SECTION 7

REAR AXLE AND REAR SUSPENSION

CONTENTS

SERVICE BULLETIN

RECORD SHEET

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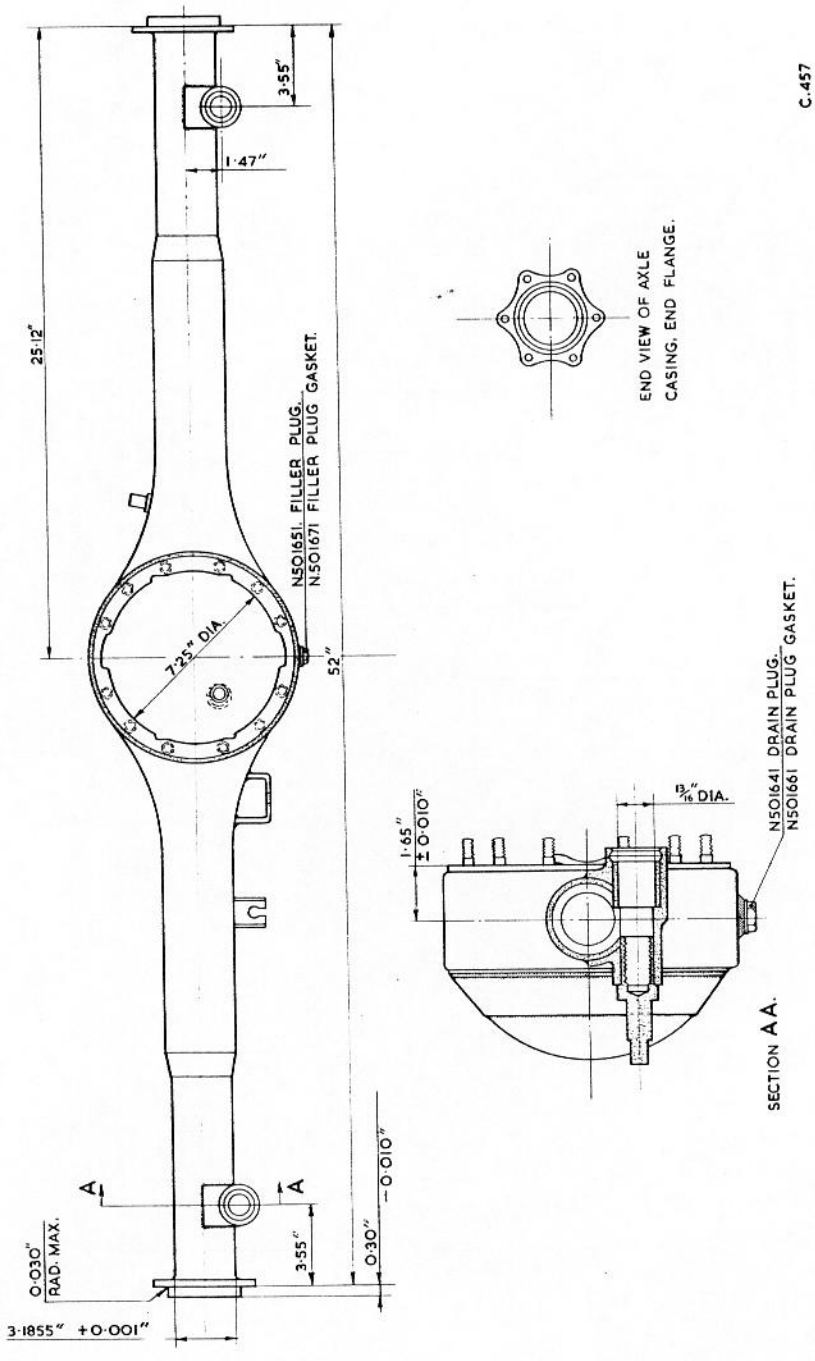


Fig.1 Axle casing.

REAR AXLE AND REAR SUSPENSION

DESCRIPTION

Rear axle

Axle casing

The axle casing, shown in Fig. 1, is of banjo construction, the ends being machined to locate the brake backplates and the bearing housings. The centre face is machined to locate the differential unit. A replaceable phosphor-bronze bush is fitted near each end of the casing, each being grooved to receive an oil sealing ring. The bushes locate the suspension arms and a stud fitted to the rear of each bush location receives the lower eye of a telescopic shock absorber.

A breather unit is situated on the top left-hand side of the casing, and a combined oil filler and level plug is located at the right-hand side of the domed cover. A drain plug is fitted to the base of the casing.

Half shafts

A single-row ball bearing and a spring-lip type sealing ring are fitted within each bearing housing, these being secured in position by a right-hand or left-hand threaded retaining ring. A tabwashered retaining nut secures the half-shaft in the bearing housing.

The left-hand shaft is shorter than the right-hand shaft and also has left-hand threads; in all other respects, the shafts are identical.

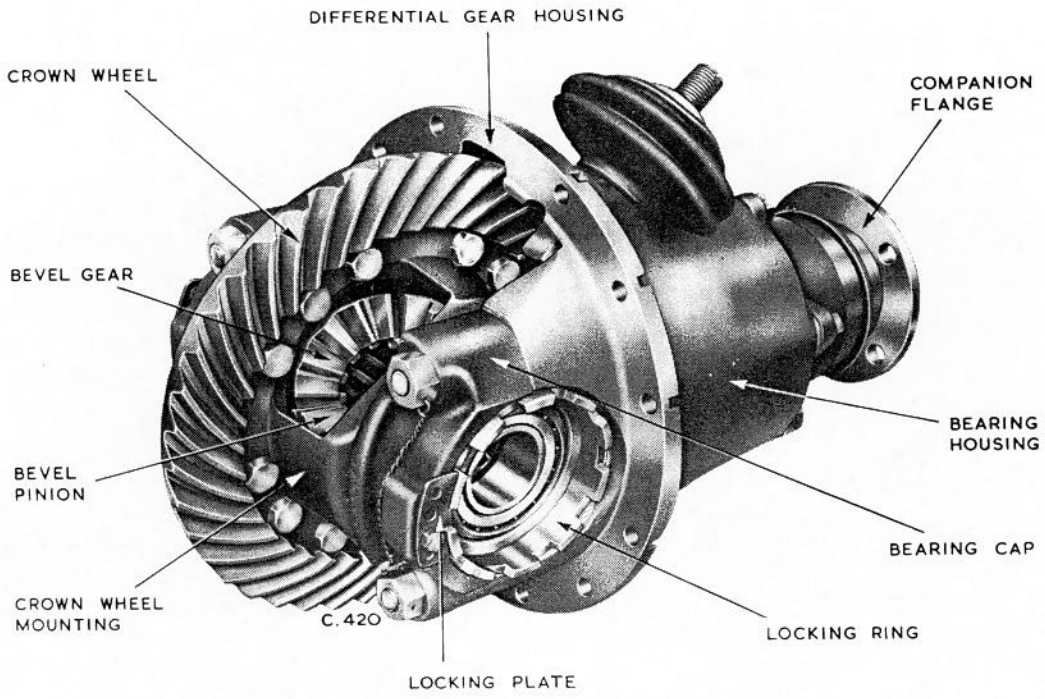


Fig.2 Differential gear.

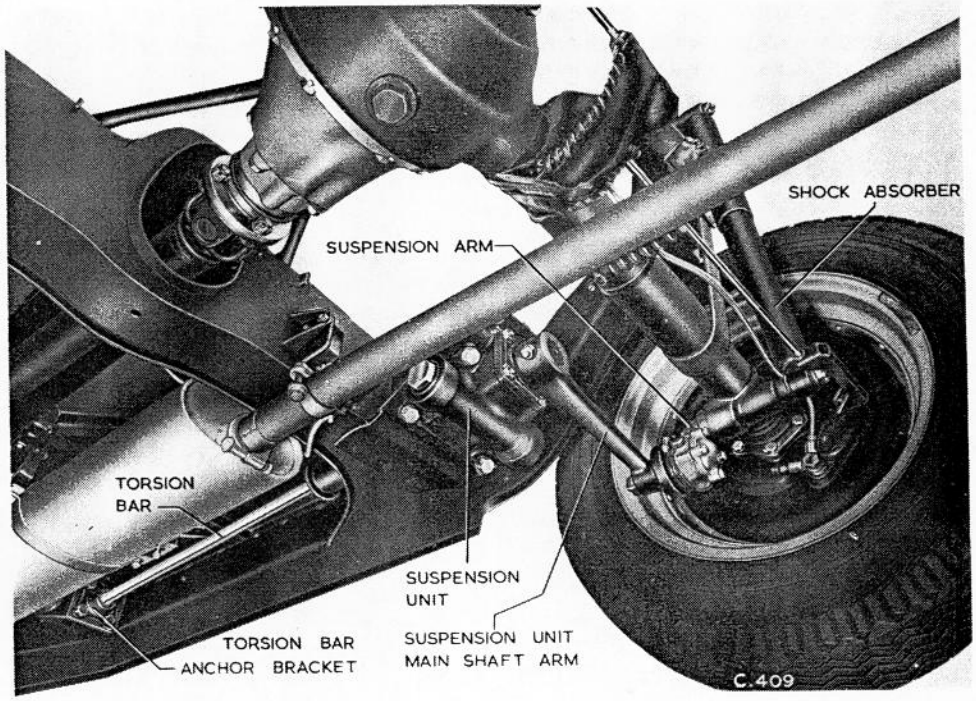


Fig.3 Rear suspension system.

Differential gearbox unit and rear ball joint

Fig.2 illustrates the construction of the differential gear. The differential gear housing is secured to the front face of the rear axle casing, the driving pinion being mounted in two taper roller bearings housed in the bearing housing. The bearings are separated by a distance piece and distance washers. Forward of the front bearing is another distance washer; the companion flange (which has an integral dust seal) is mounted on serrations on the front end of the pinion. A tabwashered retaining nut secures the companion flange to the pinion, and the pinion and its bearing in the bearing housing. An oil seal fitted in the front end of the housing embraces the shank of the companion flange. Pinion adjustment in relation to the differential crown wheel is effected by an adjustable washer fitted at the joint faces of the bearing housing.

The crown wheel is secured to the crown wheel mounting by twelve bolts, nuts and split pins. Apertures in the mounting provide for insertion or removal of the differential bevel pinions and gears. A bronze thrust washer for each bevel gear is located in a recess in the mounting, while semi-spherical bronze washers take the thrust of the bevel pinions which are freely mounted on the pinion spindle. The spindle is drilled at one end to receive the lock pin which is screwed into the crown wheel and locked with a split pin.

The differential assembly is supported by taper roller bearings located in bearing caps on either side of the differential gear housing, side adjustment being provided by locking rings, which are locked by locking plates secured in position by bolts and spring washers.

Suspension

General

The rear suspension employs longitudinal torsion bars linked by the main shaft arms of the suspension units on the chassis frame to the suspension arms fitted in the rear axle casing. Suspension is stabilised by the triangular attachment unit which is secured to a ball joint at the top of the differential gear housing and is pivoted laterally to the top of the chassis frame rear cross member. Damping of the system is effected by hydraulic telescopic shock absorbers. The system can be seen in Fig. 3.

Torsion bars

The torsion bars are located on each side of the car, at the rear, along the inside of the chassis side members. They are left-hand and right-hand and are clearly marked "L" or "R" on the rear ends. Under no circumstances must they be assembled incorrectly. Each bar is serrated at both ends; the front end engages an anchor bracket secured to No. 2 chassis cross member, while the rear end engages serrations in the bore of the suspension unit main shaft. Both torsion bars have 25 serrations at the front end and 27 at the rear end; this provides a vernier adjustment for setting. The rear end of each bar is drilled and tapped 5/16 in. B.S.F. to accommodate an extractor, and a half-round annular groove located half-way along the rear serrations accommodates the bolt which secures the bar to the suspension unit main shaft.

Suspension units

These identical units are illustrated in Fig. 3, a section view being given

in Fig. 28. They are bolted to attachment brackets on the chassis frame No. 4 cross member. The mainshaft is mounted in a needle roller bearing at the rear and a ball bearing at the front; both bearings being press fitted. Oil sealing rings at each end of the mainshaft are housed in cover plates attached to the casing, the rear ring embracing the main shaft, the front ring embracing an oil seal spacer fitted on the shaft immediately forward of the front bearing inner race. An oil seal ring is fitted to a counterbore in the rear face of the spacer and the mainshaft is retained in position by a tabwashered retaining nut. For lubrication purposes, a filler plug is provided at the rear end of the unit.

Suspension arms

The two units are identical and are located between the mainshaft and arm of the suspension units, and the rear axle casing, see Fig.3; a section view is given in Fig. 25. The suspension arm is a free screw-fit in a threaded recess inside the bushed housing in the axle casing, its ground journal locating in the bush and the arm being free to swivel in the bush. A bushed ball sleeve is positioned on the outer end of the suspension arm by a split ball sleeve housing, the outer half of which is secured by a shimmed cap which controls the loading on the ball sleeve see Fig. 25. The suspension arm shaft is screwed into the threaded bore of the ball sleeve, its outer end being tapered to receive the mainshaft arm of the suspension unit which is secured by a tabwashered nut. The tapered end also has two flats to permit adjustment of the tracking.

Lubrication is achieved automatically through passages in the suspension arm and a communicating passage in the axle casing, oil from the axle being fed to all working surfaces. Suitable oil seals and dirt-excluding seals are fitted to prevent loss of oil and ingress of foreign matter, See Fig.25.

Telescopic shock absorbers

For information on these units, refer to page 7 of Section 6.

OIL CAPACITY OF REAR AXLE

Initial filling ... ... 4 pints (2·3 litres).

Drain and refill... ... ... 3 pints (1·7 litres).

MAINTENANCE

At first 500 miles (800 k.m.)

Drain and refill the rear axle.

After first 1,500 miles (2,500 k.m.)

Drain and refill the rear axle.

After every 3,000 miles (5,000 k.m.)

Drain and refill the rear axle.

REMOVING AND REFITTING HALF SHAFTS

Removing

1. Jack up the car, then remove the road wheel and brake drum, see Section 10.
2. From behind the brake backplate, release the tabwashers and remove the six special bolts.

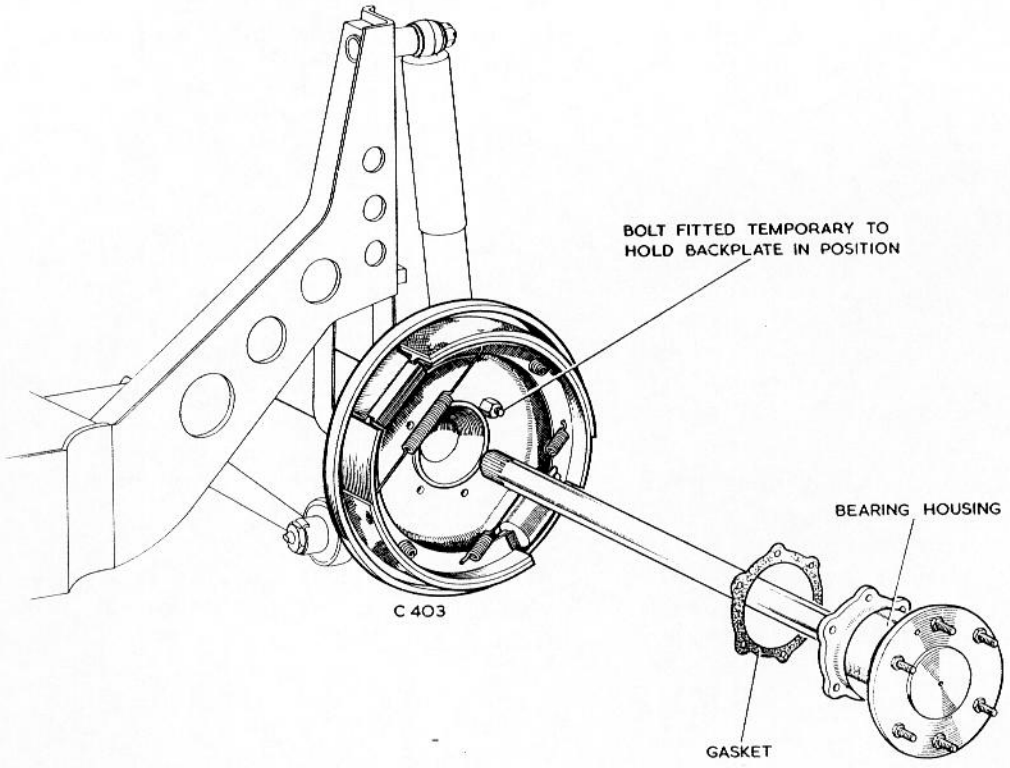


Fig.4 Withdrawing half-shaft.

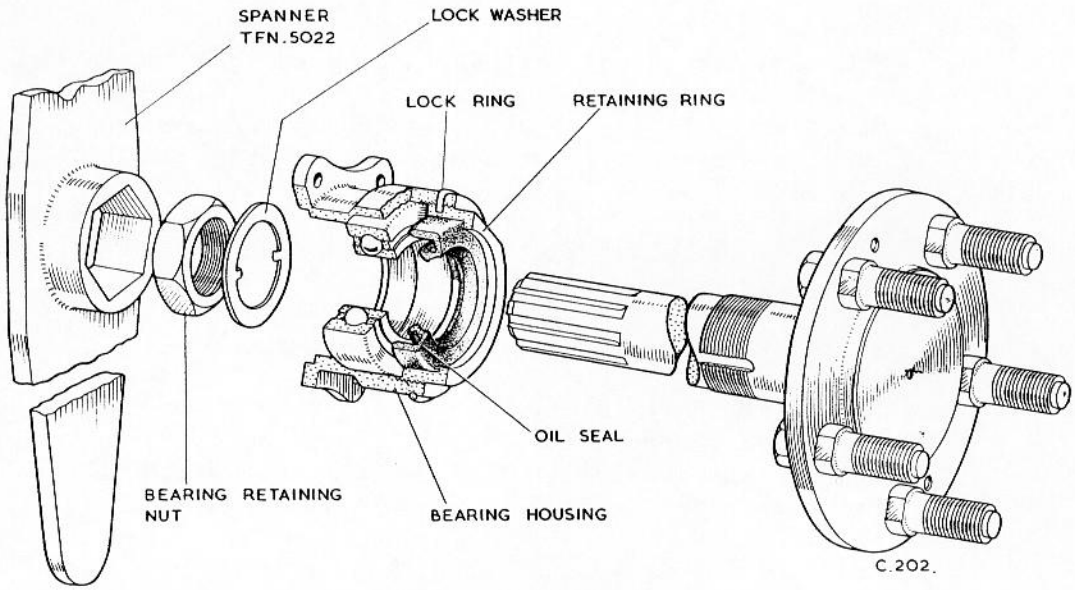


Fig.5 Rear hub assembly.

3. Withdraw the half-shaft complete with bearing housing and outer gasket, see Fig.4, then fit a nut and bolt temporarily to secure the backplate to the axle flange.

Refitting

1. Remove the nut and bolt previously fitted to hold the backplate in position, taking care not displace the backplate.

   Note :- If the backplate is displaced, check the condition of the gasket between the axle flange and the backplate.

2. Fit a new outer gasket where necessary, (see Fig.4) followed by the half-shaft.

3. Secure the bearing housing to the brake backplate and axle casing, using the special bolts and tabwashers N.501441. Lock the bolts with the tabwashers.

4. Refit the brake drum and wheel, see Section 10.

REPLACING HALF-SHAFT BEARINGS OR SEALS

1. Remove the relevant half-shaft as described previously.

2. Bend back the lock washer fitted to the recess of the bearing housing and remove the bearing retaining nut with the spanner TFN.5022, see Fig.5.

   Note :- The nut fitted to the left-hand half-shaft has a left-hand thread.

3. Withdraw the bearing assembly from the shaft.

4. Remove the external wire lock ring from the bearing housing, unscrew and remove the retaining ring complete with oil seal with the spanner TFN.5023; if necessary, press the oil seal from the retaining ring. It is advisable to discard the seal.

   Note :- The left-hand retaining ring has a left-hand thread.

5. Press the ball bearing from the bearing housing, if necessary.

The following is the sequence of operations for re-assembling the bearing housing :-

1. Clean all parts thoroughly.

2. Inspect the bearing location shoulder in the housing, remove any burrs then press the bearing right home in the housing. During the operation, avoid damage to the bearing.

3. It is advisable to fit a new oil seal to the retaining ring. Press the seal into the retaining ring with the open end upwards, keeping it square with the bore. Never apply the load to the rear face or "dishing" may occur. Screw the assembled seal and retaining ring into the housing and tighten with the special spanner TFN. 5023. Replace the wire lock ring. If the holes in the housing and retaining ring do not register, drill a new hole half-way into the retaining ring, using a No.44 (0·086 in. or 2·18 m.m.) drill.

   Caution :- Do not drill through the ring into the oil seal.

4. Fit the housing assembly to the half-shaft, ensuring that the bearing face is tight against the shoulder of the shaft.

5. Fit the retaining nut lock washer over the shaft and screw up and tighten the retaining nut. Bend up two sides of the lock washer, using the tool TFN. 5024.

6. Fit the half-shaft to the axle as described previously.

DIFFERENTIAL GEARBOX UNIT AND BALL JOINT ASSEMBLY

General Data

Drive	Spiral bevel.
Differential...	Two star bevel.
Crown wheel	39 teeth.
Driving pinion.	10 teeth.
Ratio	3·9 : 1
Bearings.	Taper roller.

Pre-loading of bearings

Crown wheel bearings	These must be pre-loaded by means of the screwed locking rings until a turning moment of 4 lb.in. (715·4 grammes c.m.) is just held. The driving pinion must be withdrawn from engagement during the setting operation.
Driving pinion bearings.	Preloading of these bearings is controlled by distance washers and distance pieces of varying thickness and length. These must be selected to ensure that a torque of 8-10lb.in. (1430·8-1788·5 grammes c.m.) is required to rotate the driving pinion when this unit is assembled and lubricated prior to meshing it with the crown wheel.
Backlash (Crown wheel and pinion) ...	0·006 in. (0·15 m.m.).
End-float of differential bevel gear	0·002 in. (0·050 m.m.).
End-float of differential bevel pinion...	0·002 in. (0·050 m.m.).
Crown wheel "run out"	0·002 in. maximum (0·050 m.m.).

Replacing driving pinion oil seal

1. From below the car, disconnect the propeller shaft rear universal joint at the companion flange.

2. Unlock and remove the five nuts securing the bearing housing to the differential unit and withdraw the bearing housing complete. Take care to retain the adjustable washer(s) fitted at this joint as its thickness has already been determined.

3. Locate the bearing housing in the vice plate TFN.5052, and using spanners TFN.5054 and TFN.5055, see Fig. 7, remove the retaining nut and tabwasher see Fig.6.

4. Using the extractor TFN.8450, withdraw the companion flange from its pinion, followed by the distance washer.

5. With the rear face of the bearing housing suitably supported, press out the driving pinion. The bearing inner race and rollers and the distance piece and distance washer should remain on the pinion. Take care to retain the distance piece and distance washer since they are selected size.

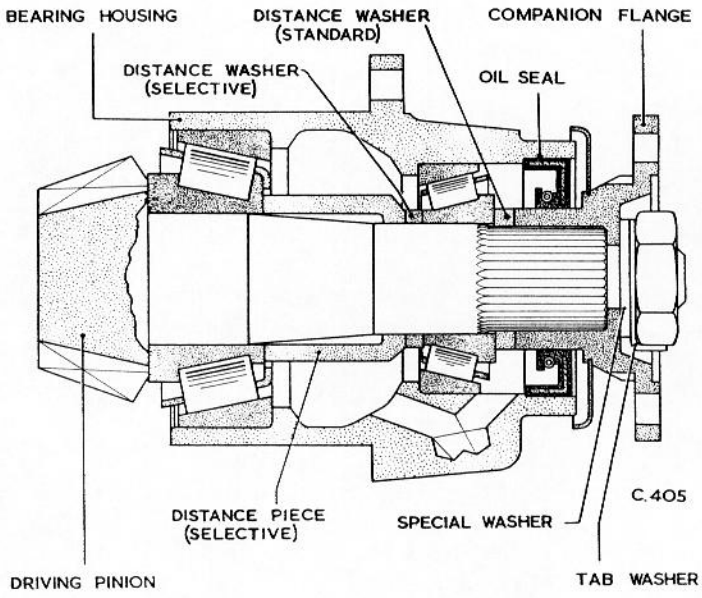


Fig.6 Differential bearing housing assembly.

