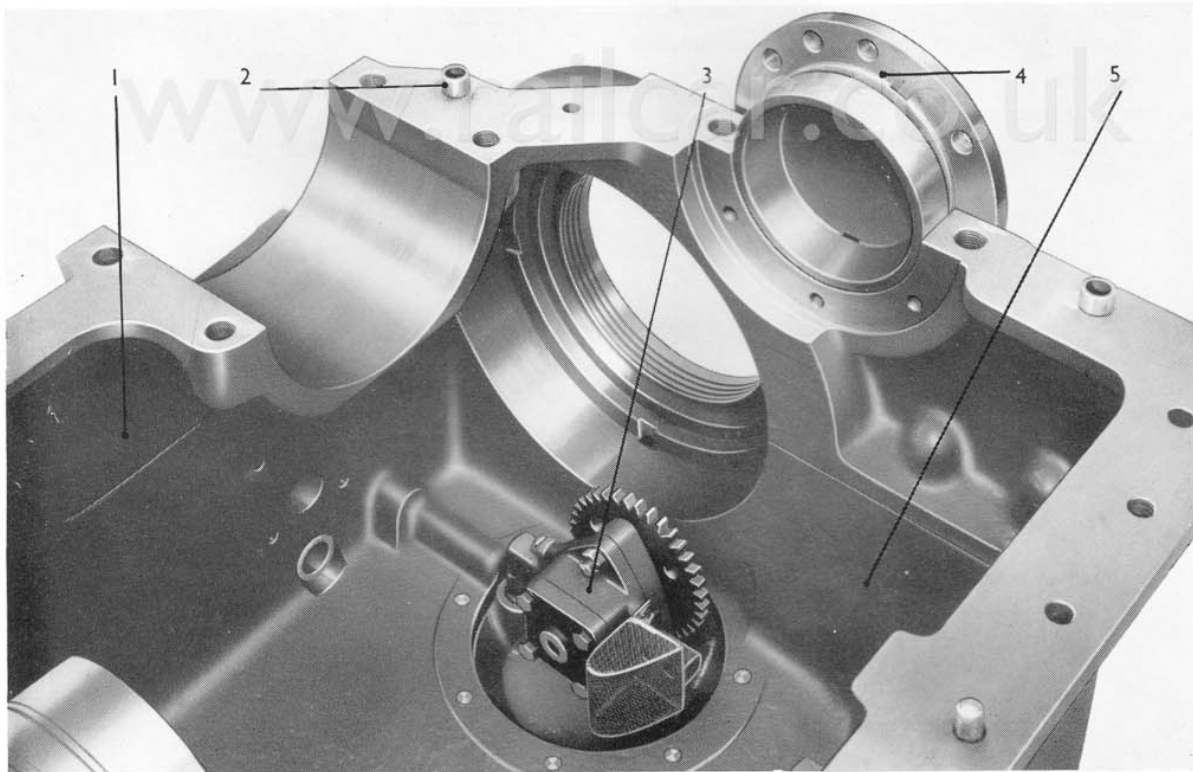


Fig. 4. VIEW OF OIL PUMP LOCATED IN BOTTOM PORTION OF GEARCASE

1 Intermediate Portion of Gearcase  
2 Hollow Dowel

3 Oil Pump  
4 End Cover

5 Bottom Portion of Gearcase



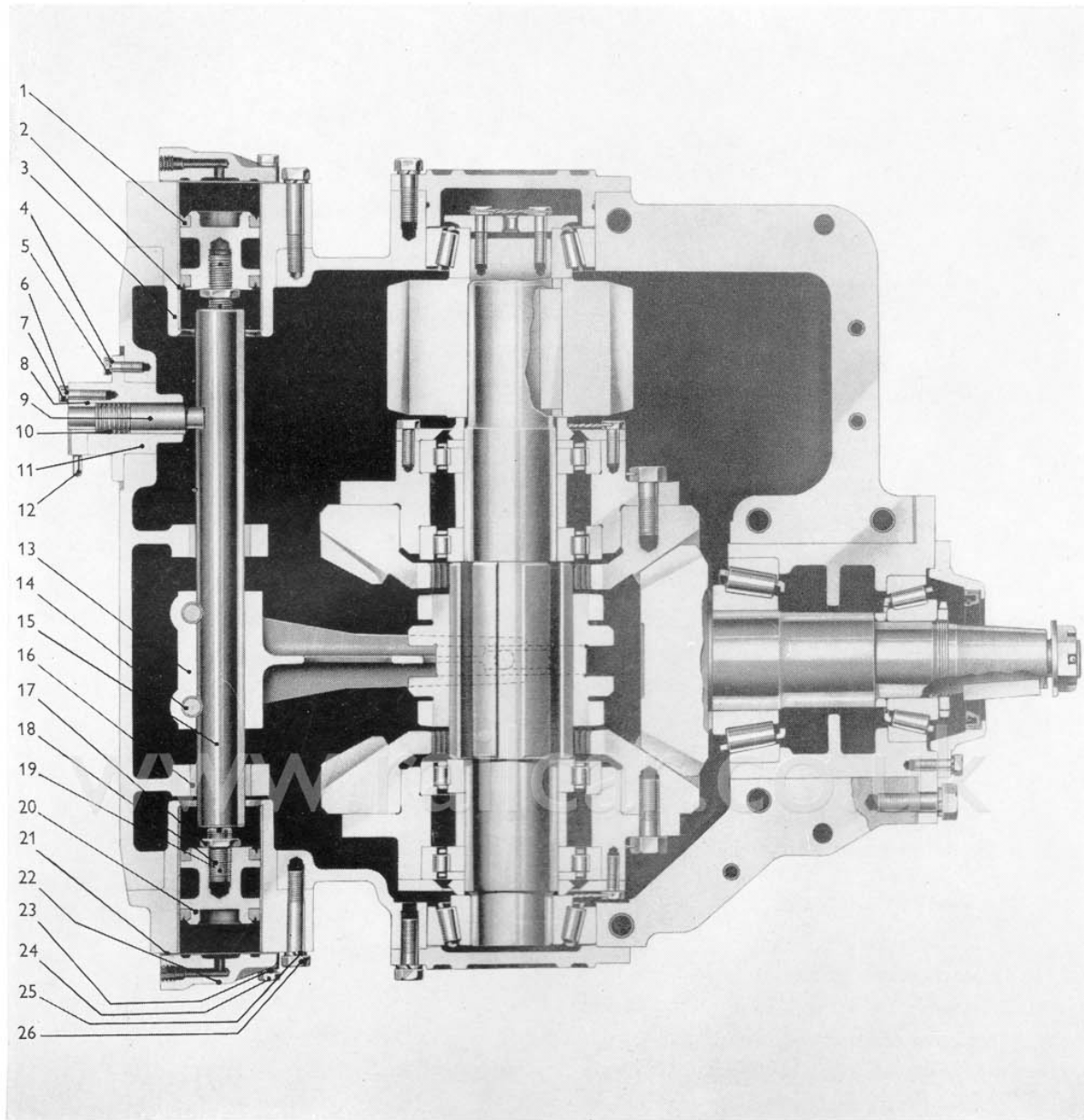


Fig. 5. SELECTOR MECHANISM

- |                         |                           |                  |
|-------------------------|---------------------------|------------------|
| 1 Piston Seal           | 10 Locking Plunger Spring | 19 Split Pin     |
| 2 Air Cylinder Liner    | 11 Neutral Lock Sleeve    | 20 Piston        |
| 3 Air Cylinder          | 12 Locking Plunger Handle | 21 Gasket        |
| 4 Spring Washer         | 13 Dog Shifting Fork      | 22 Cylinder Cap  |
| 5 Bolt                  | 14 Bolt                   | 23 Spring Washer |
| 6 Spring Washer         | 15 Selector Bar           | 24 Bolt          |
| 7 Bolt                  | 16 Selector Bar Bush      | 25 Spring Washer |
| 8 Locking Plunger Guide | 17 Locknut                | 26 Bolt          |
| 9 Locking Plunger       | 18 Adjuster Screw         |                  |

## OVERHAUL

### GEARBOX—TO DISMANTLE

Important.

**When dismantling ensure that all bearing outer races are kept paired up with their inner races, as these parts are selectively assembled and are therefore not interchangeable.**

#### REMOVING INSPECTION COVER (See Fig. 1)

Drain the sump, disconnect oil pipe unions, and remove the external pipes. Remove bolts (14), and spring washer (15), and lift away the inspection cover (13).

#### SELECTOR MECHANISM (See Fig. 5)

Remove the bolts (7), spring washers (6), and withdraw the locking plunger handle (12), spring (10), plunger guide (8) and the locking plunger (9).

Remove bolts (26), spring washers (25), and withdraw the air cylinder (3) with cylinder caps (22), gaskets (21), pistons (20), together with the adjuster screws (18), locknuts (17), split pins (19), and seals (1). Release the locking wire, remove bolts and withdraw the switch operating bracket (Fig. 1, Item 10). Release the locking wire and remove the bolts (14) from dog shifting fork assembly (13) and withdraw the selector bar (15) from the top portion of gearcase.

#### GEARCASE TOP PORTION (See Figs. 1, 5 and 6)

Remove all the bolts securing the top portion (Fig. 1, Item 8) to intermediate portion of gearcase (Fig. 1, Item 7). Remove the bolts (Fig. 6, Items 14 and 24) and spring washers from the top shaft end covers (Fig. 6, Items 22 and 45), and input bevel housing (Fig. 6, Item 1). Three bolts should be left in the bottom of the top shaft end covers, secured in position to retain the shims and outer races, whilst the top portion of gearcase (Fig. 1, Item 8) complete with the oil distribution pipe is lifted away. Remove the dog shifting fork assembly (Fig. 5, Item 13), top shaft (Fig. 6, Item 21), and input bevel housing assembly (Fig. 6, Item 1). Remove the remaining bolts from the end covers (Fig. 6, Items 22 and 45), keeping shims, and outer races together. **It is not advisable to dismantle these assemblies as they have been carefully adjusted to give correct clearances for the bearings and bevels.**

