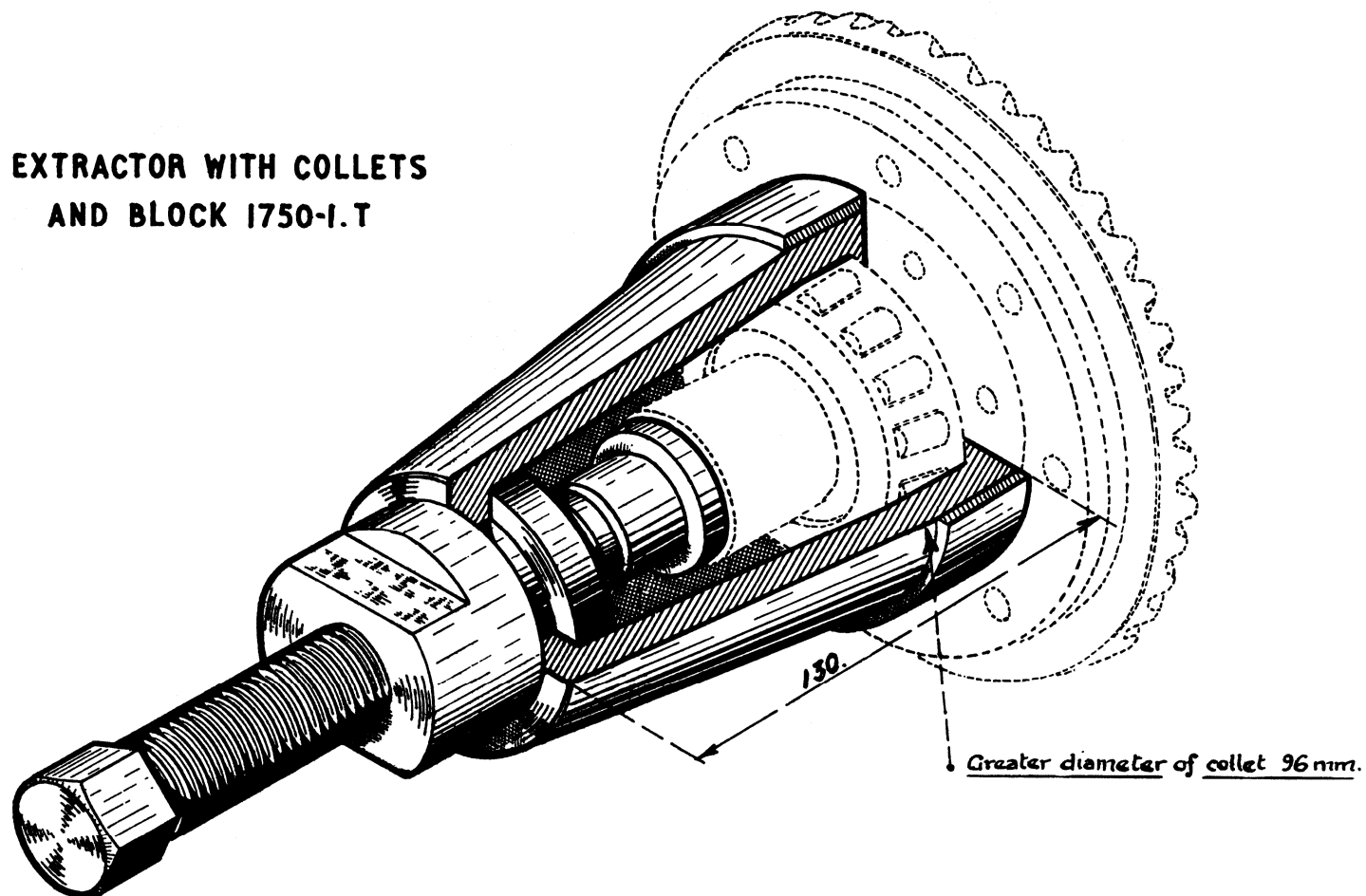


— GEARBOX —  
— DIFFERENTIAL —

DISMANTLING DIFFERENTIAL BEARINGS

EXTRACTOR WITH COLLETS  
AND BLOCK 1750-I.T



— GEARBOX —  
— STAND FOR GEARBOX —

FIG.1. USE OF STAND

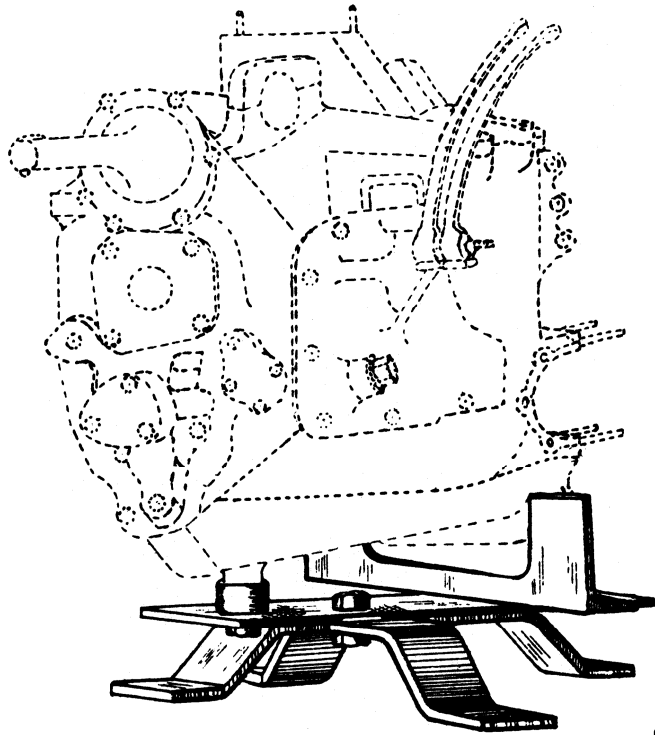


FIG.2. STAND MR. 3053-10

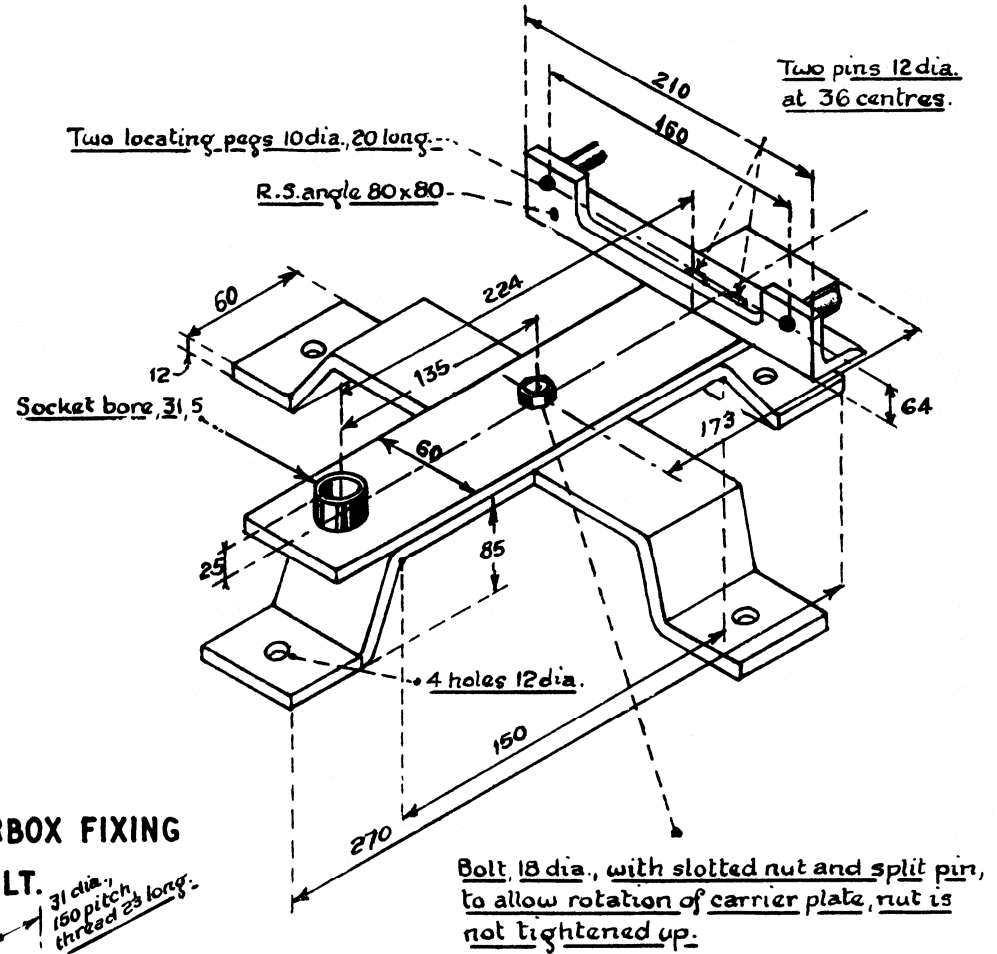
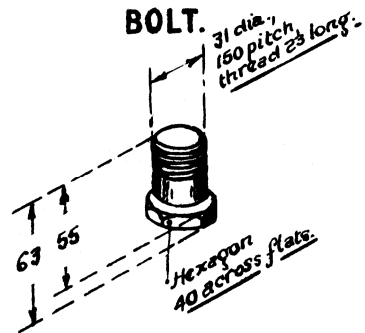
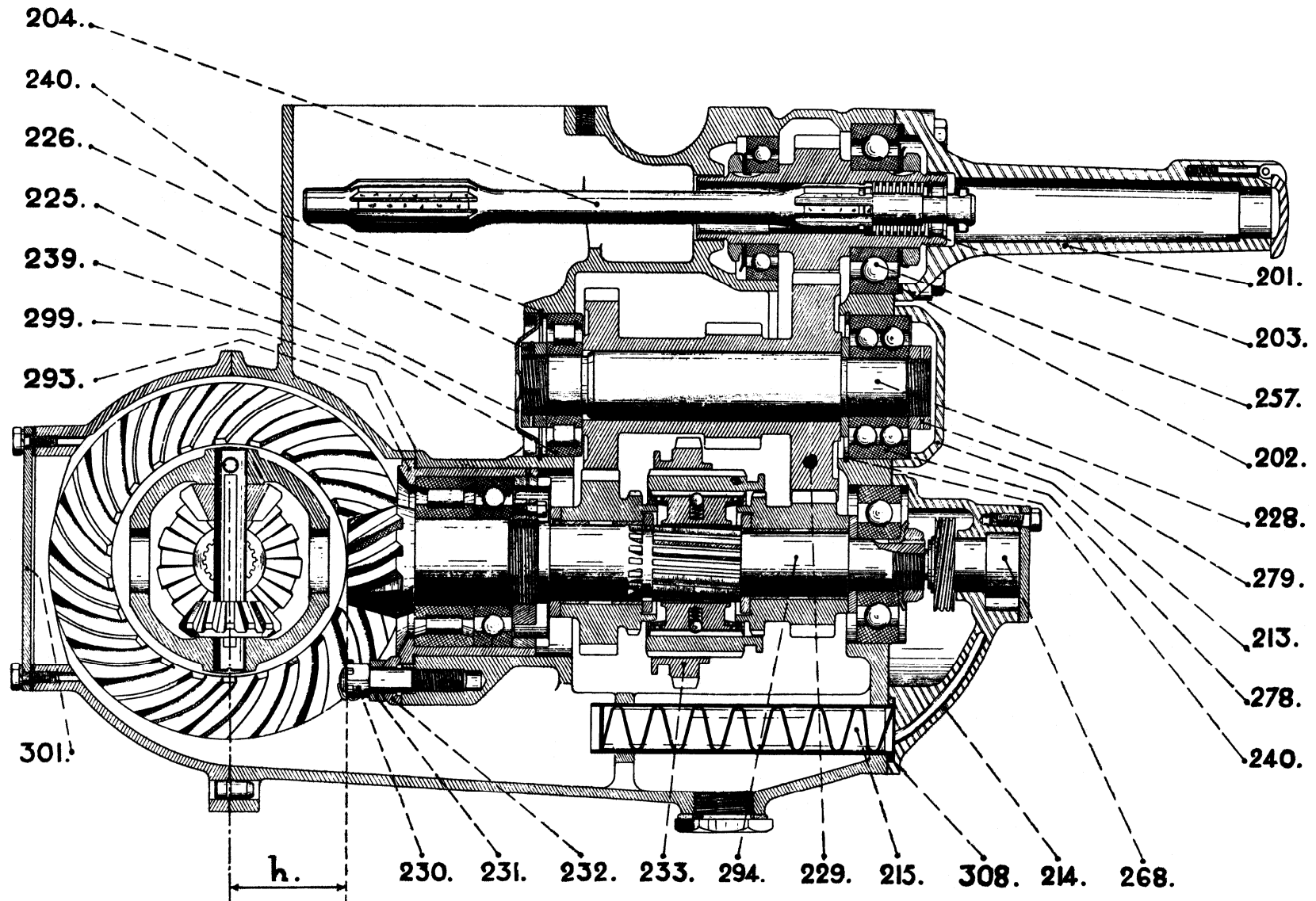