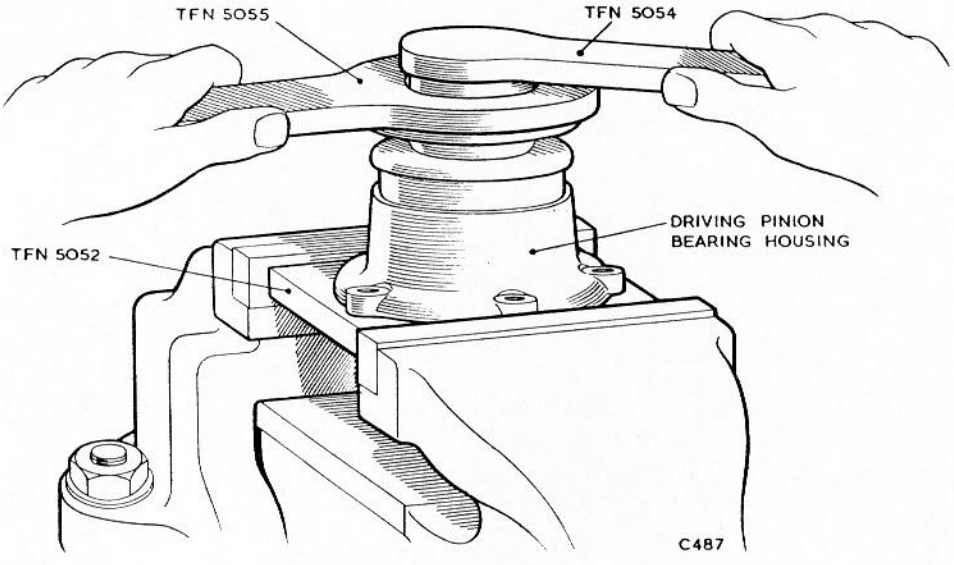


Fig.7 Removing driving pinion.

6. Reverse the bearing housing and press out the oil seal together with the inner race and rollers of the front bearing.

To reassemble proceed as follows referring to Fig. 6.

1. Refit the pinion complete with the rear inner race, the distance piece and the distance washer to the bearing housing.

2. Press the front bearing inner race and roller assembly on the pinion and fit the front distance washer.

3. Press a new oil seal into position, lip inwards.

4. Press on the companion flange, refit the special washer, tab-washer and nut.

5. Again using the vice plate TFN. 5052 and spanners TFN. 5054 and TFN. 5055, tighten and lock the nut. Refer to the General Data for the pre-loading figure.

6. Refit the bearing housing, with the adjustable washer interposed, to the differential unit and secure it with tabwashers and nuts.

7. Re-connect the propeller shaft rear universal joint to the companion flange.

Removing and refitting differential gearbox housing

In order to remove the differential gear housing, it is necessary partially to withdraw both half-shafts. The sequence of operations is as follows :-

1. Drain the rear axle, jack-up the car and support the chassis frame; avoid damage to the petrol and hydraulic system pipes. Remove both rear road wheels.

2. Withdraw the half-shafts with their respective bearing assemblies as described previously.

3. Raise the axle slightly by means of a jack. Release the tab-washer and remove the nut securing the attachment unit to the ball joint assembly; manipulate the jack until the axle is in a neutral position, then part the attachment unit from the ball joint.

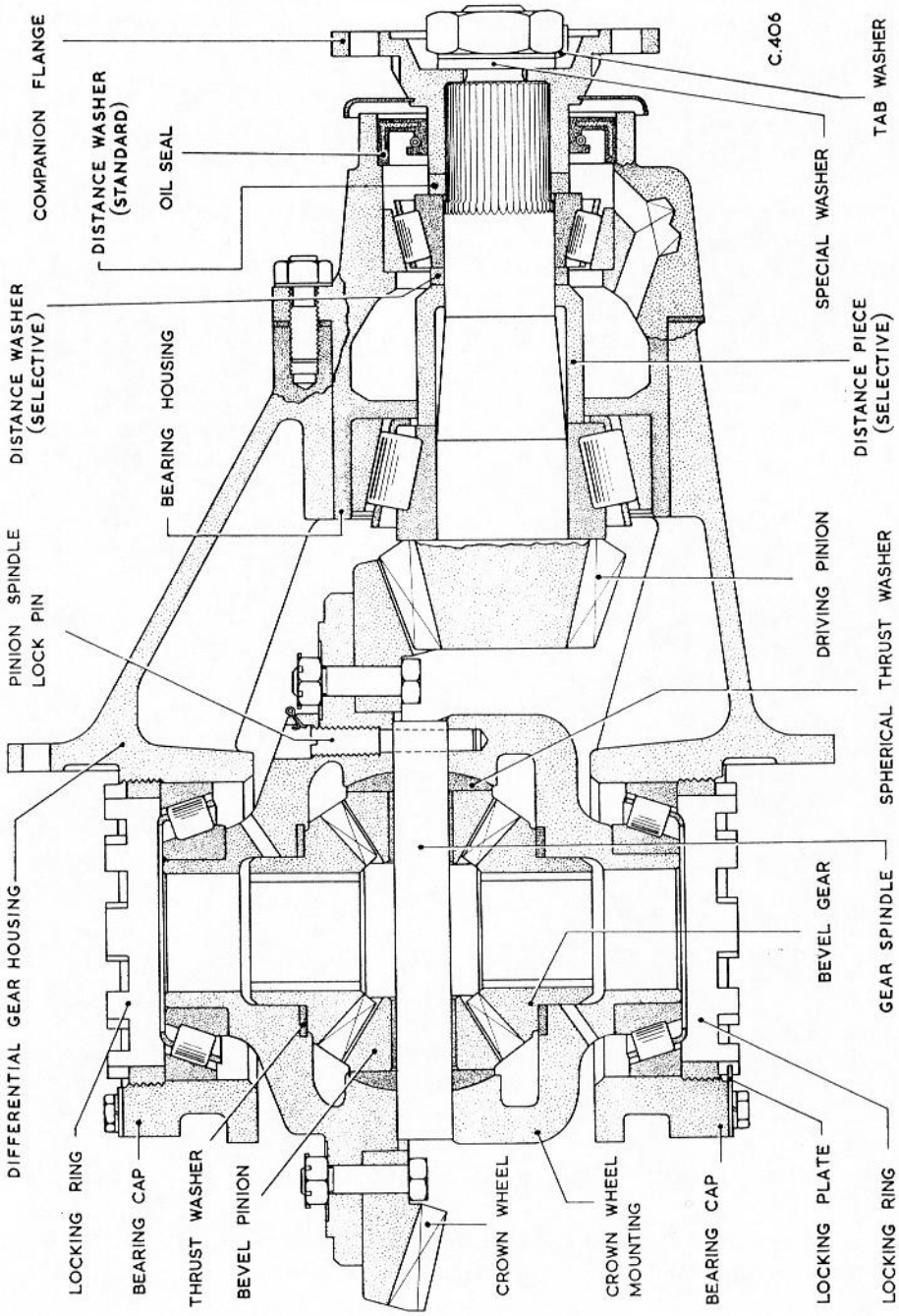


Fig.8 Differential gearbox assembly.

4. Disconnect the propeller shaft universal joint from the companion flange and push the propeller shaft forward towards the gearbox.

5. Release the tabwashers, remove the nuts securing the differential gear housing to the axle casing and draw it forward from the axle.

Adopt the following sequence to refit the assembly to the axle.

1. Clean the joint faces on the axle casing and the gear housing.

2. Fit a new gasket.

3. Refit the assembly to the axle casing, replace the tabwashers and nuts and tighten evenly.

   Note :- The nut at the top of the casing must be fitted progressively during fitment of the housing.

   Make any necessary backlash checks as described subsequently then lock the securing nuts with the tabwashers.

4. Connect the attachment unit to the ball joint on top of the differential gear housing, and secure it with a nut and tabwasher.

5. Reconnect the propeller shaft universal joint to the companion flange.

6. Remove the temporary retaining nuts from the brake backplate flanges and refit the half-shafts, brake drums and road wheels as described previously.

7. Top up the rear axle with approved oil.

Dismantling differential gearbox unit

With the differential gearbox unit out of the car, dismantle it as follows :-

1. Locate and bolt the complete assembly with fixture TFN.5053, see Fig.17.

2. Remove the locking ring locking plate from both bearings caps and break the locking wire from the bearing cap nuts.

3. Remove the bearing cap nuts and caps and lift out the crown wheel mounting together with the locking rings and bearings.

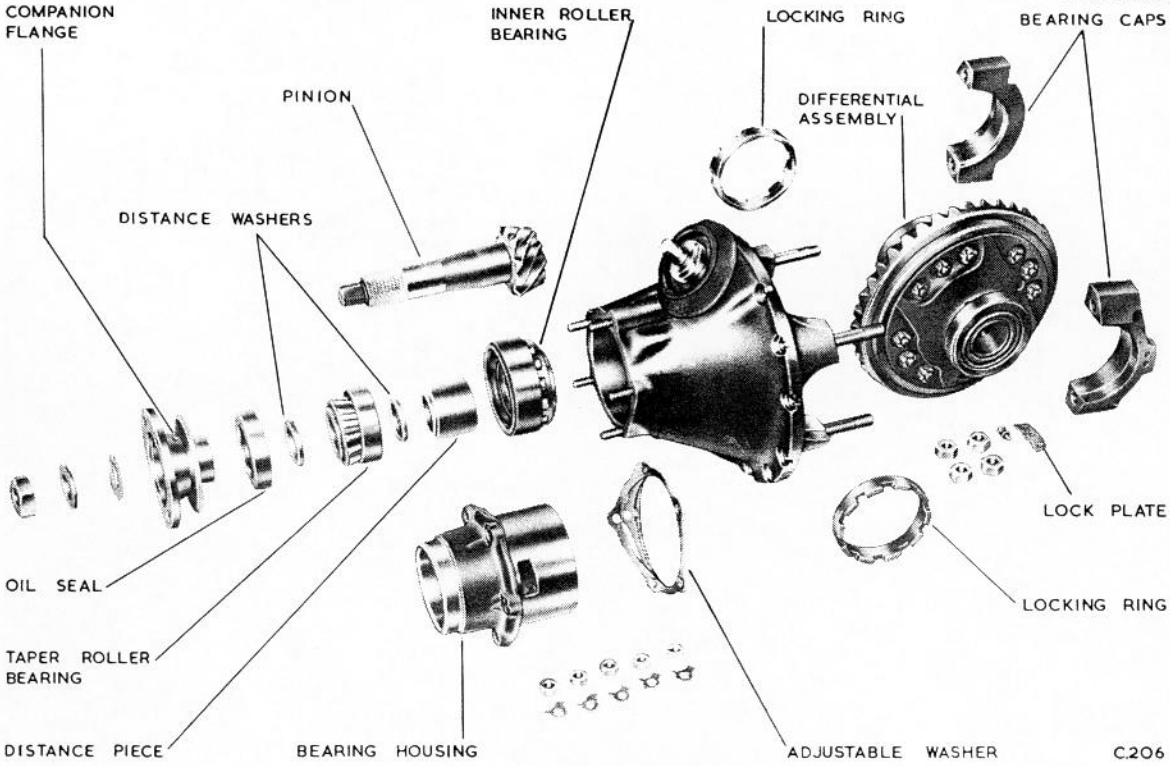


Fig. 9 Differential components.

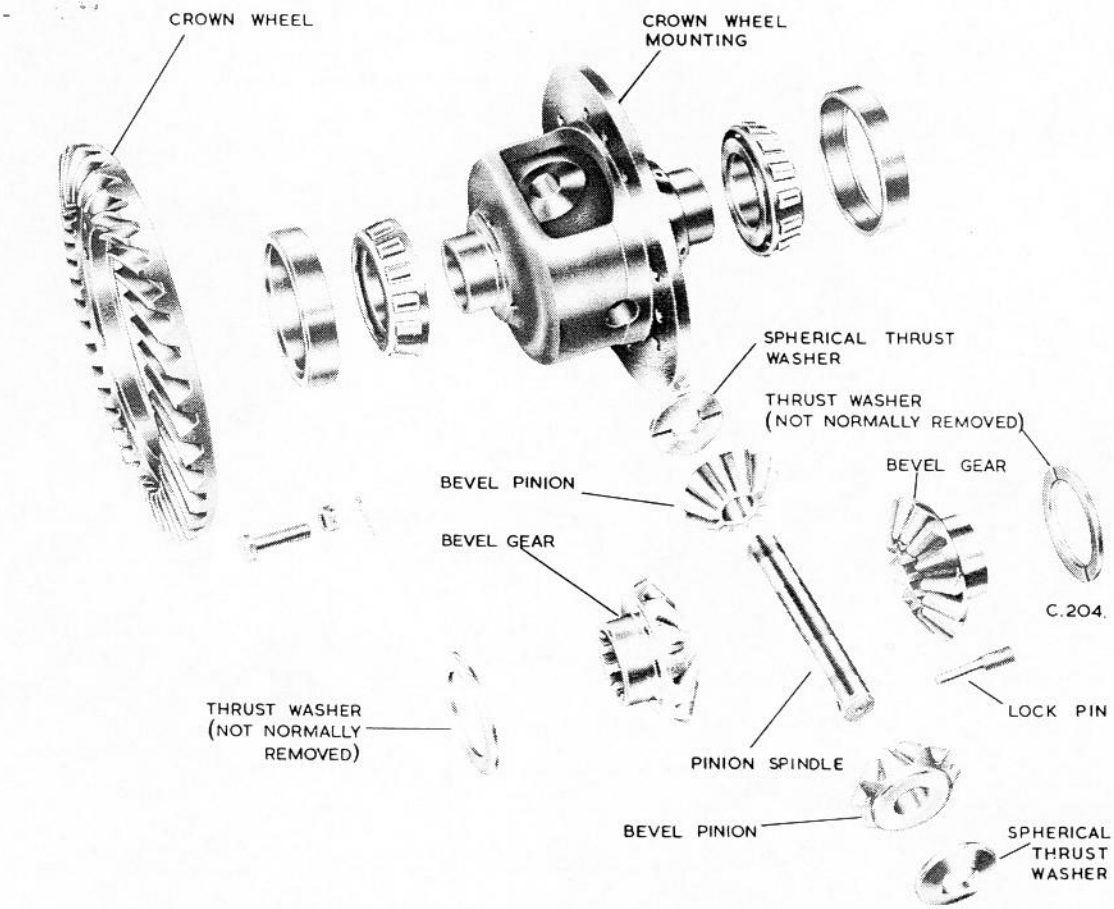


Fig. 10 Crown wheel mounting components.

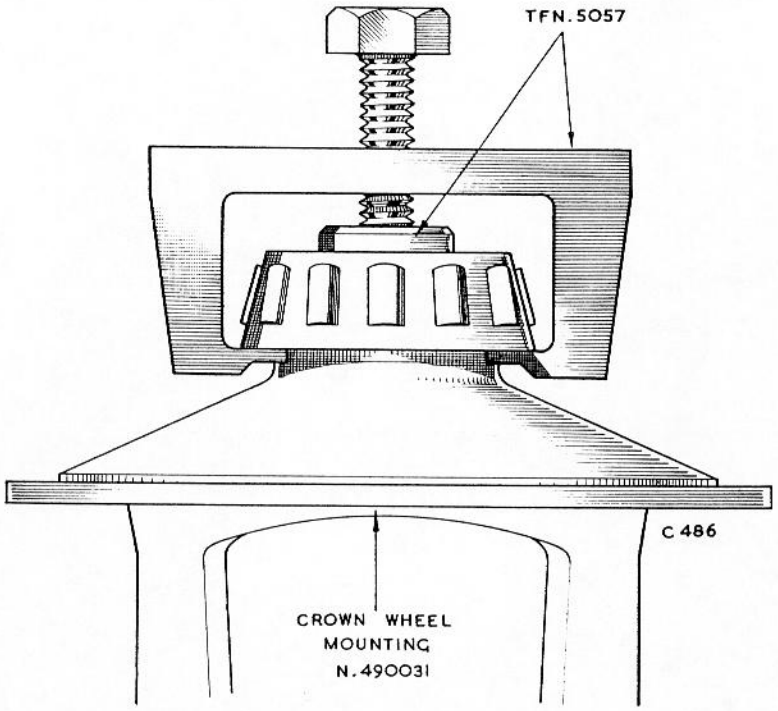


Fig. 11 Extracting bearings from crown wheel mounting.

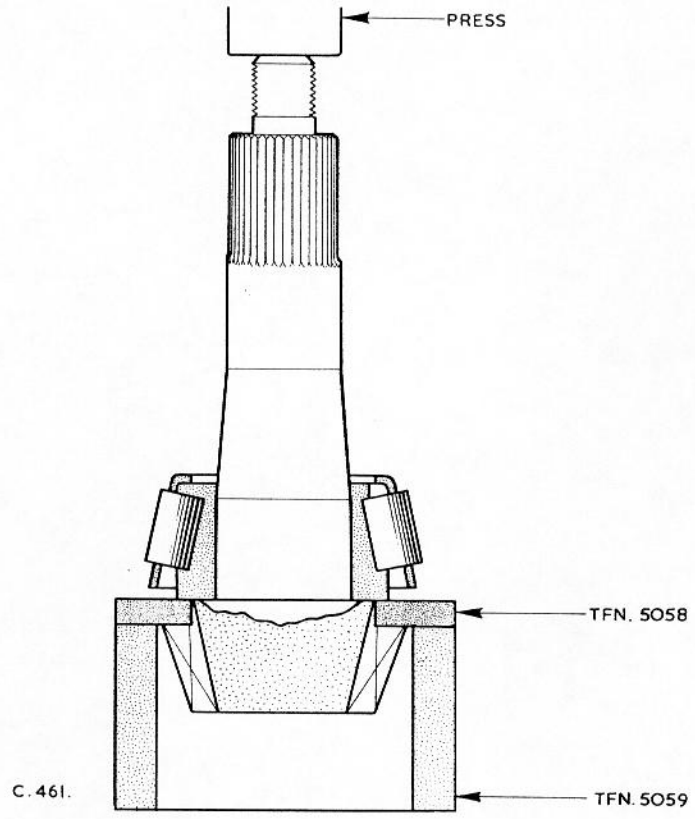


Fig. 12 Pressing rear bearing from driving pinion.

4. Unlock and remove the nuts securing the bearing housing to the differential gearbox housing, then withdraw the bearing housing complete. Take care to retain the adjustable washer(s) fitted at the joint face.

Dismantling crown wheel mounting

Referring to Figs. 2 and 10 proceed as follows.

1. Remove the split pins, nuts and bolts then remove the crown wheel from the mounting.

2. Secure the fixture TFN.5056 (see Fig.14) in a vice then secure the mounting to the fixture.

3. Remove the split pin retaining the pinion spindle lock pin and unscrew the pin. Drift out the pinion spindle.

4. Manoeuvre each pinion until opposite one of the large apertures in the mounting and withdraw them, together with their respective spherical thrust washers. Label the pinions and thrust washers to record their correct relative positions.

5. Push each bevel gear in turn to the centre of the casing and remove through the larger aperture.

6. If the taper rollers are unserviceable, remove them from the crown wheel mounting spigot using the tool TFN.5057 as shown in Fig.11.

7. Phosphor bronze thrust washers are pressed into a recess in the bevel gear location. These are a selective assembly and should only be removed if replacements are necessary. Small holes are provided to enable them to be tapped out but these are only accessible when the roller bearings have been removed.

Dismantling bearing housing

Dismantle the housing as described on page 14 under "Replacing driving pinion oil seal".

If the roller bearings are to be replaced, it will be necessary to remove both the outer races from the bearing housing and the inner race and roller assembly from the driving pinion by the following method :-

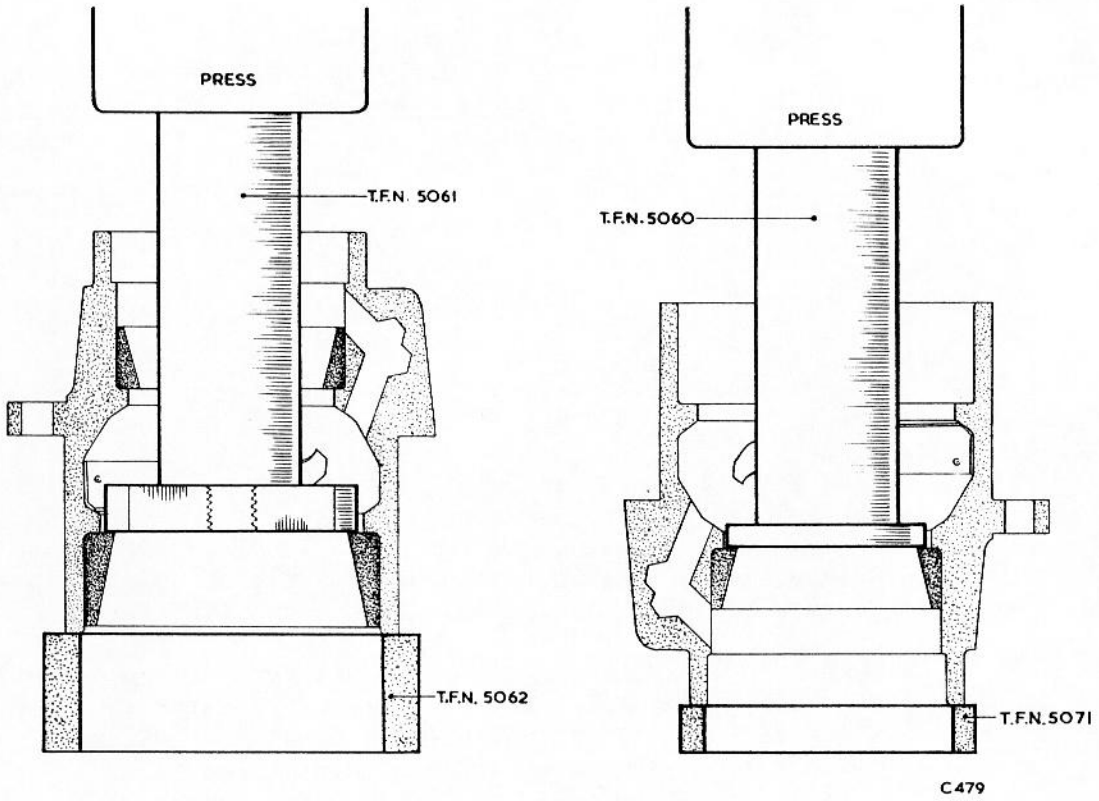


Fig. 13 Pressing bearing outer races from bearing housing.

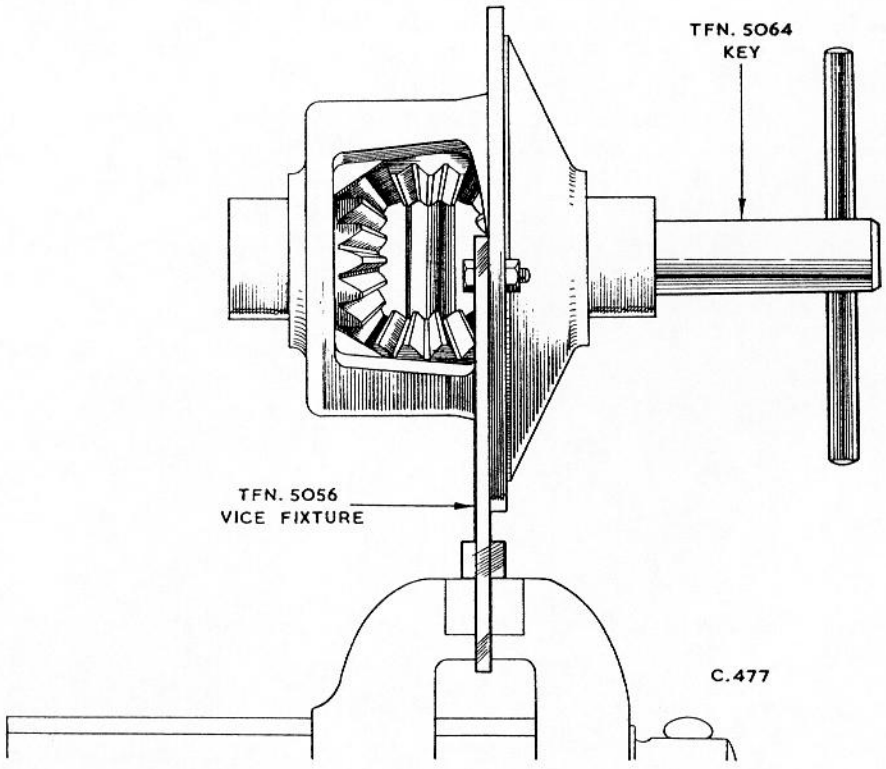


Fig. 14 Checking bevel pinions and gears.