#### GEARCASE INTERMEDIATE PORTION (See Figs. 1 and 6)

The torque arm bracket (Fig. 1, Item 5) can be withdrawn by removing split pin (Fig. 1, Item 1), slotted nut (Fig. 1, Item 2), and washers (Fig. 1, Item 3). The bolts (Fig. 1, Item 4) are a drive fit and should not be removed. Remove the nuts and spring washers from oil pump assembly and withdraw it from the bottom portion of the gearcase.

Withdraw all the bolts securing the intermediate portion (Fig. 1, Item 7) to bottom portion (Fig. 1, Item 6) of the gearcase. Remove bolts (Fig. 6, Item 41) and spring washers (Fig. 6, Item 40) from the bearing thrust plates (Fig. 6, Item 30). Two bolts should be kept lightly secured in position on the bottom of each thrust plate to retain the shims (Fig. 6, Item 31) and outer races Fig. 6, Item 32) in position, whilst the intermediate portion of casing is lifted away.

#### GEARCASE BOTTOM PORTION (See Fig. 6)

Take the weight of the axle assembly (37) and completely remove thrust plates (30), keeping axle half shims (31) and outer races (32) together. The axle (37) can now be lifted away from the bottom portion of the gearcase (See Fig. 7).

### GEARBOX—TO ASSEMBLE

First thoroughly clean all parts and make sure that all oil ways and channels are clear. **Note.** Before fitting, all joint faces should be first cleaned and then coated with a suitable jointing compound.

#### GEARCASE BOTTOM PORTION (See Fig. 6)

Replace the axle assembly (37) into the bottom portion of case (See Fig. 7). Re-fix bearing thrust plates (30) on to the bottom portion of gearcase, and so retaining in position axle taper roller bearings (32).

- 1 Input Bevel Housing
- 2 Input Bevel Pinion
- 3 Oil Seal Housing
- 4 Oil Seal
- 5 Washer—Locking Ring
- 6 Washer—Nut
- 7 Split Pin
- 8 Nut
- 9 Key
- 10 Locking Ring
- 11 Bearing
- 12 Bolt
- 13 Spring Washer
- 14 Bolt
- 15 Spring Washer
- 16 Shims
- 17 Distance Piece
- 18 Bearing
- 19 Bolt
- 20 Bolt
- 21 Top Shaft
- 22 End Cover
- 23 Oil Thrower
- 24 Bolt
- 25 Spring Washer
- 26 Bearing
- 27 Bearing
- 28 Distance Piece
- 29 Bearing
- 30 Thrust Plate
- 31 Half Shim
- 32 Bearing
- 33 Spacing Piece
- 34 Pump Driving Gear
- 35 Sliding Dog
- 36 Sleeve
- 37 Axle
- 38 Gear
- 39 Oil Thrower
- 40 Spring Washer
- 41 Bolt
- 42 Oil Collector Ring
- 43 Oil Thrower
- 44 Shims
- 45 End Cover
- 46 Bearing Retaining Plate
- 47 Bolt
- 48 Key
- 49 Driving Pinion
- 50 Bevel Hub
- 51 Bevel Wheel