FIG.3. GEARBOX FIXING

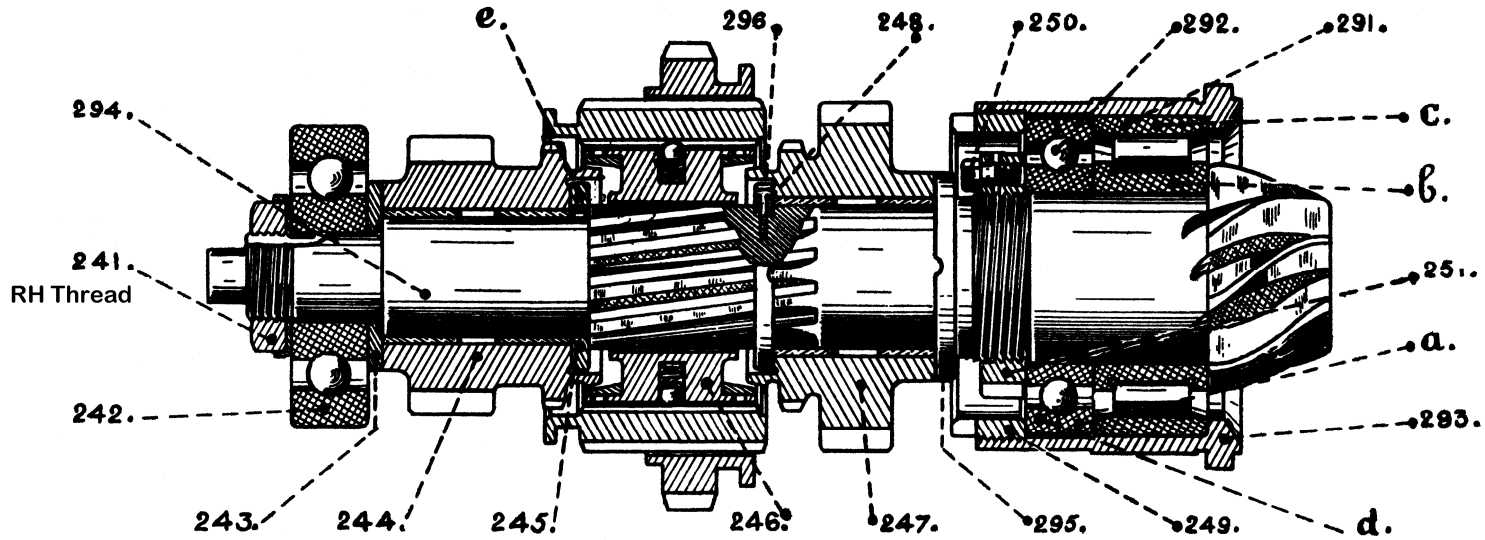


— GEARBOX —  
— LONGITUDINAL SECTION —

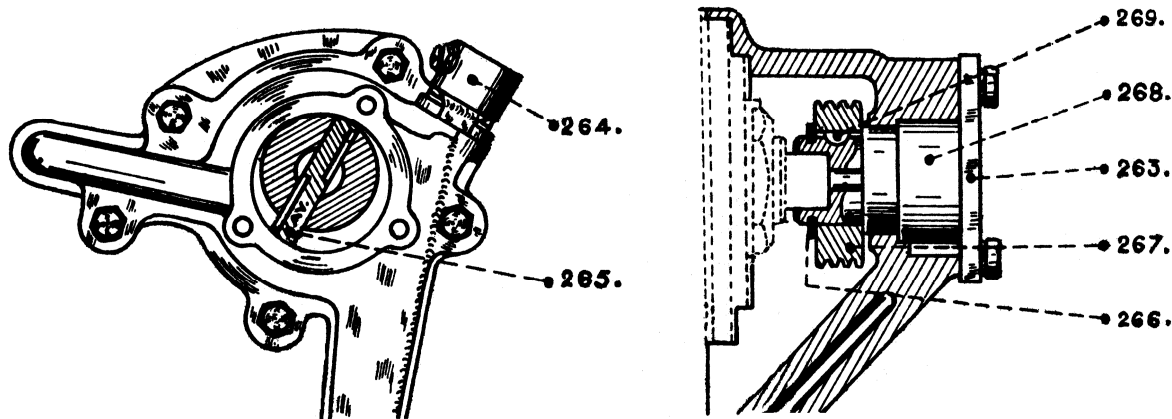


— GEARBOX —  
— SECTIONS —

— Fig. 1 — SECTION THROUGH BEVEL PINION (FORMING LAYSHAFT

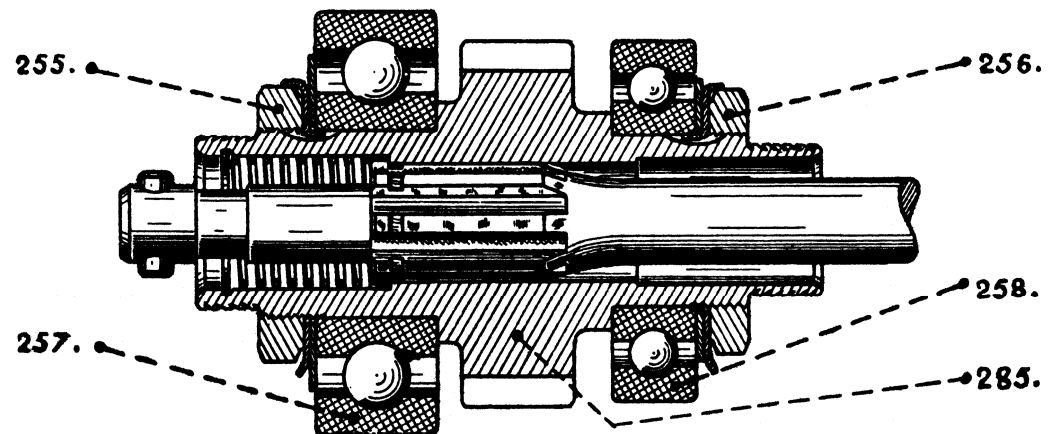


— Fig. 2 — OIL PUMP

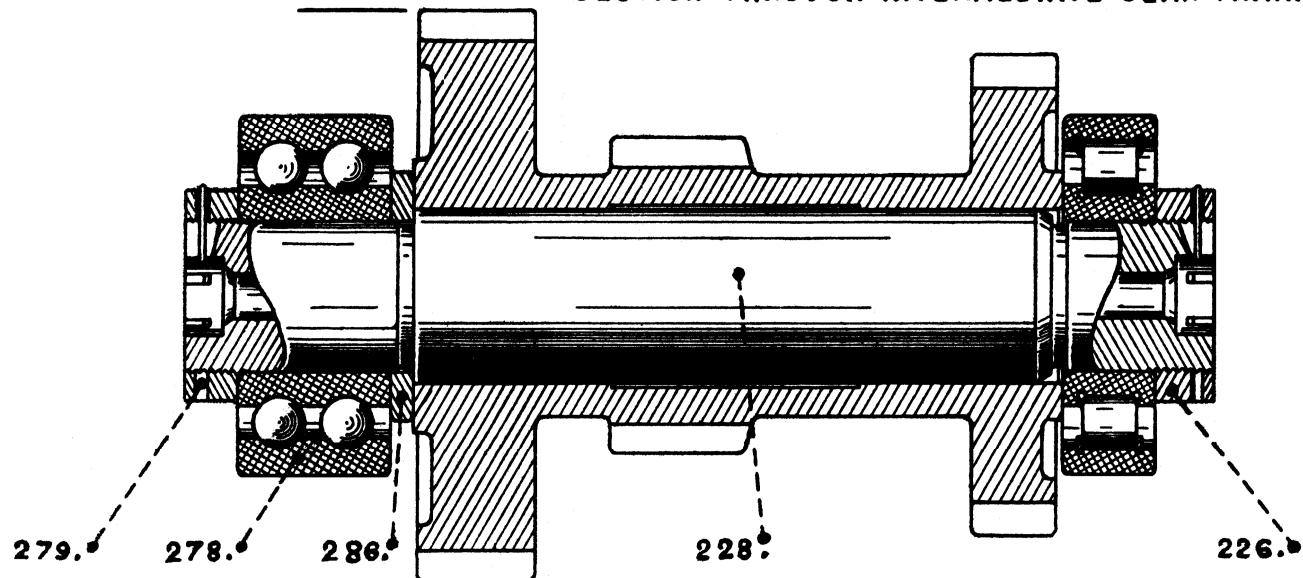


— GEARBOX —  
— VARIOUS VIEWS —

— Fig.1 — SECTION THROUGH MAINSHAFT



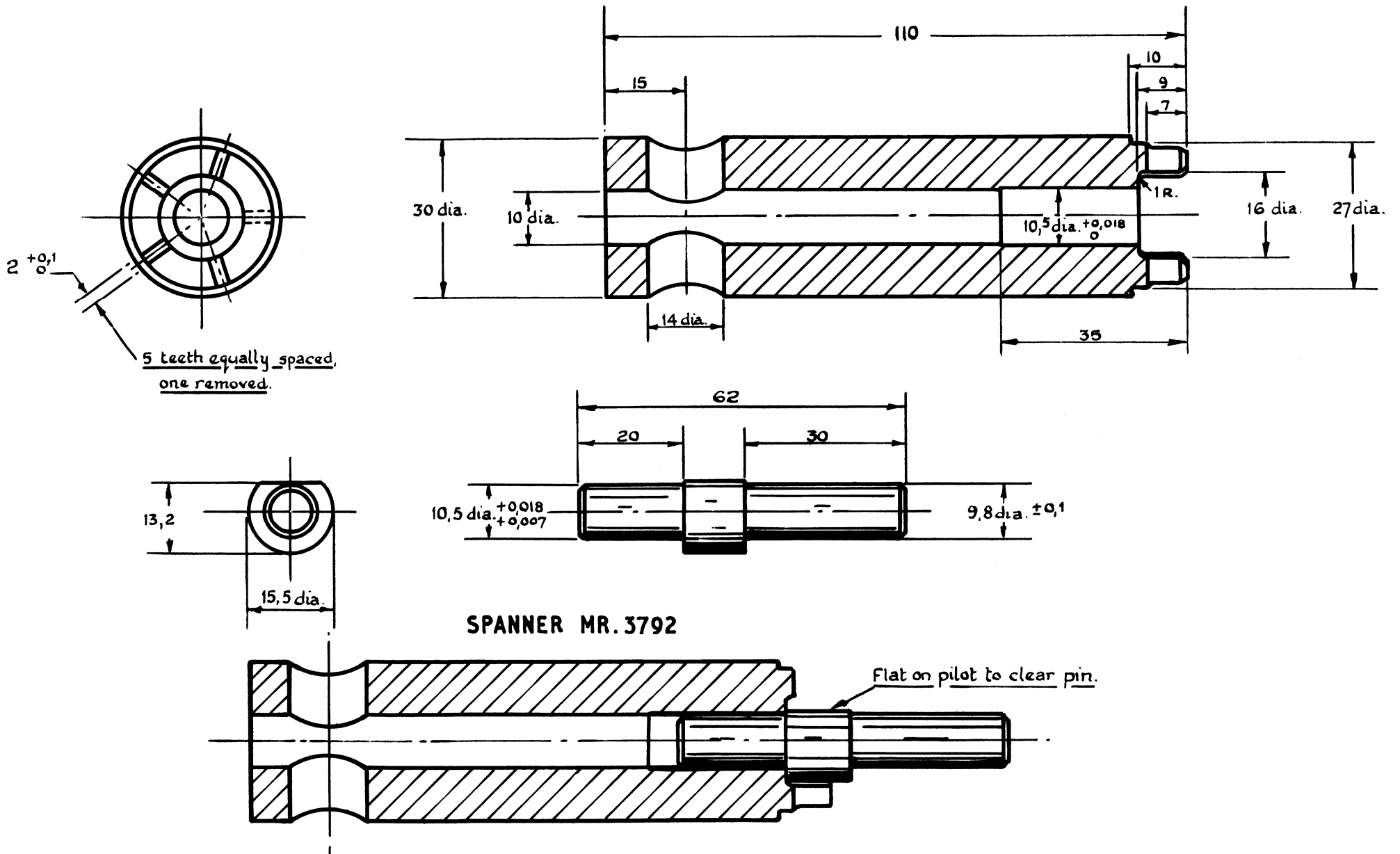
— Fig.2 — SECTION THROUGH INTERMEDIATE GEAR TRAIN



— GEARBOX —

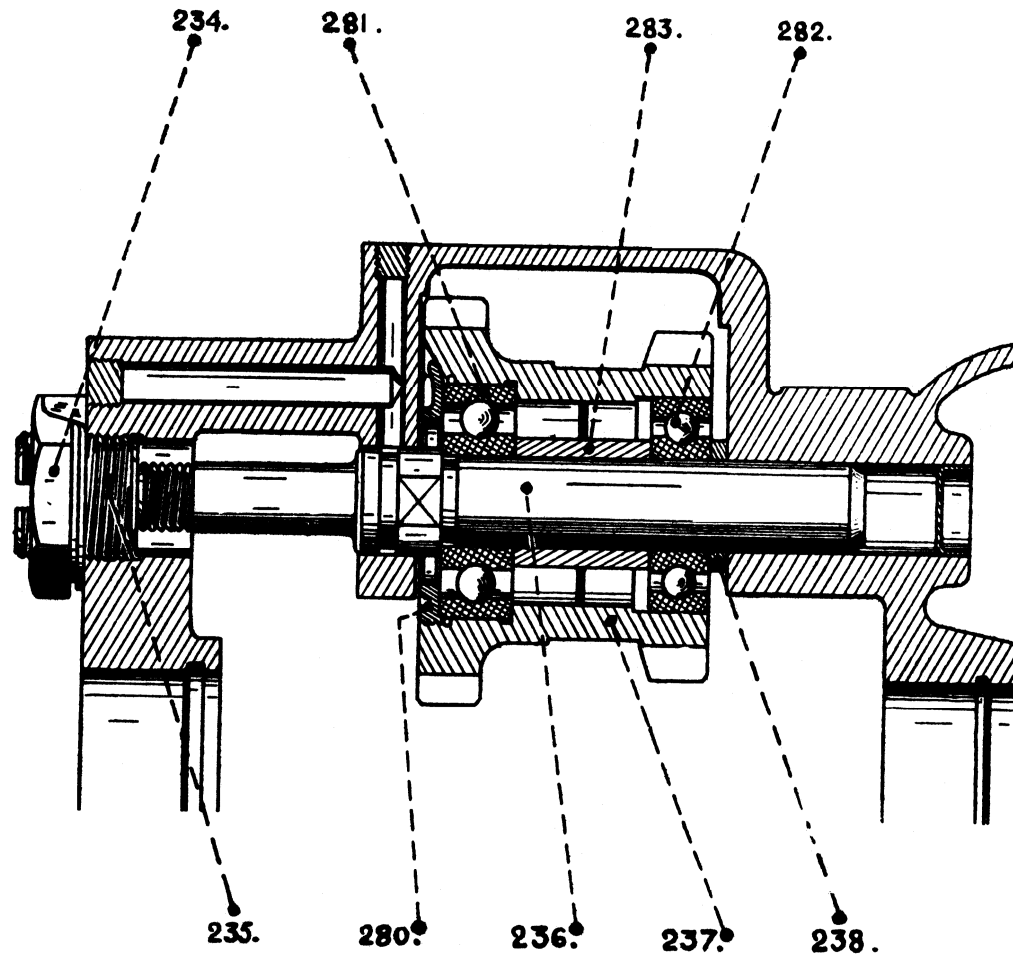
124 A

— SPANNER FOR HOLDING INTERMEDIATE GEAR SHAFT —

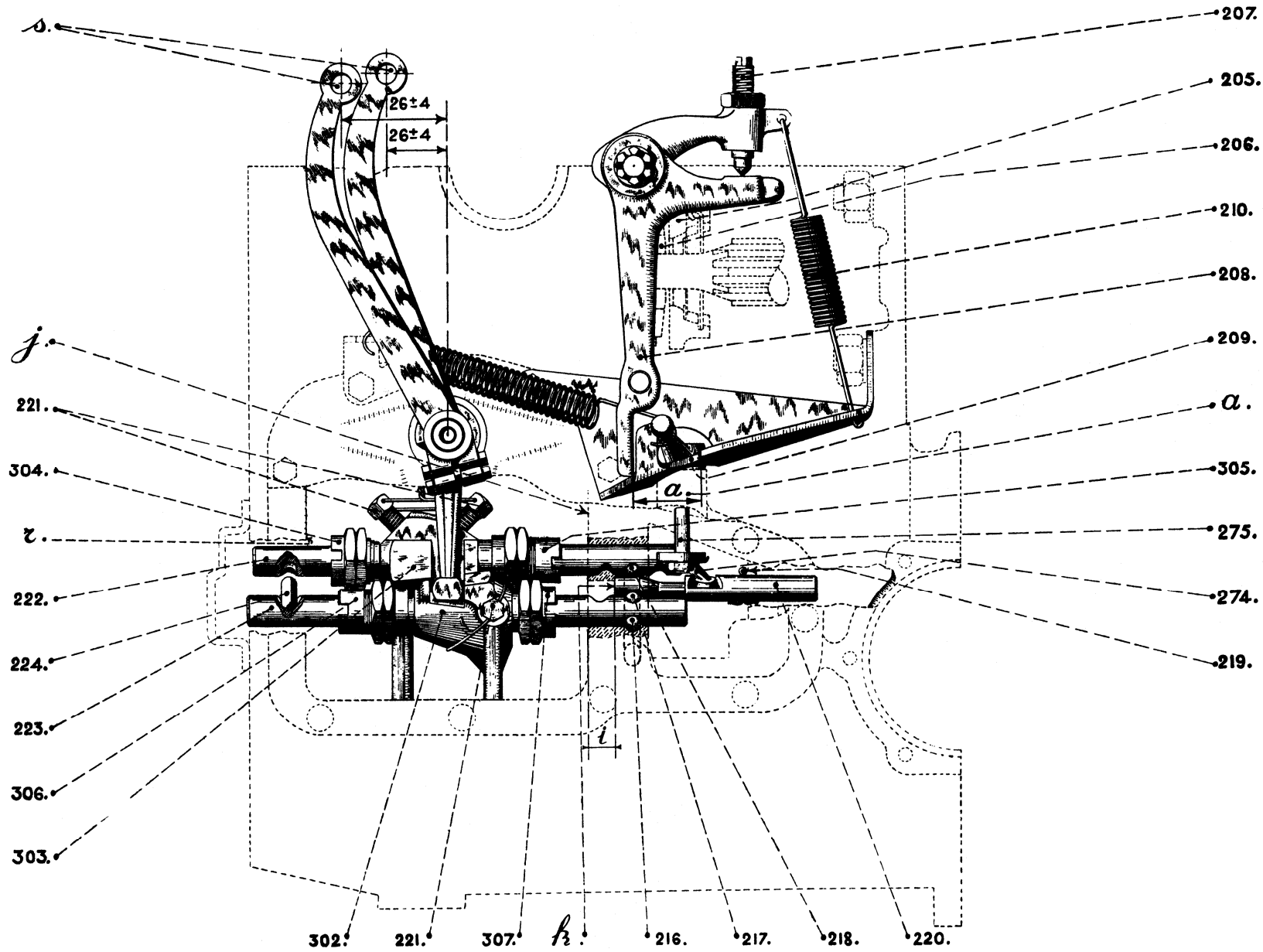


SPANNER MR. 3792

— GEARBOX —  
— SECTION THROUGH REVERSE GEAR INTERMEDIATE TRAIN —



— GEARBOX —  
— ADJUSTMENT OF CONTROL LEVERS —





— GEARBOX —

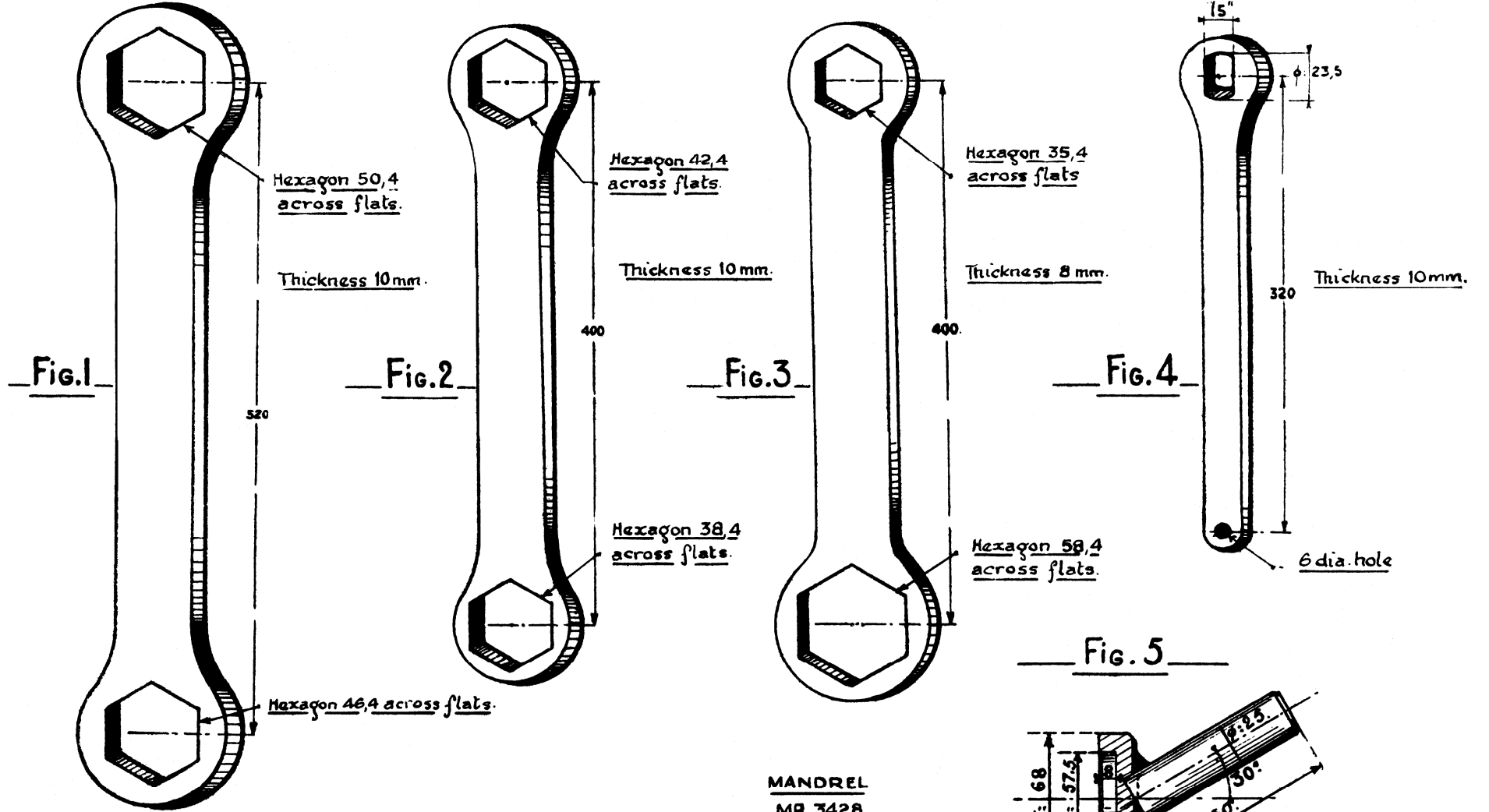
— VARIOUS TOOLS —

SPANNER 1732-T FOR MAINSHAFT FRONT AND REAR NUTS.

SPANNER 1731-T FOR INTERMEDIATE SHAFT FRONT NUT.