1. Using the tools TFN. 5058 and TFN. 5059, remove the roller race as shown in Fig. 12.

2. Using the spigots TFN. 5060 and TFN. 5061 and the ring TFN. 5062 or TFN. 5071, press out the bearing outer races (larger race first) as shown in Fig. 13.

Reassembling crown wheel mounting

Make sure that all components are scrupulously clean and that all oil passages are unobstructed. It is preferable to use petrol to clean these components finally, since this will facilitate the subsequent assembly checks. Commence re-assembly in the following sequence, referring to Fig. 10.

1. If the two phosphor bronze thrust washers have not been discarded, leave them in position pending the results of the subsequent end-float check. If the washers have been discarded, fit two new washers slightly thicker than those taken out. Thrust washers are available in the following thicknesses :-

0·102 in.	(2·55 m.m.)	0·110 in.	(2·75 m.m.)
0·104 in.	(2·6 m.m.)	0·112 in.	(2·8 m.m.)
0·105 in.	(2·63 m.m.)	0·114 in.	(2·85 m.m.)
0·107 in.	(2·68 m.m.)	0·116 in.	(2·90 m.m.)

2. With the crown wheel mounting in the vice fixture TFN. 5056, insert the bevel gears.

3. With the spherical thrust washers in position, fit the bevel pinions to the mounting. If the spherical thrust washers removed when dismantling have been discarded, a selection of thrust washers are available in the following thicknesses :-

0·219 in.	(5·43 m.m.)	0·231 in.	(5·83 m.m.)
0·221 in.	(5·53 m.m.)	0·234 in.	(5·9 m.m.)
0·228 in.	(5·7 m.m.)		

With these components in position, insert the pinion spindle aligning its hole with the locking pin position.

4. Using the key TFN.5064 as shown in Fig. 14, make sure that the pinions and gears are free in their respective positions, then check that the end-float between each pinion and gear and its respective thrust washer is within the limits given in the General Data. If necessary, correct by selecting suitable thrust washers. When this is satisfactory, fit the locking pin and lock with 1/16 x $\frac{1}{2}$ in. split pin.

5. Assemble the crown wheel to the mounting with the bolt heads on the inside of the gear, tighten the nuts evenly and securely but do not fit split pins at this stage.

6. If the taper roller bearings have been rejected, mark the outer races for identification purposes then press the inner races and roller assemblies on the crown wheel spigots. The smaller diameter of each bearing must face outwards.

7. Spin the assembly and check for "run out" with a dial indicator located on the back of the gear. The "run out" should not exceed the figure quoted in the General Data; when correct, fit the split pins to the crown wheel nuts.

Re-assembling bearing housing

1. Referring to Fig. 6, press the two roller bearing outer races into the bearing housing (the larger inner diameters facing outwards) until they abut their respective shoulders.

2. Using the dummy driving pinion TFN.5063 (as shown in Fig.15), assemble all the components (with the exception of the oil seal) then tighten the nuts securely with the spanners TFN.5054 and TFN.5055.

3. If the assembly locks solid during this process, the distance piece and/or thrust washer are too short. A selection is available in the following sizes :-

Distance piece	1·423 in.	(35·14 m.m.)	1·463 in. (37·16 m.m.)
	1·443 in.	(36·65 m.m.)	

Distance washer	0·200 in.	(5·08 m.m.)	0·212 in. (5·38 m.m.)
	0·202 in.	(5·13 m.m.)	0·214 in. (5·43 m.m.)
	0·204 in.	(5·18 m.m.)	0·216 in. (5·48 m.m.)
	0·206 in.	(5·23 m.m.)	0·218 in. (5·53 m.m.)
	0·208 in.	(5·28 m.m.)	0·220 in. (5·58 m.m.)
	0·210 in.	(5·33 m.m.)	

Conversely, should the housing revolve freely after tightening, check the end-float; this should conform to the figure given in the General Data. If necessary, make a selective assembly of distance piece and or distance washer in order to obtain the pre-loading figure given in the General Data.

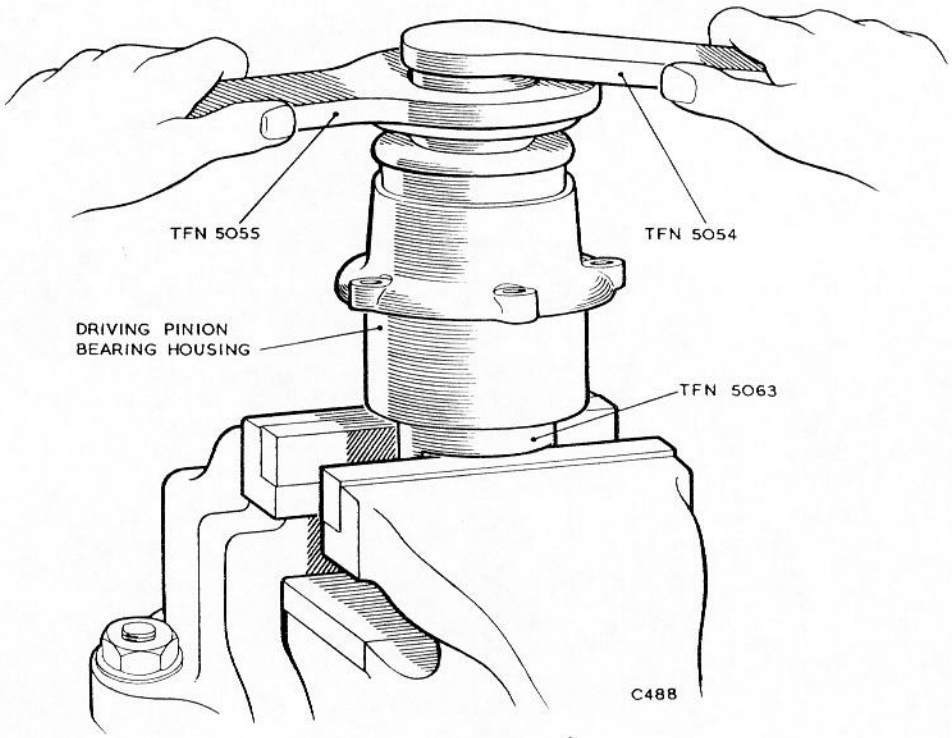


Fig. 15 Tightening bearing housing on dummy driving pinion.

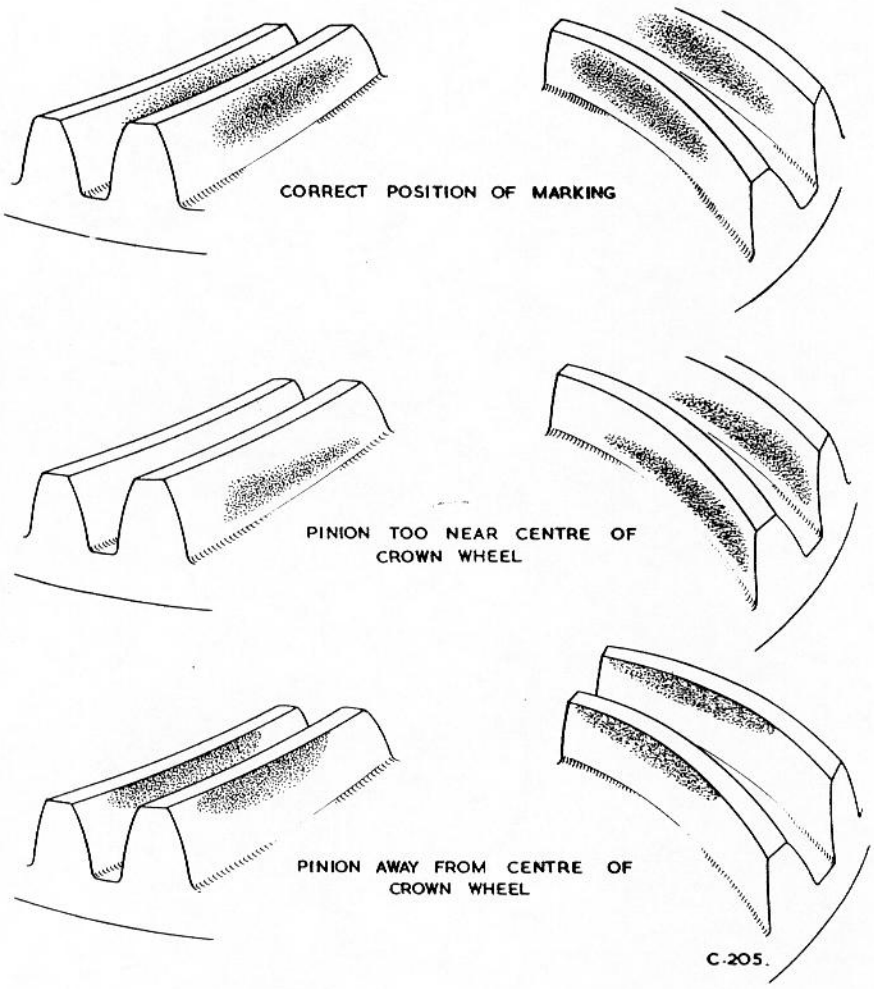


Fig. 16 Diagram of tooth contact.

4. Remove the components from the dummy pinion, and assemble the identical parts to the driving pinion in the following manner:-

   (a) With the smaller diameter towards the serrated end of shaft, press the larger bearing inner race on the pinion until it abuts the pinion head.

   (b) Fit the distance piece and distance washer then insert this assembly into the bearing housing.

   (c) Support the pinion head then, with the larger diameter facing outwards, press the outer bearing inner race on the pinion until it abuts the distance washer.

   (d) Fit the oil seal (lip inwards).

   (e) Fit the standard distance washer and companion flange.

   (f) Holding the bearing housing in the vice plate TFN.5052, fit the special washer, tabwasher and nut.

   (g) Using the spanners TFN.5054 and TFN.5055, tighten the nut and lock with the tabwasher. If the trial assembly on the dummy pinion has been carried out correctly, the pre-loading figure should be correct.

Final assembly of differential unit

1. A ball joint must be fitted to the differential casing before attempting to assemble the differential assembly; the procedure is given on page 35. It is important to note that the ball joint cannot be fitted after the differential assembly is fitted.

2. Fit the correct outer races to the crown wheel mounting roller bearings then position the crown wheel assembly in the differential casing. Enter the two locking rings into engagement with the threads, positioning the crown wheel mounting slightly towards the left-hand side in order to clear the pinion when assembled.

3. Fit the bearing caps, making sure that the locking rings can be moved freely in the threads. Screw up the bearing cap nuts reasonably tight.

4. Place this assembly into the vice fixture TFN.5053. Using the spanners TFN.5065, adjust the locking rings until the pre-loading given in the General Data is imposed on the bearings, then tighten the bearing caps thoroughly.

Note :- The pre-loading figure can be obtained fairly accurately by setting the locking so that the assembly is free to rotate without any side play, then tightening each locking ring one serration further.

5. Using a dial indicator, check on the crown wheel rear face for "run out"; this must not exceed the figure given in the General Data. When satisfactory, split pin the crown wheel nuts.

6. Fit the adjustable washer over the bearing housing retaining studs. This washer can be adjusted by peeling off the necessary number of 0·002 in. (0·05 m.m.) laminations.

7. Fit the bearing housing assembly, check that there is backlash between the crown wheel and pinion, then fit and tighten the nuts evenly.

8. With the handle TFN.5066 inserted into one side of the crown wheel mounting as shown in Fig.17, check the backlash.

9. Obtain the backlash figure given in the General Data by moving the locking rings in the bearing caps by equal increments; this will ensure that pre-loading is maintained. Measure the backlash with a dial indicator.

10. Check the tooth contacts by lightly smearing the pinion teeth with marking compound and rotating the crown wheel and pinion together, noting the contact of the teeth as shown in Fig.16. Correct as necessary to obtain the recommended contact by altering the thickness of the adjustable washer fitted to the bearing housing joint then re-adjust the backlash.

11. When adjusted correctly, fit the lock plates to the locking rings, the locking wire to the bearing cap nuts and the tab-washers to the bearing housing retaining nuts.

REMOVING AND REFITTING REAR AXLE

1. Jack up the car and place chassis stands under the chassis frame side members, well towards the rear wheels, avoiding damage to the brake fluid and fuel pipes.

2. Remove both rear wheels.

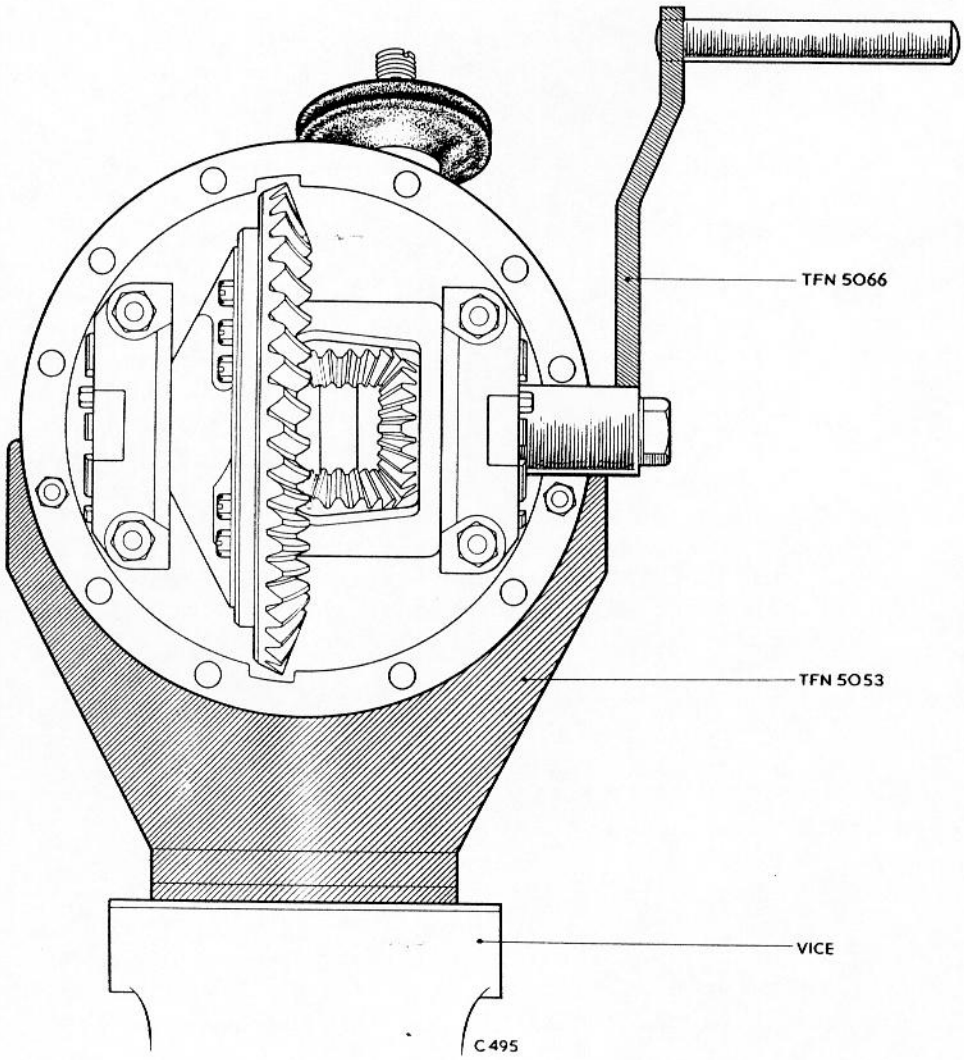


Fig. 17 Tools for checking crown wheel backlash.

3. Jack up and support the axle then detach the rearmost anchorage of each snubber strap by removing the two $\frac{1}{4}$ B.S.F. bolts, shakeproof washers, washer plate, packing washers and nuts.

4. Detach the shock absorbers from the axle.

5. Manipulate the jack until the axle is in a neutral position, i.e. with no load on the torsion bars, then support the axle in this position.

6. Referring to Fig. 20, detach the attachment unit from the ball and socket joint on the differential gearbox housing and position it so that it is out of the way.

7. Disconnect the rear universal joint from the companion flange.

8. Disconnect the brake fluid flexible pipe from the centre of the three-way union on the differential gearbox housing; detach the gaiter then disconnect the hand brake operating cable from the brake operating lever.

9. Unlock the tabwasher, unscrew and remove the nut, then using extractor TFN.8039, break the taper joint between the suspension unit mainshaft arms and the suspension arm shafts. Do not turn the suspension arm shaft since this is the adjustment for the rear tracking.

10. Draw the axle to the rear until the suspension arms are clear of their respective mainshaft arms. Remove the supports and lower the axle to the ground.

To refit the axle, proceed as follows :-

1. First check the position of the suspension arms see Fig. 25, i.e. that there is a clearance of 1/16 in. (1·59 m.m.) from the axle casing when the arm is hanging downwards and the end of the spindle is level with the inner bush. This setting is important since it forms the initial setting for the tracking.

2. Manoeuvre the axle until it is below its location on the car, then jack it up until the suspension arm shafts can be located in their respective mainshaft arms.

3. Enter both suspension arm shafts into their respective mainshaft arms, then fit a tabwasher and nut to the end of each shaft and tighten until the taper joints are right home. Do not lock the nuts with the tabwashers until an alignment check has been made.

4. Connect the attachment unit to the ball and socket joint at the top of the differential gearbox housing, fit a tabwasher and nut, then tighten and lock the nut.

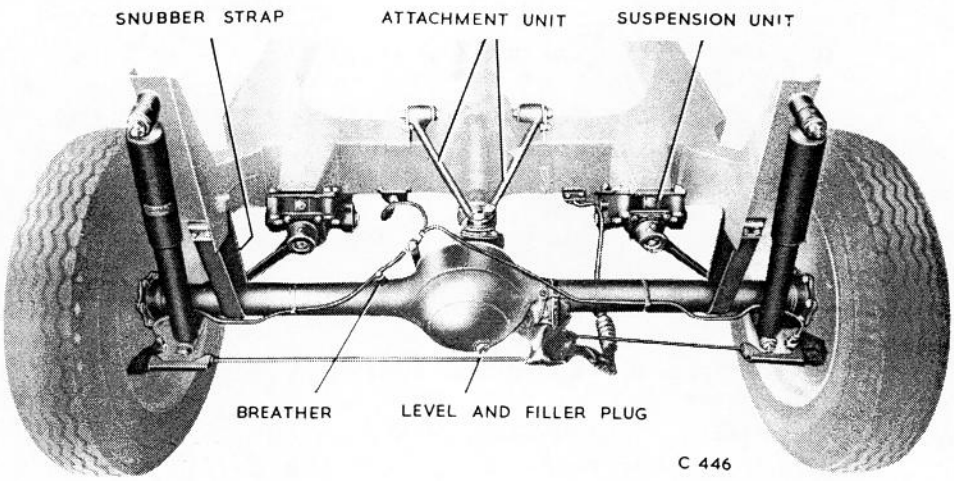


Fig. 18 Rear axle and rear suspension.

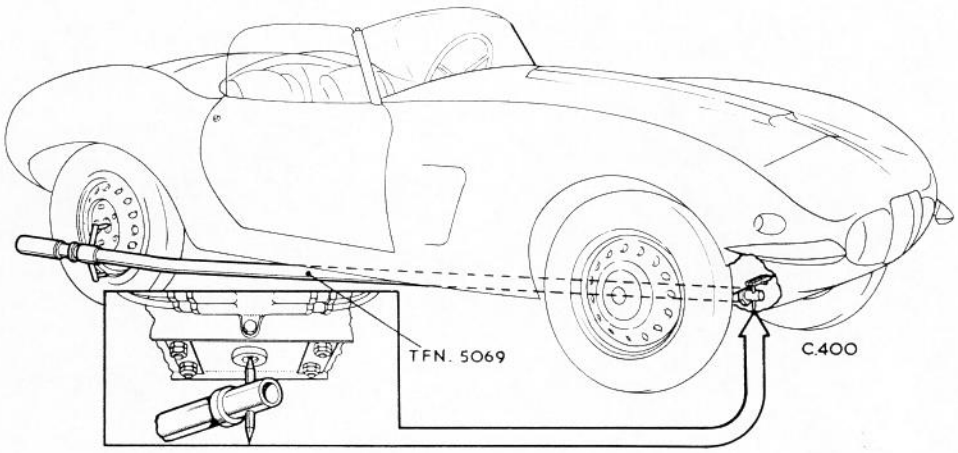


Fig. 19 - Checking rear axle alignment.

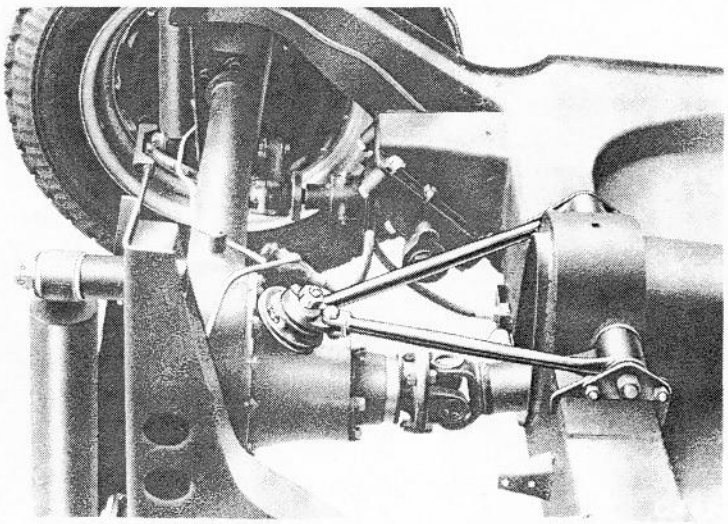


Fig. 20 Attachment unit.

5. Re-connect the rear universal joint.

6. Refit the brake fluid flexible pipe to the three-way union, and the hand brake cable to the brake operating lever, followed by the protective gaiter.

7. Re-connect the snubber strap fixtures and shock absorbers.

8. Bleed the brake system as described in Section 8.

9. Refit the rear wheels and lower the car to the ground.

10. Carry out an alignment check and when satisfactory, lock the suspension arm shaft nuts. If the suspension shafts have been adjusted, lock the suspension shaft cap nuts.

Whenever the rear axle has been removed, an alignment check is essential after refitment; if necessary, adjust as described below.

ALIGNMENT CHECK AND ADJUSTMENT

The alignment is adjusted by turning the suspension arm shaft.

1. Remove both rear wheel caps.

2. Set the trammel TFN.5069 to correspond to the distance from the centre of one rear hub to the centre of the front spring spigot see Fig.19.

3. Retain the trammel setting and check the same points on the other side of the car; the two measurements should be within ±1/16in. (1·59 m.m.); if the difference is outside this limit, adjustment is necessary.

To make the adjustment, proceed as follows :-

1. Jack up the car and place chassis stands under the chassis frame side members well towards the rear wheels, avoiding damage to the brake fluid and fuel pipes. Lower the car on to the stands.

2. Jack up the axle until the torsion bars are relieved of all strain.

3. Unlock the nut securing the suspension arm shaft to the main-shaft arm, then using extractor TFN.8039, break the joint.

4. Unlock and remove the four nuts securing the suspension arm shaft cap. Remove the cap but do not damage or mislay the gasket and shims, see Fig.25.

5. Using a spanner on the flats provided at the end of the suspension arm shaft, turn the shaft in the appropriate direction.

   Note :- Turning a suspension arm shaft clockwise will draw the adjacent rear wheel forward (i.e. decreases the trammel measurement) and vice versa.

Do not exceed the following adjustment.

Clockwise	... ...	Maximum permissible = ½ turn.
Anti-clockwise.	...	Maximum permissible = 1 turn.

The adjustment quoted is the maximum permissible adjustment from neutral, i.e. when the shaft is flush with the end of the ball sleeve, and it is therefore necessary to make a visual check on each shaft; it may be necessary to neutralise the position of both shafts to obtain a datum for correct adjustment.

ATTACHMENT UNIT

Removing

1. Jack up and support the car on chassis stands placed well towards the rear wheels so that the axle rests in the snubber straps. Take care not to damage the brake or fuel pipes.

2. Place a jack centrally beneath the axle casing and raise the axle slightly.

3. From under the car, unscrew and remove the ½ in. B.S.F. nuts and shake-proof washers from the bearing spindle on either side of the propeller shaft tunnel.

