The Talbot Manual

Technical Resource

Axles

Bill Barrott & Martin Bryant

11 Talbot Axles

AA 9 – NOTES ON FITTING TALBOT KING PINS
(To be read in conjunction with diagram)

These notes cover all Roesch Talbot king pin designs

1. Press out old pins from top to bottom having removed the screwed cap. *NB: If the thrust washers are of the type having an internal key engaging in the spiral groove of the pin, the pins must be pressed out (and the new pins in) from the bottom – see diagram.* There is usually no locking device, the pins being retained by the press fit. The bottom of the stub axle is reasonably square with the axis of the king pin.

2. Clean all parts; the bronze bushes we supply are deliberately made a Loctite fit in the stub axles. Clean and deburr the stub axles. Assemble the bushes dry without Loctite or the top cork washers. Fit the thrust washers and bottom cap etc. and offer the assembly over the axle to make sure that the end thrust will be right when the king pin is fitted. You do not want to have to press the pin in and out too many times! If the end float exceeds .006" - .010", add shim washers to the top to bring this end float within the range .002" - .006". Clean out the recess in the bottom of the stub axle where a core plug is fitted.

3. If you have access to a fair sizes lathe, a better job can be made of sealing the bottom of the king pin if you turn a stub arbor to fit the bush housings in the stub axle. You then have the thing rigidly mounted and can bore the recess for the core plug to approximately double the depth. Have the core plug you are going to use to hand and make sure it is a really snug fit. The plug should then fit as if it were in an engine block without the need for any soldering as was done originally.

4. Do any work you have to do on the back plates. Deburr, free off the adjuster etc.

5. Thoroughly clean the stub axle bores. Make sure you have the right bushes in the right holes and that the oil holes line up. Treat the bushes with Loctite as per the maker's instructions, making sure that no Loctite finds its way into the bore of the bushes. Put the appropriate king pin in whilst the Loctite is setting. Smear the pin with a trace of oil to prevent any surplus Loctite sticking it in. When the bushes are in place, fit up the thrust washer assembly and try the stub plus thrust washers over the axle eye. If more than say .008" end float, add shim washers to correct between top of axle and top bush.

6. **PUT THE CORRECT BACK PLATE ON THE CORRECT END OF THE AXLE BEAM.** Assemble the stub axle with the cork washers in the top bush, any shims necessary, the tin cover and the thrust washer at the bottom. Fit the stub axle over the axle beam, push the least worn of the old king pins up from the bottom and enter it into the axle eye a little way (to avoid damage to the new thrust washers by the descending new pin). Support the stub axle on the press in such a way that the old king pin protruding is free to be pressed down by the new pin. Make sure that the new pin is the right way up i.e. so that the oil groove in the pin registers with the oil hole in the bush. Press the pin home, taking care that it follows the old pin out through the thrust washers. Have a suitable spacer at the top of the pin at the final stages and press it down until there is clearance for the screwed-in top cap. Make sure the assembly is free and repeat the process on the other side. Smear core plugs with the jointing compound and lightly hammer into place, coat top plug threads with compound, screw top plugs home.

7. Fit the brake plates, track rod arms, track rod etc., making sure that the ball joints are in reasonable condition. Check the tracking on the edges of the brake plates at hub height, about 1/8" toe-in is correct on the brake plates at center height. Small adjustments can be made by packing the ball joints. If it is wildly out, suspect a bent steering arm.

8. All of the above pre-supposes the axle is off the car. I do not think it is worth attempting to do it with the axle on the car. You might do it with a hydraulic king pin press. The pins must be pressed and not hammered in. If the pins are loose in the axle eye, the latter should be bored to a convenient oversize and oversize pins obtained. It is of course good practice to check the bare axle beam for alignment before assembly.

9. We now supply the king pins with the diameter at the lower end reduced by the amount of the interference fit. This makes the pins much easier to start in the axle beam, because the lead in portion slides in by hand. The pin should be assembled with the lead in to the bottom caps.