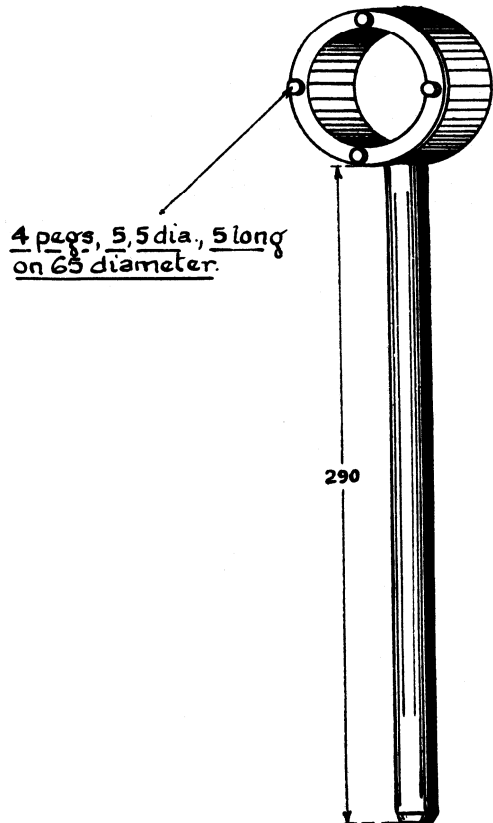
SPANNER 1734-T FOR BEVEL PINION FRONT BEARING NUT.

SPANNER 1733-T FOR HOLDING BEVEL PINION BY FLATS AT END.



— GEARBOX —  
— VARIOUS TOOLS —

FIG.1. PEG SPANNER 1758-T FOR DIFFERENTIAL SHAFT BEARING LOCK NUT.



— Fig.2 — SCREWDRIVER MR.3458.

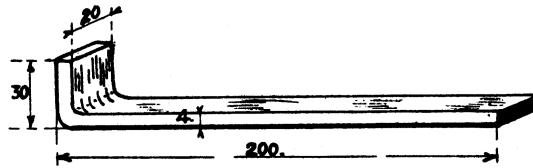
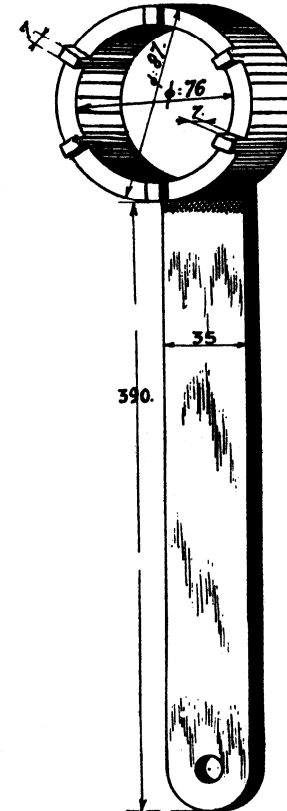


FIG.6. SPANNER FOR BEVEL PINION BEARING NUT.



— Fig.3 — SPANNER MR.3461.

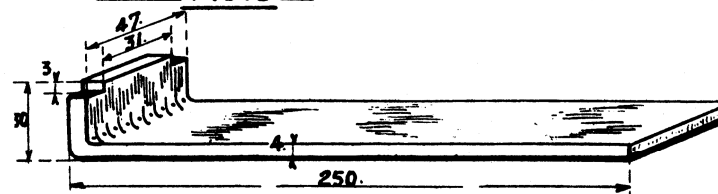
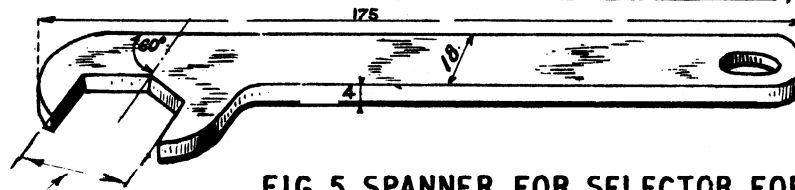
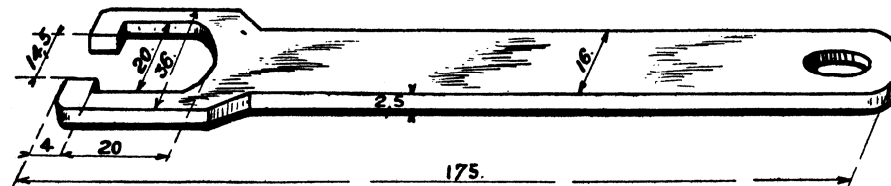


FIG.4. SPANNER 1780-T FOR SELECTOR FORK DISTANCE PIECE NUTS. *Two spanners are required.*



*26,4 across flats.*

FIG.5. SPANNER FOR SELECTOR FORK DISTANCE PIECE.



— GEARBOX —  
— EXTRACTORS —

— Fig.1 — USE OF EXTRACTORS.

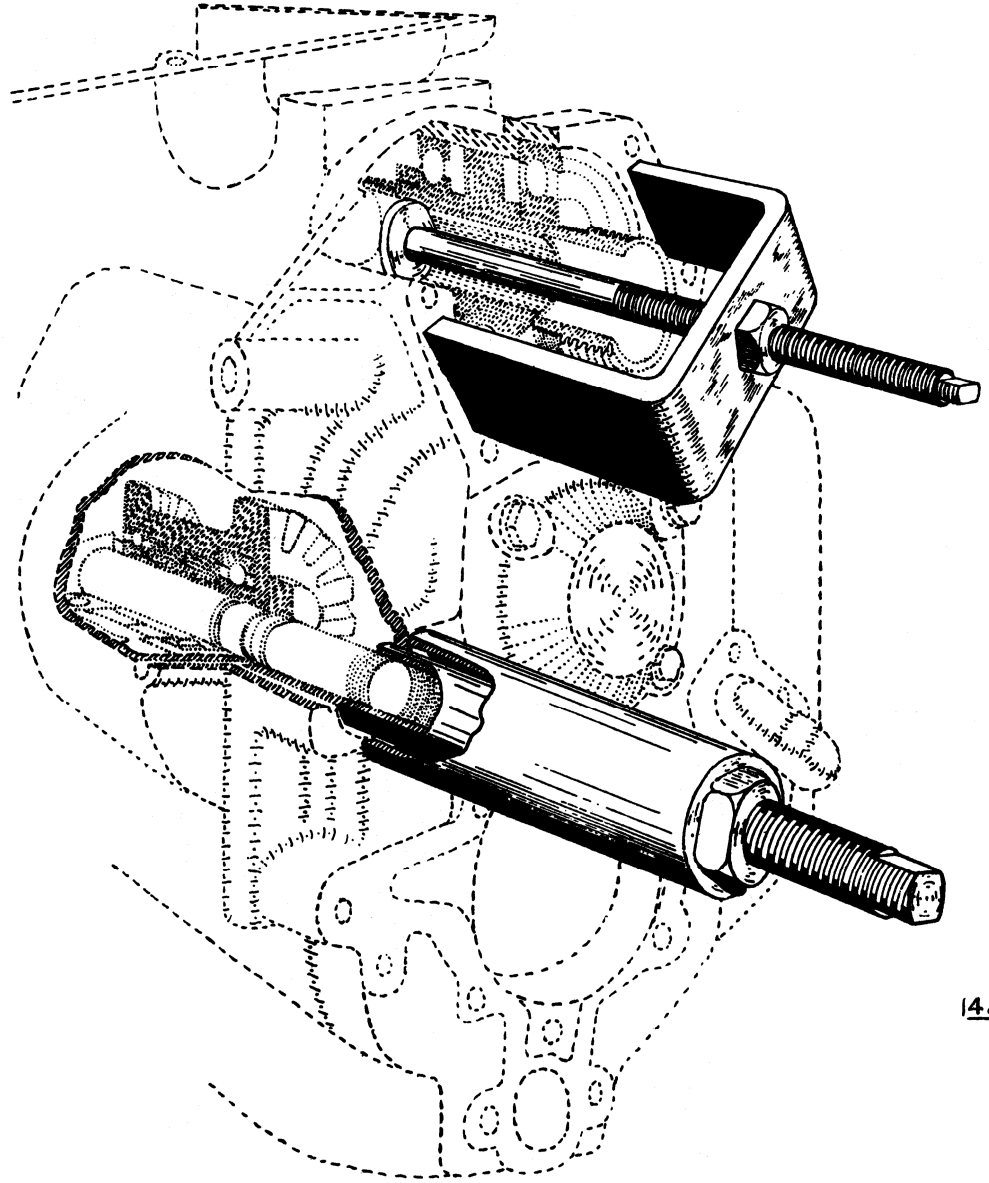
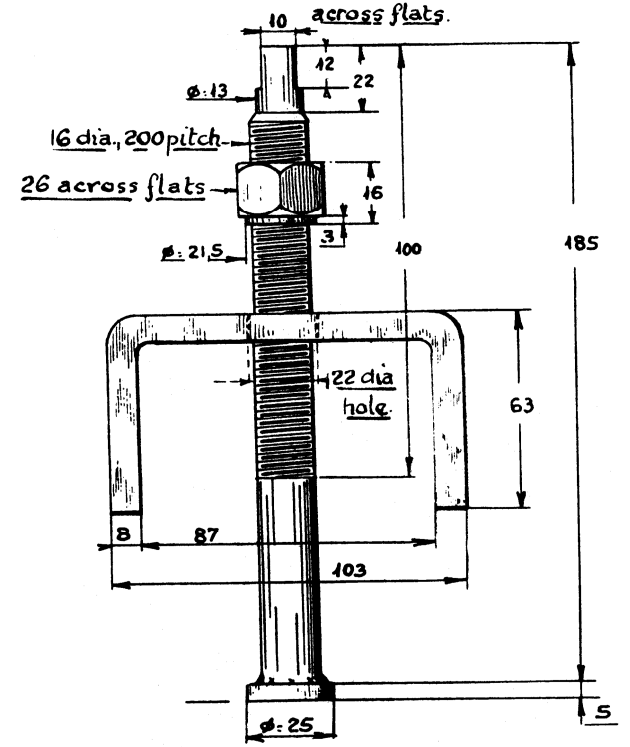
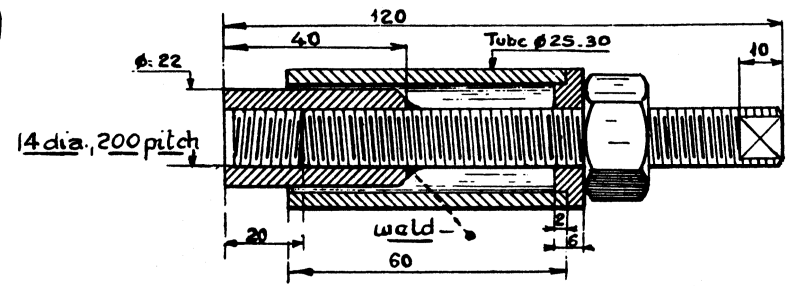


FIG.2. EXTRACTOR MR.3404



— Fig.3 — EXTRACTOR MR.3459



# GEARBOX HOLDING BEVEL PINION

FIG. I.  
USE OF CLAMPS

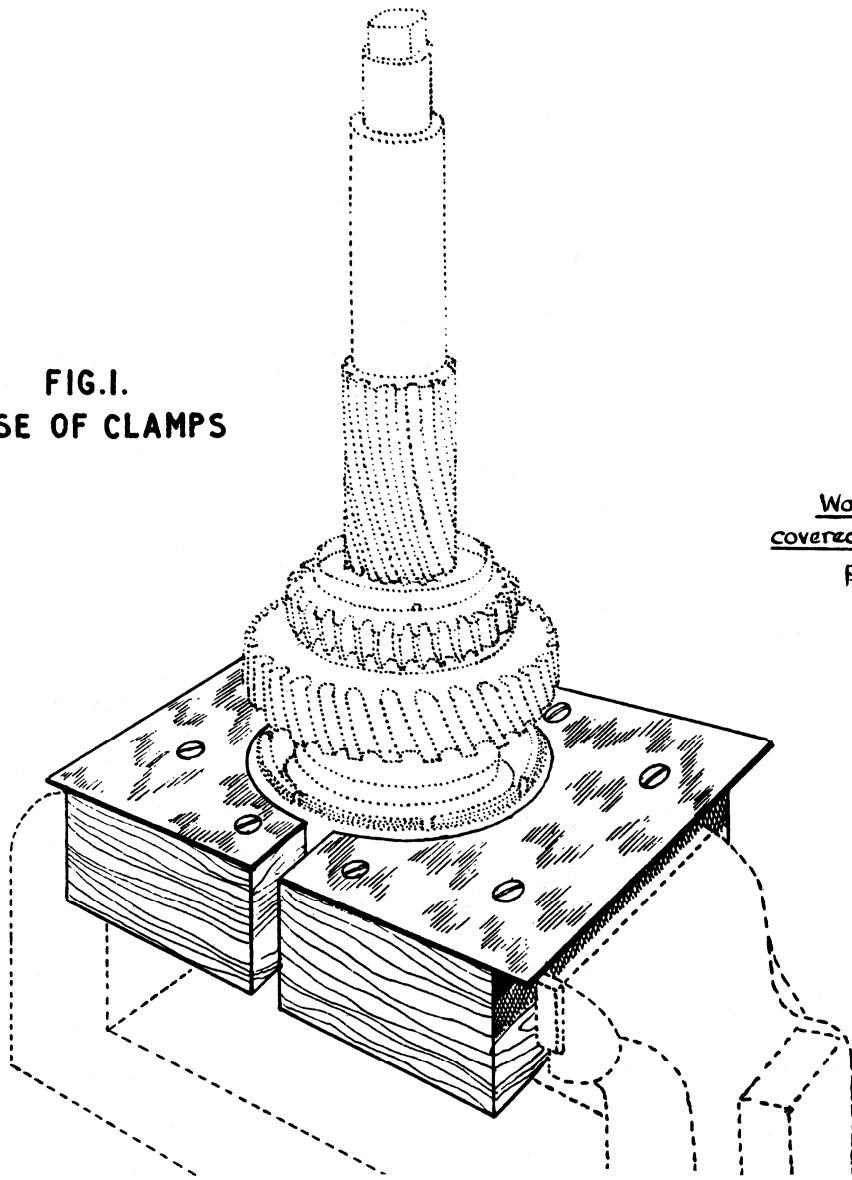
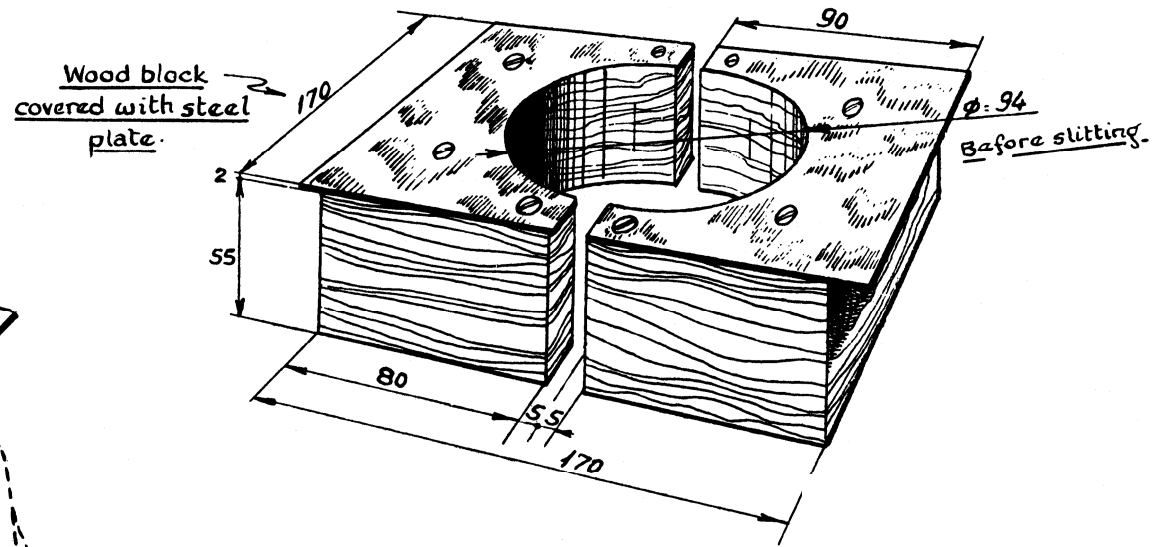