4. Unscrew and remove the two 5/16in. B.S.F. bolts, nuts and shake-proof washers and triangular washer plate from each side, see Fig. 20.

5. Release the tabwasher; remove the 9/16 in. B.S.F. nut from the ball joint assembly on the differential gear housing.

6. Manipulate the jack until the axle is in a neutral position then part the attachment unit from the ball joint assembly.

7. Remove the nut, bolt and washer connecting the major and minor arms.

8. Detach both arms from the mounting spindles and remove the rubber bearings.

Refitting

1. Coat each rubber bearing (inside and out) with Colloidal graphite.

2. Fit the bearings into the locations at the extremities of the major and minor arms.

3. Fit the arms (complete with the rubber bearings) on their respective spindles at either side of the propeller shaft tunnel, the major arm occupying the left-hand spindle. Mate the fork joint of the two arms, and fit the bolt, shake-proof washer and nut; tighten the nut.

4. Fit a triangular plate washer to each tunnel spindle. Insert the bolts, washers and nuts, and tighten the nuts.

5. Fit a nut and washer to each spindle. Hold the arms parallel to the ground and tighten the nuts.

6. Manipulate the axle until the rear location of the attachment unit can be engaged quite freely with the ball joint assembly. Fit the tabwasher and nut, then tighten and lock the nut.

   Caution :- Excess leverage on the nut will result in damage to the ball joint assembly. A standard length open-ended spanner is sufficient to tighten the nut.

7. Remove the chassis stands and lower the car to the ground.

REAR BALL JOINT ASSEMBLY

Removing and refitting

The rear ball joint can only be removed from inside the differential unit. It is therefore necessary partially to withdraw the half shafts, and then to withdraw the differential unit and to remove the crown wheel mounting from the differential unit. When this has been done, withdraw the nut and tabwasher from inside the differential housing and tap out the ball bolt with a soft metal drift.

To refit the ball joint, reverse the foregoing procedure. Ensure that the oil passage in the side of the ball bolt taper coincides with the oil passage in the differential gearbox housing, see Fig. 21. Fit the angle tabwasher from inside the gearbox housing, making sure that the tabwasher does not obstruct the oil feed passage or the oil return groove. Fit the nut to the ball bolt, then tighten the nut and lock it with the tabwasher.

Complete the assembly of the differential gearbox housing as described on page 27, then refit the assembly to the rear axle as detailed on page 18.

Dismantling and re-assembling

1. Referring to Figs. 21 and 22, remove the clip and saddle piece, securing the rubber oil seal.
2. Withdraw the rubber oil seal over the taper of the ball bolt, followed by the spiral spring and spring cap.
3. Disengage the tongue of the locking ring from its location in the housing and remove the ring.

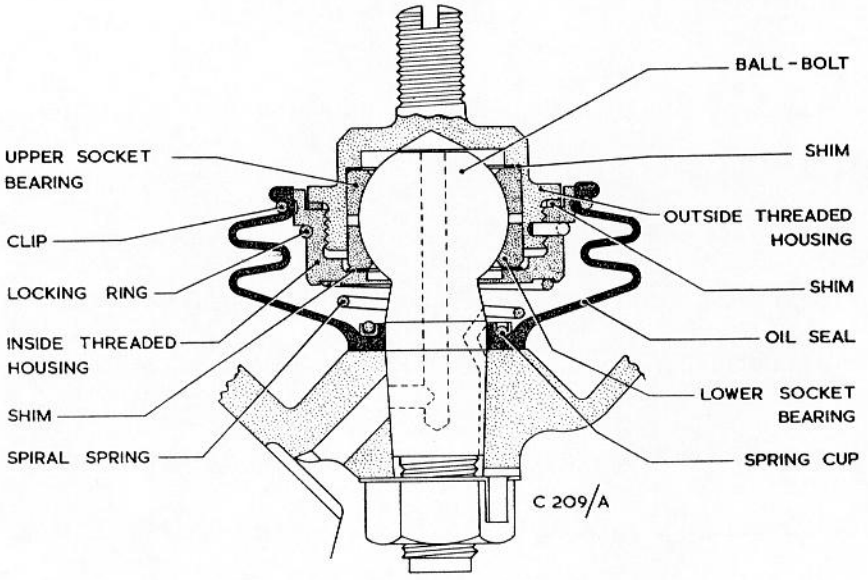


Fig.21 Section of ball joint assembly.

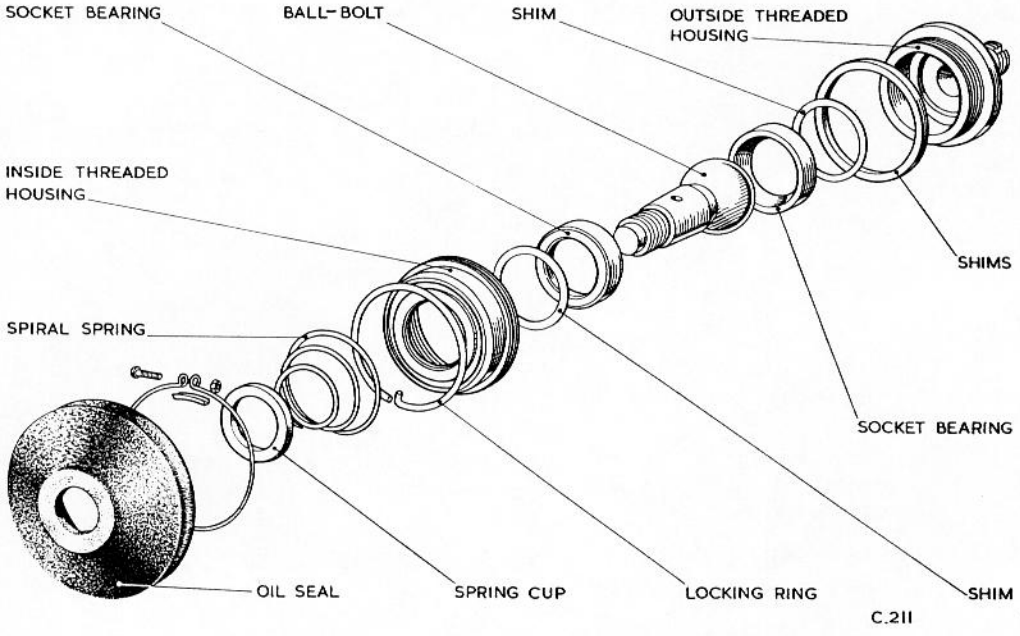


Fig.22 Ball joint components.

4. Unscrew and remove the housing (inside thread) from the housing (outside thread) using the vice plate TFN.8792 and the ring spanner TFN.10085, see Fig. 23. Retain the shims fitted between the housings.

   Note :- Inside each housing is a socket bearing which is shimmed against its respective seating in the housing. Label these components to ensure correct assembly.

5. Withdraw the ball bolt from the inside threaded housing and remove the upper socket bearing followed by the shim(s).

6. Refit the outside threaded housing on the inside threaded housing and tap the face of the inside threaded housing on a suitable block until the lower socket bearing drops from its housing. Part the housings and remove the bearing and shim(s).

To re-assemble the ball joint, adopt the following procedure.

1. Fit the correct shim(s), followed by the upper socket bearing, into the outside threaded housing, prime the ball bolt oilways and insert the bolt into the outside threaded housing and socket bearing.

2. Fit the lower socket bearing over the ball bolt and into the outside threaded housing.

3. Fit the correct shim(s) on the protruding socket bearing, then fit the large shim over the threads of the outside threaded housing and screw on the inside threaded housing; tighten the housings securely, again using the vice plate TFN.8792 and the ring spanner TFN.10085.

4. Check that there is sufficient loading on the ball joint. Some difficulty may be experienced in judging the correct "feel" of the ball joint, since the sockets are sufficiently well mated to require a distinct jerk to free the surfaces initially. The joint however, should be capable of movement by a fair amount of manual force only. Any necessary adjustment is effected by altering the shims beneath the cap.

5. Using the hole in the inside threaded housing as a pilot, drill into the outside housing with a No.44 (0·086 in. (2·18 m.m.)dia.) drill to accept the tongue of the locking ring. Do not drill right through the inside threaded housing.

6. Fit the locking ring with its tongue locating in the hole just drilled.

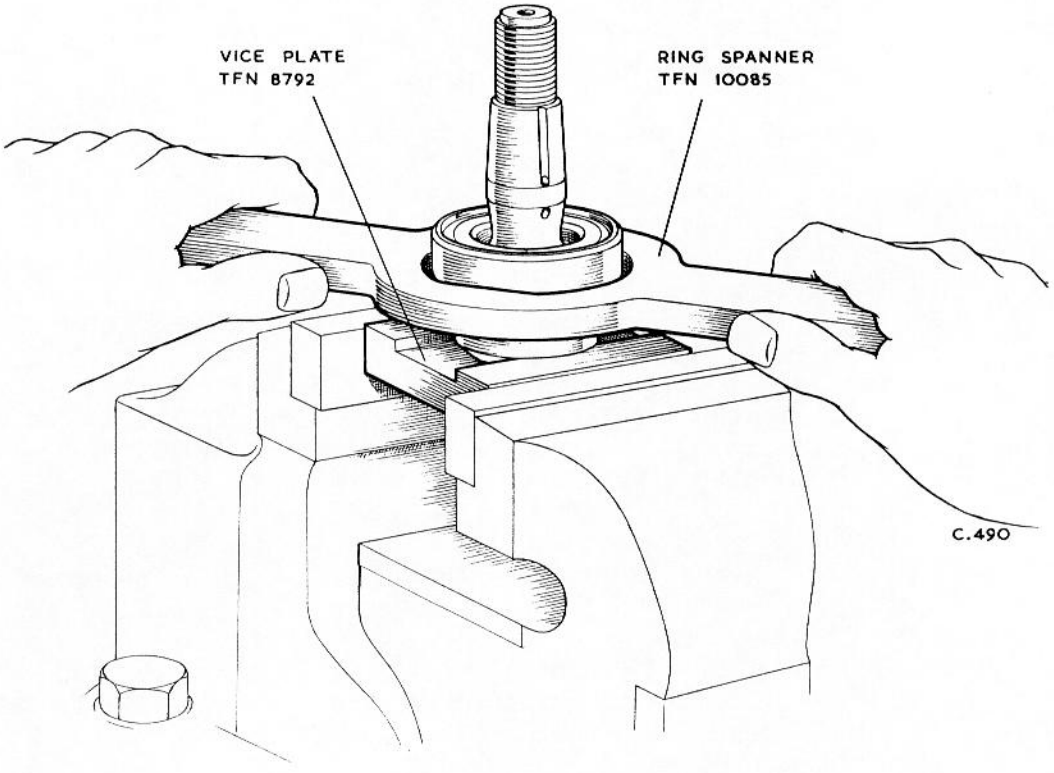


Fig. 23 Unscrewing ball joint housings.

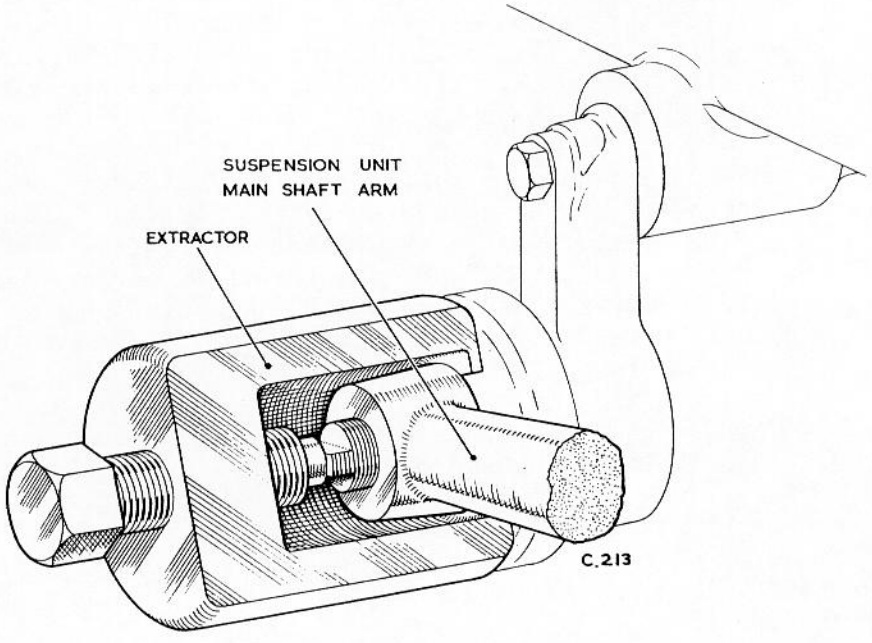


Fig. 24 Suspension arm shaft extractor.

7. Fit the spiral spring (large diameter first) over the ball bolt on to its location on the face of the inside threaded housing.

8. Position the spring cup over the small end of the spring, then fit the oil seal over the bolt and locate it on the housing.

9. Secure the seal with its circlip.

Replacements

Any grooving or scoring of the ball bolt and socket bearings render both the ball bolt and the socket bearings unserviceable. These parts are carefully selected and mated during manufacture and should not be intermixed. The ball bolt and its mating socket bearings should thus be ordered together.

Faults

If any "bumping" is audible when accelerating or braking, check the ball joint and attachment unit. To do this, select second gear, rock the car backwards and forwards and note any slackness in the attachment unit joints on the ball joint on the differential gear housing. If there is slackness at the ball joint adjust the loading by varying the shim thickness.

SUSPENSION ARM UNITS

Removing

1. Jack up the rear of the car and place chassis stands beneath each side of the chassis frame towards the rear wheels, ensuring that no damage is sustained by the brake fluid or fuel pipes. Lower the car to the stands.

2. With the jack in position under the axle, take the weight off the snubber straps, then remove the rearmost fixtures of the straps.

3. Remove the relevant rear wheel and brake drum, then withdraw the half-shaft and backplate as described on page 10.

4. Release its tabwasher then unscrew and remove the nut from the suspension arm shaft.

5. Jack up and support the relevant side of the axle then, using extractor TFN.8039 as shown in Fig. 24, break the taper joint of the suspension unit.

6. Roll back the relevant side of the axle until the mainshaft arm is clear of the suspension arm shaft. Remove the oil retainer cover.

7. Release the tabwashers and remove the four bolts and the cap at the forward end of the suspension arm shaft. Do not damage or mislay the shims and gasket.

8. Unscrew the suspension arm (anti-clockwise) from the axle casing.

Refitting

1. Assuming that a serviced or new unit is to be fitted, first remove the four screws from the end cap then remove the cap and shims. Carefully retain the shims as they are a selected fit.

2. Enter the screwed portion of the suspension arm into the bushed housing in the rear axle casing, screw it home, then turn it back so that there is a minimum of 1/16 in. (1·59 m.m.) between the end of the bush and the machined lip of the suspension arm when the arm is in its correct position (i.e. the unit is hanging downwards). If the clearance is less than 1/16in.(1·59 m.m.) unscrew the shaft one turn.

3. Refit the shims, gasket and cap to the forward end of the suspension arm shaft and secure with tabwashers and nuts; lock the nuts with the tabwashers.

4. Fit the suspension arm shaft to the mainshaft arm, with the oil retainer cover interposed, then fit the tabwasher and nut. Tighten the nut but leave it unlocked at this stage.

5. Refit the snubber strap fixtures.

6. Refit the backplate, half-shaft, brake drum and rear wheel, then remove the chassis stands and lower the car to the ground.

7. Check the axle alignment as described on page 32; when satisfactory, lock the suspension arm shaft nut with its tabwasher.

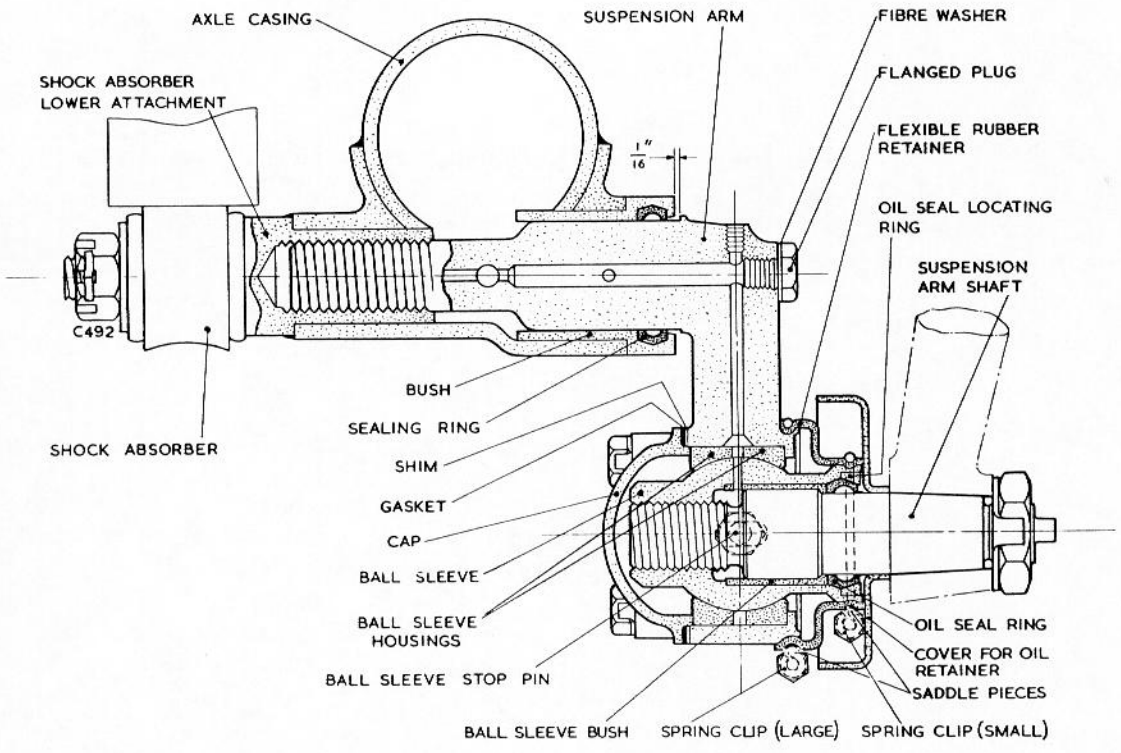


Fig.25 Section of suspension arm unit.

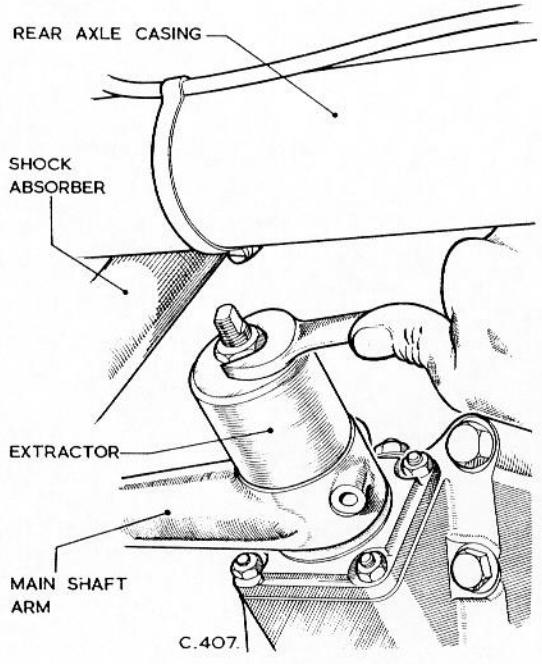


Fig.26 Torsion bar extractor.

Dismantling and re-assembling

During this procedure, refer to Fig.25.

1. Withdraw the oil retainer cover from the suspension arm shaft.
2. Remove both spring clips from around the flexible oil retainer and remove the oil retainer and clip saddle pieces.
3. Unlock and remove the four nuts securing the shaft cap. Remove the shaft cap and shims, taking care not to damage or lose the shims.
4. Break the locking and remove the two ball sleeve stop pins.
5. Push out the suspension arm shaft and ball sleeve, together with the outer ball sleeve housing, in the direction of the capped end; do not drop the outer ball sleeve housing.
6. Carefully unscrew the suspension arm shaft from the ball sleeve, bringing with it the oil seal. Remove the oil seal retaining ring and seal; discard the seal.
7. Remove the flanged plug at the top of the suspensiom arm to facilitate cleaning.

Adopt the following procedure to re-assemble.

1. Clean all parts and flush out the oilways. Refit the flanged plug and washer to the top of the suspension arm.
2. Screw the suspension arm shaft into the ball sleeve two or three threads.
3. Fill the inner groove of the new oil seal with Colloidal graphite and slide the seal on the suspension arm shaft (from the tapered end) until it abuts the shoulder.
4. Degrease the outer diameter of the oil seal and apply jointing compound. The compound must be confined to the outer diameter.
5. Refit the mainshaft and arm of the suspension unit until the end of the shaft is flush with the front face of the ball sleeve. This is important.

6. Fit the oil seal retaining ring on the shaft and tap it into position, i.e. slightly below the end face of the ball sleeve.

   Note :- If the seal protrudes when the retaining ring is in position, allow the compound to dry before re-positioning the seal.

7. Refit the inner ball sleeve housing (if removed); the stop pin grooves must line up with the stop pin holes.

8. Apply a liberal quantity of oil to the ball sleeve, then fit the ball sleeve to the suspension arm.

9. Refit the stop pins and washers, followed by the outer ball sleeve housing, ensuring that the alignment of the stop pin grooves is correct. Wire-lock the stop pins.

10. Refit the shims, gasket, cap, tabwashers and nuts. Tighten the nuts evenly and check the movement of the ball joint. Some difficulty may be experienced in acquiring the correct "feel" of the ball joint, since the housings are sufficiently well mated to require a distinct jerk to free the surfaces initially. The joint however should be moveable by a fair amount of manual force only. If necessary, adjust by altering the number of shims beneath the cap. These are available in thicknesses of 0·001 in. (0·03 m.m.)., 0·002 in. (0·05 m.m.) and 0·003 in. (0·08 m.m.).

11. Refit the flexible oil retainer, saddle pieces and clips, position the saddle pieces at the clip gaps then tighten the clips; check that the clips bed into their respective grooves.

12. Refit the oil retainer cover. This cover is finally retained in position by the mainshaft arm.

Replacing oil seal

To replace the oil seal in the ball sleeve, it is not necessary to remove the suspension arm from the car. With the axle suitably supported, detach the mainshaft arm, following the procedure given on page 40; do not disturb the suspension arm shaft adjustment. Then proceed as follows :-

1. Detach the oil retainer cover.

2. Hook out the oil seal retaining ring, followed by the oil seal. If necessary, remove the flexible oil retainer for replacement at this stage.

3. Fill the inner groove of the new oil seal with Colloidal graphite and slide the seal on the suspension arm shaft, then degrease the outer diameter and apply jointing compound, confining the compound to the outer diameter.

4. Move the oil seal along the shaft until it is positioned correctly, fit the retaining ring, followed by the flexible oil retainer with saddle pieces and clips. Check that the clips bed into their respective grooves.

5. Refit the axle fixtures as described on page 40.

Replacing ball sleeve and housing

The ball sleeve and the inner and outer halves of its housing are lapped and mated. They are therefore only supplied as a mated assembly, wired together in their correct relative positions. The inner and outer halves of the housing are not interchangeable. To replace the inner and outer halves of the ball sleeve housing, dismantle the assembly as described on page 42 and re-assemble, using serviceable parts.

Replacing ball sleeve bush

1. Remove the ball sleeve bush from the ball sleeve housing, dress any withdrawal scores and carefully press in the new bush. Drill the oil passage, using the oil hole in the ball sleeve as a pilot. Ream the bush to 0·0937 in. dia. (2·35 m.m.) ensuring that the reamed surface is concentric with the threaded portion of the ball sleeve.

2. Thoroughly clean all parts and re-assemble as described on page 42.

3. Refit the suspension arm shaft to the shock absorber arm with the oil retainer cover interposed, then check the axle alignment as described on page 32; when the alignment is satisfactory, lock the suspension arm shaft nut with its tabwasher.

Replacing suspension arm bush in rear axle casing

Remove the old bush and dress any withdrawal scores in the casing. There are two methods of replacing the bush, i.e. :-

Method (a) ... ... without tools.
Method (b) ... ... using special tools.

Method (a)

If freezing facilities are available, freeze and insert the bush. If these facilities are not available, press in the bush. A reaming allowance in the bore of all replacement bushes permits the bush to be reamed to 1·1875 in. (30·16 m.m.) bore dia. If this operation is carried out carefully, the bush bore and the threaded portion should automatically align. Test this by screwing in the suspension arm.