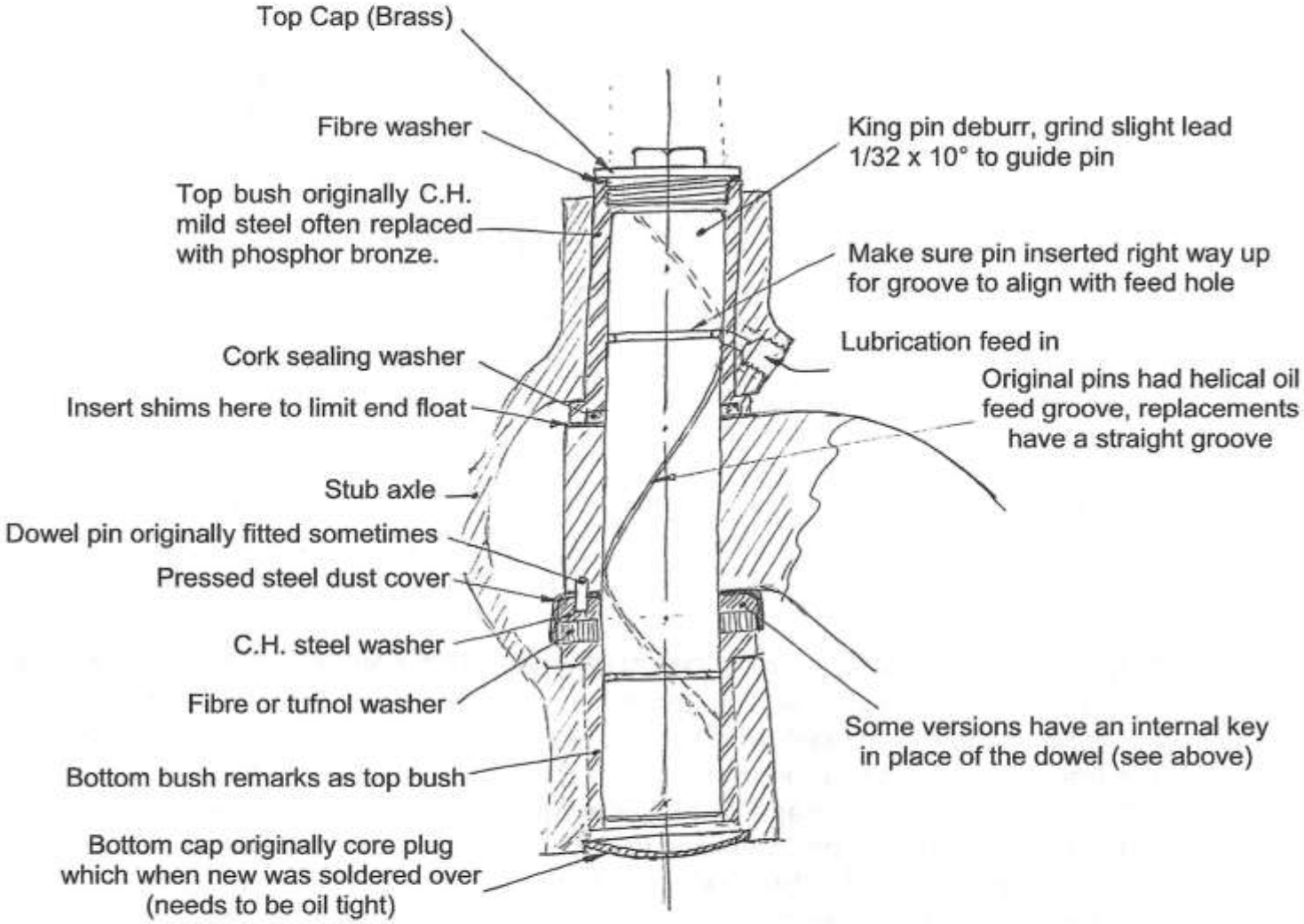

Diagram for Talbot King Pins - 1930/1937 - 14/45,65,75,90,105,110 Models.

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TALBOT
SERVICE BULLETIN

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NO. 6.
HOME & EXPORT.

ALL MODELS.

SUBJECT:- FRONT HUB ROLLER BEARINGS.

Although we have been using Taper Roller Bearings for front hub mountings for many years, different degrees of tightness in adjustment have occurred, and there seems to be doubt concerning the correct method of approach to this subject.

In order that any question of doubt may be finally cleared in regard to the correct adjustment to be applied, we wish it to be understood that the following procedure should be carried out so that satisfactory and consistent results are obtained.

BEARING ADJUSTMENT.

1. The bearings should be adjusted so that a perceptible shake is noticeable after the nut has been finally tightened; an actual measurement of .010" to .020" "end float" is a satisfactory amount.

2. Adjustment of bearings should be carried out before road wheels are fitted as, in our opinion the amount of "shake" present cannot be correctly judged with the wheels mounted.

3. Under no circumstances should attempts be made to cure "steering kick" by re-adjusting stub axle bearings after the original correct setting has once been obtained; any "steering

kick" trouble must be approached from a different angle and any interference with the wheel bearings for the supposed cure of this type of trouble is highly reprehensible and must be discountenanced.

FELT WASHERS.

Felt oil retaining washers (where used) are to be impregnated with oil (Light pressure should be applied to the washers to exude excess oil).

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OVERHAULING A TALBOT FRONT AXLE

The requirements of the MOT tests have in recent years revealed a considerable number of Talbots in need of a front axle overhaul, so much so that I have received more queries on this subject than any other and an article for the Journal is long overdue.

Reference to the accompanying drawing (typical of each model 1927 to 1938) will make the construction clear, the Swivel Pin (2) is a press fit in the axle eye and the Bushes (1 & 5) are a press fit in the stub axle, these bushes were of case hardened steel and so is the swivel pin. It is this combination of hard materials which is the usual cause of failure; any grit accidently introduced into the oil groove "picks up" between the two hard surfaces and quickly destroys them.