Fig 2 CLAMPS MR.3407



— GEARBOX —  
EXTRACTION OF BEVEL PINION SHAFT REAR  
BEARING —

FIG.1.  
USE OF SOCKET

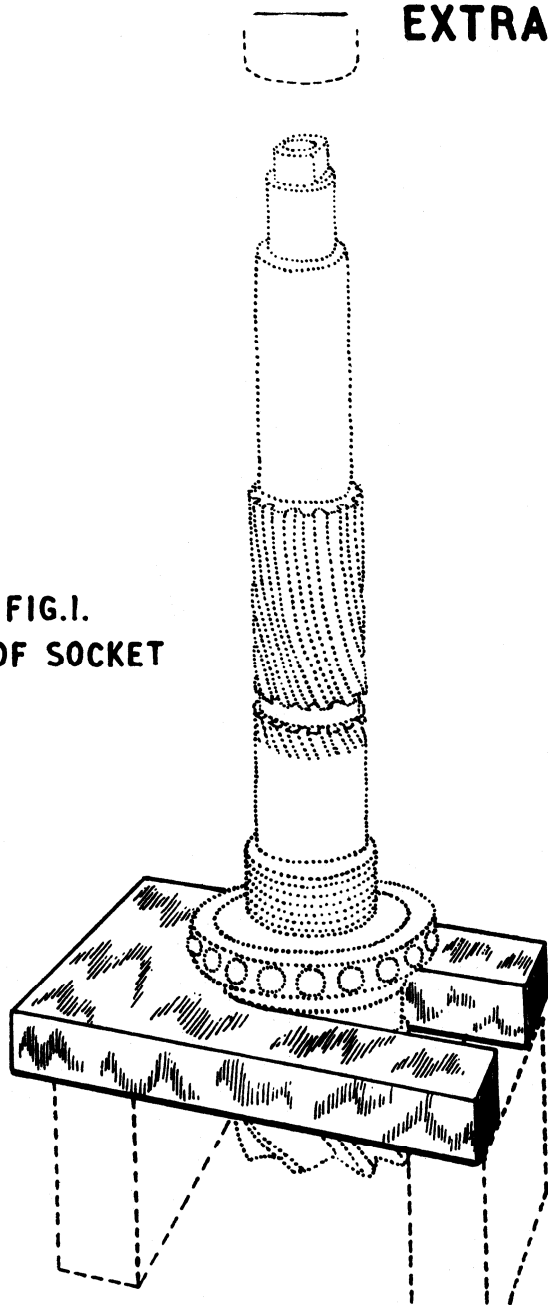
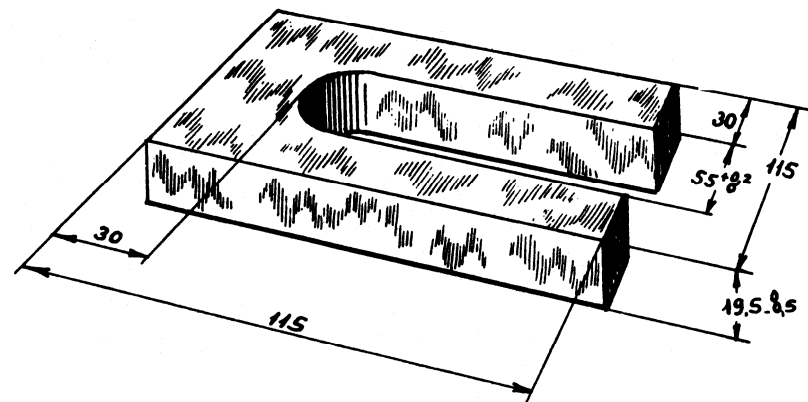
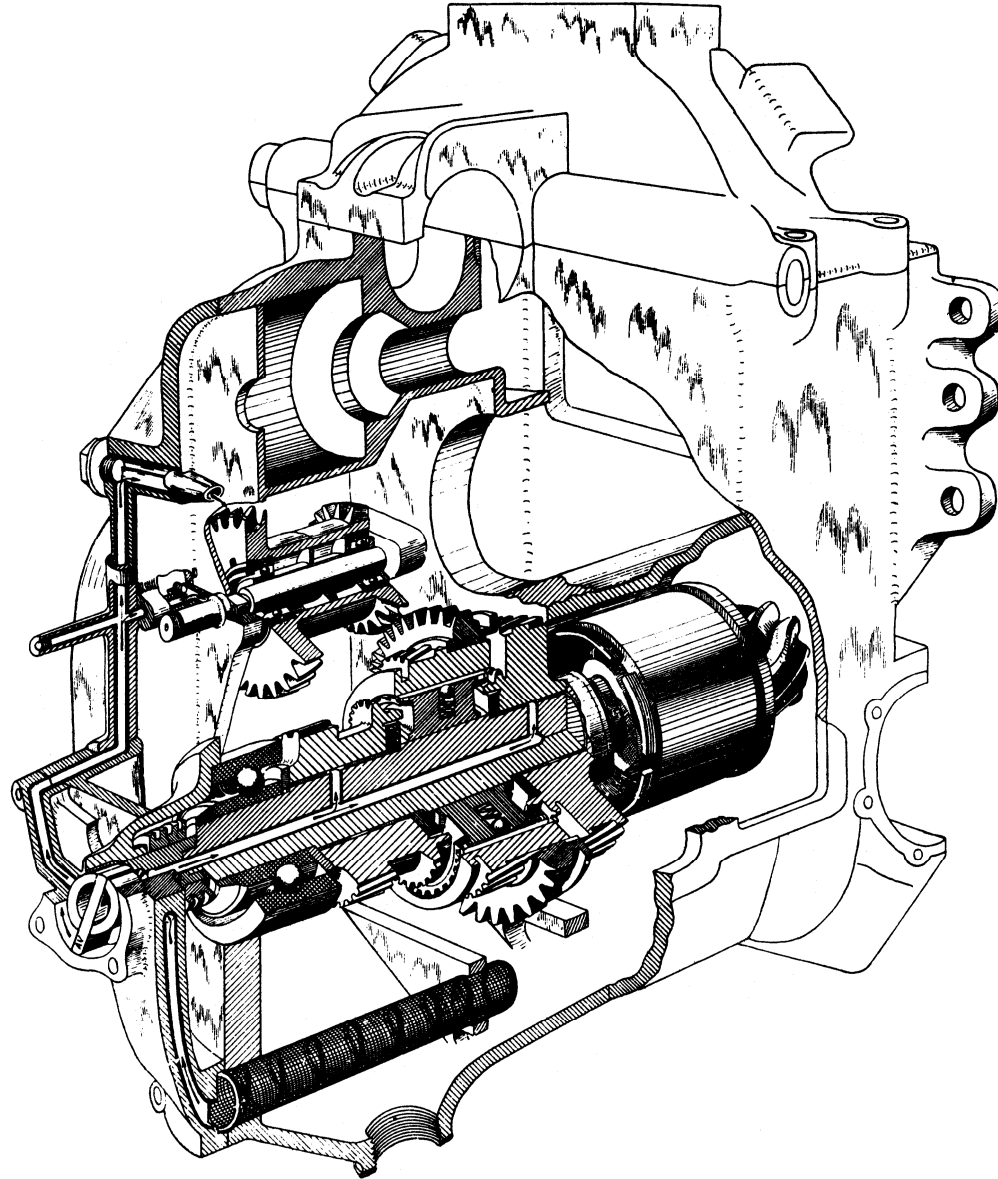


FIG.2. SOCKET MR. 3460

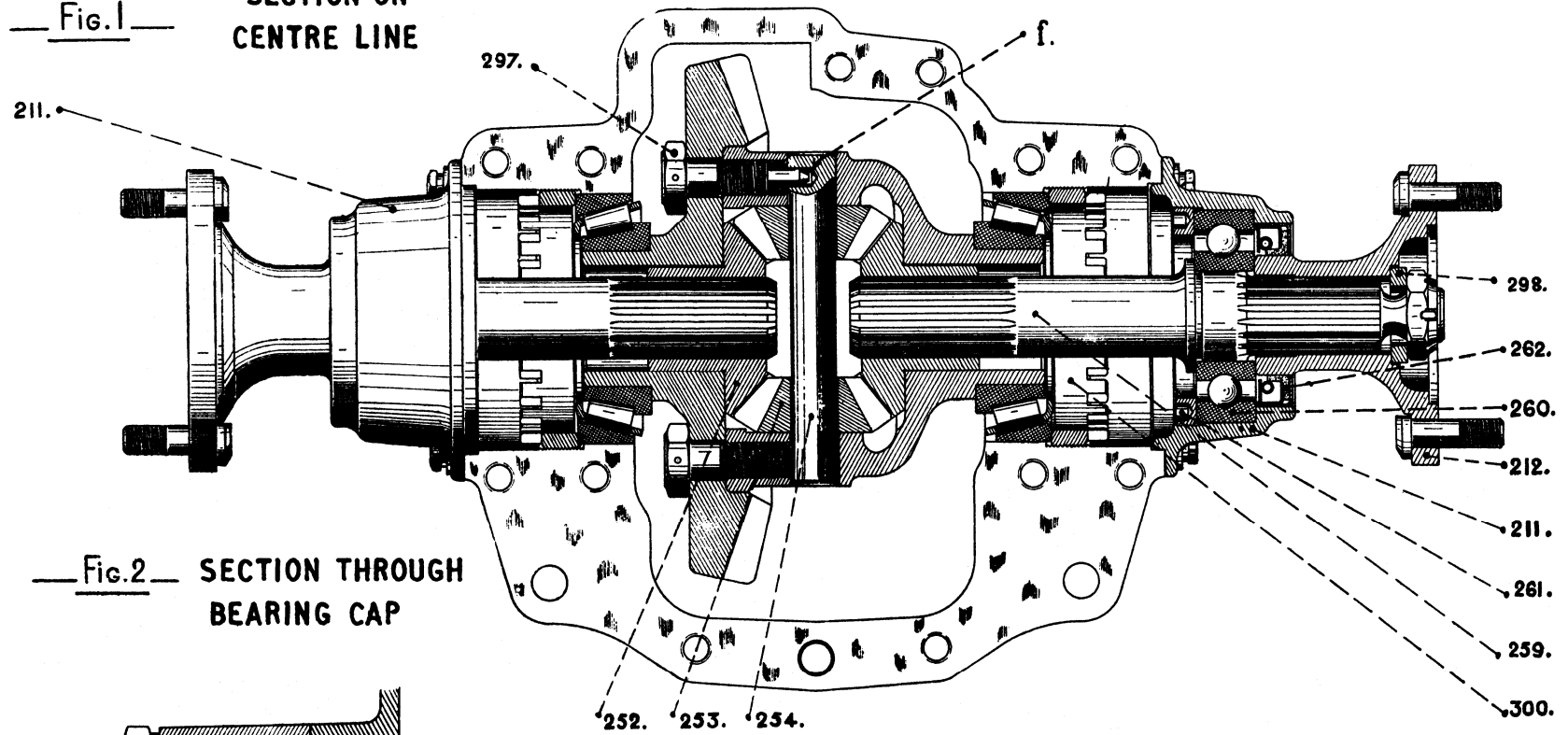


— GEARBOX —  
— SECTION THROUGH OILWAYS —



— GEARBOX —  
— DIFFERENTIAL —

— Fig. 1 — SECTION ON CENTRE LINE



— Fig. 2 — SECTION THROUGH BEARING CAP

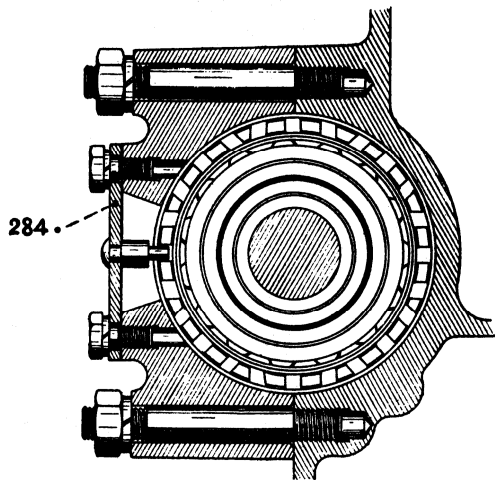
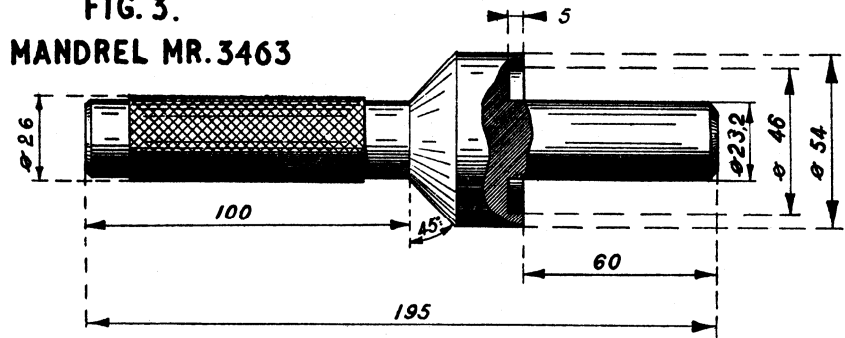
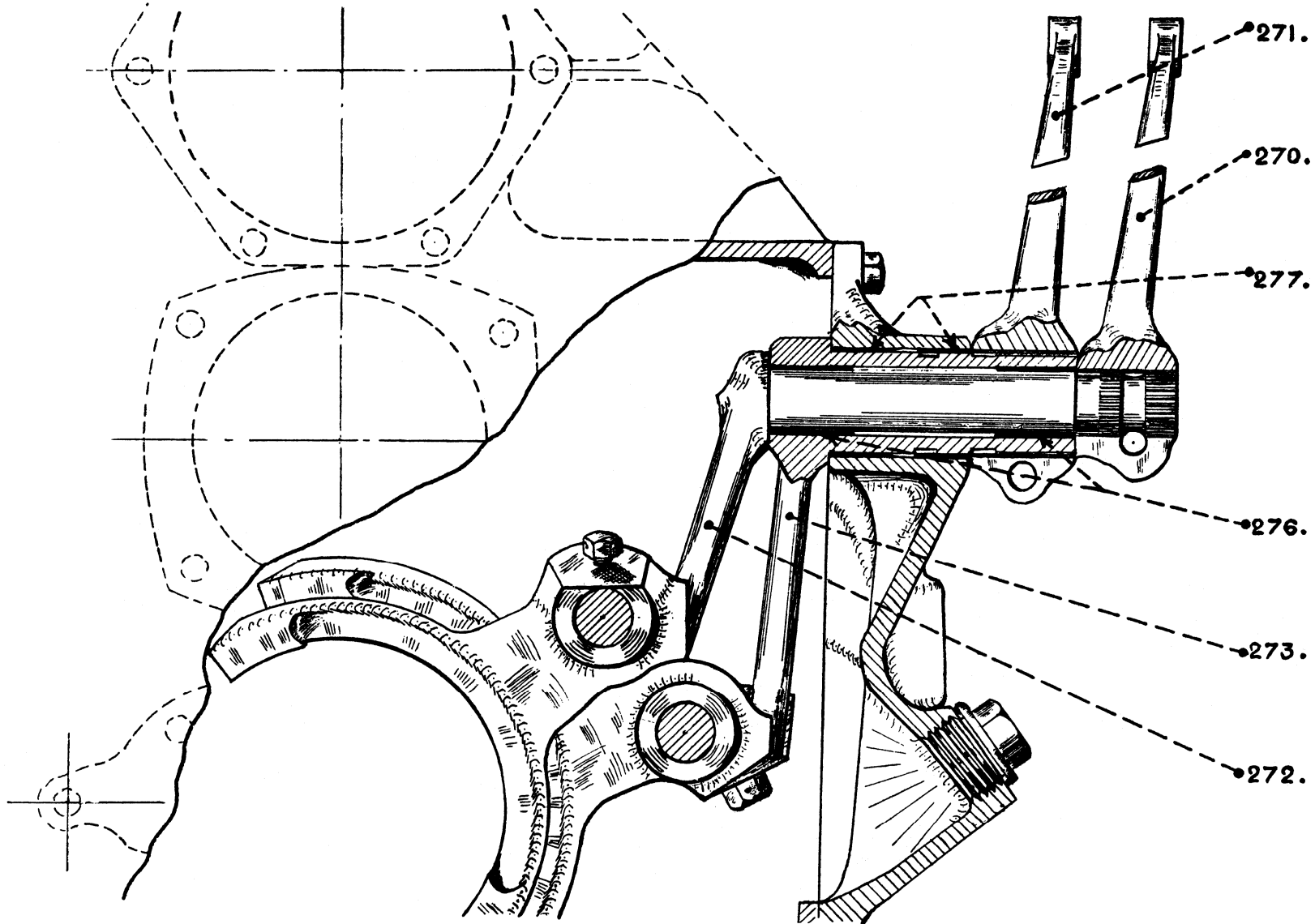


FIG. 3.  
MANDREL MR. 3463

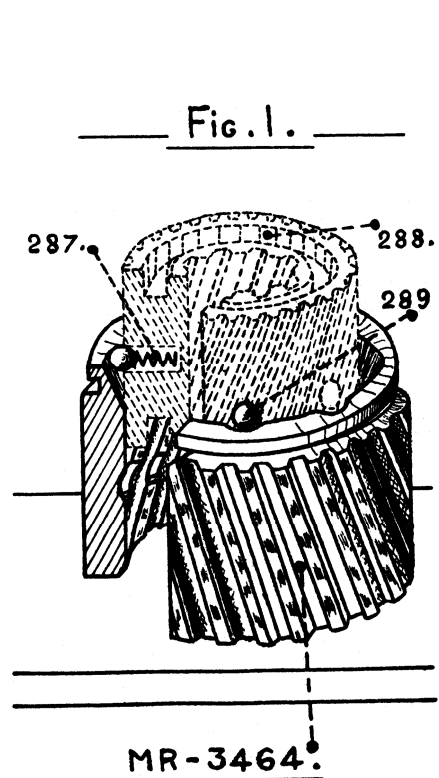


— GEARBOX —  
— GEARBOX COVER —  
SECTION THROUGH CHANGE SPEED LEVER SHAFT

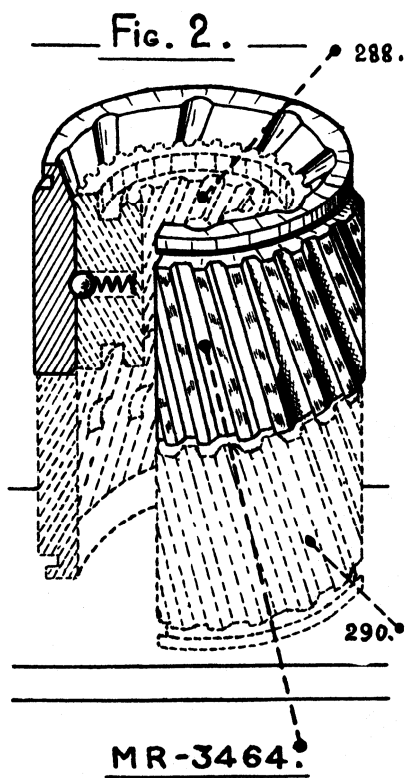




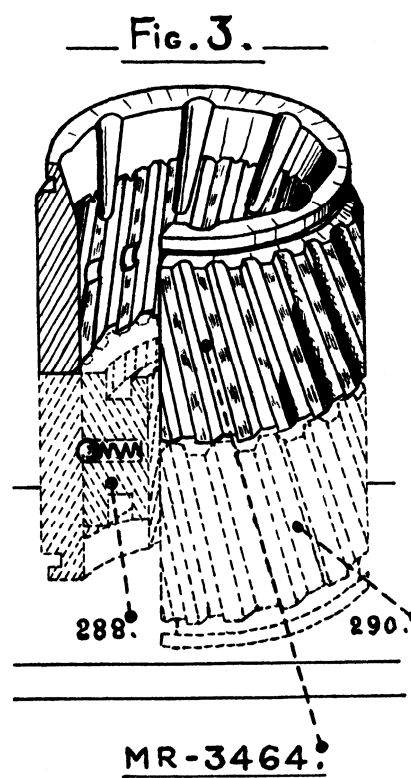
— GEARBOX —  
— FITTING SYNCHROMESH GEAR —



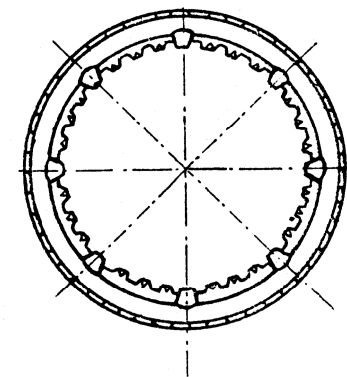
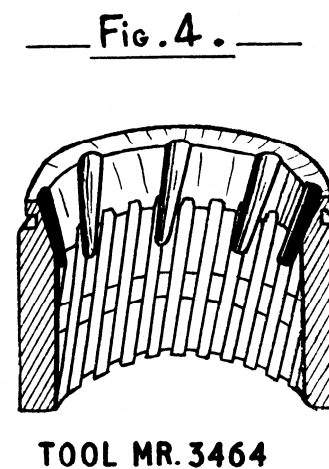
Place synchromesh hub in tool.  
Place springs and balls in position.  
Press hub into ring.