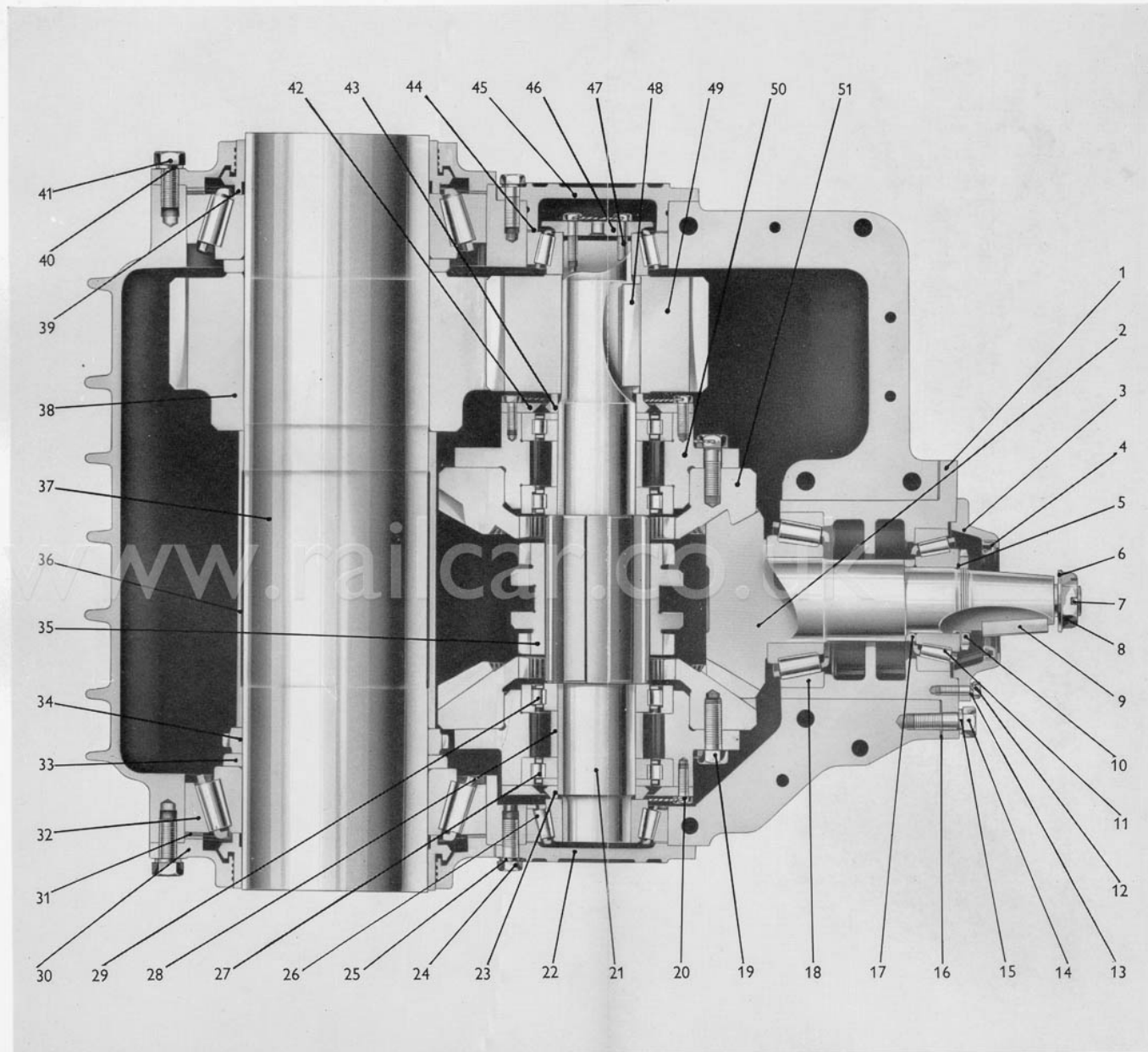


Fig. 6. SECTIONAL ELEVATION THROUGH FINAL DRIVE

**GEARCASE INTERMEDIATE PORTION (See Figs. 1, 2 and 6)**

**Re-fit** the intermediate portion of the gearcase (Fig. 1, Item 7) on to the bottom portion, locating with the hollow dowels. The axle half shims (Fig. 6, Item 31) can now be replaced, and the bearing thrust plates (Fig. 6, Item 30) secured in position, first ensuring that there is a  $.004/5''$  end float on the axle assembly. **Re-fit** the oil pump assembly (See Fig. 2) into the bottom portion of the gearcase and secure in position, ensuring that there is backlash between the pump driving gear (Fig. 6, Item 34), and the pump gear (Fig. 2, Item 19).

Replace the torque arm bracket (Fig. 1, Item 5) ensuring that it is perfectly square in relation to the machined surface of the intermediate portion of the gearcase. The top shaft assembly end cover (Fig. 6, Item 22) and (Fig. 6, Item 45) can now be replaced on to the intermediate portion of gearcase, and lightly secured in position with three bolts (Fig. 6, Item 24).

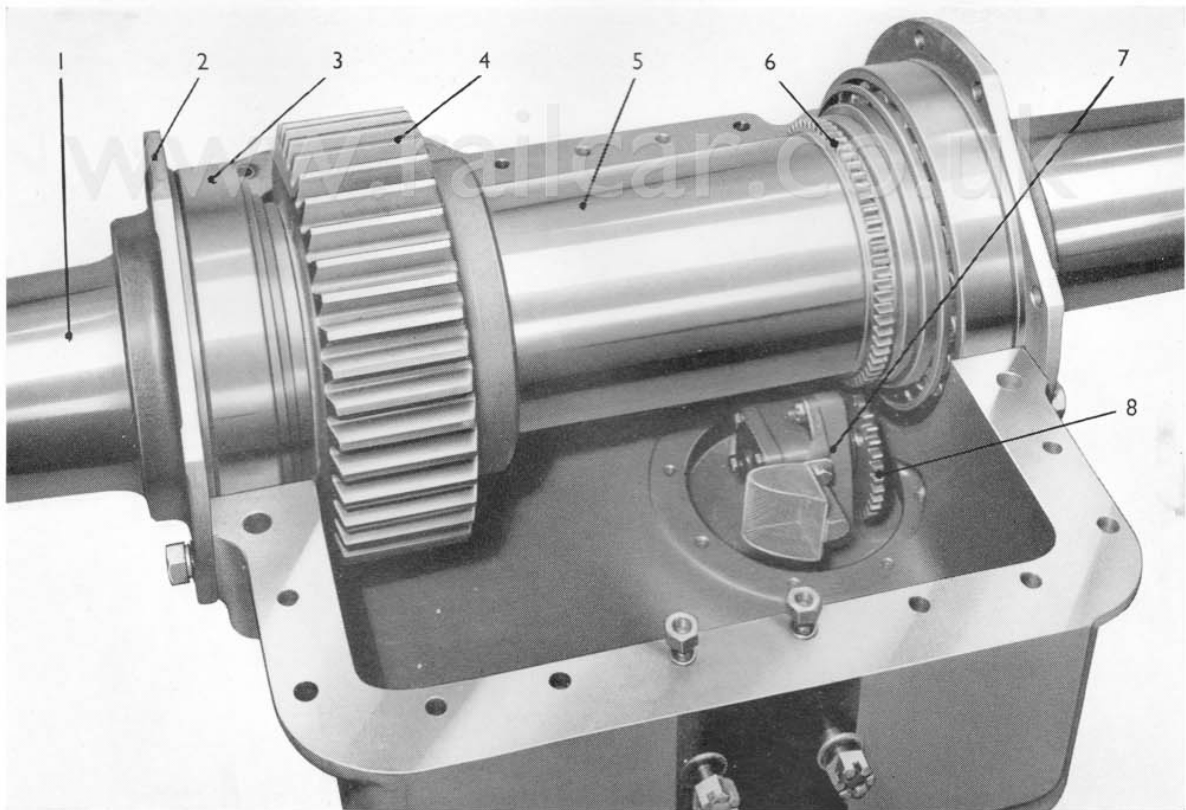
The top shaft and input bevel assemblies can now be replaced in the casing.