In order to overcome the cause of failure my brother and I have incorporated a few modifications on axles which we have overhauled and as these are illustrated a description of the original would perhaps be appropriate. The original swivel pin has an oil groove which is a continuous helix of about 1¼ turns (this design enabled the part to be "centreless" ground in manufacture) and the steel Thrust Pin (6) has a "nib" raised in the bore which engages in the oil groove and is, therefore kept from rotating with the stub axle. This design is really quite awful on two counts:-

1. The "nib" partly (or completely) obstructs the oil groove.

2. As the "nib" was not made helical to match the oil groove the contact between the two is very local, and the unit pressures are high, resulting in chipping the edges of both the oil groove and "nib". In this way the particles are created which will destroy the swivel pin and bushes (it is usual to find that the lower bush is the first to fail). Our modification consists of a dowel (1/8" dia) which is a press fit in a hole in the thrust ring and passes through a hole in the Cover (7) and engages in a slot machined in the lower face of the axle. As an aid to making, our swivel pin has straight grooves in it and our bushes are of phospher bronze, but otherwise the original design is followed. The Oil Seal (3) originally made of cork is directly interchangeable with a modern "O ring" .984 inside dia. 139 section (BS ref. 0519).

The following is a list of work required to strip and restore a typical axle: -

1. Having removed the axle from the car and removed the wheel hubs from the stub axles, undo the bolts holding the brake back plates to the stub axles and move these towards the middle of the axle.

2. Remove the screwed cap from the top bush and un-solder the brass sealing plate from the bottom bush (if a grease gun has in the past been too enthusiastically applied this disc will probably be displaced anyway. When re-making the bottom bush there is no reason why this should not have a screwed plug as well).

3. Press out the swivel pin (a force of between 3 and 7 tons will usually be required).

4. Inspect the parts, you will probably need to make the Swivel Pins, Bushes, Steel Thrust Ring, and Fibre Thrust Washer (8).

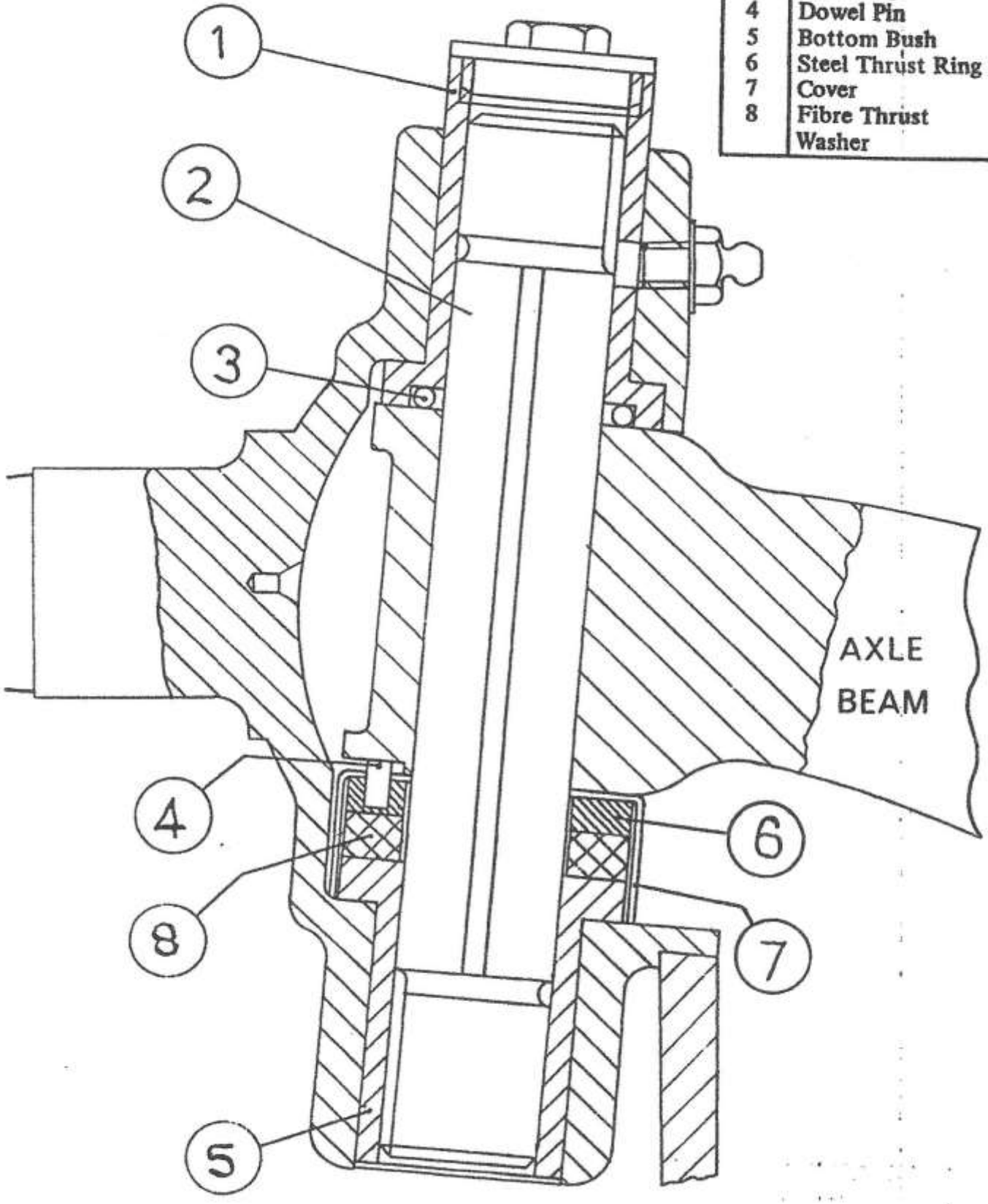
5. Inspect the stub axles and you may find that the diameters where the inners of the taper roller-races fit are worn (I have found them to be worn as much as .014!). If so, clean and true up the centres and skim the worn diameters on a lathe, these can then be built up by metal spraying and ground to fit the bearing inners (which will themselves be worn a little large).