Place assembly from Fig. 1 on  
synchromesh ring. Press hub  
into ring and thereby carry  
balls through.



Push hub completely into ring  
in order to free tool.



The tool is made by modifying a synchromesh ring as follows:-

1. Anneal part.
2. Machine 8 grooves to receive balls.
3. Ease off teeth to give free fitting of ring on hub.

# GEARBOX BEVEL PINION ADJUSTMENT

Fig.1 ADJUSTMENT OF PINION DEPTH.  
APPARATUS 2040-T

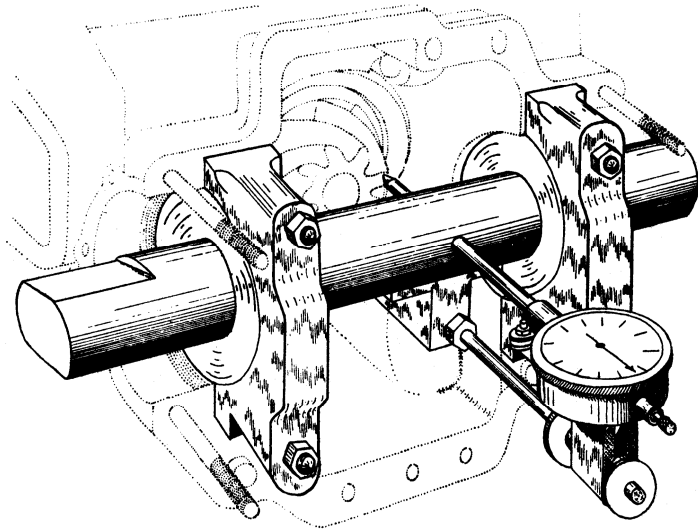


Fig.2 ADJUSTMENT OF MESH  
BRACKET 2041-T FOR CLOCK GAUGE

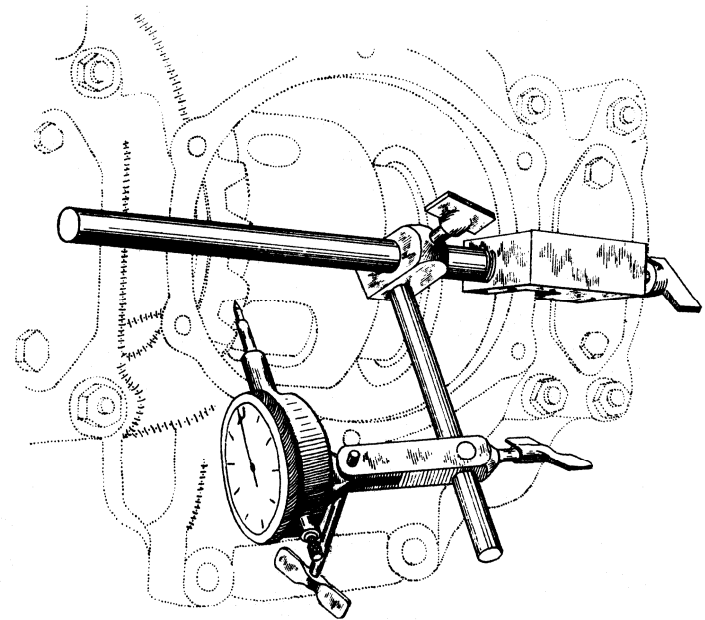


Fig.3 PINION

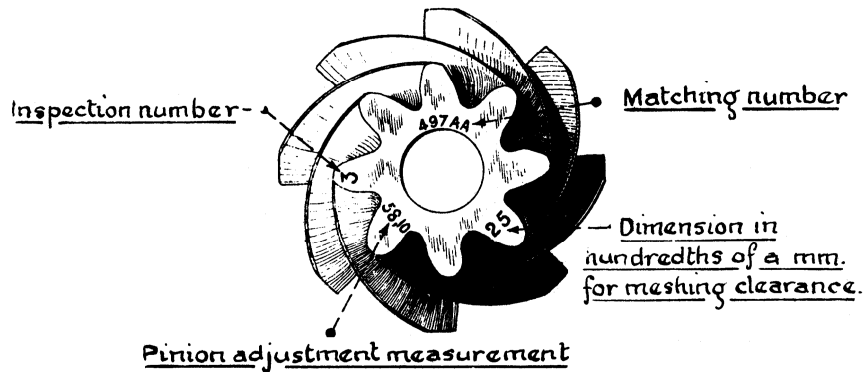
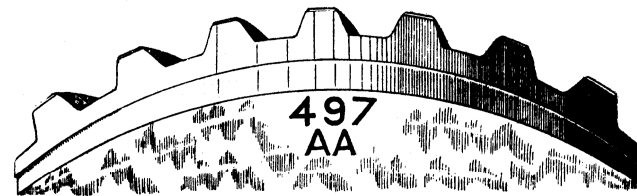


Fig.4 CROWN WHEEL

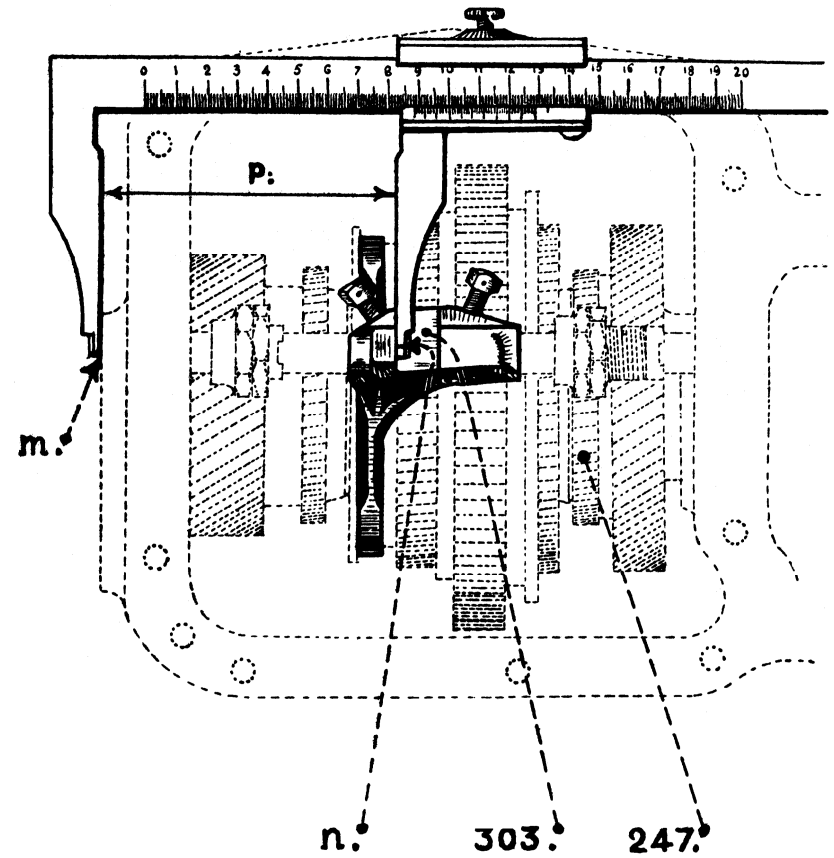
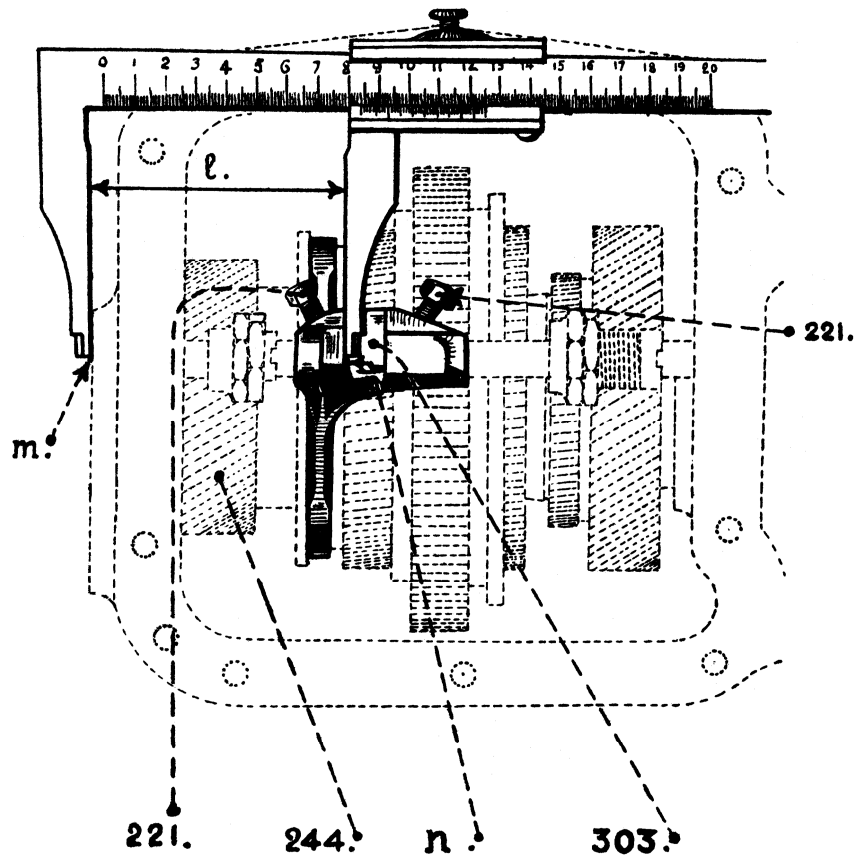


Explanation of inscriptions (on pinion and crown wheel shown).  
 58,10 - Pinion setting dimension (etched on pinion).  
 25 - Meshing clearance (etched on pinion).  
 497AA - Matching number (etched on pinion and crown wheel).

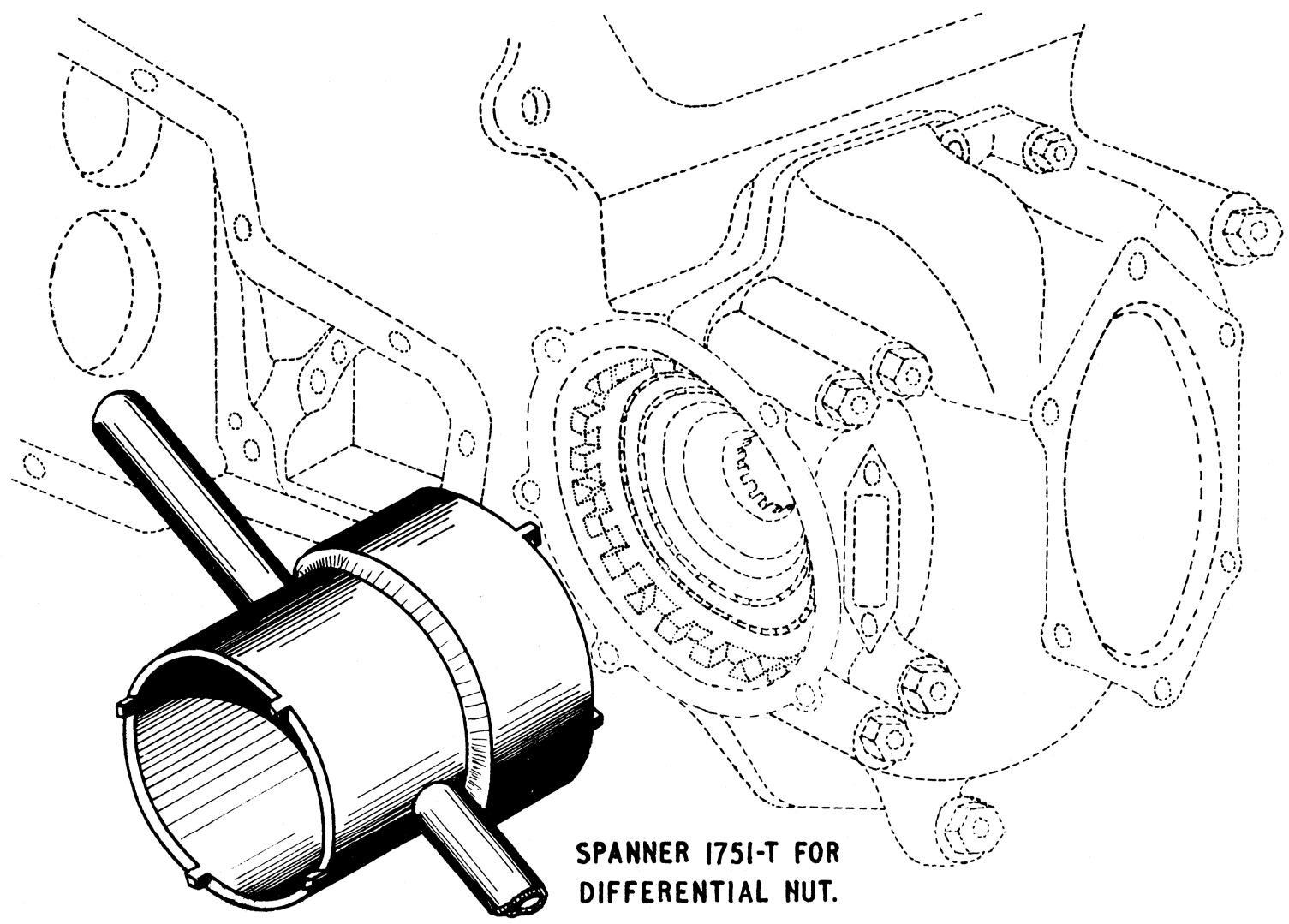
— GEARBOX —  
— ADJUSTMENT OF SYNCHROMESH —

— Fig. 1. —

— Fig. 2. —



— GEARBOX —  
— TIGHTENING DIFFERENTIAL BEARING LOCK NUTS —



SPANNER 1751-T FOR  
DIFFERENTIAL NUT.

REMOVING GEARBOX (See Drawing 122)		
1	Drain water from the radiator and meanwhile remove the bonnet.	
2	Raise the vehicle at the front. (Use jack attachment MR.3300-90, see Drawing 67). Block up under ends of lower link arms.	Jack attachment MR.3300-T
3	Disconnect cable from battery negative terminal. (Use extractor 2200-T, see Drawing 1, fig. 1). Disconnect leads from horns, headlamps, dynamo, starter motor and ignition coil.	Extractor 2200-T Flat spanners 8-14 Universal joint spanner 10-12-14
4	Remove radiator shell and front wings as an assembly.	Brace spanner 10-12-14
5	Remove the air intake silencer by disconnecting pipe from carburettor and fixing bolts on hull.	Flat spanner 12
6	Remove the front bumper brackets assembly and radiator without disconnecting radiator from tie-bar between bumper brackets. Slacken and remove nuts from four front axle mounting studs. (Use spanner 1880-T).	Box spanner 14-17 Spanner 1880-T
7	Disconnect the two gear selector rods from relay levers on timing cover and the two control rods from levers on gearbox. Disconnect clutch cable from lever at the front. Remove speedometer drive cable at gearbox end.	Box spanner 10
8	Uncouple drive shaft flanges from gearbox but do not disengage. (Use spanner 1832-T. see Drawing 60A).	Spanner 1832-T
9	Disconnect exhaust pipe from engine exhaust manifold. (Use spanner 1626-T, see Drawing 1, fig.2).	Universal joint spanner 17 Spanner 1626-T
10	Disconnect accelerator control rod from carburettor by sliding retaining spring along rod to release ball pin. Disconnect starter carburettor, starter motor and variable ignition controls. Disconnect petrol pump inlet pipe.	Small adjustable spanner Box Spanners 8-10 Flat spanners 8-14
11	Uncouple engine from rear flexible mountings, and the engine front bearer tube from front axle cradle.	Universal joint spanner 24 Flat spanner 26
12	Take out engine and gearbox assembly from the car. (Use chain sling MR.3320-30, see Drawing 2). (In order to allow the rear of the engine to be raised first, the chain legs are of unequal length). To prevent fouling the gear selector rods place the gear change lever in "REVERSE" position. Slightly raise the engine, disengage from rear mountings, and disengage drive shafts,	Chain sling MR.3320-30

	<p>one after the other, from gearbox flanges. Pull engine forward to disengage the front bearer tube from studs on front axle cradle. Completely disengage unit from vehicle.</p>	
13	<p>Place the engine on a stand. (Use stand MR.3300-50, see Drawing 119).</p>	<p>Stand MR.3300-50</p>
14	<p>Take off the dynamo.</p>	<p>Flat spanner 17</p>
15	<p>Remove bearing cap (201) forming bracket for starting handle. NOTE. TAKE CARE NOT TO DISPERSE THE SHIMS (202) THAT MAY BE FITTED. With the aid of a pair of round nose pliers take out circlip (203) retaining the spring. Disengage the mainshaft by pulling forwards.</p>	<p>Brace spanner and extension 12</p>
16	<p>Take off clutch housing cover, unhook return spring from clutch fork lever, and remove clutch fork with thrust ring.</p>	<p>Brace spanner and extension 17</p>
17	<p>Uncouple gearbox from cylinder block.</p>	<p>Universal joint spanner 21</p>
	<p>REFITTING GEARBOX (see Drawing 122)</p>	<p>Flat spanner 17</p>
	<p>NOTE. If the gearbox or spacer has been replaced, it is essential to slacken the sump fixing bolts to refit the gearbox. This operation is necessary to avoid any strain on the gearbox fixing plates or the sump.</p>	
	<p>Tightening of the sump fixing bolts will be carried out after tightening bolts fixing gearbox and spacer.</p>	
18	<p>Make sure that the gearbox locating dowels are correctly fitted in the cylinder block. Offer up the gearbox, engage it on locating dowels, fit two bolts but do not tighten. Fit the spacer, put all fixing bolts in position, fit spring washers under nuts, and tighten. If necessary, tighten sump fixing bolts.</p>	<p>Universal joint spanner 21 Flat spanners 17-21</p>
19	<p>Fit the clutch withdrawal fork, with thrust ring assembled, SO THAT THE GRAPHITE BUSH FACES THE CLUTCH TOGGLE THRUST RING, and the end of the double lever is in front of the outer locking control lever.</p>	
20	<p>Fit mainshaft pinion. Engage pinion with splines of mainshaft by turning the latter by hand. Fit the circlip for retaining spring (203) by using a pair of round nose pliers.</p>	
21	<p>Fit the bearing cap (201) forming starting handle bracket, FITTING, IF NECESSARY, SHIMS (202) TAKEN OUT DURING GEARBOX REMOVAL. Coat the paper gasket with Hermetical and tighten bolts fixing bearing caps.</p>	<p>Brace spanner and extension 12</p>