Method (b)

Enter the bush slightly into the bore and pull the bush into position with the tool TFN.5067. Remove the tool and insert the pilot of the reamer TFN.4662. Locate the reamer over the pilot and ream the bush bore. This assures alignment of the bore with the threaded portion.

With both methods, clean the bore thoroughly after reaming, apply colloidal graphite to a new oil seal and fit the seal to the recess in the bush.

TORSION BARS

Removing

1. Jack up the car and place chassis stands well towards the rear wheels, avoiding the brake and fuel pipes.

2. Disconnect the upper attachments of the telescopic shock absorbers, the rear attachment only of the snubber straps and the rear coupling of the propeller shaft.

3. Jack up the rear axle casing until the load is relieved from the torsion bar.

4. Remove the nut and shake-proof washer and withdraw the bolt securing the torsion bar in the suspension unit, then withdraw the torsion bar from its serrations, using the extractor TFN.5026, see Fig. 26.

5. Jack up the axle casing clear of the torsion bar and remove the bar completely.

Refitting

With the rear axle casing jacked up, pass the small end (front) of the torsion bar through the suspension unit from under the axle casing. It is now positioned for setting.

Checking and setting

The petrol tank should be empty for this procedure. It is recommended that the fixture TFN.5050 is used; this fixture is shown in position in Fig. 27. Note that the fixture discs are employed during the checking procedure. Provided the setting is within the limit of 3 in. $\pm\frac{1}{8}$in. (7·62 c.m. ± 3·18 m.m.) and that this is identical on both sides of the car, no adjustment is required.

Should it be necessary to set the bars, withdraw them from their serrations using the procedure described previously then continue as follows :-

1. Locate the setting fixture TFN.5050 over the serrated end of the bars as shown in Fig. 27.

2. Jack up or lower the axle casing until the suspension unit arm is at 50° and the pointed jig pin will locate in the centre of the suspension arm.

3. Revolve the torsion bar until it will enter both its front and rear serrations then push the bar into position, at the same time removing the fixture.

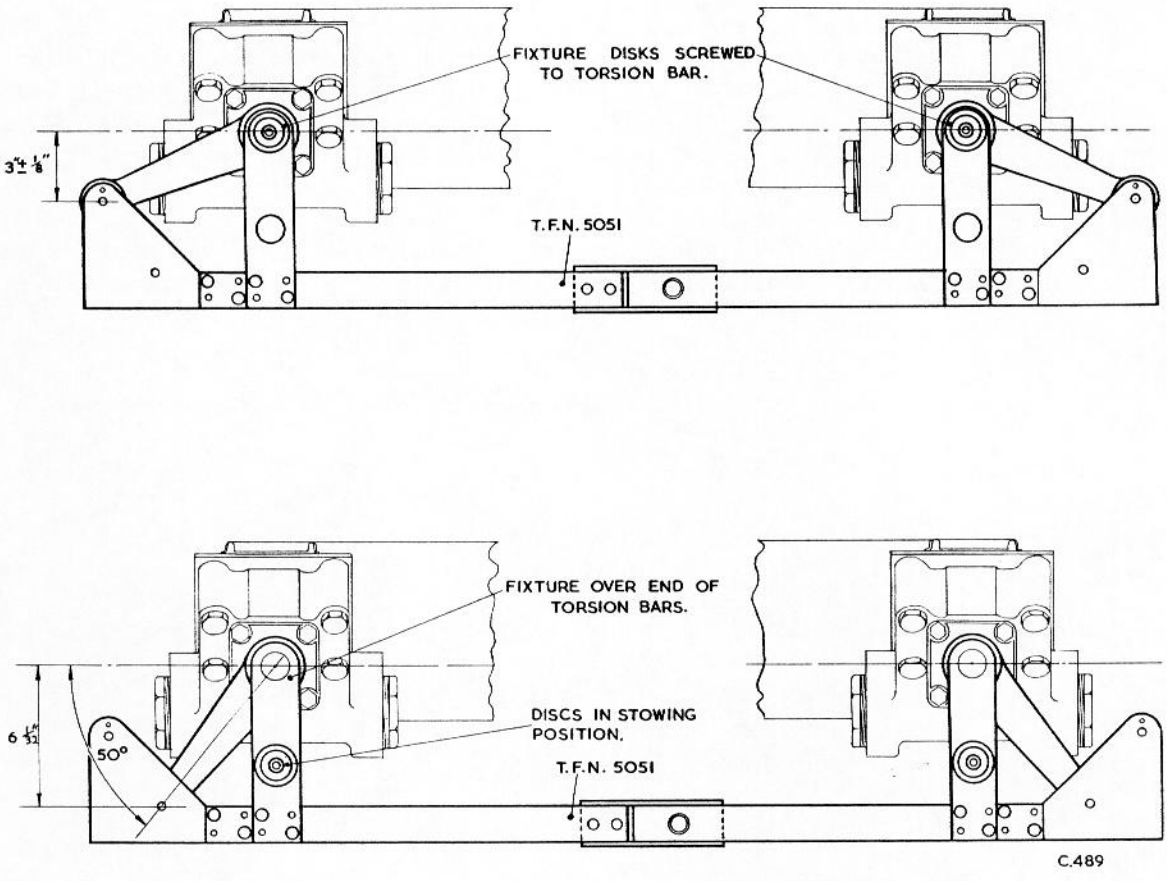


Fig. 27 Setting torsion bars.

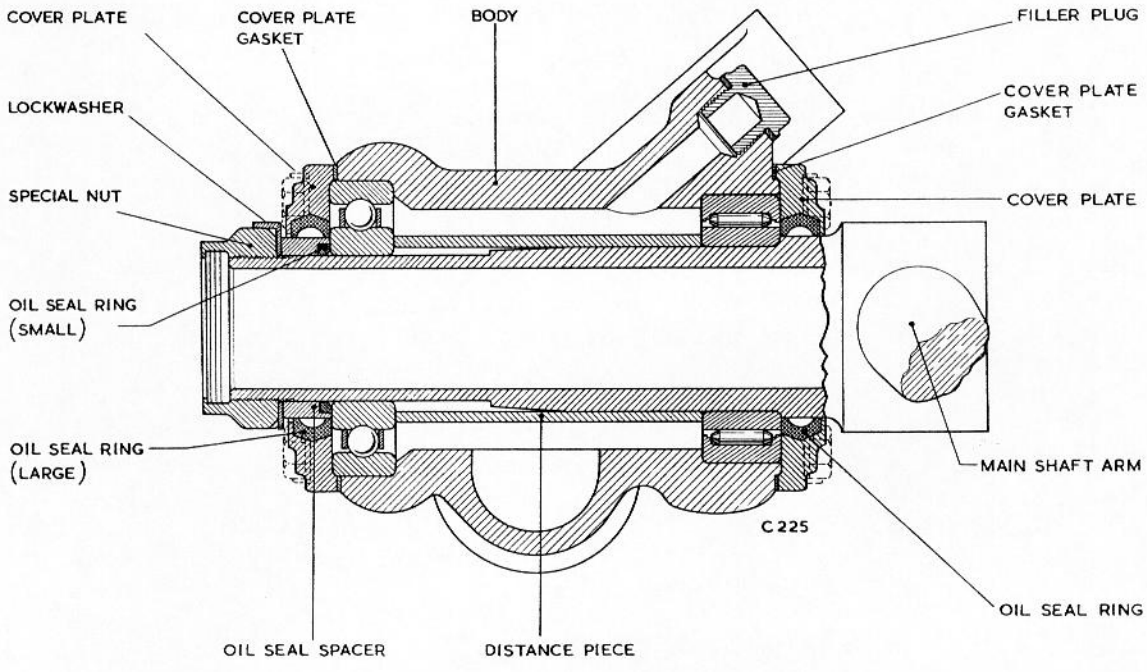


Fig. 28 Suspension unit.

4. Insert the bolt into the suspension arm, fit the nut and shake-proof washer and tighten to retain the torsion bar. Lower the car on its wheels and again using the setting fixture with its discs, check the top setting at 3 in. $\pm\frac{1}{8}$ in. (7·62 c.m. $\pm$ 3·18 m.m.). If the setting has been made correctly, this dimension should also be correct.

5. If the check is satisfactory, reconnect the snubber straps, telescopic shock absorbers and the propeller shaft rear coupling.

SUSPENSION UNITS

Removing

To remove the suspension units, adopt the following procedure :-

1. Raise the car on a lift, or use other suitable means to facilitate working on the underside; the weight of the car must be on the road wheels at this stage.

2. Remove the rearmost fixtures of the snubber straps.

3. Jack up the car, place chassis stands well towards the rear wheels, ensuring that no damage is sustained by the brake fluid or fuel pipes, then lower the car on to the chassis stands.

4. Jack up the axle until the torsion bars are relieved of all strain.

5. Unlock the tabwasher and remove the nut from the suspension arm shaft then, using extractor TFN.8039, break the taper joint.

6. Roll back the relevant side of the axle until the mainshaft arm is clear of the suspension arm shaft. Remove the oil retainer cover.

   Note :- Do not disturb the setting of the suspension arm shaft.

7. Remove the nut, followed by the shake-proof washer, then withdraw the bolt from the mainshaft arm of the suspension unit.

8. Using extractor TFN.5026 (see Fig. 26) withdraw the torsion bar from the serrations in the suspension unit. Withdraw the torsion bar from under the axle.

9. Unlock the tabwashers and remove the nuts securing the suspension unit to the chassis bracket; remove the suspension unit.

10. Repeat the foregoing procedure on the other side of the car if necessary.

Refitting

To refit the suspension arm unit proceed as follows :-

1. Offer up the suspension unit to its chassis bracket then secure it with nuts and tabwashers.

2. Pass the small end of the torsion bar through the suspension unit from the underside of the axle and enter the front end of the bar just into the anchor bracket on No.2 chassis cross member.

3. Fit the oil retainer to the suspension arm shaft.

4. Manoeuvre the axle until the suspension arm shaft will enter the tapered hole of the mainshaft arm, then fit the tabwasher and nut. Do not lock the nut with the tabwasher at this stage, as final adjustment may be necessary.

   Note :- Do not disturb the setting of the suspension arm shaft.

5. Set the torsion bar as described on page 46, then remove the chassis stands and refit the snubber straps. Check the axle alignment as described on page 32.

Dismantling and re-assembling

Remove the filler plug and drain the oil from the casing. Loosen the set-screws holding the applicable side plate of the carrier TFN.5069, then mount the unit in the carrier as shown in Fig.29 then tighten the set-screws and proceed as follows :-

1. Release the lockwasher then unscrew and remove the special nut and lockwasher from the forward end of the mainshaft.

2. Release the tabwashers and remove the nuts securing the cover plates.

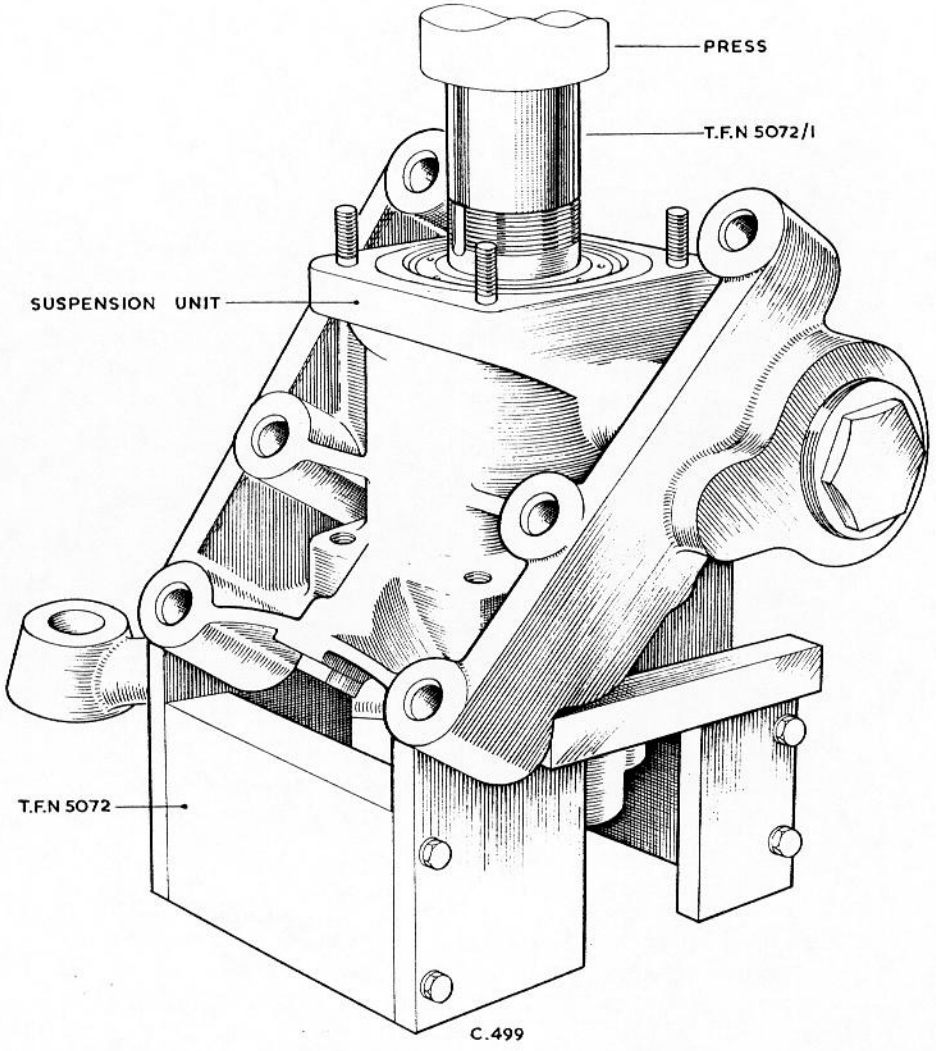


Fig.29 Removing mainshaft and arm complete.

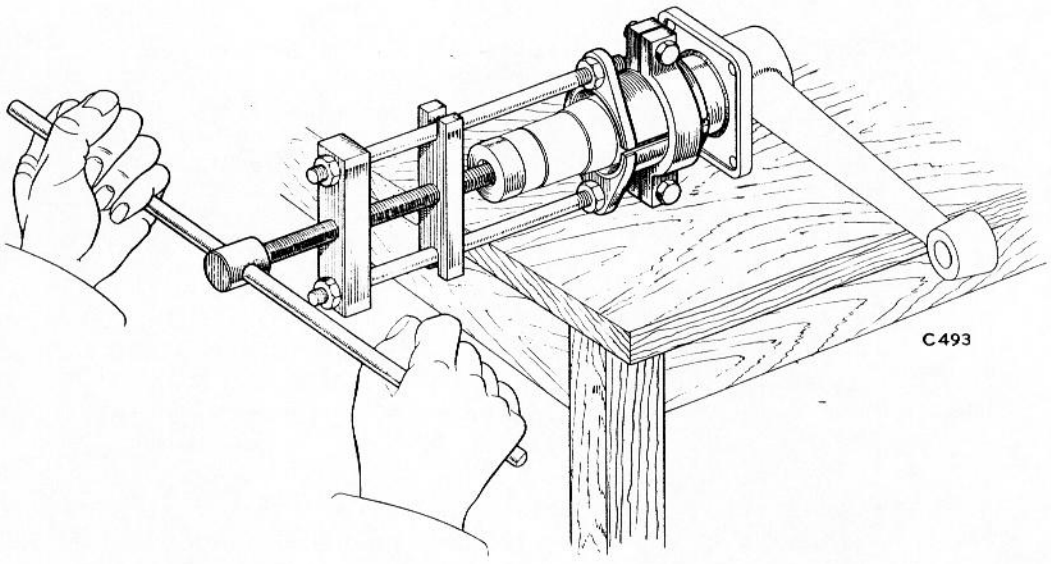


Fig. 30 Rear needle roller inner race extractor.

3. Referring to Fig. 29, position the pilot end of the ejector tool TFN.5069/1 in the bore of the mainshaft and carefully press the shaft clear of the ball bearing in the forward end of the casing, at the same time easing the rear cover plate from the casing. This will displace the oil seal spacer with the small oil seal ring, and the mainshaft, distance piece, inner race of the needle roller bearing and rear cover plate assembly and gasket.

4. Carefully ease the front cover plate, complete with gasket and oil seal, from the casing.

To re-assemble the unit reverse the above procedure.

Replacing oil seal (rear)

Dismantle the suspension unit then proceed as follows.

1. Using the extractor TFN.5070 as shown in Fig. 30, remove the inner race of the needle roller bearing from the mainshaft.

2. Remove the cover plate and gasket from the mainshaft, then push out and discard the oil seal.

3. Fit a replacement seal, refit the cover plate and gasket to the mainshaft (nut bosses to the mainshaft arm) then, using a suitable tube, press on the inner race of the needle roller bearing until it abuts the shoulder at the end of the shaft.

4. Re-assemble the suspension unit as described previously.

Replacing rear needle roller bearing

Dismantle the suspension unit as described previously. Where facilities are available, heat the casing to approximately 200°F. and remove the bearing. Where such facilities are not available, drive the bearing from the casing, using a suitable drift. Remove the inner race from the mainshaft as described above. Press the new outer needle roller race into the casing and re-assemble the suspension unit as described above, fitting the new inner race to the mainshaft.

Replacing front ball bearing

Dismantle the suspension unit as described on page 49, then, using the technique applied to the rear needle roller bearing, described on page 52, remove and discard the race; press in a replacement race and re-assemble the unit.

TORSION BAR ADJUSTERS

The Arnolt-Bristol car is fitted with fixed sockets for the front ends of the torsion bars. Consequently, any necessary adjustment can only be effected by withdrawing the torsion bars from their respective serrations and then re-setting.

Torsion bar adjustors as illustrated in Fig.31 are available; these easily replace the fixed sockets and enable any adjustment to be made without difficulty. When the adjustors are fitted, it is advisable to have the initial torsion bar setting made with the setting fixture TFN.5050 (see Fig. 27) with the setting screw on the adjustor in its lowest position. This will permit the full adjustment to be used when it is required.

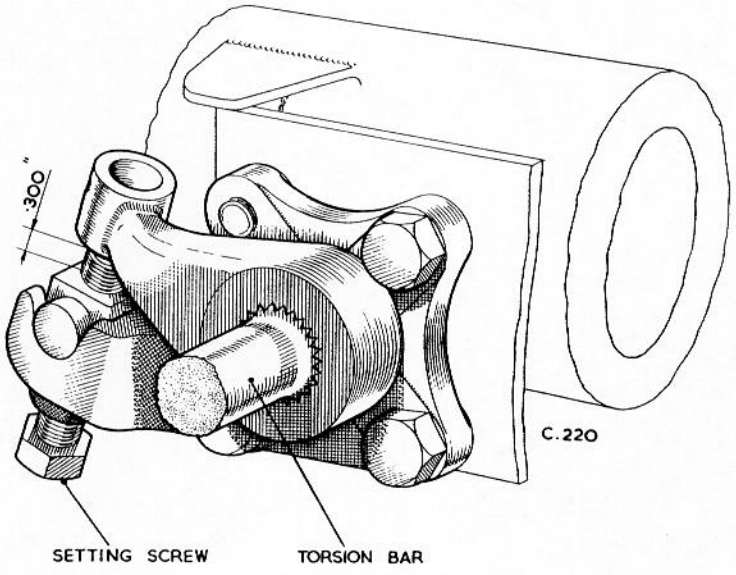
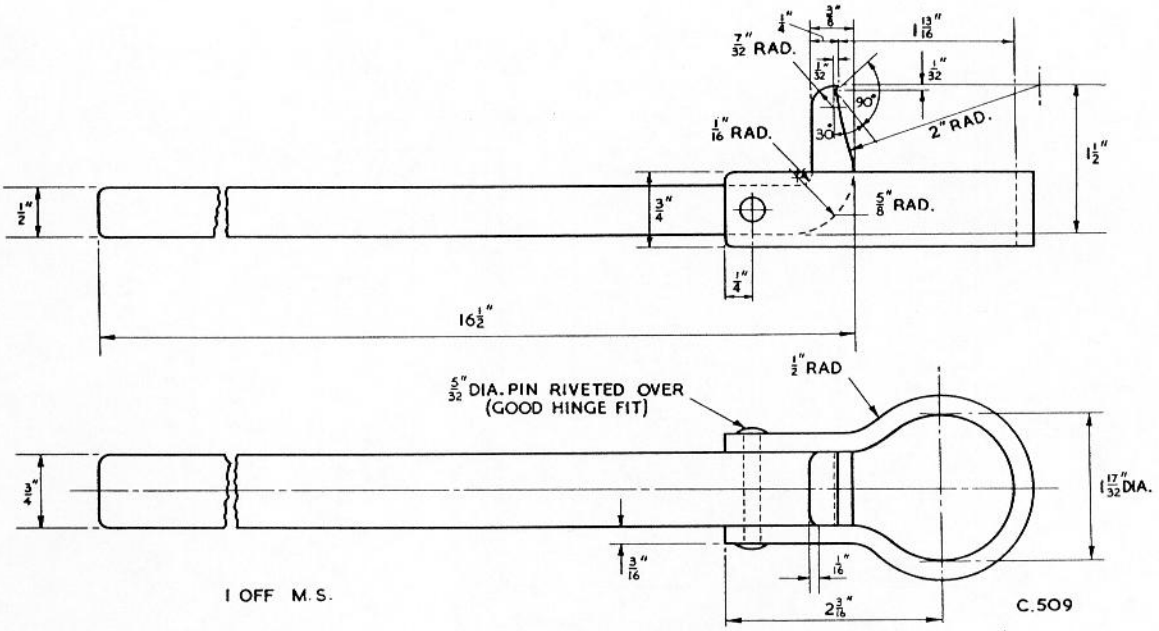
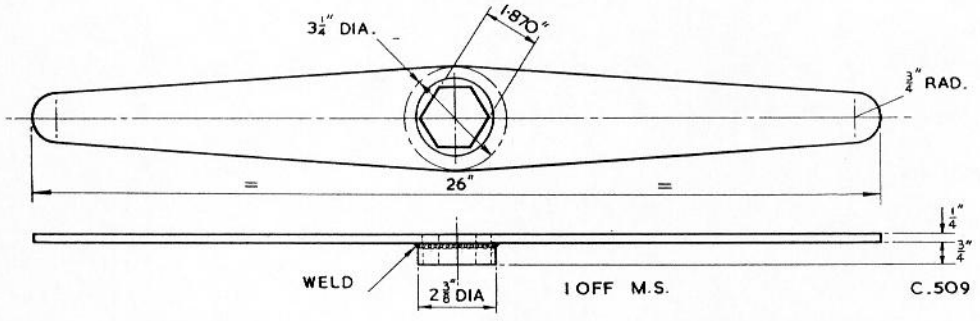


Fig. 31 Torsion bar adjustor.

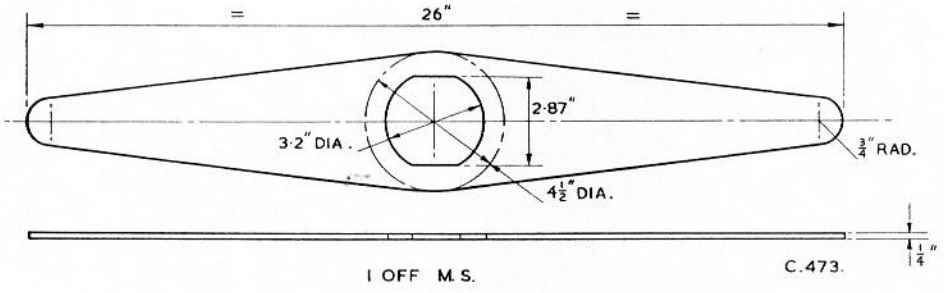
SPECIAL TOOLS



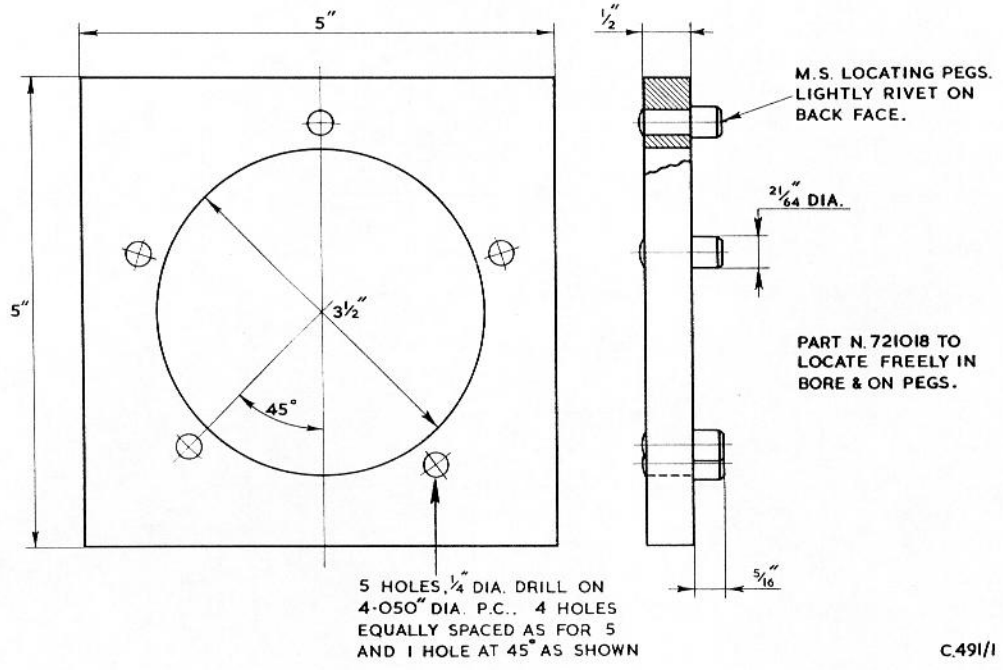
TURN UP TOOL FOR TABWASHERS T.F.N. 5024.