6. Adjust the thickness of the fibre thrust washer so that an end float of .005 maximum is achieved before re-assembly with the swivel pin.

If the swivel pin has been loose in the axle eye this will have to be re-bored and an oversized swivel pin fitted.

Anthony Rawlings

ITEM	DESCRIPTION
1	Top Bush
2	Swivel Pin
3	"O" Ring
4	Dowel Pin
5	Bottom Bush
6	Steel Thrust Ring
7	Cover
8	Fibre Thrust Washer



5-10-70 RWH

TOE-IN, OR NO TOE-IN?

By Michael Marshall

That is the question I asked myself a couple of years ago when trying to improve the steering of my 14/45, which originally was pretty awful. A number of items were replaced: a broken front spring leaf; a stiff king pin, and a loose track rod ball joint. I also removed the wedges under the axle pads that had been fitted in 1929 to cancel out the castor angle in order to make the steering lighter for the first owner (a partially disabled lady), thereby restoring the correct castor angle of about 2¾ degrees. However, though the steering was much improved, not pulling to right or left, it was still rather 'vague', inclined to wander and not in the same class as that of my Riley Nine - although this, perhaps, was rather a lot to expect!

The steering box was worn (as they all are to some degree), but the free play at the rim of the steering wheel is only an inch and, with what I consider the right lubricant (steam oil), control is reasonable. So I examined the toe-in, which I had not done before as, being Talbot and not Riley, it is not adjustable. I was struck by the graceful downwards curve of the track rod, which was so uniform that, in my ignorance, I assumed to be as intended. A few phone calls to those that know put me straight on this (no pun intended): the track rod should *not* be curved in any way!

Intending to make up something to measure the actual amount of toe-in, I came across some 1" x 1/8" angle iron originally acquired to mend a fence, but which was ideally suited to making a universal gauge for use on practically any pre-war car - much more interesting. Fig. 1 shows it folded up like a penknife so that it can be hung on a nail, and Fig. 2 shows it deployed for use. The lower ends of the fingers are secured to the main cross rail, which has a series of alternative holes to provide a range of adjustment to suit the track of the car. One finger is fixed and its bolts done up tight and the other has a slotted link which allows it to be set, then locked with a wing nut.

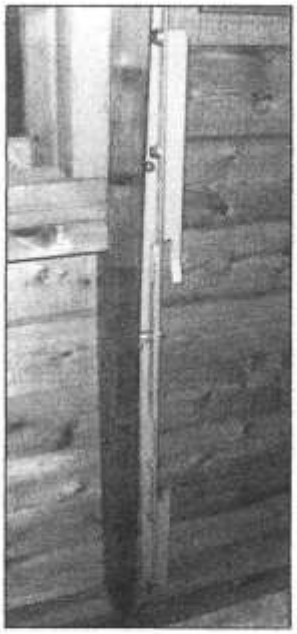


Figure 1 Gauge stowed.

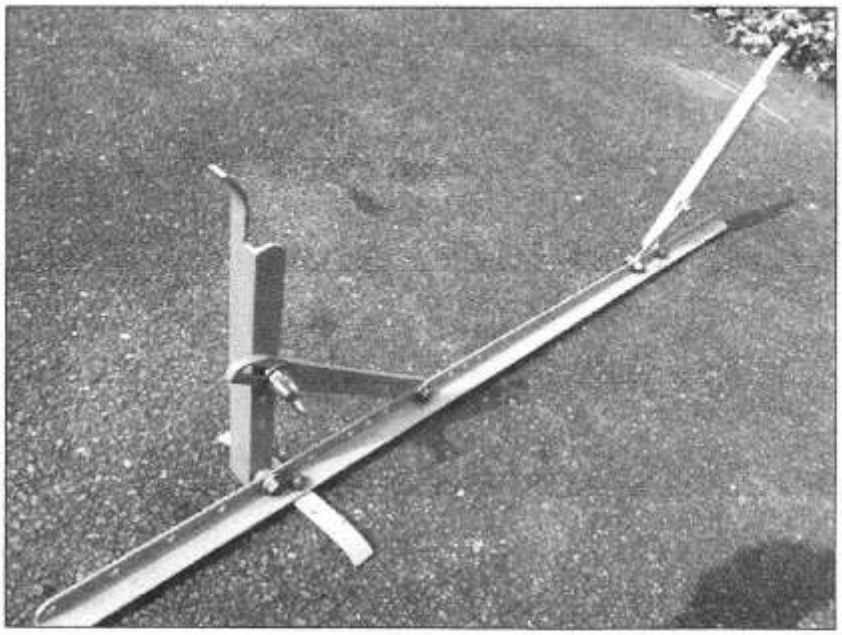


Figure 2 Gauge deployed, ready for use.

With the car on level ground and its wheels pointing more or less straight ahead, one of the front tyres is marked at the front with a piece masking tape at hub height; the foot bar is swung at right angles so that the gauge can support itself and it is positioned in front of the axle so that with the fixed finger against the rim at centre height, the adjustable finger can be set against the opposite rim and secured with the wing nut. See Fig. 3 showing the device in use on my Riley, the Talbot being temporarily indisposed.