- |  |   |
|--|---|
| <p>22 Fit the engine front bearer tube (see Drawing 5, fig. 1). Turn the tube so that the threaded holes "a" for bolts fixing radiator upper brackets are towards the front. Make sure that the distance between the centre of the rubber bush (62) and the centre of the left hand fixing eye of the tube is 353 mm. If necessary, use packing washers, sold by our Spare Parts Department, between thrust washer (64) and ring welded on tube, to obtain this dimension.</p> |   |
| <p>23 Fit the clutch housing cover. Coat the threads of the three forward fixing screws and the flange in the corresponding zone with Hermetical. Fit spring washers under heads of bolts and tighten. MAKE CERTAIN, THAT AFTER TIGHTENING, CLUTCH FORK SHAFT TURNS FREELY.</p>  | Universal joint spanner 17                    |
| <p>24 Fit the dynamo: Fit a plain and a spring washer under each nut, and tighten.</p>   | Flat spanner 17                               |
| <p>25 ADJUST DOUBLE LEVER (208) (see Drawing 126)</p> <p>(a) Position double lever (208) to obtain a dimension 'a' of 27 mm., plus or minus 1 mm. between the end of lever and stop on plate (209).</p> <p>(b) Adjust screw (207) so that with the double lever in the above position the graphite bush of the clutch fork thrust ring is in contact with the toggle thrust ring.</p> <p>(c) Tighten adjusting screw lock nut. Hook on return spring (210).</p>                | Flat spanner 17                               |
| <p>NOTE. Clutch toggle clearance is obtained by adjustment of the clutch pedal after the engine is in position in car.</p>   |   |
| <p>26 Check and adjust the height of the engine rear flexible mountings. (Use template MR.3450, see Drawing 5, figs. 3 and 4).</p>   | Template MR.3450                              |
| <p>27 Raise the vehicle at the front. (Use Jack attachment MR.3300-90, see Drawing 57). Block it up under ends of lower linkarms.</p>  | Jack attachment MR.3300-90                    |
| <p>28 Suspend the engine. (Use chain sling MR.3320-30, see Drawing 2).</p>   | Sling MR.3320-30                              |
| <p>29 Lower engine into hull. Engage drive shaft couplings with gearbox flanges. Fit engine front bearer tube on studs on front axle cradle, provisionally screwing nuts, with spring washers under, on studs. Lower engine on rear mountings. Remove the chain sling. Tighten front bearer tube nuts. Tighten engine rear mounting nuts. Fit a plain and spring washer between nut and mounting bracket.</p>  | Flat spanner 26<br>Universal joint spanner 23 |
| <p>30 WELL TIGHTEN nuts of drive shaft flanges using a "Blocfort" lockwrasher under each nut (Use Spanner 1832-T, see Drawing 60A).</p>  | Spanner 1832-T                                |

31	Fit exhaust pipe using a C. and A. gasket between pipe and manifold flanges. TIGHTEN THE NUTS WELL. (Use spanner 1626-T, see Drawing 1, fig. 2).	Spanner 1626-T
32	Connect clutch cable. Adjust cable to give an idle movement of 15 mm. to 20 mm. to the highest position of the clutch pedal. This movement corresponds to a necessary clearance of 1.5 mm. to 2.0 mm. between clutch fork graphite bush and the toggle thrust ring. After adjusting the cable tighten the lock nut and fit split pin to trunnion pin.	Flat spanner 14
33	Connect the two gear control rods and fit split pins to fork and pins. Connect the two gear selector rods to the relay levers. Set these rods to an exact length so that no pull is applied to the levers. Make sure that the gear change lever does not catch in its lateral movement in the selector. Fit split pins to the fork end pins.	
34	Fit speedometer drive cable and tighten bolt with a spring washer fitted under head. Fit variable ignition, starter motor, and starter carburettor controls. Connect ignition coil wires. Fit flexible pipe on petrol pump. Connect accelerator control.	Small adjustable spanner Flat spanners 8-14
35	Fit the assembly of radiator and front bumper brackets. Tighten bumper brackets, using a plain washer and a spring washer under each bolt. Fit shouldered bushes, previously oiled, for aligning front axle cradle. Tighten front axle cradle fixing nuts with spring washers under. (Use spanner 1880-T) Line up the radiator with the gearbox bearing cap, which forms the starting handle bracket, by positioning radiator on bumper bracket tie-bar. Tighten 'U' bolts and radiator upper fixing plates. Tighten hose clips. After making sure that drain plug is shut, fill the radiator with water.	Spanner 1880-T Universal joint spanner 17 Box spanners 10-14-17
36	Clip the group of headlamps and horn wires to the engine front bearer tube. Connect the two earth wires under one of the bolts under each bumper bracket.	Box and flat spanners 14
37	Fit the assembly of radiator shell and front wings. Fit a plain washer and a spring washer under all the fixing bolts and screw in a few turns only. Offer up the bonnet and line up parts in relation to one another. Fit wing piping and tighten the fixing bolts.	Flat spanner 14 Box spanners 8-12
38	Connect wiring to headlamps, horns, dynamo, and starter motor. Connect positive and negative cables to battery.	Box and flat spanners 12
39	Fit the air intake silencer. Use a Hugo-Reintz gasket between the upper flange of the carburettor and the inlet silencer. Fit the Silencer fixing plates with a rubber washer on either side. Fit screws and secure with split pins.	Flat and box spanners 12
40	Fit interior heater tube.	Flat spanner 12



- |    |  |                               |
|----|--|-------------------------------|
| 41 | Lower vehicle to the ground. (Use jack attachment MR.3300-90, see Drawing 67).   | Jack attachment<br>MR.3300-90 |
| 42 | Fill gearbox with oil (3.5 litres - 6 pints approximately). Use only special hypoid gear oil (similar to Mobiloil GX). Tighten filler plug fitted with a C. and A. Washer. | Flat spanner 21               |

NOTE. It is recommended to remove the engine in order to detach the gearbox. However it is possible to remove the gearbox only if means are not available for taking out the engine (for example, absence of suitable lifting tackle). In this case the clutch must be removed as well.

REMOVING GEARBOX (see Drawing 122)

- |    |  |  |
|----|--|--|
| 1  | Drain water from the radiator and meanwhile remove the bonnet.   |  |
| 2  | Raise the vehicle at the front. (Use jack attachment MR.3300-90, see Drawing 67). Block up under ends of lower link arms.  | Jack attachment MR. 3300-90                                  |
| 3  | Disconnect positive cable from battery. (Use extractor 2200-T, see Drawing 1, fig. 1). Disconnect horn, headlamp, and dynamo wires.  | Extractor 2200-T<br>Flat spanners 8-14                       |
| 4  | Remove the assembly of wings and radiator shell.   | Universal joint spanners 10-12-14<br>Brace spanners 10-12-14 |
| 5  | Remove the air intake silencer. (Disconnect pipe from carburettor and remove fixing bolts from hull).  | Flat spanner 12  |
| 6  | Remove the front bumper brackets and radiator brackets as an assembly without dismantling radiator block from bumper bracket tie bar. Unscrew the four nuts on front axle cradle fixing studs. (Use spanner 1880-T). | Box spanner 14-17<br>Spanner 1880-T                          |
| 7  | Uncouple the two gear control rods from levers on gearbox. Disconnect clutch cable from front lever. Disconnect speedometer drive cable from gearbox.  | Box spanner 10   |
| 8  | Remove the dynamo.   | Flat spanner 17  |
| 9  | Block up the engine under the sump with a hand operated Jack. Apply the jack between the steering rack tube and tie bar across hull, USING A BLOCK OF WOOD BETWEEN SUMP AND JACK HEAD.                               |  |
| 10 | Take off clutch housing cover.   | Brace spanner with extension 17                              |
| 11 | Remove front bearing cap (201). TAKE CARE NOT TO DISPERSE SHIMS. With the aid of a pair of round nose pliers remove the circlip (203) of the spring. Disengage mainshaft (204) by pulling towards the front.         | Brace spanner with extension 12                              |
| 12 | Unhook return springs and take out the clutch fork with its thrust ring.   |  |

13	<p>Fit clamps to hold clutch toggles. (Use clamps MR.3451,) see Drawing 26). Remove the clutch. Make sure before removing if the clutch position, in relation to the flywheel, is indicated (either by a letter or figure). If there is no indication of location, mark the position of the clutch so that it can be re-assembled in the same position and thus preserve the balance established during manufacture. Take clutch discs and pressure plate.</p>	<p>Clamps MR.3451 Universal joint spanner 12</p>
14	<p>Remove the engine flywheel. Hold the flywheel with a pin engaged in one of the balancing holes when slackening nuts or bolts fixing flywheel.</p>	<p>Universal joint spanner 12</p>
15	<p>Disconnect drive shafts from gearbox flanges. (Use spanner 1832-T, see Drawing 60A). Disconnect drive shafts at the flexible coupling by tapping the parts lightly with a mallet, and if necessary prising apart with a screwdriver or small lever.</p>	<p>Flat spanner 14 Spanner 1832-T</p>
16	<p>Disconnect from cylinder block WITHOUT UNCOUPLING SUMP SPACER. Take out all gearbox fixing bolts</p>	<p>Universal joint spanner 21</p>
17	<p>Take out gearbox from car. To do so, disengage gearbox drive shaft flanges from front axle cradle one after the other.</p>	<p>Flat spanner 21</p>
<p>REFITTING GEARBOX</p>		
18	<p>Offer up gearbox to car by engaging drive shaft flanges in front axle cradle one after the other. Fit engine front support tube (see operation 702 paragraph 13d for position and adjustment). Couple up gearbox, fit spring washers under nuts and tighten. Tighten the front support tube.</p>	<p>Universal joint spanner 21-24 Flat spanner 21</p>
19	<p>Connect drive shafts to gearbox flanges. TIGHTEN SECURELY THE NUTS OF THE UNIVERSAL COUPLING FLANGES, using a 'Blocfort' type washer under each nut. (Use spanner 1832-T, see Drawing 60A). Connect drive shafts at the flexible coupling. To ensure constant velocity of the universal joints, the crosshead pins of the single joint must be parallel with those in the double Joint. Tighten up bolts using a 'Blocfort' type washer under heads.</p>	<p>Spanner 1832-T Flat spanner 14</p>
20	<p>Fit the engine flywheel (position located by an offset bolt). Fit lockwasher, tighten nuts to a tension of 2.500 mkg., plus 0.25. mkg., minus 0 mkg. (18 foot pounds, plus 1¼ foot pounds, minus 0 foot pounds). (Use torsion wrench 2470-T, see Drawing 18). Turn back lockwasher tabs against flats of nuts.</p>	<p>Torsion wrench 2470-T and socket 14</p>
21	<p>FIT THE CLUTCH (see Drawing 27) (a) Make certain that the thrust faces on the flywheel, intermediate pressure plate, and clutch pressure plate are in perfect condition. Ensure that the intermediate pressure plate slides freely between the flywheel driving studs. Mark the position which gives the best result for re-assembling.</p>	

	<p>(b) Fit the intermediate pressure plate retaining spring (1) between two flywheel driving studs (see fig. 6). Fit the first clutch disc (2), with offset hub, positioned according to fig. 1. Fit the intermediate pressure plate in the position previously marked (see paragraph 21a). Offer up the second clutch disc (3), flat type, positioned according to fig. 1. To centre the clutch disk in relation to the flywheel bearing use a mandrel or spare gearbox mainshaft. Fit the clutch so that markings on plate and flywheel register. Fit bolts (4), with spring washers under heads, and tighten to a tension of 2 mkg., plus 0.250 mkg., minus 0 mkg. (14½ foot pounds, plus 1¾ foot pounds, minus 0 foot pounds. During tightening make certain that the mandrel (or mainshaft) slides freely and so indicating correct centering of discs. Remove the mandrel and toggle clamps MR.3451.</p>	Shouldered mandrel, small dia. 17, length 25 large dia. 21, length 300 Brace spanner 12
	<p>(c) Fit the clutch fork, with thrust ring assembled, so THAT GRAPHITE BUSH FACES THE TOGGLE THRUST RING, and the end of the double lever is in front of the outer locking lever.</p>	
	<p>(d) Engage the gearbox mainshaft by turning by hand to engage the splines. Fit the shaft retaining spring circlip by using a pair of round nose pliers.</p>	
22	<p>Fit the clutch housing cover. Coat the threads of the three forward fixing bolts and the flange face in the corresponding zone with Hermetical. Fit bolts' with spring washers under heads, and tighten. AFTER TIGHTENING, MAKE SURE THAT THE CLUTCH FORK SHAFT TURNS FREELY.</p>	Universal Joint spanner 17
23	<p>Stick the front bearing cap paper gasket to the gearbox flange with Hermetical. Fit the front bearing cap, WITH THE SHIMS REMOVED DURING DISMANTLING. Coat the bearing cap flange with Hermetical, fit, and tighten fixing screws.</p>	Brace spanner with extension 12
24	<p>ADJUST CLUTCH TOGGLE CLEARANCE (see Drawing 126)</p> <p>(a) Bring the clutch fork thrust ring (206) into contact with the clutch toggle thrust ring (205) and keep in this position with the clutch fork.</p>	
	<p>(b)Screw the adjusting stud (207) to give a clearance 'a' of 27.5 mm. between the end of the double lever (208) and the stop on thrust plate (209). Tighten the locknut of stud (207). Hook on return spring (210).</p>	Flat spanner 17
	<p>(c) Connect the clutch cable and adjust length so that there is 15 mm. to 20 mm. idle movement on the pedal before clutch fork thrust ring (205) operates against toggle thrust ring.</p>	Flat spanner 14
25	<p>Fit the dynamo and tighten nuts after fitting plain washers and spring washers under each. Adjust the driving belt without excessive tension. Fit the speedometer cable.</p>	Flat spanners 10-17
26	<p>Fit the assembly of radiator and front bumper brackets. Tighten nuts fixing bumper brackets</p>	Spanner 1880-T

	<p>after fitting a plain washer and a spring washer under each. Using a spring washer under each, fit the four nuts on front axle cradle studs and tighten up. (Use spanner 1880-T). Position the radiator on the bumper bracket tie bar in order to line up the starting handle opening with the front bearing cap. Tighten 'U' bolts fixing radiator to tie bar. Tighten radiator upper fixing plates. Fit and tighten radiator hose clips, after making sure that the drain tap is closed, fill the radiator with water.</p>	<p>Universal joint spanner 17 Flat spanner 17 Box spanners 10-14-17</p>
27	<p>Train the group of headlamp and horn wires along the engine front bearer tube and use clips to keep them in position. Connect the two earth wires under one bolt of each bumper bracket.</p>	<p>Flat and box spanners 14</p>
28	<p>Fit the assembly of wings and radiator shell. Fit a plain washer and spring washer under the heads of all the fixing bolts and engage the latter for a few threads only. Offer up the bonnet and line up parts in relation to one another, and after correctly positioning the wing piping, tighten the fixing bolts. Take off the bonnet.</p>	<p>Flat spanner 14 Box spanners 10-12-14</p>
29	<p>Connect wiring to horns, headlamps, dynamo, and battery positive terminal.</p>	<p>Flat spanners 8-12-14</p>
30	<p>Fit the air intake silencer. Use a Hugo-Reintz gasket between the upper flange of the carburettor and the air intake tube (4) (see Drawing 23). Tighten the screws. Tighten fixing plates fitted between two rubber washers. Tighten up nuts and fit split pins.</p>	<p>Flat and box spanners 12</p>
31	<p>Lower the vehicle to the ground. (Use jack attachment MR.3300-90, see Drawing 67).</p>	<p>Attachment MR.3300-90</p>
32	<p>Fill gearbox with oil (3.0 litres 5¼ pints). USE EXCLUSIVELY SPECIAL OIL FOR HYPOID AXLES (oil similar to Mobiloil GX).</p>	<p>Flat spanner 21</p>
33	<p>Fit the bonnet.</p>	

1	Drain oil from gearbox.	Adjustable spanner 50
2	Place the gearbox on a stand. (Use stand MR.3053-10, see Drawing 121).	Stand MR.3053-10
3	Remove bolts fixing caps (211) of differential shafts. Disengage caps with shafts and coupling flanges assembled. Tap the back of the coupling flanges (212) with a copper mallet to free differential shafts for removal (see Drawing 133).	Brace spanner 12
4	Remove box forming differential bearing cap and remove differential from gearbox.	Brace spanner 17
5	Remove gearbox mainshaft bearing cap forming starting handle guide (201), the bearing cap (213) for gearbox intermediate shaft, and the oil pump (214). Take off clutch fork cover and the gearbox cover. Remove the oil filter (215) (see Drawing 122).	Brace spanner with extension 10-12
6	Remove the locking spring retaining plate and take out the spring and the ball (216). Take out split pin (219) limiting the stroke of the looking rod and move rod (220) towards the rear end of the gearbox to free the second looking ball (217) (see Drawing 126).	Box spanner 8
7	Unscrew selector fork locking bolts (221), disengage second and top speed selector fork shaft (222) and remove the fork. Disengage first and reverse speed selector fork shaft (223), the third locking ball (218), and the first and reverse speed selector fork. Remove the safety locking plunger (224).	Box spanners 10-12
8	REMOVE THE INTERMEDIATE GEAR TRAIN (see Drawing 122) (a) Knock out plug (225) by using a pin passing through the bore of the intermediate shaft. (b) Remove split pin and take off rear nut (226) holding the shaft (228) by means of a spanner. (Use spanner MR.3792 see Drawing 124A). (c) Remove shaft and the front bearing from the gear train through the front of the box. If shaft is difficult to remove tap the rear end with a copper mallet. (d) Take out gear train (229) from box.	Pin 10 dia,, length 300 Spanner MR.3792 Elbow spanner 42
9	REMOVE THE BEVEL PINION (FORMING LAYSHAFT) (see Drawing 122). [a) Remove nuts (230) locking bearing cage retainers. Remove washers (231) and retainers (232). (b) Remove the assembly of layshaft and pinions from the rear of the gearbox by tapping the shaft front end with a mallet. The first speed gear ring (233) remaining in the box. Next take out first speed gear ring.	Brace spanner 17