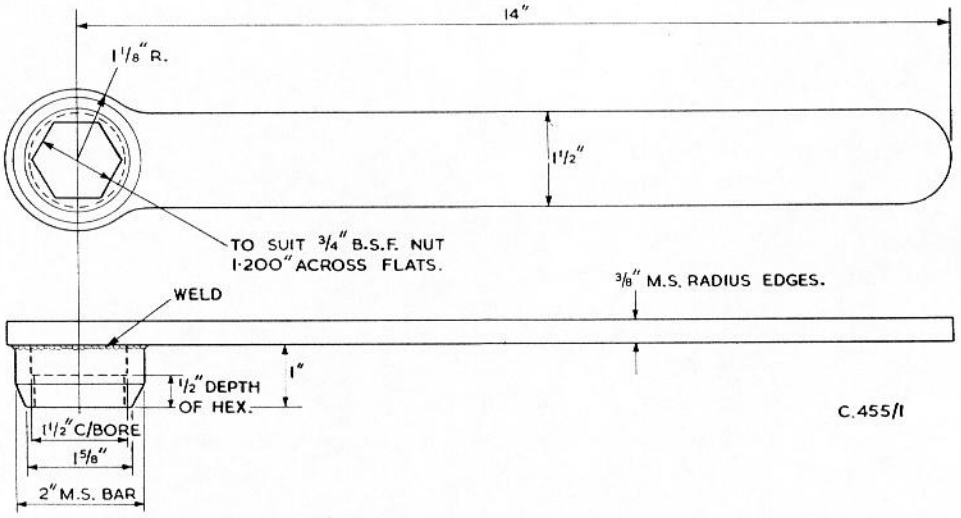
SPANNER FOR RETAINING RINGS T.F.N. 5022.



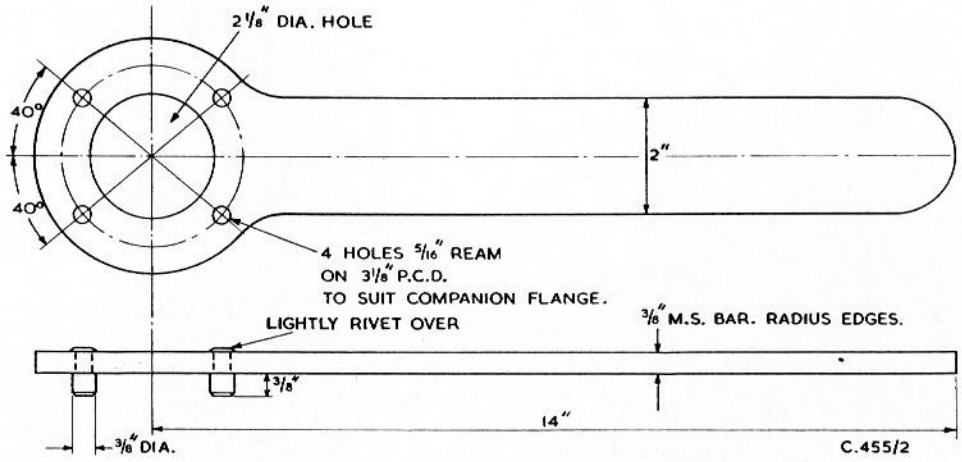
SPANNER FOR RETAINING NUTS T.F.N. 5023.
(REAR HUBS)



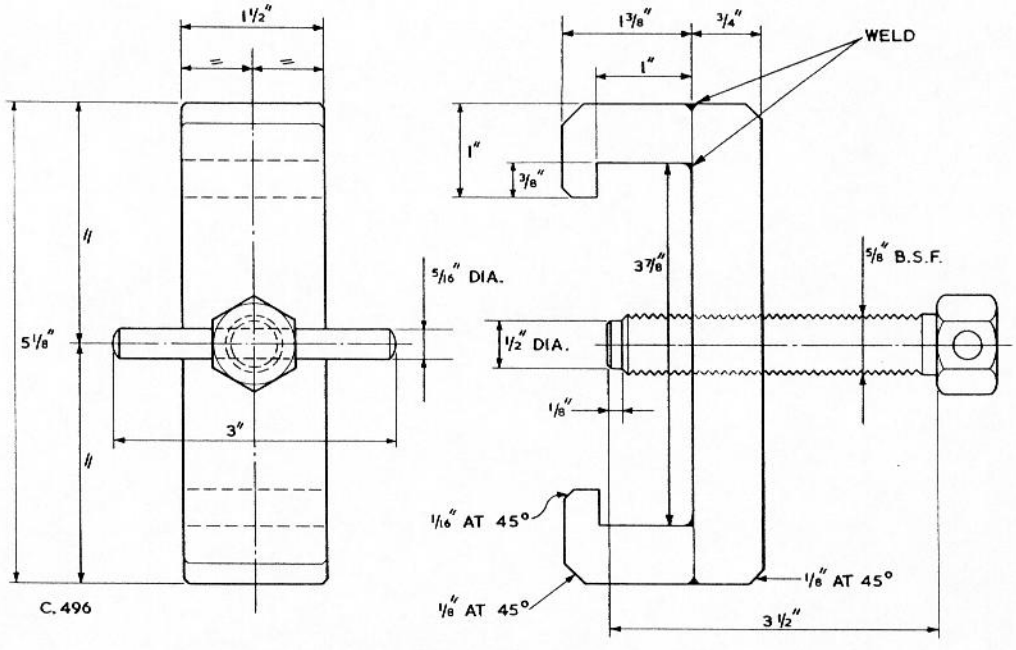
VICE PLATE FOR BEARING HOUSING. TFN. 5052



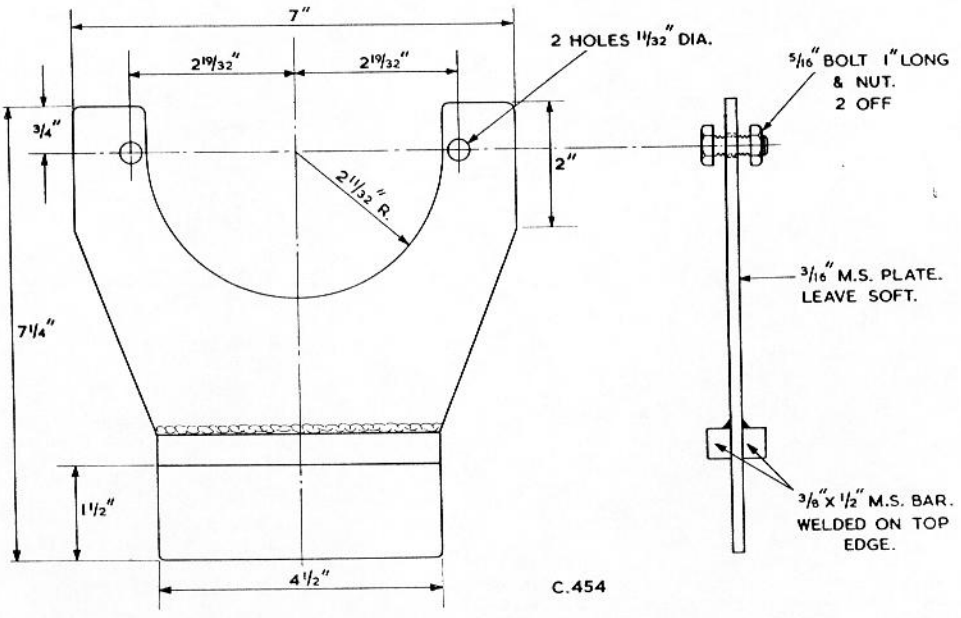
SPANNER FOR NUT ON DRIVING PINION. TFN. 5054.



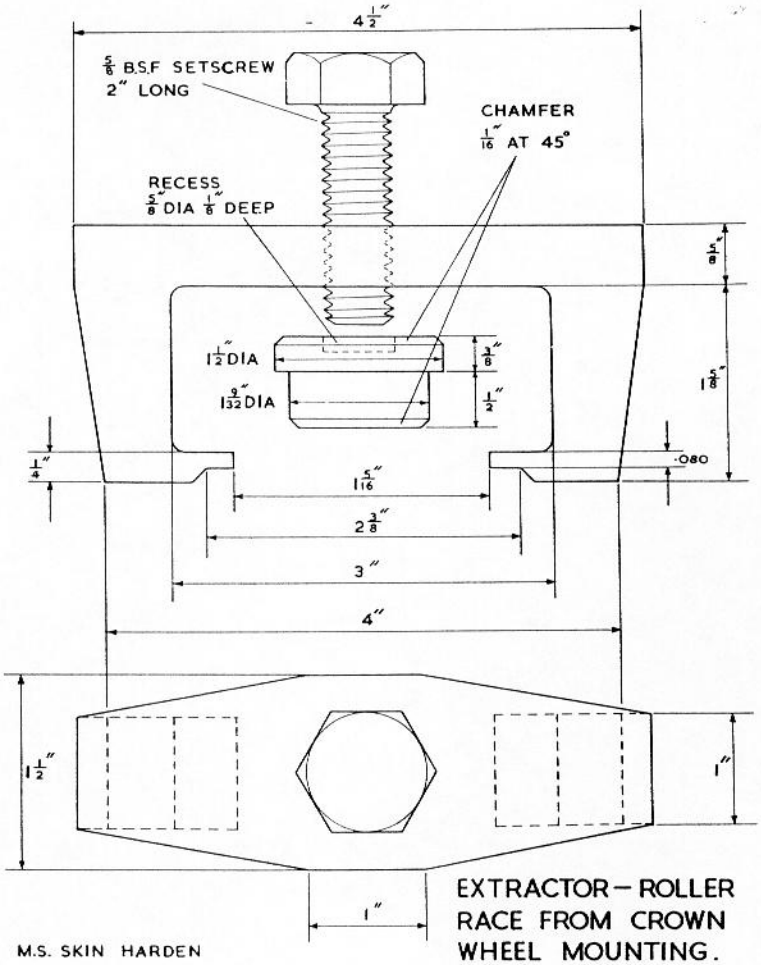
SPANNER FOR COMPANION FLANGE. TFN. 5055



COMPANION FLANGE EXTRACTOR. TFN. 8450



VICE FIXTURE FOR CROWN WHEEL MOUNTING. TFN. 5056.



EXTRACTOR – ROLLER RACE FROM CROWN WHEEL MOUNTING. TFN. 5057. C.502

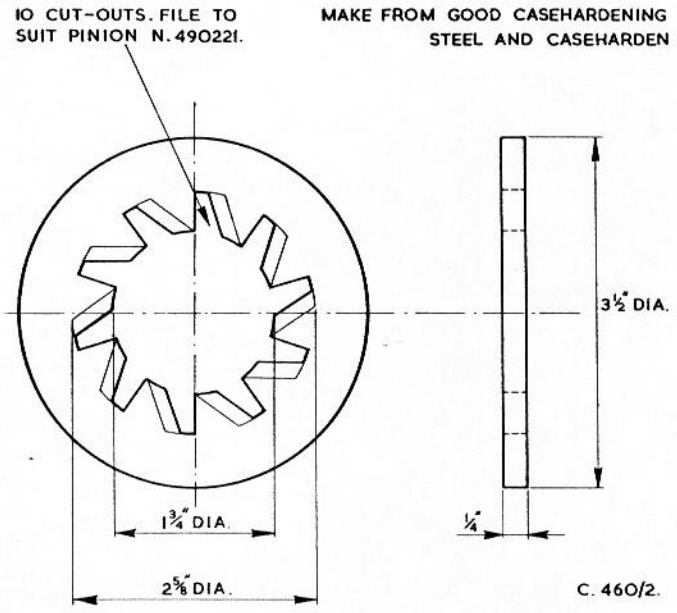
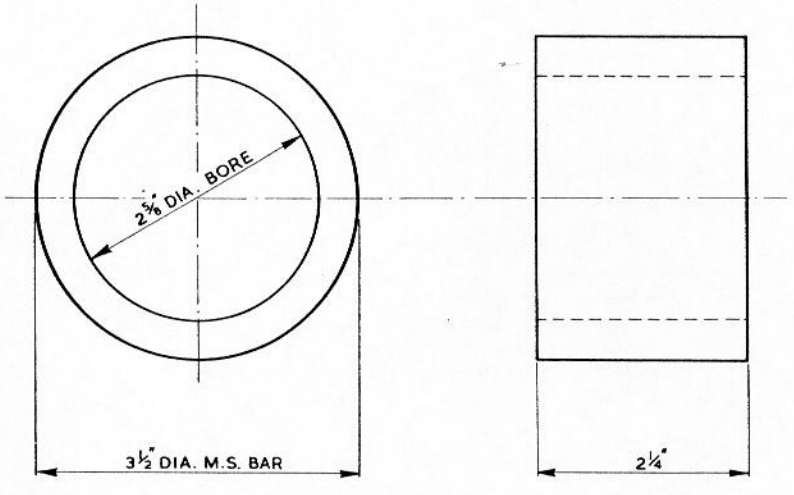
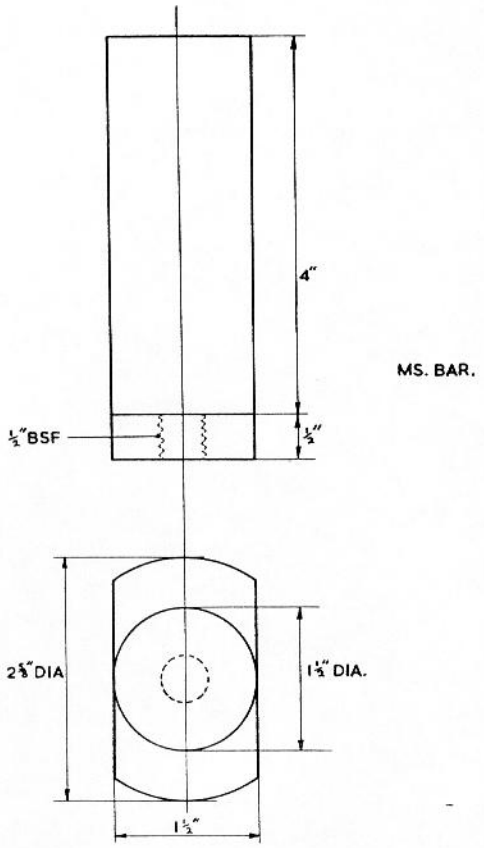


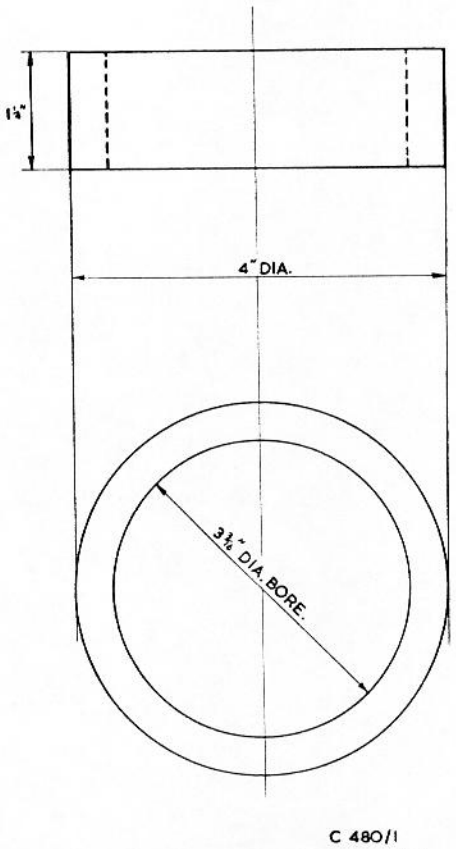
PLATE FOR REMOVING ROLLER RACE FROM DRIVING PINION. TFN. 5058.



SUPPORT RING FOR PRESSING THE ROLLER RACE FROM THE PINION. TFN. 5059.

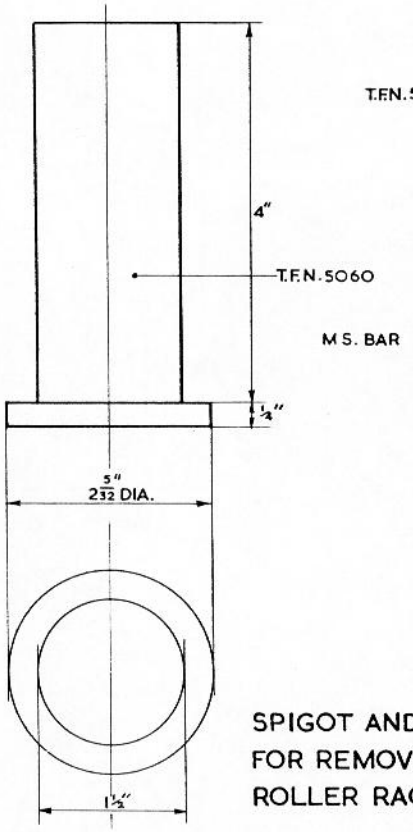


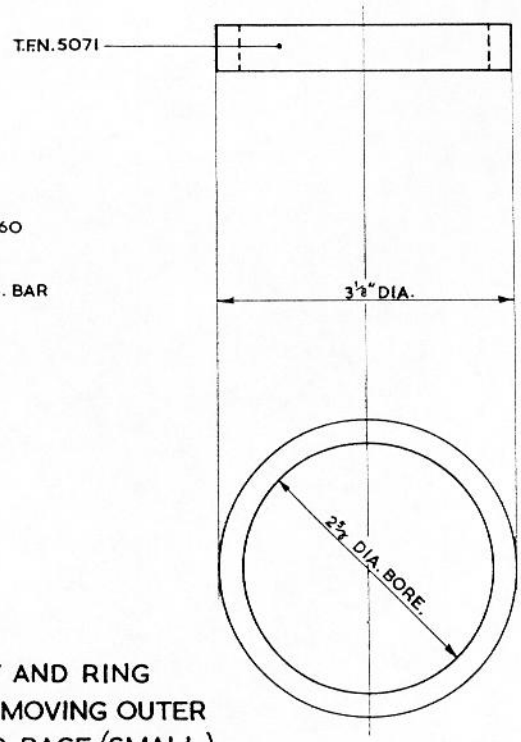
SPIGOT FOR REMOVING OUTER ROLLER RACE.(LARGE) T.F.N.5061.



C 480/1

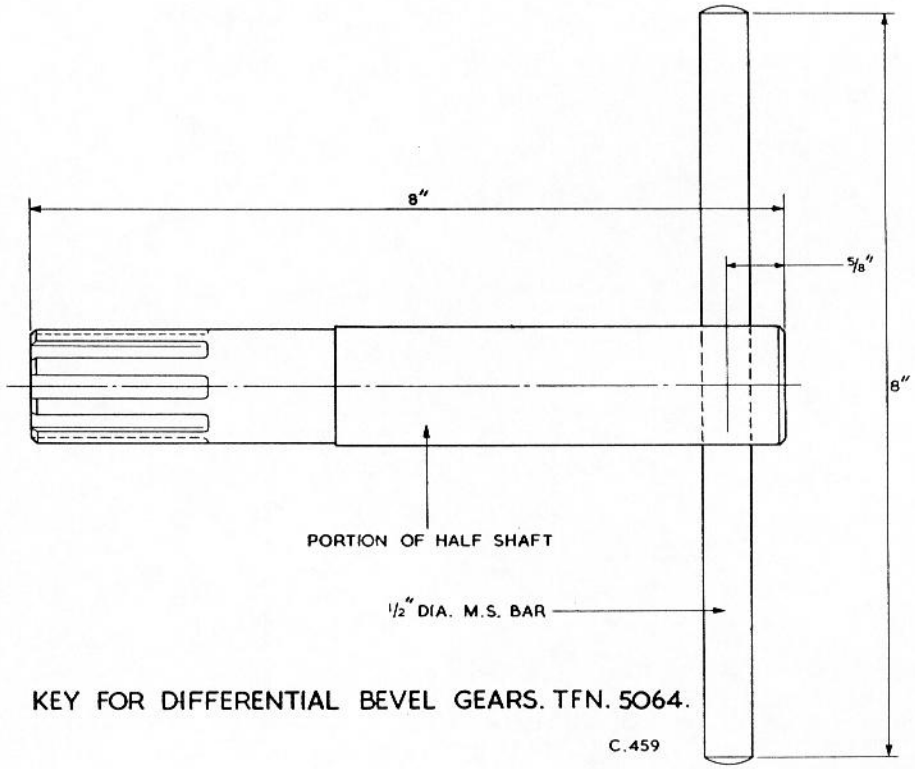
RING FOR PRESSING OUT ROLLER BEARING. T.F.N.5062.





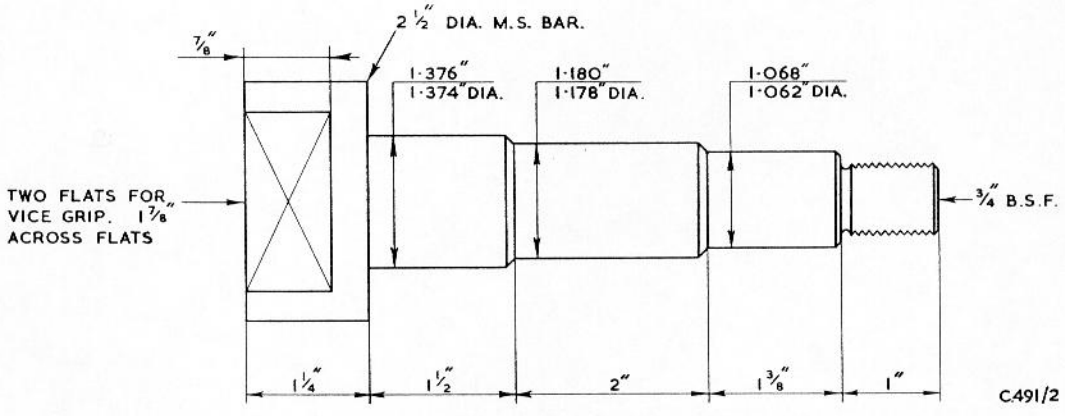
SPIGOT AND RING FOR REMOVING OUTER ROLLER RACE.(SMALL.)