Replace the top shaft assembly in position ensuring that there is a  $.004/5''$  end float.

The input shaft can now be replaced, and the shimming checked by measuring the dimension between the face of the input bevel pinion (Fig. 6, Item 2) to the O/Dia. of the sliding dog (Fig. 6, Item 35) which should be  $.887''$ . Locate the dog shifting fork into position on the top shaft.

**GEARCASE TOP PORTION (See Figs. 1, 5 and 6)**

Replace the top portion of gearcase (Fig. 1, Item 8) ensuring that the dog shifting fork assembly (Fig. 5, Item 13) is in its approximate working position, with the dog shifting fork pads which are located in the grooves



**Fig. 7. VIEW OF AXLE MOUNTED IN BOTTOM PORTION OF GEARCASE**

1 Axle  
2 Thrust Plate  
3 Bearing

4 Axle Gear  
5 Axle Sleeve  
6 Oil Pump

7 Pump Gear Driver  
8 Pump Gear Driven

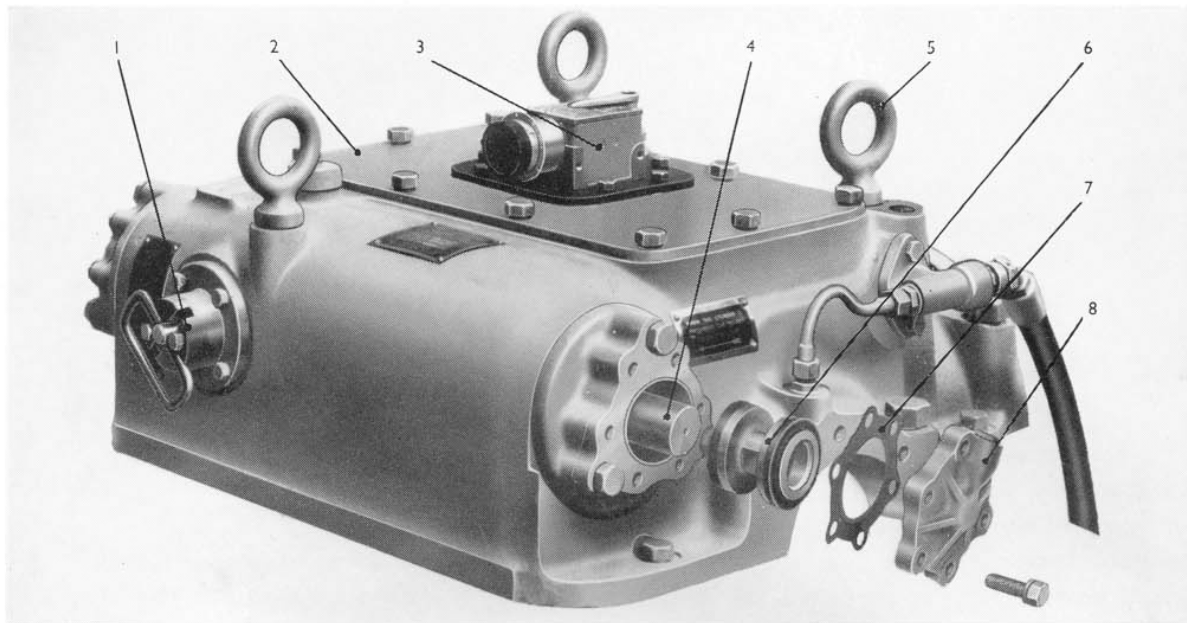


Fig. 8. VIEW OF TOP PORTION OF CASE AND PISTON

- |                              |                |                |
|------------------------------|----------------|----------------|
| 1 Neutral Lock               | 4 Selector Bar | 7 Gasket Cap   |
| 2 Inspection Cover           | 5 Eyebolt      | 8 Cylinder Cap |
| 3 Direction Indicator Switch | 6 Piston       |                |