- |    |  |  |
|----|--|--|
| 10 | Take out gear train of primary shaft from the box. (If necessary, use extractor MR.3404, see Drawing 129, figs. 1 and 2).  | Extractor MR.3404  |
| 11 | <p>REMOVE THE REVERSE GEAR TRAIN (see Drawing 125)</p> <p>(a) Unscrew locknut (234) and take out reverse gear shaft thrust plug (235). (Use screwdriver MR.3458, see Drawing 128, fig. 2).</p> <p>(b) Withdraw the reverse gear shaft (236). (Use extractor MR.3459, see Drawing 129, figs. 1 and 3).</p> <p>(c) Disengage pinion (237) and thrust washer (238) from the box.</p>  | <p>Screwdriver MR.3458<br/>Elbow spanner 35</p> <p>Extractor MR.3459</p>   |
| 12 | Remove the rear bearing (239) of the intermediate shaft from its seating in gearbox. Remove front and rear circlips (240). Remove the oil duct plug and the two covers of the gearbox air inlet orifices. (See Drawing 122).   | Brace spanner 12-i4  |
| 13 | <p>DISMANTLE THE BEVEL PINION (FORMING LAYSHAFT) (see Drawing 123, fig. 1)</p> <p>(a) Hold the assembly in a vice. (Use clamps MR.3407, see Drawing 130, figs. 1. and 2).</p> <p>(b) Remove bearing locknut (241). (Use spanner 1734-T, see Drawing 127, fig. 3). Grip the shaft on flats at end. (1733-T, see Drawing 127, fig. 4).</p> <p>(c) Remove bearing (242) from shaft. (Use extractor 1750-T with collets 1753-T, see Drawing 37). Remove thrust washer (243), top speed pinion (244), spacing washer. (245), and synchromesh (246).</p> <p>(d) Remove the second speed pinion (247). To do this, press down with a small thin screwdriver, the locking plunger (248) which is visible in a spline of the front thrust washer (296). Turn the thrust washer to bring its splines to coincide with those in the shaft. Remove the thrust washer KEEPING THE PINION (247) IN POSITION ON THE SHAFT. Take out the locking plunger (248) and its spring. AT THIS POINT ONLY remove the pinion (247), and afterwards, the washer (295).</p> <p>NOTE. THIS ORDER OF DISMANTLING MUST BE RIGIDLY ADHERED TO because if the pinion is slid along the shaft with the washer without removing the plunger, the latter, under pressure of its spring, will jam between the two pinion bushes. IT WILL NOT THEN BE POSSIBLE TO REMOVE THE PINION FROM THE SHAFT.</p> <p>(e) Take out split pin and remove slotted ring nut (249) locking bearing. (Use spanner 1757-T, see Drawing 128, fig. 6). Disengage bevel pin from bearing cage. (Take care not to disperse the rollers).</p> | <p>Clamps MR.3407</p> <p>Spanners 1733-T and 1734-T</p> <p>Extractor 1750-T<br/>Collets 1753-T</p> <p>Spanner 1757-T</p> |

	<p>(f) Remove screw (250) locking bearing locknut (251). Remove bearing lock nut (251), (Use spanner 1734-T, see Drawing 127, fig. 3).</p>	Spanner 1734-T
	<p>(g) Remove the bearing inner races from the bevel pinion shaft by means of a press. (Use socket MR.3460, see Drawing 131, figs. 1 and 2).</p>	Socket InR.3460
14	<p>DISMANTLE THE DIFFERENTIAL (see Drawing 133)</p> <p>(a) Extract the tapered roller bearings. (Use extractor 1750-T with collets 1753-T, see drawing 37).</p> <p>(b) Cut the locking wire of the assembly bolts and remove crown wheel from differential housing.</p> <p>(c) Remove planet wheels (252), satellite wheels (253), and spindle (254) from housing.</p>	<p>Extractor 1750-T Collets 1753-T</p> <p>Universal joint spanner 19</p>
15	<p>DISMANTLE MAINSHAFT PINION (see Drawing 124) (fig. 1)</p> <p>(a) Hold the assembly on an old mainshaft gripped in a vice and remove successively the nuts (255 and 256). (Use spanner 1732-T, see Drawing 127, fig, 1).</p> <p>(b) Remove bearing (257). Do this in a press with the ram bearing on the front end of the mainshaft end with two plates or a socket fork bearing behind outer race of bearing.</p> <p>(c) Remove the rear bearing (258). Do this in a press with the ram bearing on the rear end of the pinion spigot and the bearing resting on two steel plates, 7 mm. thick, fitted between pinion and bearing.</p>	Spanner 1732-T
16	<p>DISMANTLE DIFFERENTIAL SHAFTS AND CAPS (see Drawing 133).</p> <p>(a) Remove coupling flange (212) from shaft.</p> <p>(b) Remove shaft (259) from bearing (260) by means of a press.</p> <p>(c) Remove bearing locknut (261). (Use spanner 1758-T, see Drawing 128, fig. 1). Take out bearing (260) from cap (it is easily removed).</p> <p>(d) Knock out oil seal (S.P.I. joint) from cap.</p>	<p>Universal joint spanner with socket 26</p> <p>Spanner 1758-T</p>
17	<p>DISMANTLE THE OIL PUMP (see Drawing 123, fig. 2).</p> <p>(a) Take off pump cover (263), speedometer cable socket (264), and take out drive pinion.</p> <p>(b) Take out the pump impeller blade, remove speedometer drive worm circlip (266), and remove worm (267) by knocking out the spindle (268) from the pump body. Take out key (269) from its recess.</p>	



18	<p>DISMANTLE THE SYNCHROMESH</p> <p>(a) Wrap the synchromesh assembly in a cloth to prevent dispersal of balls and springs when dismantling.</p> <p>(b) Disengage synchromesh hub by pressing out by hand.</p>	
19	<p>DISMANTLE GEARBOX COVER (see Drawing 134)</p> <p>(a) Take off outer selector levers (270 and 271). Disengage inner levers (272 and 273) from cover.</p> <p>(b) Take off inner locking lever (274) and disengage outer lever (275) from cover (see Drawing 126)</p> <p>(c) Remove the oil filler plug.</p> <p>(d) Knock out bushes (276) from inner lever (273), (Use a shouldered mandrel).</p> <p>(e) Knock out bushes (277) from cover. (Use a shouldered mandrel)</p>	<p>Box spanner 12</p> <p>Flat spanner 12</p> <p>Box spanner 21</p> <p>Mandrel, small dia. 16 large dia. 18, length 150</p> <p>Mandrel, small dia. 24 large dia. 26, length 150</p>
20	<p>Remove front bearing (278) from intermediate shaft (see Drawing 124, fig. 2) by unscrewing nut (279). (Use spanner 1731-T, see Drawing 127, fig. 2). Remove shaft (228) from bearing by means of a press.</p>	<p>Spanner 1731-T</p>
21	<p>DISMANTLE REVERSE GEAR TRAIN (see Drawing 125)</p> <p>(a) Remove metal from the nut punched into the two pinion slots either with an awl or small punch.</p> <p>(b) Unscrew nut (280) with a hammer and chisel. The nut must be replaced by a new one after each dismantling.</p> <p>(c) Take out bearings (281 and 282) from the pinion (these are readily removed), and the distance piece (283).</p>	
22	<p>Remove differential nut covers, Remove looking plates (284) of differential nuts. (See Drawing 133, fig. 2).</p>	<p>Brace spanner 12</p>
23	<p>Remove gearbox casing from stand.</p>	

24 Clean the parts,  
ASSEMBLING GEARBOX

IMPORTANT NOTE, IN CASES WHERE THE PINION BUSHES ARE WORN IT IS NECESSARY TO REPLACE THE PINIONS. IT IS ESSENTIAL FOR THE BORE OF THE BUSHES TO BE EXACTLY CONCENTRIC WITH THE PINION PITCH DIAMETER. THE MANUFACTURE OF THESE PARTS IS SUCH THAT THE BORE OF THE BUSHES IS NOT CONCENTRIC WITH THE PINION PITCH DIAMETER. We give herewith a method to be strictly adhered to when replacing bushes.

Set up the pinion to be rectified on a mandrel FITTING THE WORN BUSH. (In the case of excessive ovality the pinion cannot be rectified). True up the outside diameter of the pinion. Remove the mandrel and change the bushes. Centre the pinion in lathe using the rectified portion as a basis for concentricity. Use lathe tool to bore the bushes.

PREPARE INTERMEDIATE REVERSE GEAR TRAIN (see Drawing 125)

25 (a) Fit bearing (281) into pinion, using a press if necessary.

(b) Fit distance piece (283) and bearing (282).

(c) Screw up and lock nut (280). (Use spanner MR.3461, see Drawing 128, fig. 3).  
Use a chisel or punch to force metal from the nut into the two slots in the pinion.

PREPARE MAINSHAFT PINION (see Drawing 124, fig. 1)

26 (a) Fit bearings (257 and 258) to pinion with the aid of a press.

(b) Fit oil retaining washers and then lock washers on spigot ends of pinion. Engage tongues of lock washers into grooves and screw on nuts (255 and 256).

(c) Mount the assembly on an old mainshaft and hold the latter in a vice in order to prevent damage to the pinion teeth. Tighten nuts (255 and 256). (Use spanner 1732-T, see Drawing 127, fig. 1). Turn back lockwasher tabs against flats of both nuts.

Spanner 1732-T

PREPARE THE INTERMEDIATE SHAFT (see Drawing 124, fig. 2)

First case : shaft without a key.

27 Fit washer (286) on shaft. Fit bearing (278) by means of a press. Grip the shaft in a vice fitted with soft jaws. Tighten nut (279), (using spanner 1731-T, see Drawing 127, fig. 2) so that it becomes flush with the front face of the shaft. This tightening determines the position of bearing (278). Secure nut with a split pin. NOTE - Proceed in this manner whether or not the shaft is chamfered.

Spanner 1731-T

Second case : shaft with key.

Proceed as above. Fit key in shaft.

- 28 PREPARE SYNCHROMESH (see Drawing 135)
- (a) Use modified synchromesh ring MIR,3464 (fig. 4)
- (b) Place springs (287) in position. Fit synchromesh hub (288) in tool MR.3464. Engage the balls (289). Push the hub down until balls lock.
- NOTE. THE SYNCHROMESH HUB AND RING ARE MARKED ACCORDING TO MACHINING. THE MARKING SYMBOL + IS STAMPED ON THE FACE NEAREST THE SELECTOR FORK GROOVE. WHEN RE-ASSEMBLING THE MARKINGS MUST COINCIDE IN ORDER TO ENSURE CONCENTRICITY OF THE TWO PARTS AND CORRECTLY LOCATE THE SYNCHROMESH CONES (THE TWO CONE ANGLES DIFFER).
- (c) Place the assembly as made in paragraph 28(b) on synchromesh ring (290) previously oiled. Keep the parts together, to prevent the balls escaping, and slide the hub (288) right into the ring (290).
- 29 PREPARE THE BEVEL PINION (see Drawing 123, fig. 1)
- (a) Fit bearings (291 and 292) and cage (293). Proceed as follows:-
1. Fit to bevel pinion (294), the inner race 'b' of roller bearing (291) (the face with the oil groove must be opposite the pinion) then the inner race of thrust bearing (292), by means of a press.
  2. Tighten bearing locknut (251) and lock the nut with screw (250). (Use spanner 1734-T, see Drawing 127, fig. 3).
  3. Hold the cage (293) in a vice. (Use clamps MR.3407, see Drawing 130). Tighten vice moderately only to prevent distorting cage.
  4. Hold the bevel pinion vertically, the pinion end at the top. Position half ring 'a' of thrust bearing (292). Stick in place with a little grease the rollers of bearing (291) to the inner race and fit the outer race 'c' over the rollers.
  5. Introduce the assembly into cage (293). Fit the second half ring 'd' of the thrust, bearing (292) and tighten nut (249). (Use spanner 1757-T, see Drawing 128, fig. 6). Fit the split pin and FORCE THE HEAD WELL INTO THE HOLE IN THE CAGE SO THAT IT DOES NOT STAND PROUD. Open out ends of pin.
- (b) FIT AND ADJUST SECOND SPEED IDLER PINION (see Drawing 123, fig. 1)
1. Fit second speed pinion adjusting washer (295) on shaft (the grease grooves on the pinion side). Fit second speed pinion (247) and the splined front thrust washer (296) turning the latter so that it is locked by the shaft splines.

Tool MR.3464

Spanner 1734-T  
Flat spanner 7

Clamps MR.3407

<p>2. Use feeler gauges to measure the clearance between washer (295) and the pinion. The clearance should be between 0.05 mm. and 0.15 mm. and is arrived at by using a washer (295) from the range sold by our Spare Parts Department.</p> <p>3. After this adjustment remove the splined washer (296) and the second speed pinion (247). Fit the locking plunger spring and refit the second speed pinion (247) after oiling. Fit the locking plunger (248) in position.</p> <p>4. Fit splined front thrust washer (296) on shaft and against locking plunger. Press down the locking plunger with a small pin introduced in the hole in the tapered portion of the second speed pinion. Bring the splined washer (296) over the groove in the shaft and turn it so that the locking plunger (248) locates in the wide slot of the washer.</p>	<p>Set of feeler gauges</p> <p>Pin 2.5 dia.</p>
<p>(c) FIT THE SYNCHROMESH. TOP SPEED IDLER PINION, ADJUST THE LATTER (see Drawing 123, fig. 1).</p> <p>1. Fit synchromesh, without first and reverse speed gear ring, on shaft and locating against the second speed pinion. NOTE. The shaft (294) bears a symbol on the portion which carries the top speed idler pinion (244). Fit the synchromesh so that the symbol + , marked on its face, lines up with the marking on the shaft or centre punched at the bottom of the groove.</p> <p>2. Fit the spacing washer (245) (grease grooves on pinion side) against shoulder on shaft and located on the peg 'e'.</p> <p>3. Fit top speed idler pinion (244) on shaft. Fit thrust washer (245) with grease grooves against pinion.</p> <p>4. For easy determination of the adjustment, use a tube equal in thickness to, and in place of bearing (242).</p> <p>5. Fit the tube on, the shaft, screw on nut (241), and tighten to an approximate tension of 15 mkg. (108½ foot pounds). (Use spanners 1734-T and 1733-T, see Drawing 127, figs. 3 and 4).</p> <p>6. Use feeler gauges, measure the clearance between washer (243) and the pinion. This clearance must be between 0.20 mm. and 0.25 mm. From the range of spacing washers (245) sold by our Spare Parts Department, choose one of the necessary thickness to provide for the correct clearance between washer (243) and pinion(244).</p> <p>7. After obtaining the correct adjustment, oil and finally fit the top speed idler pinion (244). Fit thrust washer (243). Fit bearing (242) to shaft by means of a press and a piece of tubing. (Assembling the bearing by knocking into position can cause the spacing washer (245) to jump off the locating peg 'e'.</p>	<p>Tube 26 inside dia., 25 long</p> <p>Spanners 1734-T and 1733-T</p> <p>Set of feeler gauges</p> <p>Tube 26 inside dia. 100 long.</p>

8. Hold the assembly in a vice using clamps MR.3407 (see Drawing 130), fit lockwasher on end of shaft with tongue engaged in shaft groove. Screw on nut (241) and tighten to a tension of 15 mkg. (108½ foot pounds). (Use spanners 1734-T and 1733-T, see Drawing 127, figs. 3 and 4). TURN BACK ALL LOCKWASHER TABS against flats of nuts.

Spanners 1734-T  
and 1733-T

9. Remove the assembly from vice.

30 PREPARE THE DIFFERENTIAL (see Drawing 133)

NOTE, As the differential housing, planet and satellite wheels are precision machined, these parts can be fitted without the need of adjustment (tooth meshing or clearance). As it has not been possible to foresee the amount of wear in the assembly over a long period of use, we have not been able to determine sizes of packing washers that might be needed to take up any play that could possibly occur.

(a) Hold the differential housing in a vice.

(b) Oil the satellite pinions and shaft (254).

(c) Mount planet wheel (252) and two satellite wheels (253) in the housing, press in the shaft (254), positioned so that the hole 'f' lines up with the hole for locking screw (297).

(d) Turn the planet wheel by the shaft and make sure there are no high spots in the meshing. If there is tightness, find which satellite wheel has no tooth clearance and replace it. Make sure that the new wheel gives free rotation. If the high spot remains it may be caused by the planet wheel. In this case try another planet wheel.

(e) Mount the second planet wheel in the housing. Fit the crown wheel and tighten assembly bolts to a tension of 7.5 mkg. (54½ foot pounds). Turn the planet wheel and if high spots are present try another.

Universal joint  
spanner 19

(f) Lock the bolts assembling the crown wheel with iron wire fitted so as to prevent any chance of loosening.

(g) Fit the taper roller bearings using a press. (Use mandrel MR.3463, see Drawing 133, fig. 3).

Mandrel MR.3463

31 PREPARE DIFFERENTIAL BEARING CAPS AND SHAFTS (see Drawing 133)

(a) Fit the oil seal (262) in cap (211) by using a press. The leather rim of the oil seal faces towards the inside of the cap.

(b) Use a press to fit bearing (260) on shaft (259).