C 480/2



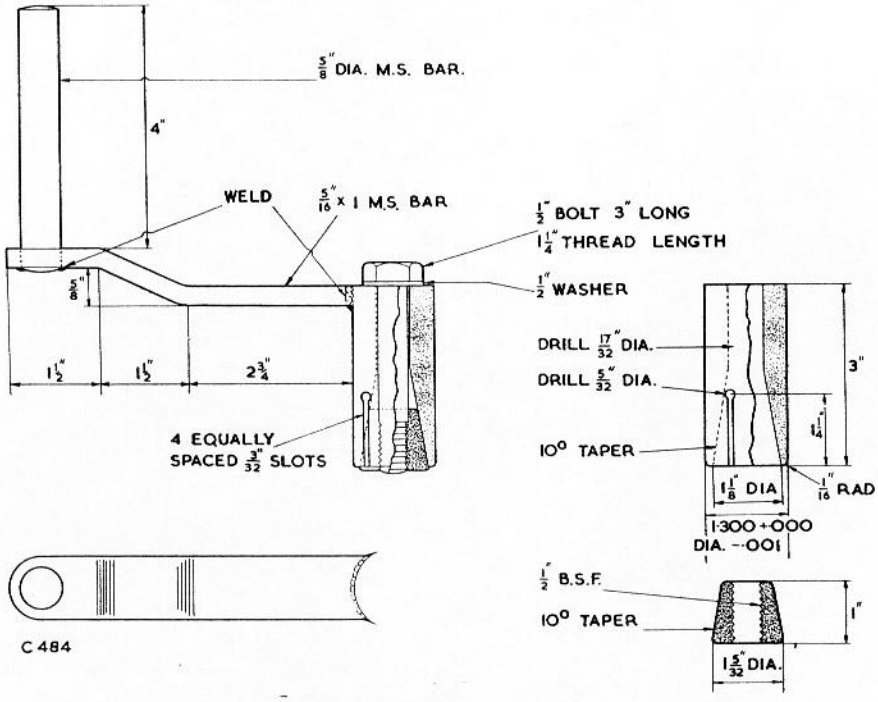
KEY FOR DIFFERENTIAL BEVEL GEARS. TFN. 5064.

C.459

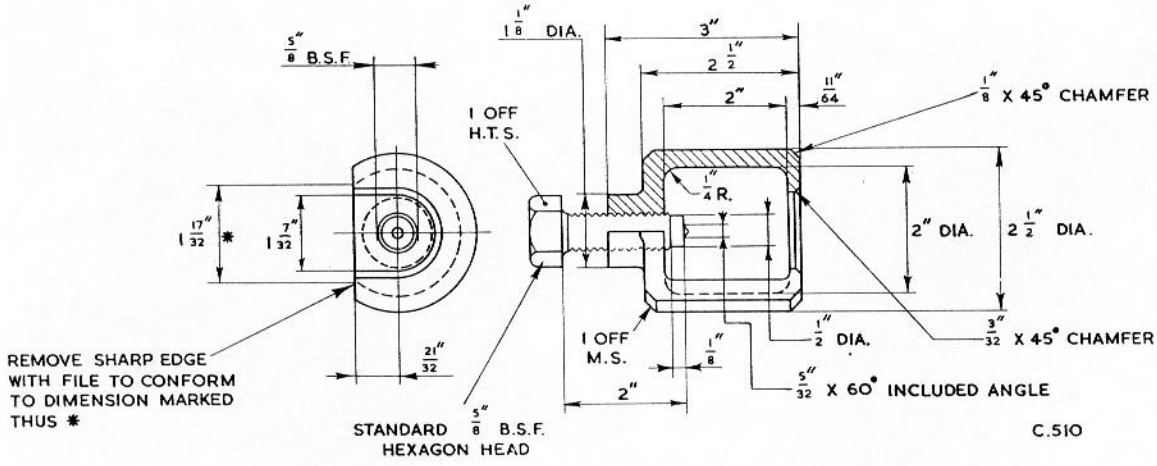


C.491/2

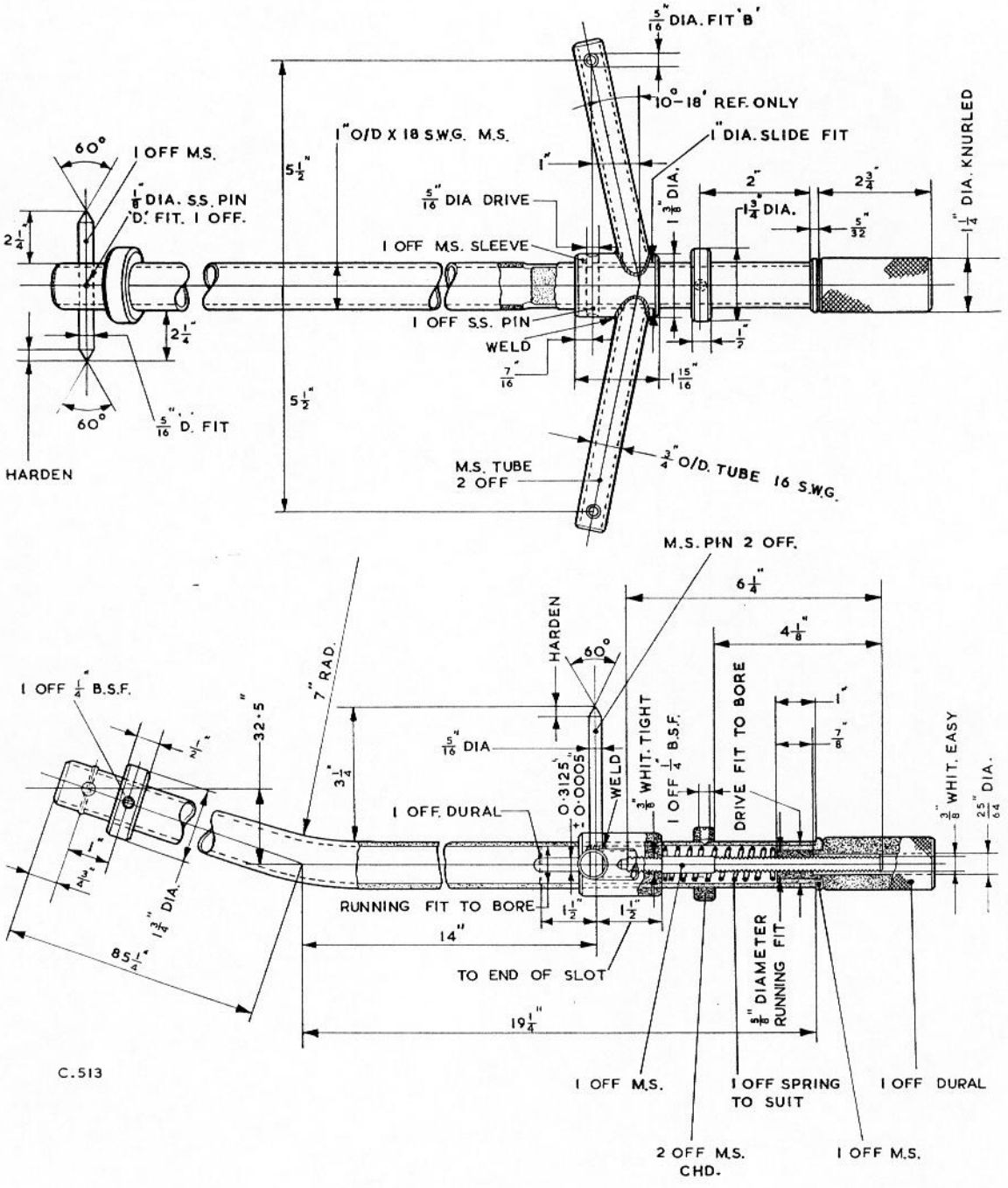
DUMMY DRIVING PINION. TFN. 5063



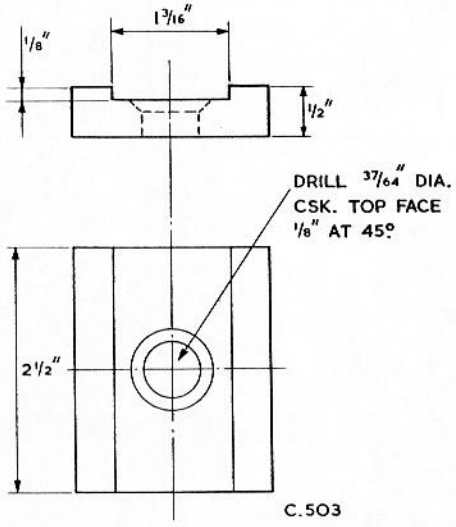
HANDLE FOR CROWN WHEEL MOUNTING. TFN. 5066.



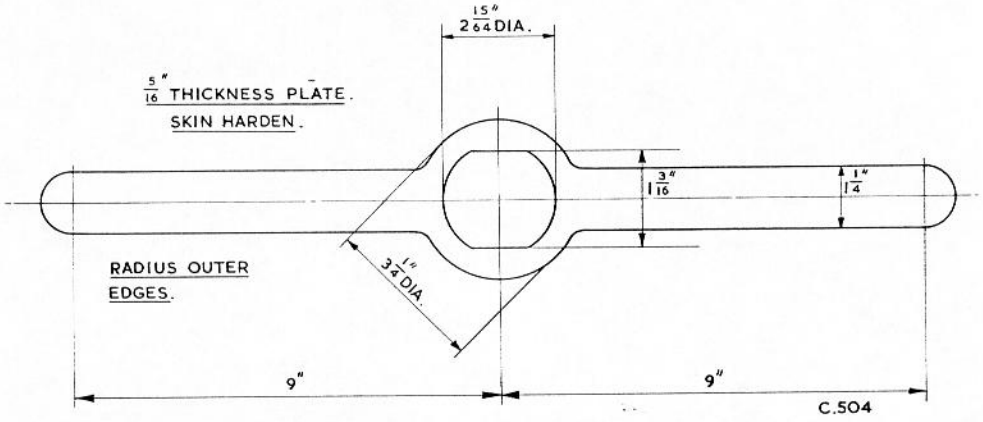
REAR SUSPENSION ARM EXTRACTOR T.F.N. 8039.



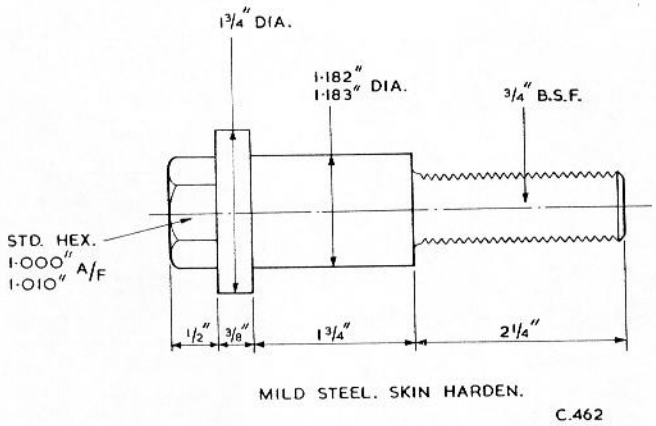
TRAMMELS FOR CHECKING REAR AXLE ALIGNMENT. T.F.N.5069



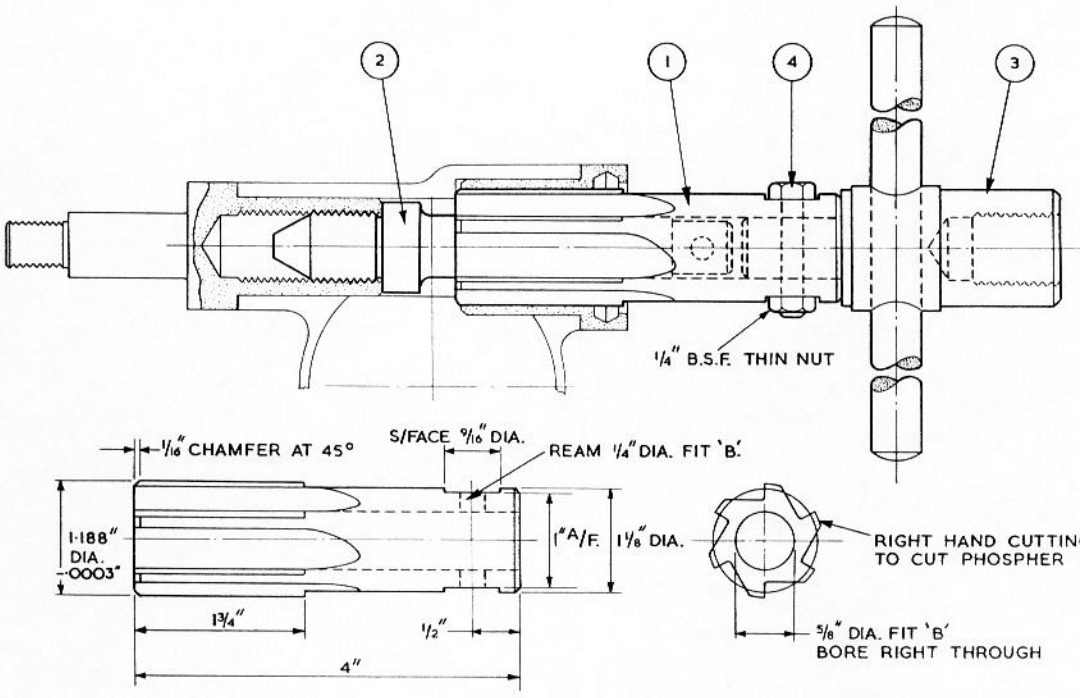
VICE PLATE FOR BALL BOLT ASSEMBLY. TFN.8792.



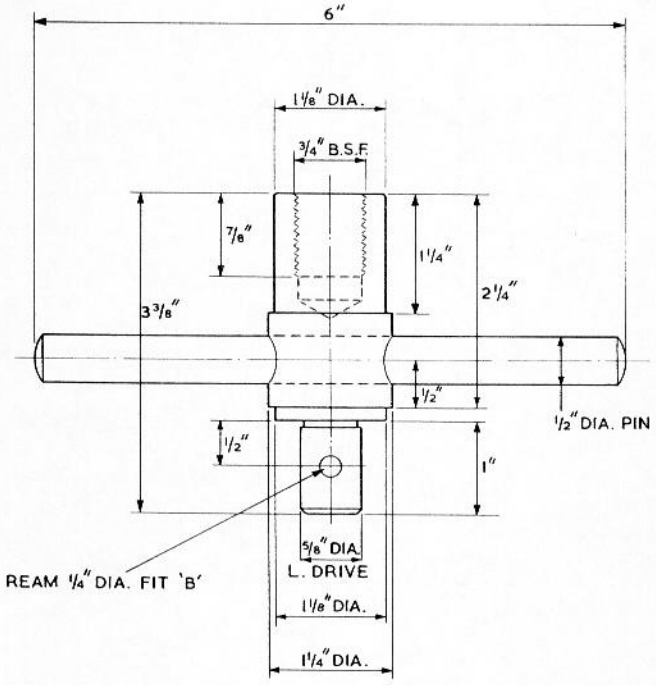
RING SPANNER FOR BALL BOLT ASSEMBLY. TFN.10085.



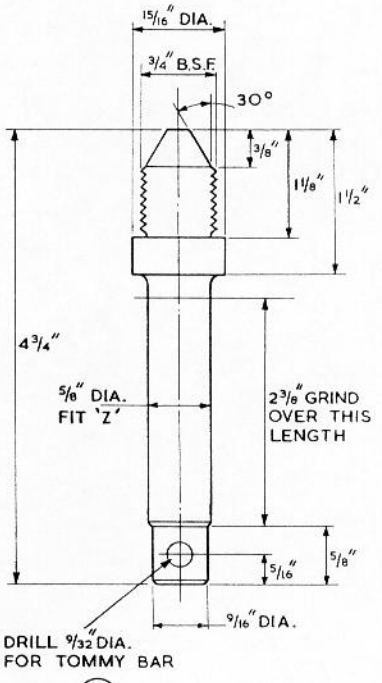
INSERTING TOOL FOR REAR AXLE BUSHES. TFN.5067.



(1) 1 OFF. H.S.S. HARDEN AND GRIND



(3) 1 OFF. M.S.



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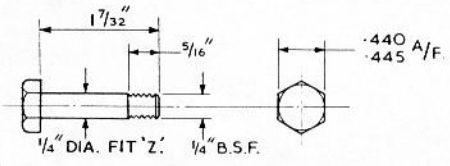
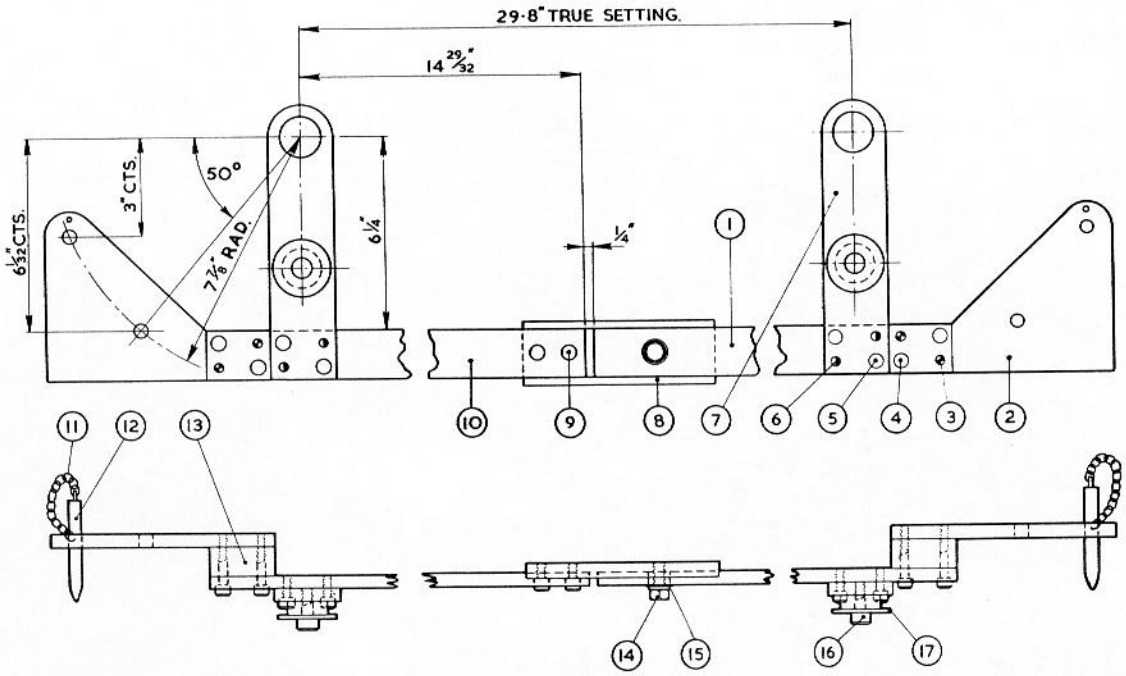


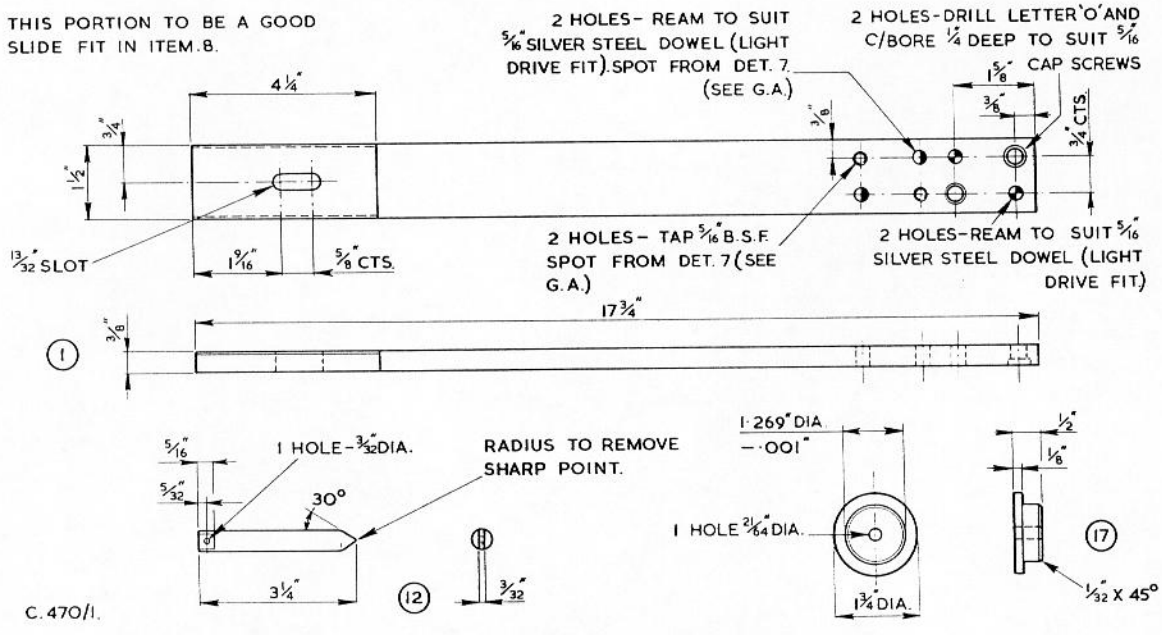
(4) 1 OFF. UBAS. CASE HARDEN AND GRIND. LEAVE THREADS SOFT

C.482.

REAMER FOR REAR AXLE BUSHES. TFN. 4662.

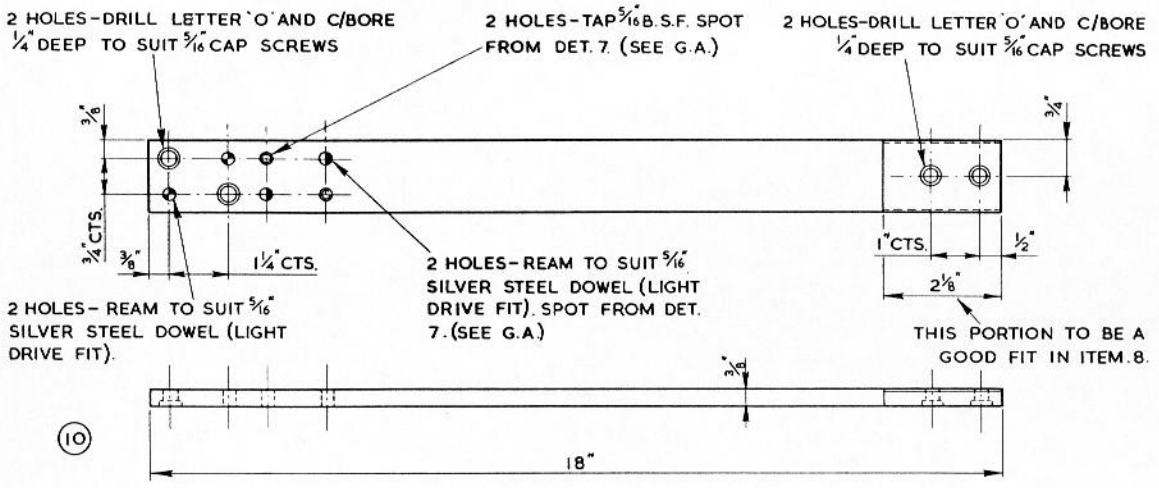


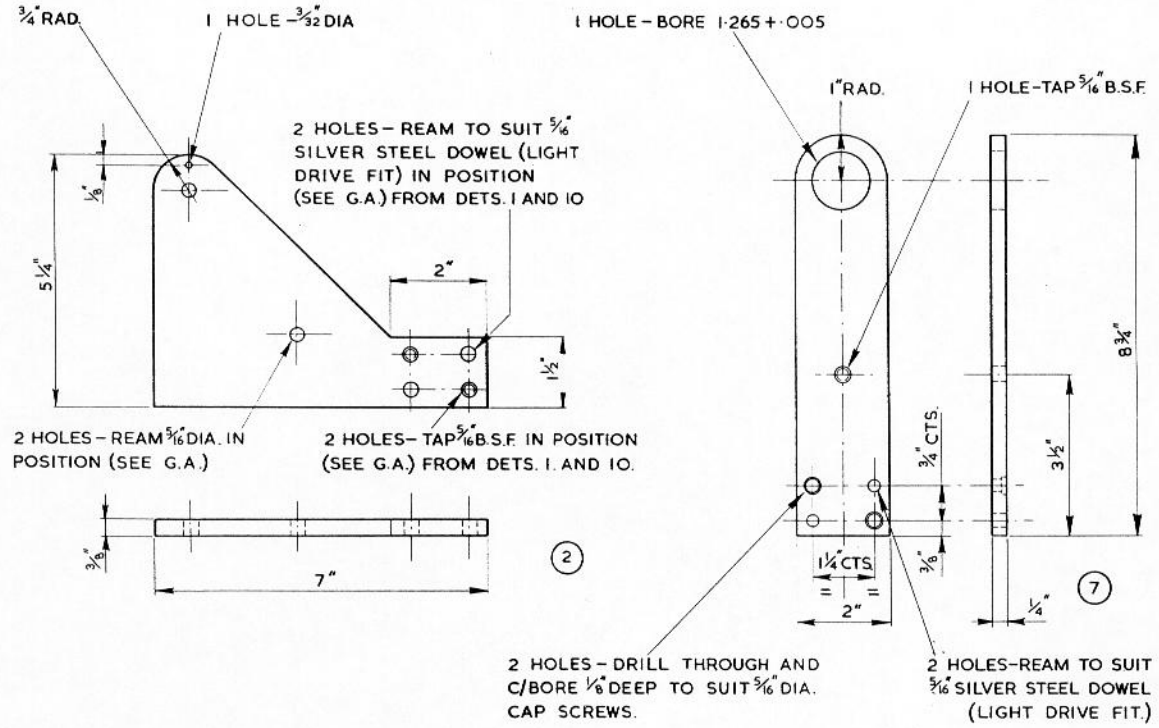
ITEM	DESCRIPTION	NO. OFF	MATERIALS	ITEM	DESCRIPTION	NO. OFF	MATERIALS
1.	PLATE.	1	M.S.	9.	CAP SCREW.	2	STD. UNBRAKO. 5/16" B.S.F. X 1/2" LONG
2.	LOCATION PLATE.	2	M.S.	10.	PLATE.	1	M.S.
3.	DOWEL.	4	SILVER STEEL 5/16" DIA. X 1 3/8" LONG.	11.	CHAIN.	2	BRASS. TO SUIT.
4.	CAP SCREW.	4	STD. UNBRAKO. 5/16" B.S.F. X 1 1/8" LONG.	12.	PIN.	2	SILVER STEEL. DIA.
5	CAP SCREW.	4	STD. UNBRAKO. 5/16" B.S.F. X 1/2" LONG.	13.	DISTANCE PIECE.	2	M.S.
6.	DOWEL.	4	SILVER STEEL. 5/16" DIA. X 5/8" LONG.	14.	SET SCREW.	1	M.S. 3/8" B.S.F. X 5/8" LONG.
7.	SETTING PILLAR.	2	M.S.	15.	WASHER DIA.	1	M.S. STOCK
8	SLIDE.	1	M.S.	16.	CAP SCREW.	2	STD. UNBRAKO. 5/16" B.S.F. X 3/4" LONG.
				17	DISC.	2	M.S.