Figure 3 Gauge in position in front of the axle.

The gauge is then carefully removed from in front of the axle, the car is moved forwards until the wheel makes one and a half turns, i.e. with the mark again at centre height, but now at the *rear* of the axle. (This cancels out the effect of any 'wobble' there might be in either of the rims.) Then, with its foot bar folded in line so that it doesn't get in the way, the gauge is inserted behind the wheels (taking care not to knock it) and swung up into position, the foot bar being swung out again so that it is again self-supporting. With the fixed finger in contact with its rim there should be a gap of about 4mm between the tip of the adjustable finger and the inside surface of the other rim. (see Fig.4.)

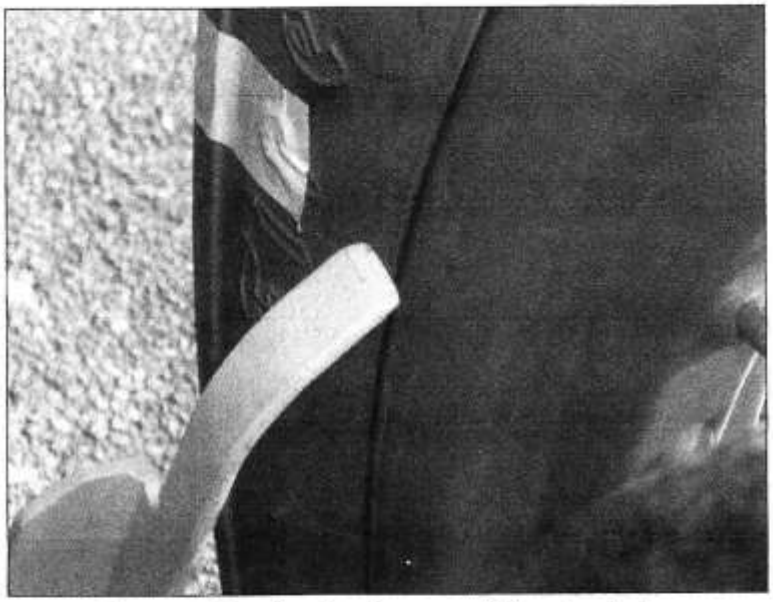


Figure 4 Showing the finger and the wheel rim.

This amount of toe-in is not critical, but should be near to this figure. Alternatively, you could also use a good tape to measure the distances over the tips of the fingers after setting them in front of and behind the axle, and derive the toe-in from the difference. However, this introduces other opportunities for error and, provided I can get my head in to see, I prefer to assess the gap directly.

When I first used this I found a difference of 4mm, but in the wrong way; the rims were wider apart in front of the axle than behind, so that my car had toe-out! As neither of the steering arms showed signs of being bent (there being an equal gap of about 6mm between the track rod end caps and the brake backplates at either side, the obvious culprit was the bent track rod. Once I had had this straightened by a friend with a hydraulic press I got just the result I hoped for: a *toe-in* of 4mm. (I have read that packing washers can be used behind the inner ball sockets, but doubt that any significant adjustment can be achieved in this way as the design of the track rod ends is typically Roesch - dedicated to the application and not intended to facilitate interference by ingenious amateurs.)

The chap that straightened the track rod reckons that it got bent as a result of straps having been hitched round it to secure it to a trailer, saying that he does this straightening job quite often for Land Rovers. However, it was so uniformly curved that I suspect it was bowed at the time of the original modifications in 1929. Be that as it may, steering is now probably as good as it's going to get without attention to the box, and almost registers on the Riley scale!

Talbot front hub clamping inner races.
Preamble.

A design fault on Talbot front hubs is that there is no means of preventing the inner races from rotating other than a good fit. Over the years, due to constant hammering from road shock, this fit deteriorates and the inner races start turning on the stub axle. This can be felt as distinct ridges on the stub axles. One solution is to loctite the bearings to the stub axle, but this makes disassembly difficult and means it is impossible to adjust the outer bearing to give the correct endfloat.

Cecil Schumacher provided me with a set of drawings and instructions for a method of clamping the inner races. The following is a record of how I carried out the job. Inevitably there were small differences in dimensions due to wear and the use of different bearings, so anybody doing this job should measure everything very carefully before starting. I apologise for some mixing of units. The drawings are dimensioned in mm, but when talking of end float I use 'thou' and torque I use foot lbs as I understand what these mean.

The basic principle is that a sleeve is made that is clamped between the inner races. Making the sleeve to exactly the correct length would be a very skilled job, and a new sleeve would be needed each time any adjustment is required due to wear etc. Cecil's method involves interposing a very strong spring (formed from two disc springs with a working compression load of 1500 lbs) to allow for greater tolerance in the overall length of the sleeve. (See General Arrangement Drawing 001)

An extra 'belt & braces' mod to prevent the inner of the outer race turning is a dome headed rivet fitted to the 'D' washer, the dome head fitting in a groove ground in the inner race.

If you are fitting new bearings then the General Arrangement shows that the new inner bearing differs in length from the original bearing, requiring bearing spacers (1 & 2) to be made. I also found that the new outer bearing was slightly different in length.