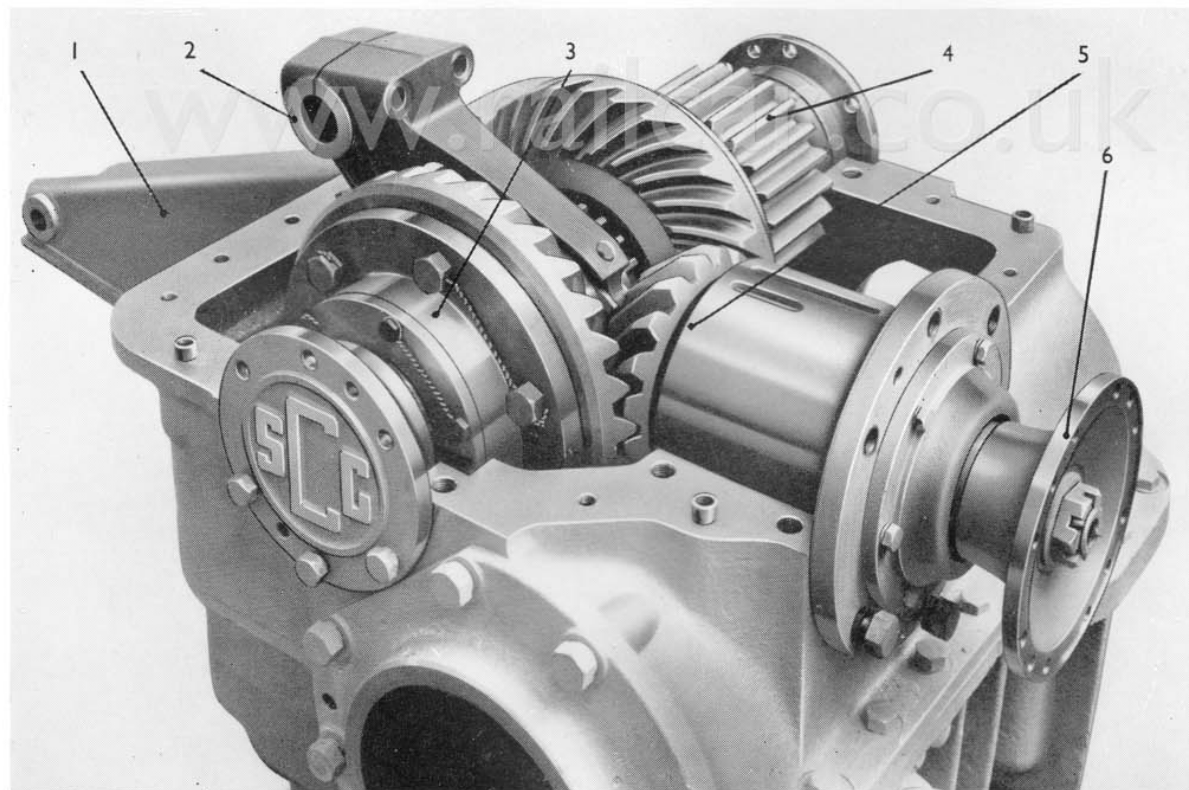


Fig. 9. VIEW OF INPUT BEVEL AND TOP SHAFT SHOWING LOCATION OF DOG SHIFTING FORK

- |                     |                      |                        |
|---------------------|----------------------|------------------------|
| 1 Torque Arm        | 3 Top Shaft Assembly | 5 Input Bevel Assembly |
| 2 Dog Shifting Fork | 4 Driving Pinion     | 6 Input Coupling       |

in the sliding dog (Fig. 6, Item 35) on the top shaft assembly. Locate top portion with the hollow dowels, replace bolts and secure in position.

Finally secure into position the top shaft end covers and input bevel housing and note that the letters S. C. G. on all end covers are kept in an upright position, as this ensures that the lubrication ports in the cases and covers are in alignment.

**SELECTOR MECHANISM (See Fig. 5)**

Slide the selector bar (15) into position in the top portion of the gearcase, and secure it to the dog shifting fork assembly (13) with the bolts (14). Locking the bolts with a suitable wire, replace the switch operating bracket (Fig. 1, Item 10) on to the dog shifting fork bolts, securing with bolts and spring washer, and locking bolts with a suitable wire.

Replace the air cylinders (3) with cylinder caps (22), gaskets (21), pistons (20) together with the adjuster screws (18), locknuts (17), split pins (19), and seals (1), securing in position with bolts (26) spring washers (25). Replace the locking plunger (9), locking plunger handle (12), spring (10), and plunger guide (8), securing with bolts (7) and spring washers (6).

**TO REPLACE TOP COVER (See Fig. 1)**

Replace the inspection cover (13) complete with indicator switch (12) on to the top portion of the gearcase, ensuring that the arm on the indicator switch is correctly located in the switch operating bracket (10). Secure with bolts (14), and spring washer (15).

Replace the external oil pipes and fill up the unit with the correct grade of oil, ensuring that the drain plug (21) has been replaced.

The sump will be at correct capacity when oil overflows from the filler spout (20).

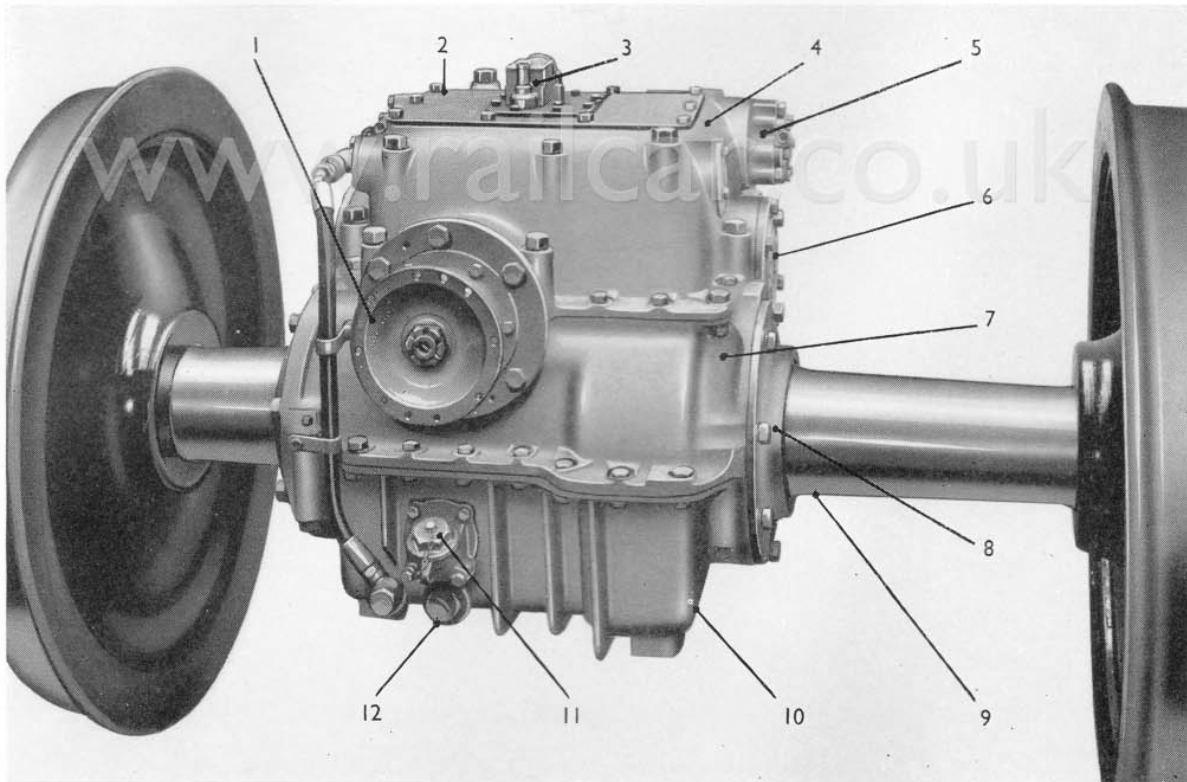


Fig. 10. VIEW OF COMPLETE UNIT MOUNTED ON AXLE

- |                           |                                 |                               |
|---------------------------|---------------------------------|-------------------------------|
| 1 Input Coupling          | 5 Air Cylinder                  | 9 Axle                        |
| 2 Inspection Cover        | 6 End Covers                    | 10 Bottom Portion of Gearcase |
| 3 Indicator Switch        | 7 Intermediate Portion Gearcase | 11 Filler Spout               |
| 4 Top Portion of Gearcase | 8 Thrust Plate                  | 12 Drain Plug                 |

## R.F.28 PARTS LIST

Fig. 6. (Sectional Elevation Through Final Drive)