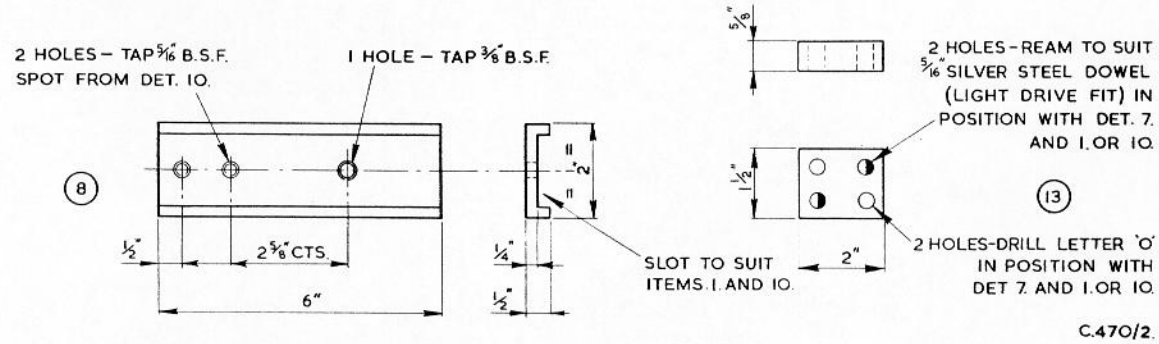


C.470/1.

TORSION BAR SETTING JIG. TFN. 5050.

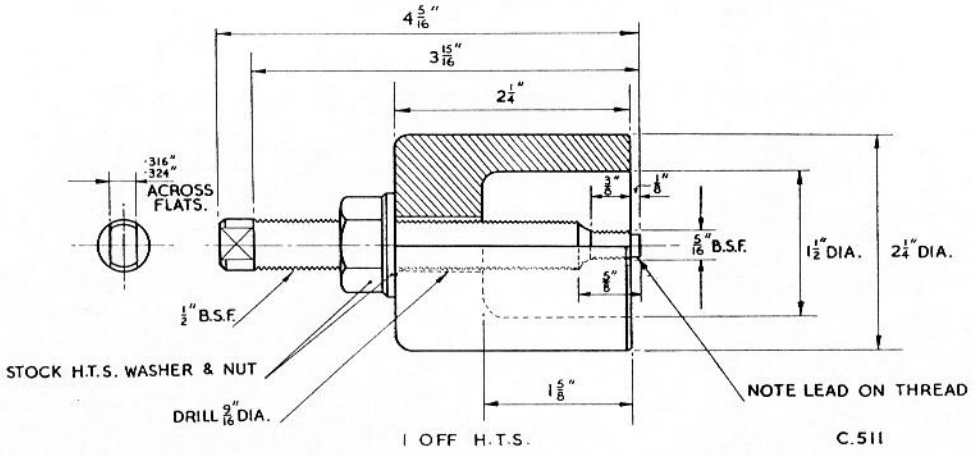




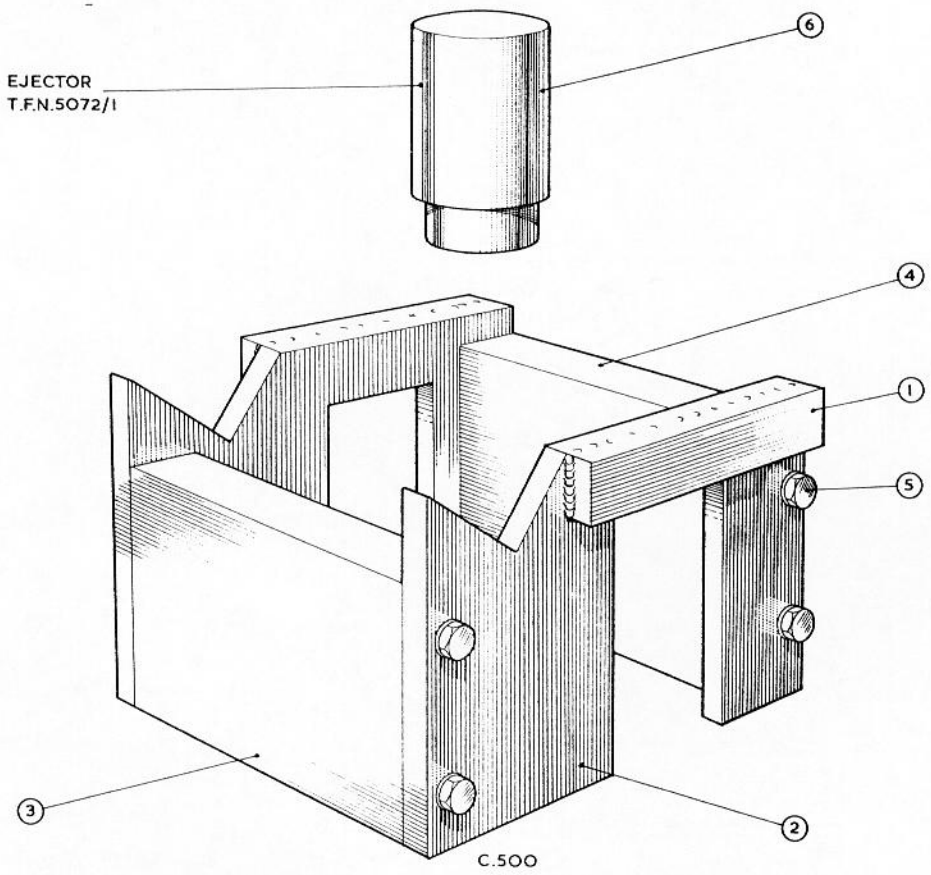


C.470/2.

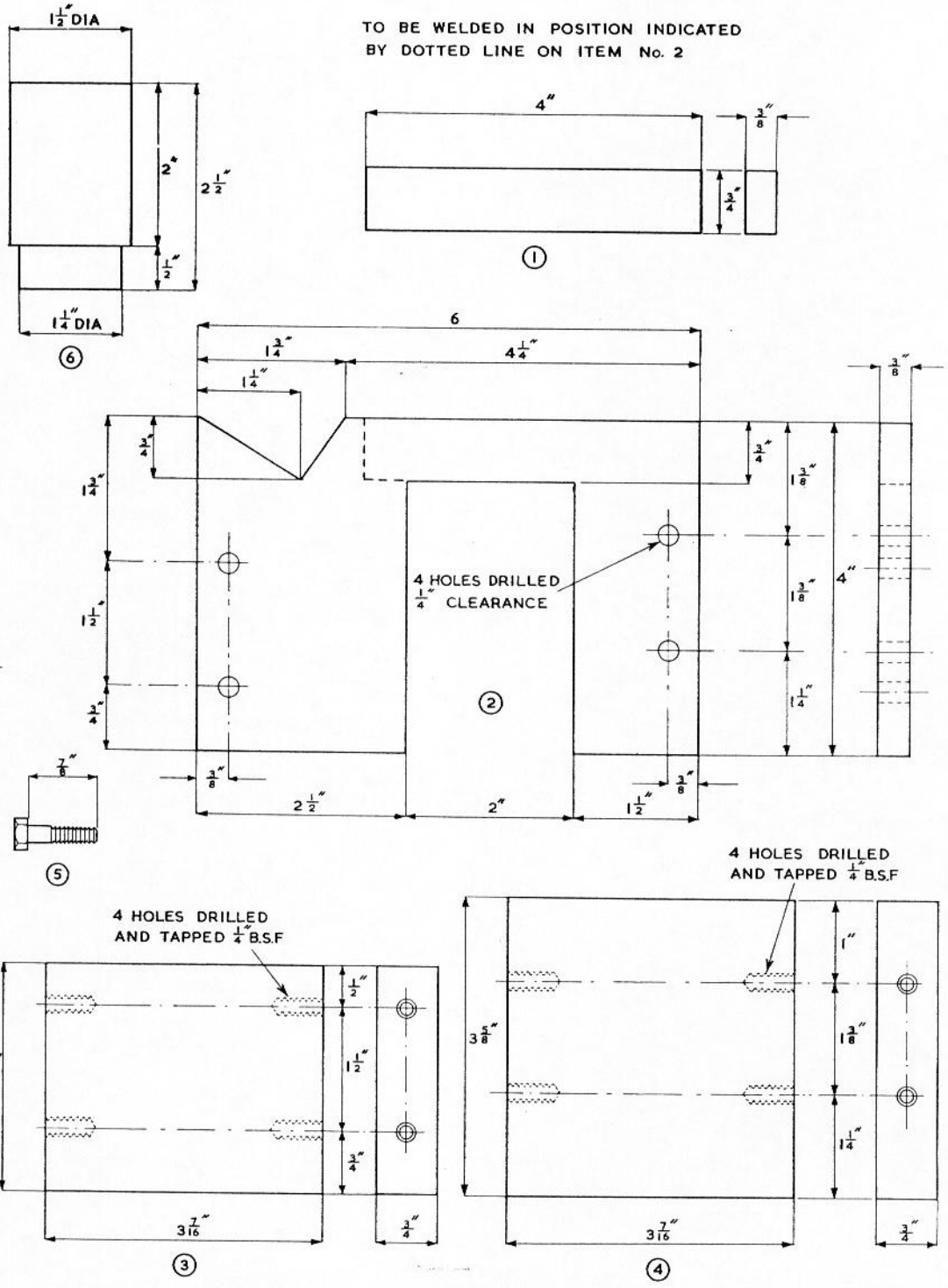
COMPONENTS FOR TORSION BAR SETTING JIG. TFN. 5050.



TORSION BAR EXTRACTOR T.F.N. 5026



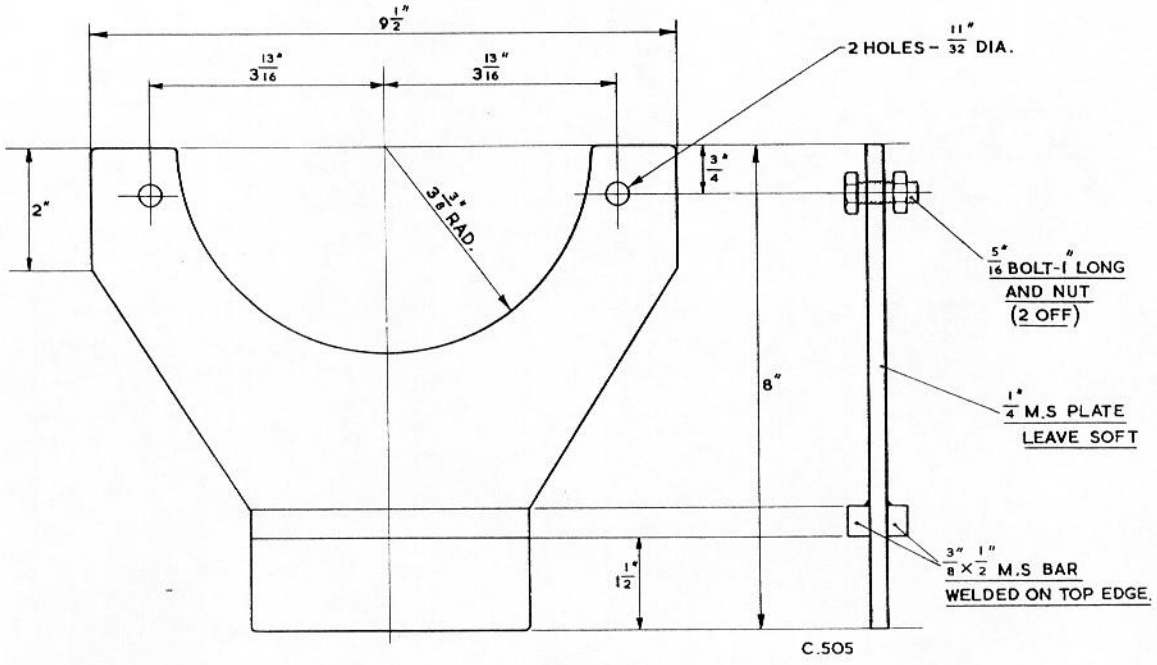
CARRIER FOR REAR SUSPENSION UNIT. T.F.N.5072.



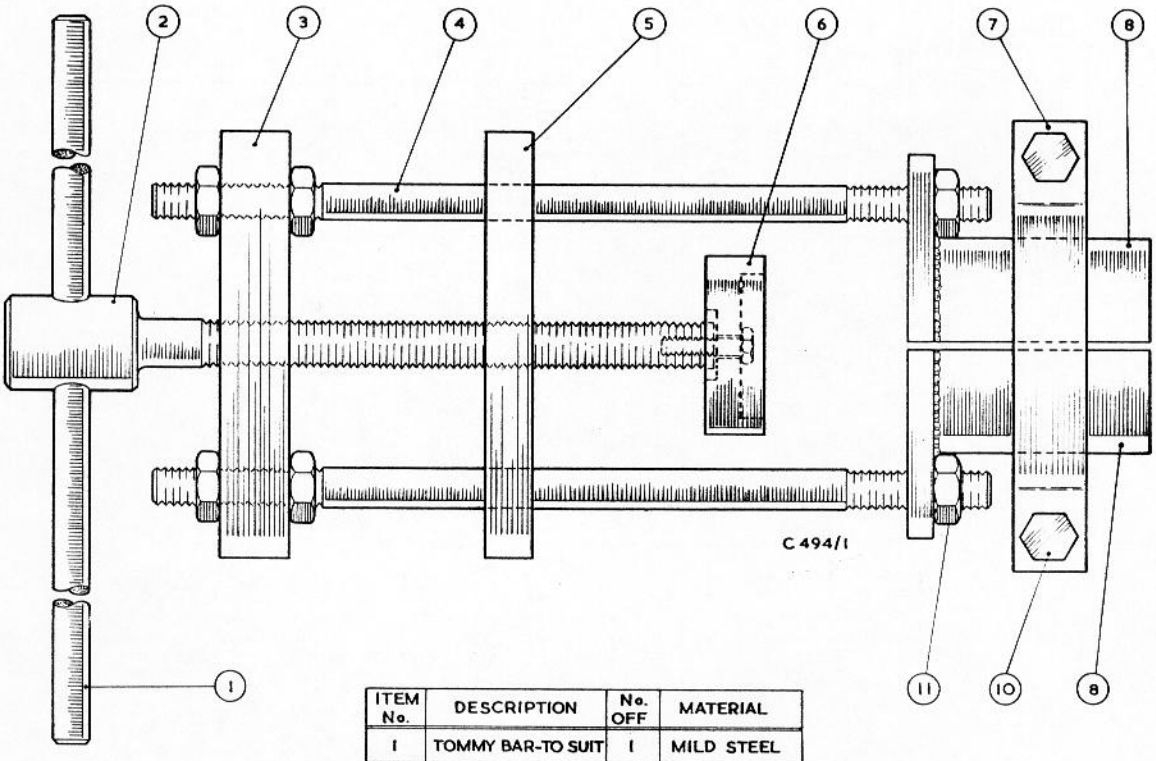
C.501

ITEM No.	DESCRIPTION	No. OFF	MATERIAL
1	STIFFENER	2	M.S.
2	SIDE PLATE	2	M.S.
3	END BLOCK	1	M.S.
4	END BLOCK	1	M.S.
5	¼" B.S.F HEX.HD. BOLT	8	M.S.
6	EJECTOR	1	BRASS

T.F.N.5072.

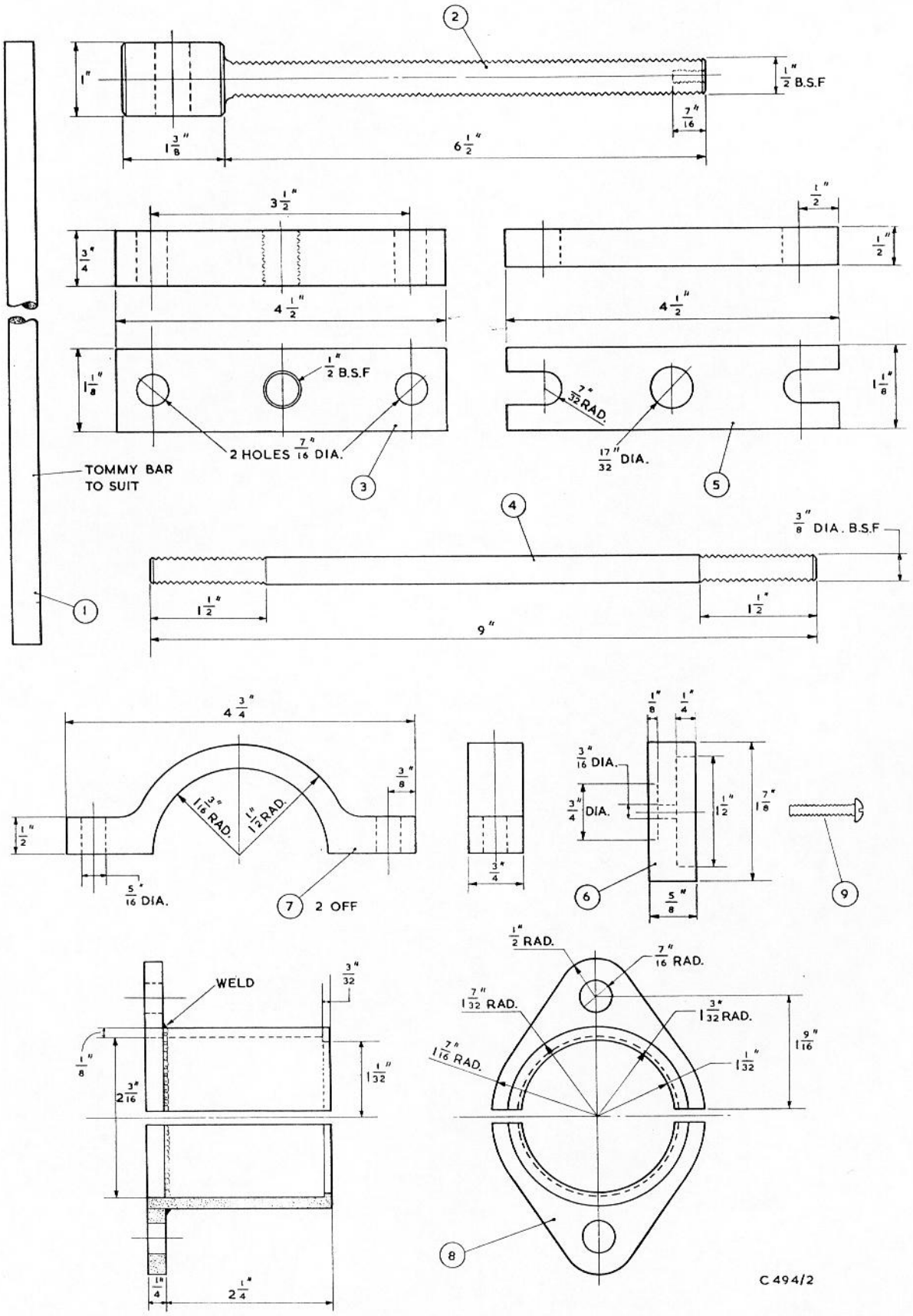


VICE FIXTURE FOR DIFFERENTIAL ASSEMBLY. TFN.5053

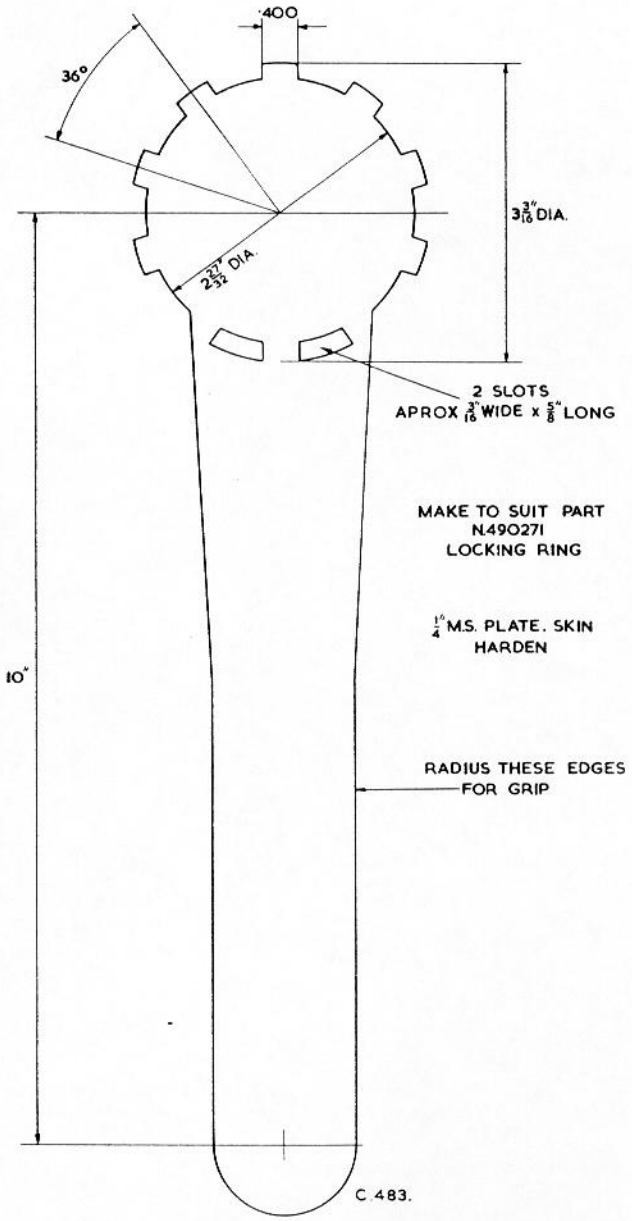


EXTRACTOR FOR MAIN SHAFT ARM. (REAR INNER NEEDLE ROLLER RACE.) T.F.N5070

ITEM No.	DESCRIPTION	No. OFF	MATERIAL
1	TOMMY BAR-TO SUIT	1	MILD STEEL
2	DRAW BOLT	1	MILD STEEL
3	END PLATE	1	MILD STEEL
4	TIE RODS	2	MILD STEEL
5	GUIDE PLATE	1	MILD STEEL
6	PRESS BLOCK	1	MILD STEEL
7	CLAMP	1	MILD STEEL
8	SPLIT SLEEVE	2	MILD STEEL
9	2 B.A SET SCREW TO SUIT	1	TO SUIT
10	$\frac{1}{4}$" B.S.F BOLT	2	TO SUIT
11	$\frac{1}{2}$" B.S.F NUT	6	MILD STEEL



EXTRACTOR FOR MAIN SHAFT ARM. (REAR INNER NEEDLE ROLLER RACE) T.F.N5070



SPANNER FOR LOCKING RING. TFN. 5065.