These instructions also include modifying the cork seal to a modern lip seal. I sourced my seals from an internet firm called 'Simply Bearings'.

As far as I am aware exactly the same parts could be used to clamp the races on hubs for bolt-on wheels, though I have yet to try this.

Fitting a lip seal.
Refer to drawing 004. Note if you intend to fit a spacer (see point 12) then a narrower seal might be needed.

1. Clean up the retaining ring.
2. Clean up the seal housing.
3. Make the seal spacer to fit into retaining ring, loctite in position.
4. Fit lip seal Φ45 × Φ60 × 7

Note: Cecil used seals 8mm wide, I found these were too wide for my car. He also used a seal with dimensions Φ66 × Φ50 × 8 fitted inside the retaining ring, with the seal spacer fitting on the seal housing and the seal running on the outside of the seal spacer. If the surface of your seal housing is poor, then Cecil's method is better. (I couldn't find a Φ66 × Φ50 × 7 seal)

5. Obtain four disc springs (two for each side) with dimensions 50 OD by 25.4 ID by 2.5 thick with a compression height of 1.4. (I got mine from Cecil) Modify ID to Φ33.5 – Φ33.6
6. Make taper sleeve (see drawing 005)
7. Make inner race spacer (see drawing 005)
8. Check the taper sleeve fits inside the inner spacer. Loctite the taper sleeve to the stub axle.
9. Fit dome rivet to 'D' washer (See drawing 003)

10. Grind a groove in the inner of the outer race to take the head of the rivet. (See drawing 003) Take the utmost care not to get grit in the bearing (I made a cardboard shield held in place with masking tape) and clean the bearing afterwards to make doubly sure. Check that the 'D' washer is not held up by the rivet and that it lies flat on the bearing.

11. If you are using new inner bearings, make the Spacer (2). Mine was Φ41.5 × Φ33.5 × 3.54.

12. If necessary fit a spacer (See G.A.) to allow for any wear on the thrust face of the seal housing and to increase the clearance between brake drum and backplate.

13. Oil the nut on the end of the stub axle and check it runs up freely. Fit everything together as in drawing 002, tightening the nut by hand to take up all clearances. Pull the outer race of the outer bearing outwards while pushing the conical piece back. Measure the gap as indicated on drawing 002. Ideal gap is 1.5mm. If you are using new bearings and your gap is wrong then it is easy to make a new Spacer(2) to get the correct gap.

14. Fit everything together as in the General Arrangement drawing 001. Oil the nut. Tightening torque should rise smoothly to 40 ft lbs max. While tightening continuously check for bearing clearance – go to zero bearing clearance when torque will rise and rotation is less free. **DO NOT OVERTIGHTEN!** As a guide this tightening should take one turn of the nut as the thread is 1.5 mm pitch. Back off to give 3 thou axial clearance. (See picture. I fitted the brake drum at this stage to hold the dial gauge when measuring the axial clearance.)