	(c) Fit shaft with bearing assembled into cap (if necessary tap the end of the shaft with a mallet to complete the fitting).	
	(d) Tighten bearing locknut (261), (Use spanner 1758-T, see Drawing 128, fig. 1). Lock the nut (261) by using a chisel to punch some of the nut threads into the cap groove.	Spanner 1758-T
	(e) Fit coupling flange (212) on shaft. Fit thrust washer (298) by centering in the recess in the flange. Hold the flange in a vice and tighten nut to a tension of 20 mkg. (144 foot pounds). Secure nut with a split pin.	Universal joint spanner with extension 26
32	PREPARE THE OIL PUMP (see Drawing 123, fig. 2)	
	(a) Place key (269) in shaft (268). Oil shaft and engage it in pump body. Fit the impeller (265) So that front edge marked "AV" is located according to fig, 2).	
	(b) Fit pump cover with a paper gasket, coated with Hermetical, under. Tighten fixing bolts fitted with spring washers under the heads.	Box spanner 12
	(c) Fit the speedometer drive worm (267) making sure that the key has not slipped out of the shaft meanwhile. Fit circlip (266).	
33	PREPARE THE GEARBOX COVER (see Drawing 134).	
	(a) Fit bronze bushes (277) in bore in cover. (Use a shouldered mandrel).	Mandrel, small dia. 24, length 20 large dia. 26, length 130
	(b) Fit bronze bushes (276) in bore of first and reverse speed selector fork lever (273). (Use a shouldered mandrel).	Mandrel, small dia. 24, length 20 large dia. 26, length 130
	(c) Oil and fit levers (272 and 273). Provisionally fit the outer levers (271 and 270). (The position of these levers will be determined when the cover is fitted to the gearbox).	
	(d) Fit lever (275). Fit gear lock control lever (274), tighten the nut, turn back tabs of lockwasher (see Drawing 126).	Flat spanner 12
	(e) Provisionally screw in oil filler plug using a C' and A' washer under.	
34	Place the gearbox casing on stand MR.3053-10 (see Drawing 121, fig, 1).	Stand MR.3053-10
35	Fit circlips (240) for retaining intermediate shaft bearings in box (see Drawing 122).	
36	Fit intermediate shaft rear bearing (239) in box. Tap the bearing outer race lightly, with a	

copper mallet until bearing rests against the circlip (240).

37 FIT THE INTERMEDIATE (REVERSE GEAR TRAIN (see Drawing 125)

(a) Oil the shaft (236).

(b) Offer up the reverse gear train in the box, position thrust washer (238) and hold it in place with the gear train.

(c) Fit the shaft (236) and turn it by hand to engage it in the thrust washer (238). The shaft has a chamfer at the end). Complete the fitting of the shaft by screwing in the plug (235). (Use screwdriver MR.3458, see Drawing 128, fig.2). Fit on the plug the double tabbed lockwasher. Turn, one tab against stop of gearbox. Screw on nut (234) and tighten. Turn back second Lockwasher tab against flat of nut.

Screwdriver MR.3458  
Elbow spanner 35

38 FIT THE MAINSHAFT GEAR TRAIN (see Drawing 122)

(a) Oil the bearings.

(b) Offer up the assembly squarely with the gearbox bore and push in until it comes against the stop. If necessary, use a mallet to drive the assembly into position.

39 FIT AND ADJUST THE POSITION OF THE BEVEL PINION (see Drawing 122).

NOTE THE ADJUSTING OF THE BEVEL PINION POSITION IS OF VERY GREAT IMPORTANCE. BY giving the teeth correct meshing, silence and long service is assured.

(a) Etched on the bevel pinion face is a dimension (in millimetres) see Drawing 136, fig. 3) indicating the height of the bevel apex determined during machining. (The figure represents the distance 'h' between the differential centre line and the end face of the bevel pinion).

(b) Fit the layshaft assembly (as prepared according to paragraph 29) in the box. On each fixing stud fit a retainer (232) and a thrust washer (231). Screw on and tighten nuts (230).

Brace spanner 17

(c) Set up the apparatus 2040-T (see Drawing 136, fig. 1), establishing the dimension 'h'. Fit shims, chosen from the range listed by our Spare Parts Department, between the cage (293) and the box so that the measured dimension 'h' is the same as that etched on the pinion. The adjustment must be made with the greatest precision, THE PART OF THE DIMENSION IN HUNDREDTHS OF A mm. MUST BE RIGIDLY OBSERVED. This justifies the use of a clock gauge SET UP ON A FIXTURE MOUNTED IN THE BORES OF THE DIFFERENTIAL BEARINGS. Do not measure from the flanges of the box as the machining tolerance here is several tenths of a millimetre.

(d) After establishing the correct adjustment, remove the layshaft assembly from the box.

To ensure concentricity when assembled, the first and reverse speed gear ring and the synchromesh are marked to indicate correct fitting. BOTH PARTS ARE CORRECTLY ASSEMBLED WHEN THE MARKINGS COINCIDE. Having determined the positioning of the parts, use chalk to mark the teeth of both items so they can be correctly mated on assembly. (On certain vehicles the parts are not marked).

(e) Offer up the layshaft assembly, with shims (299) fitted on cage (293), in bore of box. Introduce into the box, by way of the gearbox cover opening, the first and reverse speed gear ring, and engage it on the synchromesh. The teeth must mesh correctly in the way already determined and indicated by the chalk marks. Complete the fitting of the layshaft assembly by tapping the end of the bevel pinion with a mallet.

(f) On each fixing stud fit a retainer (232) and thrust washer (231). Tighten nuts (230) and secure with split pins.

Universal joint  
spanner with  
extension 17

40 FIT THE INTERMEDIATE GEAR TRAIN (see Drawing 122)

(a) Engage the intermediate gear train (229) in the box, by inserting through cover opening, and hold in line for fitting shaft.

First case : shaft without key.

(b) Fit shaft (228) (prepared according to paragraph 27) through front end of box and in gear train (229). Use a mallet to tap the front end until front bearing rests against circlip (240).

(c) Hold the shaft (228). (Use spanner MR.3792, see Drawing 124A). Tighten rear nut (226) and secure with split pin.

Spanner MR.3792  
Elbow spanner 42

Second case : shaft with key.

(d) Introduce shaft (228), fitted with key, through front face of gearbox into rear bearing. If necessary use a copper mallet.

(e) Engage two pinions. Tighten up rear nut (226) and secure with split pin. Return two pinions to natural position.

Box spanner 42

41

FIT THE DIFFERENTIAL, ADJUST TOOTH CLEARANCE (see Drawing 136, fig. 2 and Drawing 133)

(a) Read on the face of the pinion the dimension, expressed in hundredths of a millimetre, indicating the bevel pinion and crown wheel tooth clearance to be realised by adjustment (see fig. 3).



<p>(b) Offer up the differential in housings in box with bearings fitted with outer races. Place bearing locknuts (300) on threads of bores in gearbox and against bearing outer races. Make sure that the threads are correctly engaged and that the locating dowels are fitted properly in the box. Coat the flange faces of the box and cover with Hermetical. Fit the differential box.</p>	<p>Universal joint spanner 17</p>
<p>Fit a spring washer on each stud, screw on nuts but do not tighten.</p>	
<p>(c) Mount a clock gauge. (Use clock gauge bracket 2041-T see Drawing 136, fig. 2)</p>	<p>Clock gauge bracket 2041-T</p>
<p>(d) Tighten the two bearing locknuts (300). (Use spanner 1751-T: see Drawing 138). To bring the crown wheel into contact with the bevel pinion, move the differential assembly in the manner necessary to correct meshing clearance. The clearance is measured by the clock gauge on the outside diameter of the crown wheel tangentially to the flank of a tooth. Make four readings, spaced at approximately 90°, and take the average of the four. The difference between any two readings must not exceed 0.1 mm. Remove the clock gauge bracket.</p>	<p>Spanner 1751-T</p>
<p>(e) The Timken bearings must be fitted with slight clearance. Without altering the adjustment, unscrew nut D one notch (equivalent to approximately 5 mm. on the outer circumference of the nut). (Use spanner 1751-T, see Drawing 138).</p>	<p>Spanner 1751-T</p>
<p>(f) Finally tighten nuts of differential box.</p>	<p>Universal joint spanner 17</p>
<p>(g) On the differential box, coat the lockplate (284) and closing plate (301) seating faces with Hermetical. Fit paper gaskets, and also coat the seating faces of the plates with Hermetical. Fit the lock plates by positioning the locking peg in one of the bearing locknut (300) castellations. Fit the closing plate (301). Coat the threads of the fixing screws with Hermetical and tighten screws after fitting spring washers under heads (see Drawing 122 and 133).</p>	<p>Universal joint spanner 12</p>
<p>42 FIT THE DIFFERENTIAL SHAFTS (see Drawing 133)</p>	
<p>(a) Coat the flanges of the differential shaft bearing caps and the corresponding flanges on the box with Hermetical. Fit paper gaskets to the caps.</p>	
<p>(b) Engage differential shafts in planet wheels, fit spring washers under heads of bearing cap fixing bolts, and tighten.</p>	<p>Universal joint spanner 12</p>
<p>43 Coat the outer circumference of the intermediate shaft plug (225) with Hermetical and fit in place in box (see Drawing: 122). (Use mandrel MR.3428, see Drawing 127, fig. 5).</p>	<p>Mandrel MR.3428</p>
<p>44 FIT AND ADJUST SELECTOR FORKS. ADJUST POSITION OF SYNCHROMESH (see Drawing 126)</p>	

NOTE. Some gearboxes have been built with locking rods (220), having an adjusting screw at one end. This screw is intended for adjusting the length of the rod to obtain positive locking of the forks.

At present the locking rods are of a fixed length and have no adjusting screw.

- |   |                    |
|---|--------------------|
| <p>(a) If the locking rod has an adjusting screw, engage the rod in its bore in the gearbox and push right in until the head of the adjusting screw bears against the gearbox wall. By operating the adjusting screw obtain a sufficient length of rod to give a dimension at 'i' of 16.5 mm. plus or minus 0.5 mm. (see Drawing 126) between the flange of the box and the end of the rod. After adjusting tighten locknut of screw.</p> | Flat spanner 10    |
| <p>(b) If the locking rod has no adjusting screw, oil the rod and fit into gearbox so that the front end of the rod 'k' is flush with face 'j' of the gearbox flange.</p>   |                    |
| <p>(c) Fit ball (218) in position by inserting it by way of the bore for the second and top speed selector fork shaft (222).</p>  |                    |
| <p>(d) Fit the first and reverse speed selector fork (202) in the groove of the first and reverse speed gear ring carried by the synchromesh. Fit the second and top speed selector fork (303) in groove of the synchromesh. (The first and reverse speed gear ring and the synchromesh having previously been placed in the neutral position).</p>   |                    |
| <p>(e) Oil the second and top speed selector fork shaft (222). Fit the shaft into its boring in the gearbox and force into place by fitting the short distance piece (304) (see Drawing 126 for location). Engage the shaft in the selector fork (303) and then in the long distance piece (305) positioning the latter as indicated on Drawing 126.</p>  |                    |
| <p>(f) Fit the locking split pin (219) in the locking rod and open out ends. (The split pin is fitted to locking rods having no adjusting screw).</p>   |                    |
| <p>(g) Fit the locking plunger (224) in position, using a little grease to hold it, by pushing it in with a 6 mm. diameter rod.</p>   | Rod 6 mm. diameter |
| <p>(h) Fit ball (217) in place, using a little grease to hold it, by pushing it in with a 6 mm. diameter rod.</p>   | Rod 6 mm. diameter |
| <p>(i) Oil the first and reverse speed selector fork shaft (223) and, fit in gearbox. Force shaft into place by fitting the long distance piece (306) (see Drawing 126 for location). Engage the shaft into selector fork (302) and then in the short distance piece (307) positioning the latter as indicated on Drawing 126.</p>  |                    |

<p>(j) Fit ball (216) and its spring. Fit plate retaining the spring, tighten fixing bolt with a spring washer fitted under head.</p>	Box spanner 12
<p>(k) Tighten the pointed screw (221) fixing first and reverse speed selector fork (302). Lock the screw with wire SO AS TO PREVENT IT SLACKENING. Make sure that the wire does not foul BETWEEN THE SELECTOR FORKS AND THE DISTANCE PIECES.</p>	Flat spanner 10
<p>(l) Adjust the position of the synchromesh.</p>	
<p>NOTE. The synchromesh has approximately 4 mm. clearance from the cones of the second and top speed pinions. This is necessary to prevent any possibility of friction between the cones when gears are in the neutral position. On the other hand, it is necessary to position the synchromesh at the main point of its travel. Position the synchromesh according to the following operation (see Drawing 137).</p>	
<p>(m) Free the selector fork adjusting screw (221) and place the gear locking rod in the neutral position.</p>	Flat spanner 10
<p>By means of selector fork (303) slide the synchromesh towards the top speed pinion (244). Using a calliper gauge, measure the distance 'l' between the front face of the gearbox ('m') and the front inner wall of the throat of the selector, at 'n' (see fig. 1). Say for example 'l' = 84 mm. Next, again by means of the selector fork (303) slide the synchromesh towards the second speed pinion (247). Take a fresh dimension 'p' between points 'm' and 'n', and say, for example, 'p' = 88 mm. The average of the two measurements is 'l' + 'p' divided by 2, say from the preceding examples <math>84 + 88</math> divided by 2 = 86 mm. This figure represents the distance from the front face of the box 'm' to the front inner wall of the throat of the selector fork 'n' when the synchromesh is at the midpoint of its travel. Alter the position of the synchromesh, by turning the selector fork adjusting screw (one complete turn of the screw moves the synchromesh approximately 0.7 mm.), so as to obtain a dimension between points 'm' and 'n', measured with a calliper gauge, equivalent to <math>l + p</math> divided by 2 as in the preceding example, 86 mm.</p>	
<p>(n) Engage successively top speed and then second speed. Make sure that in these positions the flanks of the synchromesh do not rub against the second and top speed pinions of the intermediate gear train. If there is fouling correct the positioning by changing the selector fork adjusting screw.</p>	
<p>(o) Return gears to the neutral position, Turn the layshaft (294) and make sure that the synchromesh does not foul the second or top speed pinions (244 and 247). Lock the selector fork adjusting screws (221) with wire in such a way SO AS TO PREVENT ANY POSSIBILITY OF SLACKENING. Make sure that the wire does not FALL IN BETWEEN THE SELECTOR FORK AND DISTANCE PIECES.</p>	

<p>(p) Adjust the second and top speed selector fork distance pieces (see Drawing 123, fig. 1 and Drawing 126). With the aid of a lever, push the synchromesh towards the top speed pinion (244) far enough to lock the shaft 222 with the ball. Lock the shaft by operating the locking rod. In this position, adjust the length of distance piece (304) so that the clearance between distance piece and face 'r' of the gearbox is from 0.1 mm. to 0.2 mm. (Use two spanners 1780-T and one spanner 1781-T, see Drawing 128, figs. 4 and 5). Withdraw the locking device. Push the synchromesh towards the second speed pinion (247) far enough for the selector shaft to be locked by the ball. Lock in position with the locking rod and adjust the length of distance piece (305) by the same method as before.</p>	Spanners 1780-T and 1781-T
<p>(q) Adjust the first and reverse speed selector fork distance pieces. (Operations are the same as for those of the second and top speed selector fork).</p>	Spanners 1780-T and 1781-T
<p>(r) Fit the selector fork shaft protecting plate. Coat the gasket with Hermetical, tighten fixing screws using spring washers under the heads.</p>	Box spanner 10
<p>45 FIT THE OIL PUMP (see Drawing 122)</p>	
<p>(a) Fit the cork gasket (308) on the filter (215) and engage the latter in the gearbox.</p>	
<p>(b) Stick the pump paper gasket on the face of the box with Hermetical.</p>	
<p>(c) Coat the exposed face of the gasket on the box with Hermetical. Turn the pump shaft (268) so that its slot is in line with the tongue on the end of the layshaft (294). Fit the pump. Coat threads of fixing screws with Hermetical and tighten up.</p>	Universal joint spanner 12
<p>46 FIT INTERMEDIATE SHAFT FRONT BEARING CAP (see Drawing 122)</p>	
<p>(a) Stick the paper gasket to the face of the box with Hermetical.</p>	
<p>(b) Make sure that the front bearing (278) is seating correctly against circlip (240) in the gearbox.</p>	
<p>(c) Measure the amount the bearing stands proud from the face of the gearbox. (Use a clock gauge mounted on bracket MR.3377, see Drawing 17, fig. 3). Place the straight edge on the bearing and let the finger of the gauge bear against the paper gasket previously stuck on the gearbox flange.</p>	
<p>(d) Measure the depth of the bearing housing in cap (213).</p>	
<p>(e) If the depth of the bearing housing is greater than the amount the bearing stands proud, choose adjusting washers from the range listed by our Spare Parts Department to take up the difference. Use grease to stick the washers in recess of cap. Fit cap (213).</p>	Universal joint spanner 12

	Coat the cap and the threads of the fixing screw with Hermetical. Tighten the screws.	
47	FIT MAINSHAFT FRONT BEARING CAP (201) FORMING STARTING HANDLE GUIDE (see Drawing 122). (a) Stick paper gasket to gearbox flange with Hermetical.  (b) Make sure that the front bearing (257) is correctly positioned in the box.  (c) Measure the amount the bearing stands proud, and the depth of its recess in cap (201) in the manner described in paragraphs 44(c) and (d).  (d) Choose adjusting washers from the range listed by our Spare Parts Department to take up the difference in measurements. Use grease to stick the washers in the bearing cap (201). Provisionally fit the bearing cap (the final fitting is carried out after gearbox is connected to the engine.	
48	FIT THE GEARBOX COVER. ADJUST POSITION OF LEVERS (see Drawings 126 and 134) (a) Set the selector forks in the neutral position.  (b) Stick the paper gasket to the gearbox with Hermetical. Coat the cover flange with Hermetical. Fit plain washers on bolts fixing the cover.  (c) Offer up the cover, engage inner levers (272 and 273) in selector forks and control lever (274) in notch in gear locking rod (220). Fit the thrust bracket (209) (see Drawing 126) for the gear lock and the plate fixing locking rod return spring. Tighten bolts fixing cover. Hook on return spring.  (d) Adjust the position of the outer control lever. With the selector forks in the neutral position, the centres of the holes 's' in the upper bosses of the levers must be 26 mm. plus or minus 4 mm. forward of a vertical line passing through the centres of the lower bosses of the levers. Tighten the lever clamp bolts fitted with spring washers under heads.	Box spanner 12
49	Fit the oil circulation plug using a C. and A. gasket. Fit the two covers to the air inlet orifices.	Box spanner 12 and 14
50	Paint the unit.	
51	Remove gearbox from stand.	
52	Tighten the drain plug fitted with a C. and A. gasket.	Adjustable spanner 50