Ref. No.	Part No.	Description	No. off
1	31599	Input bevel housing ... ..	1
2	31549	Input bevel pinion ... ..	1
	31611	Oil scoop ... ..	1
	31612	Gasket—oil scoop... ..	1
	30422	2 B.A. bolt (oil scoop to input housing)	2
	30620	$\frac{1}{4}$ " B.S.F. plug ... ..	1
3	31601	Oil seal housing ... ..	1
4	26302	Oil Seal ... ..	1
5	32124	Washer—locking ring ... ..	1
6	11339	Washer—nut ... ..	1
7	19069	Split pin ... ..	1
8	11338	Nut ... ..	1
9	11943	Key—coupling flange ... ..	1
10	32123	Locking ring ... ..	1
11	16725	Taper roller bearing ... ..	1
12	16354	$\frac{3}{16}$ " B.S.F. bolt ... ..	6
13	17330	$\frac{1}{2}$ " dia. spring washer ... ..	6
14	30081	$\frac{3}{16}$ " B.S.F. bolt ... ..	6
15	17334	$\frac{1}{2}$ " spring washer ... ..	6
16	31594	Shims .002" ... ..	
	31595	Shims .005" ... ..	
	31596	Shims .020" ... ..	
		} Input housing to casing ... ..	As reqd.
17	31600	Distance piece ... ..	1
18	26852	Taper roller bearing ... ..	1
	37427	Input coupling ... ..	1
	37395	Sleeve for input coupling ... ..	1
19	31609	Set bolt ... ..	12
20	22534	$\frac{3}{8}$ " B.S.F. bolt (collector ring to hub) ... ..	12
21	37204	Top shaft ... ..	1
22	37242	End cover (top shaft) ... ..	1
23	37243	Oil thrower (part of top shaft assy. 4365)	1
24	22689	$\frac{1}{2}$ " B.S.F. bolt ... ..	12
25	17332	$\frac{1}{2}$ " dia. spring washer ... ..	12
26	16724	Taper roller bearing ... ..	2
27	29999	Roller bearing ... ..	2
28	31565	Distance piece ... ..	2
29	29998	Roller bearing ... ..	2
30	37253	Bearing, thrust plate—axle ... ..	2
31	37258	Axle, half shim ... ..	4
32	16717	Taper roller bearing ... ..	2
33	37313	Spacing piece ... ..	2
34	37244	Pump driving gear... ..	1

Ref. No.	Part No.	Description	No. off
35	31551	Sliding dog (part of top shaft assy. 4365) ... ..	1
36	37248	Sleeve for axle ... ..	1
37		Axle } See Special Notes at end of ... ..	1
38		Gear } Parts List ... ..	1
39	37254	Oil thrower ... ..	2
40	17334	$\frac{5}{16}$ " dia. spring washer } Bearing thrust plate ... ..	16
41	30081	$\frac{5}{16}$ " B.S.F. bolt } to casing ... ..	16
42	31560	Oil collector ring ... } Part of top shaft ... ..	2
43	31561	Oil thrower ... } assy. 4365 ... ..	1
44	31585	Shim .002" } Top shaft end covers ... ..	As reqd.
	31586	Shim .005" }	
	31587	Shim .020" }	
45	31567	End cover top shaft ... ..	1
46	31559	Bearing retainer plate ... ..	1
47	31563	$\frac{3}{8}$ " B.S.F. bolt (retaining plate to top shaft) ... } Part of top shaft	4
48	31604	Key (driving pinion) ... ..	1
49		Driving pinion ... ..	1
50	31572	Bevel hub ... ..	1
51	31550	Bevel wheel ... ..	1

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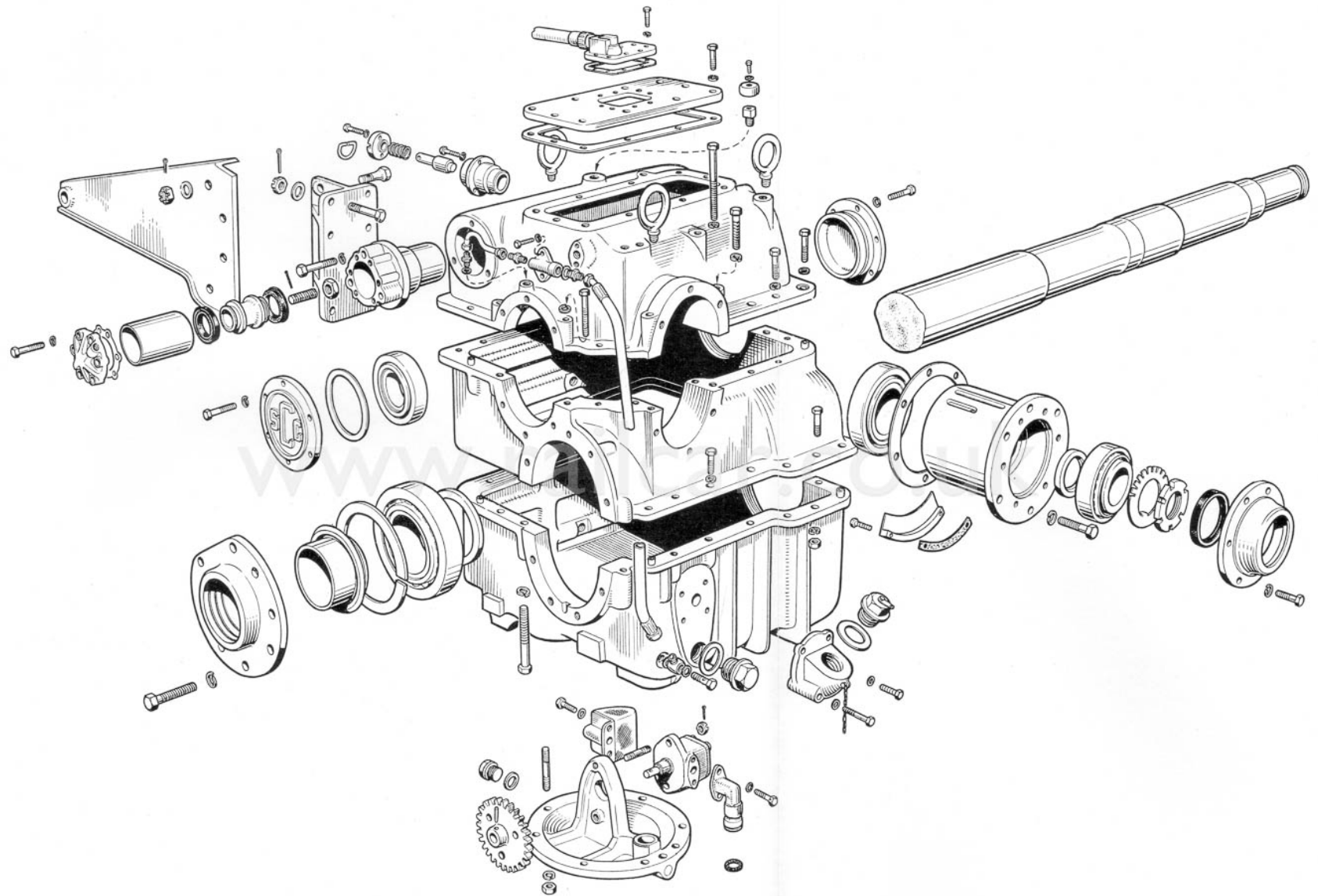