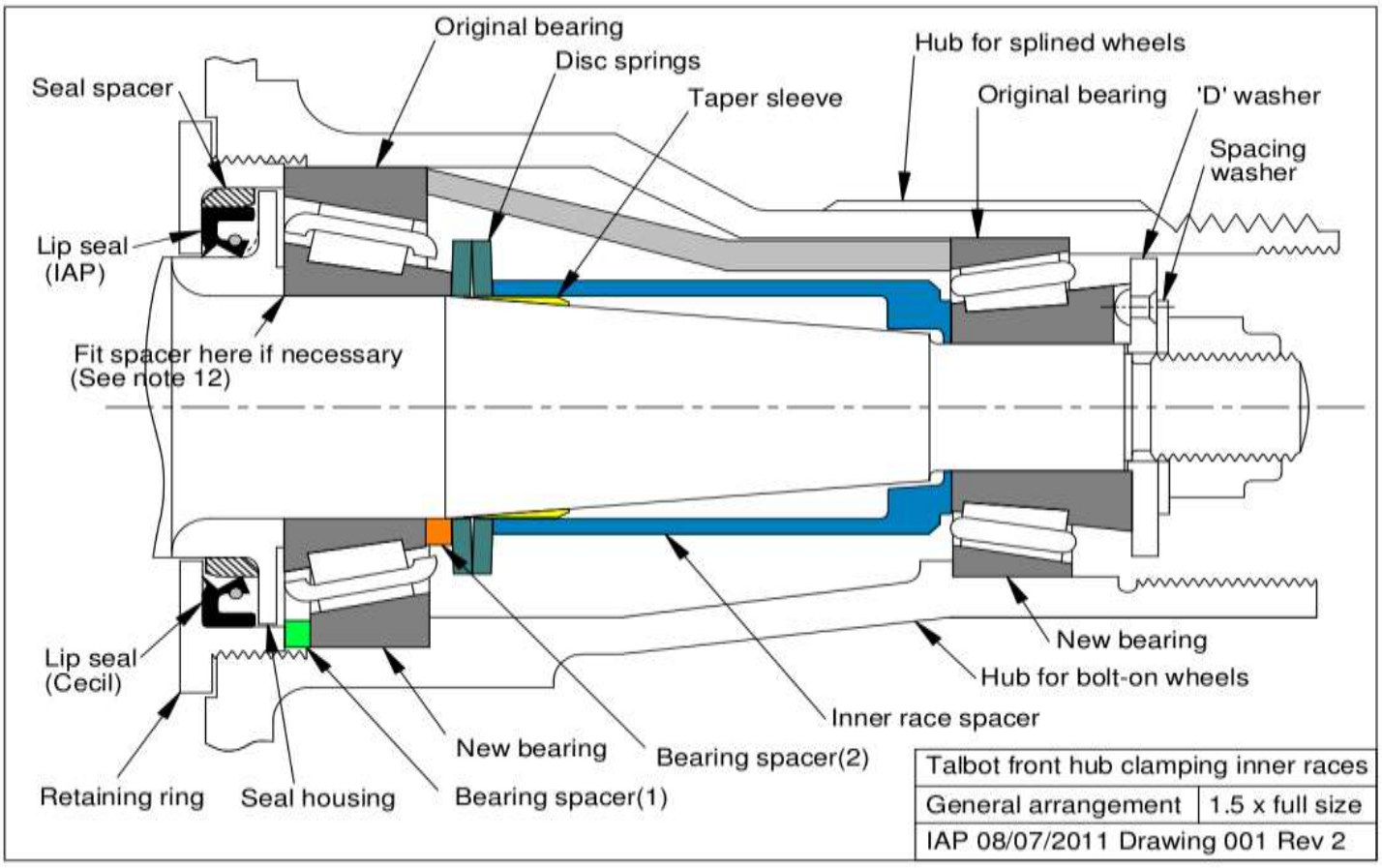
Measuring the gap

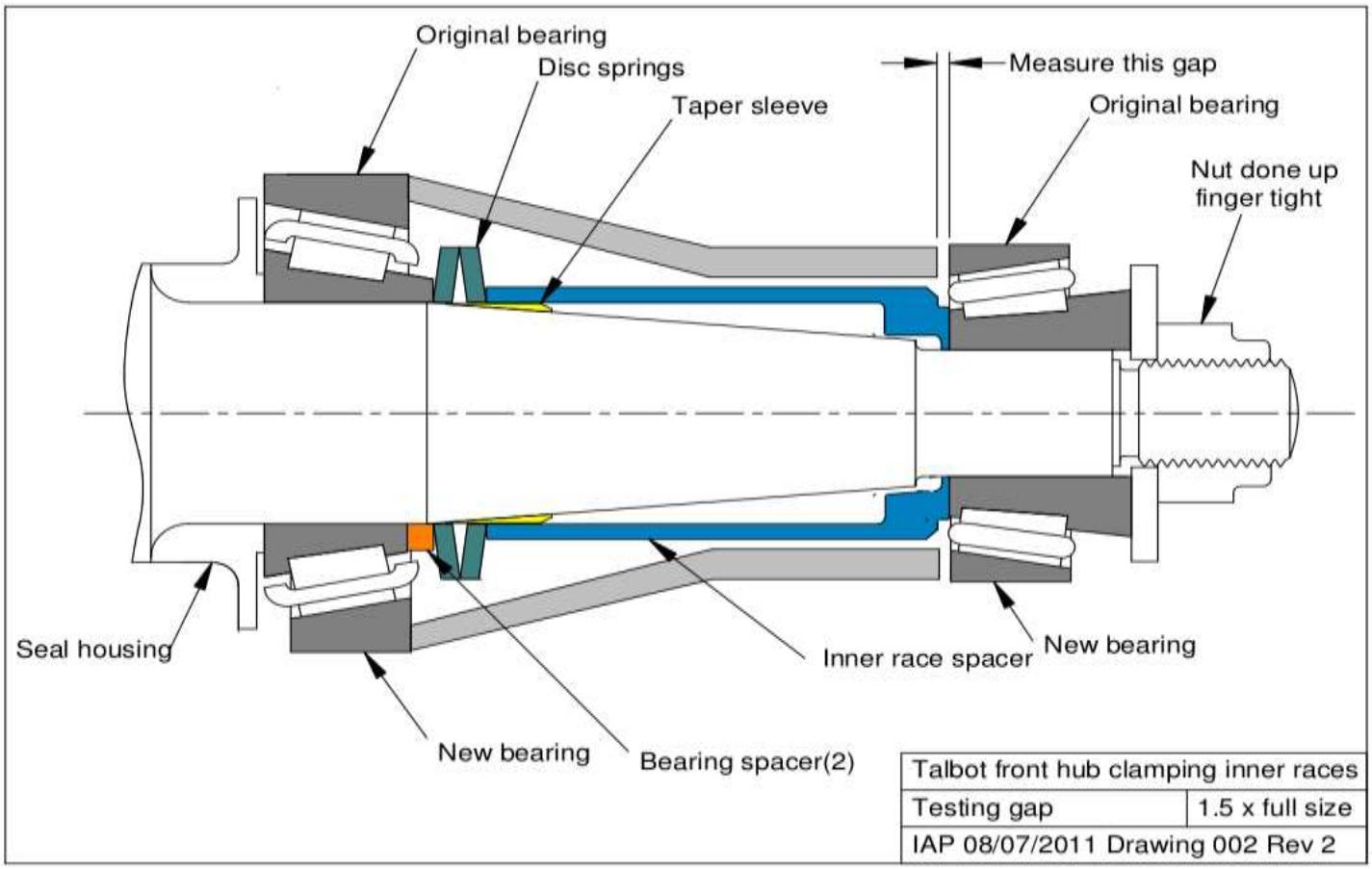
Measuring the axial clearance

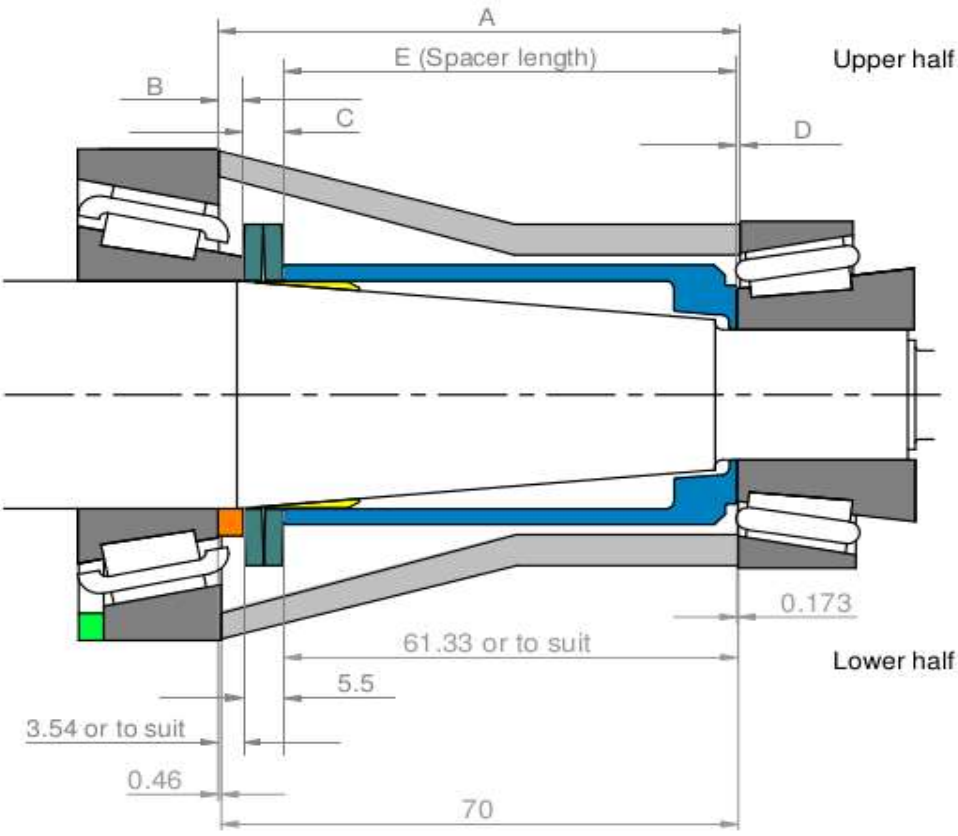
15. If the split pin holes do not line up **DO NOT** tighten or slacken the nut to line up the holes. Either face the nut off (each split pin hole change corresponds to approx 10 thou change in axial clearance) or make up some spacing washers. These washers should be about 31.5 OD, 16.2 ID and approx 1.5 mm thick. Make up one washer, assemble as in point 14 and calculate, using the fact that one split pin hole corresponds to 10 thou, how much to change the thickness to make the holes line up. Then make a new washer with your calculated thickness and the split pin holes should line up. If not recalculate the thickness and try again!

16. Check the axial clearance after a few hundred miles in case things have bedded down a bit, and adjust if necessary.