FIG. 11. CASING AND COVERS

Fig. 1. (Vertical Section along Axis of Input Shaft)

Ref. No.	Part No.	Description	No. off
1	17964	$\frac{5}{16}$ " dia. x 2" long split pin (torque arm bracket to casing) ...	8
2	17300	B.S.F. slotted nut (torque arm bracket to casing) ...	8
3	25286	" dia. plain washer (torque arm bracket to casing) ...	8
4	41050	" B.S.F. bolt (torque arm bracket to casing) ...	8
5	37322	Torque arm bracket ...	1
	39697	Torque arm ...	1
	38812	" B.S.F. bolt (special) ...	4
	17301	" B.S.F. slotted nut ...	4
	19069	Split pin $\frac{5}{16}$ " dia. x 2" long ...	4
	25287	" dia. plain washer (Torque arm to bracket) ...	4
6	39815	Gearcase (bottom portion) (Part of assy. A5569) ...	1
	10873/2	" B.S.F. bolt ...	4
	11378/2	" B.S.F. bolt ...	3
	16284	" B.S.F. bolt ...	4
	37319	" B.S.F. bolt ...	4
	41186	" B.S.F. bolt ...	5
	17332	" dia. spring washer ...	7
	19033	" dia. D.C. spring washer ...	4
	17335	" dia. spring washer ...	9
	24994	" dia. plain washer ...	2
	17947	" B.S.F. plain nut ...	3
7	39816	Gearcase (Intermediate portion) } Part of assy. ...	1
8	39817	Gearcase (Top portion) ... } A5569 ...	1
	10873/2	" B.S.F. bolt ...	2
	11378/2	" B.S.F. bolt ...	2
	16284	" B.S.F. bolt ...	11
	37318	" B.S.F. bolt ...	4
	37319	" B.S.F. bolt ...	2
	37320	" B.S.F. bolt ...	2
	17332	" dia. spring washer ...	11
	19033	" dia. spring washer ...	4
	17335	" dia. spring washer ...	8
	17947	" B.S.F. plain nut ...	2
	12666	" B.S.F. bolt ...	2
	17330	" dia. spring washer ...	2
9	30083	Breather body ...	1
	30084	Breather cap ...	1
	17531	$\frac{5}{16}$ " B.S.F. bolt ...	1
	17329	$\frac{5}{16}$ " dia. spring washer ...	1
10	42570	Switch operating bracket ...	1
11	4365	Assy. of top shaft, see Fig. 6 ...	1

Ref. No.	Part No.	Description	No. off
12	A5561	Direction indicator switch ... ..	1
	41248	Gasket for direction indicator switch ... ..	1
	A5562	Direction indicator cable and plug unit ... ..	1
13	42569	Inspection cover plate ... ..	1
	41213	Inspection cover plate gasket ... ..	1
	32602	Cover plate ... ..	1
	41199	Hollow dowel ... ..	8
	17824	Name plate ... ..	1
	32619	Interlock indicator plate ... ..	1
	17337	Drive screw No. 4 x $\frac{5}{16}$ " ... ..	16
	41196	Direction indicator plate... ..	2
	17531	$\frac{5}{16}$ " B.S.F. bolt ... ..	8
	17329	$\frac{5}{16}$ " dia. spring washer ... ..	8
14	19584	$\frac{1}{2}$ " B.S.F. bolt ... ..	10
15	17332	$\frac{1}{2}$ " dia. spring washer ... ..	10
16	41042	Oil distribution pipe } Assy. ... ..	1
	37324	Oil feed elbow joint } A5558 ... ..	1
17	30076	$\frac{7}{8}$ " Whit. eyebolt ... ..	3
18	3765	Assy. of bevel input housing—See Fig. 6 ... ..	1
19	4366/2	Assy. of axle—See Fig. 6 ... ..	1
20	37255	Oil filler spout ... ..	1
	14254	$\frac{3}{8}$ " B.S.F. bolt } Oil filler to ... ..	2
	32612	$\frac{3}{8}$ " B.S.F. bolt } bottom casing ... ..	2
	37256	Gasket for oil filler ... ..	1
	17330	$\frac{3}{8}$ " dia. spring washer (oil filler to bottom casing) ... ..	4
	30078	Oil filler plug ... ..	1
	30079	Rivet ... ..	1
	11415	Drain plug and filler plug washer ... ..	2
	30077	Oil filler plug chain ... ..	1
21	11414	Drain plug ... ..	1

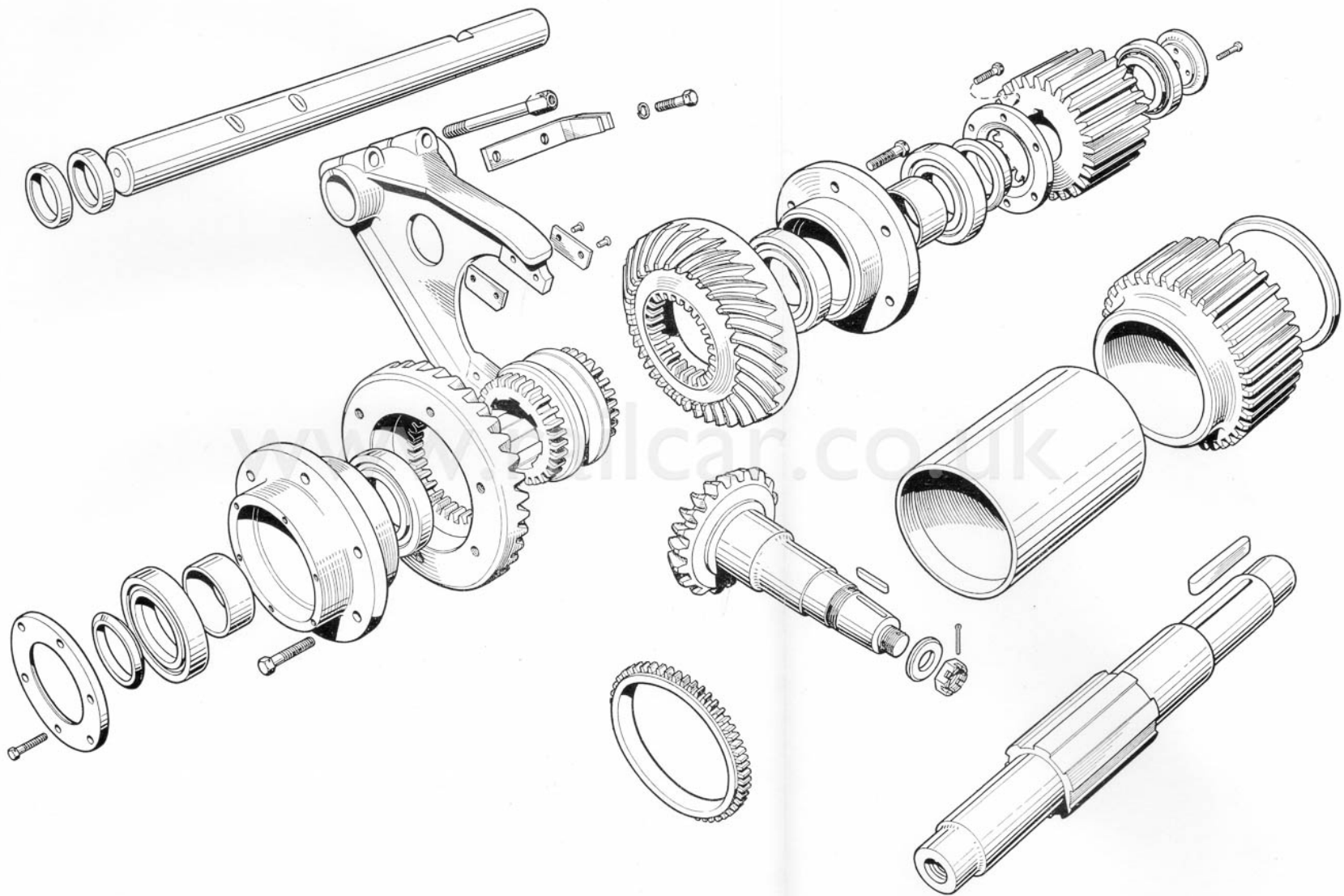


FIG. 12. GEARS

Fig. 5. (Selector Mechanism)

Ref. No.	Part No.	Description	No. off
1	11716	Piston seal ... ..	4
	17330	$\frac{3}{4}$ " dia. spring washer ... ..	4
	10873/1	$\frac{3}{8}$ " B.S.F. bolt ... ..	4
2	37251	Liner for air cylinder ... ..	2
3	37250	Forward and reverse air cylinder ... ..	2
4	17329	$\frac{5}{16}$ " dia. spring washer ... ..	4
5	14377	$\frac{5}{16}$ " B.S.F. hex. headed bolt ... ..	4
6	17329	$\frac{5}{16}$ " dia. spring washer ... ..	2
7	22694	$\frac{5}{16}$ " B.S.F. hex. headed bolt ... ..	2
8	22572	Guide for locking plunger ... ..	1
9	31558	Locking plunger ... ..	1
10	18510	Spring for locking plunger ... ..	1
11	41043	Sleeve for neutral lock ... ..	1
12	18509	Handle for locking plunger ... ..	1
	31667	Rivet pad to dog shifting fork ... ..	4
	31557	Pad dog shifting fork ... ..	4
13	31555	Dog shifting fork ... ..	1
14	41047	Bolt for selector fork ... ..	2
15	41041	Selector bar ... ..	1
16	37314	Bush for selector bar ... ..	2
17	19621	$\frac{3}{4}$ " B.S.F. hex. locknut ... ..	2
18	37257	Adjuster screw ... ..	2
19	19069	Split pin, $\frac{5}{32}$ " dia. x 2" long ... ..	2
20	37252	Piston ... ..	2
21	31436	Gasket for air cylinder ... ..	2
22	29618	Cylinder cap ... ..	2
23	17330	$\frac{3}{8}$ " dia. spring washer ... ..	12
24	15276/4	$\frac{3}{8}$ " B.S.F. hex. headed bolt ... ..	12
25	17332	$\frac{1}{2}$ " dia. spring washer ... ..	6
26	21851	$\frac{1}{2}$ " B.S.F. hex. headed bolt ... ..	6

Fig. 2. (Oil Pump)

Ref. No.	Part No.	Description	No. off
1	26279	'O' ring for bush	1
2	35088	Bush	1
3	32601	Oil delivery pipe	1
4	33311	$\frac{1}{2}$ " B.S.F. bolt	} Filter and Elbow to oil pump
5	15608	$\frac{1}{2}$ " dia. plain washer	
6	29637	Elbow for oil pump	1
7	37316	Bracket for oil pump	1
8	17343	Drain plug washer	1
9	17342	$\frac{1}{2}$ " B.S.P. drain plug	1
10	32603	Oil filter	} Not supplied separately
11	32604	Oil filter mounting plate	
12	3143	Hobourn-Eaton reversible pump	} Oil pump assy. 4367
13	18753	$\frac{1}{2}$ " B.S.F. nuts	
14	17332	$\frac{1}{2}$ " spring washer	8
15	10100/13	$\frac{1}{2}$ " B.S.F. studs	8
16	17362	Split pin $\frac{3}{32}$ " x $1\frac{1}{4}$ " long	} Oil pump bracket
17	37317	$\frac{7}{16}$ " B.S.F. slotted nut	
18	33310	$\frac{7}{16}$ " B.S.F. stud	2
19	29639	Pump gear	1
20	33309	Taper pin	1
		Locking wire	1

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## Oil Pipe and Fittings

Ref. No.	Part No.	Description	No. off
	36045	Banjo bolt ... ..	1
	36043	Banjo union ... ..	1
	34881	Dowty sealing washer, $\frac{3}{4}$ " B.S.P. ... ..	2
	37326	Pipe clip ... ..	2
	37878	Dowty sealing washer, $\frac{1}{2}$ " B.S.P. ... ..	2
	37399	Union ( $\frac{5}{8}$ " x $\frac{1}{2}$ " B.S.P.) ... ..	1
	36004/5	Aeroquip end fitting (straight) ... ..	1
	36007/4	Aeroquip end fitting (135°) ... ..	1
	36053/4	Aeroquip hose (20.5" long) ... } Assy. 4371/1 Oil pump	1
	37331	Oil pipe ( $\frac{3}{8}$ " o/d) ... } to gallery pipe ...	1
	19050	Union nut ( $\frac{3}{8}$ " B.S.P.) ... } Assy. 4370 Gallery pipe to bearing ...	2
	19049	Union nipple ( $\frac{3}{8}$ " B.S.P.) ... }	2
	34875	Dowty sealing washer ... ..	4
	36402/3	Union ( $\frac{3}{8}$ " B.S.P.) ... ..	4
	37324	Oil feed elbow joint ... ..	1
	17342	Plug, $\frac{1}{2}$ " B.S.P. ... ..	1
	41049	Oil pipe ( $\frac{3}{8}$ " o/d) ... ..	1
	19050	Union nut ( $\frac{3}{8}$ " B.S.P.) ... } Assy. A5582 Gallery pipe to bearing ...	2
	19049	Union nipple ( $\frac{3}{8}$ " B.S.P.) ... }	2

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### SPECIAL NOTES

#### PARTS WHICH DIFFER FOR EACH GEARBOX

When ordering these components Unit No. and List No. of gearbox must be quoted.

- AXLE ... .. (See Fig. 6, Item 37)
- AXLE GEAR ... .. (See Fig. 6, Item 38)
- DRIVING PINION (See Fig. 6, Item 49)

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