I. A. Potts. Version 2 19th July 2011


Original bearing
Disc springs
Taper sleeve
Hub for splined wheels
Original bearing
'D' washer
Spacing washer
Seal spacer
Lip seal (IAP)
Fit spacer here if necessary (See note 12)
Lip seal (Cecil)
Retaining ring
Seal housing
New bearing
Bearing spacer(1)
Bearing spacer(2)
Inner race spacer
New bearing
Hub for bolt-on wheels
Talbot front hub clamping inner races
General arrangement
1.5 x full size
IAP 08/07/2011 Drawing 001 Rev 2


Original bearing
Disc springs
Taper sleeve
Measure this gap
Original bearing
Nut done up finger tight
Seal housing
Inner race spacer
New bearing
New bearing
Bearing spacer(2)
Talbot front hub clamping inner races
Testing gap
1.5 x full size
IAP 08/07/2011 Drawing 002 Rev 2



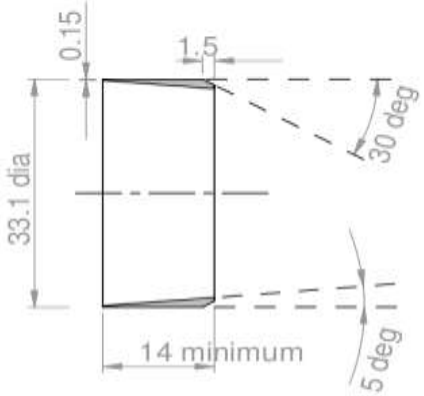
Dimensions with original bearings

	A	B	C	D	E = A - B - C - D
Cecil	69.93	3.175	5.49	0	61.265
IAP	70	3.26	5.5	0.07	61.17

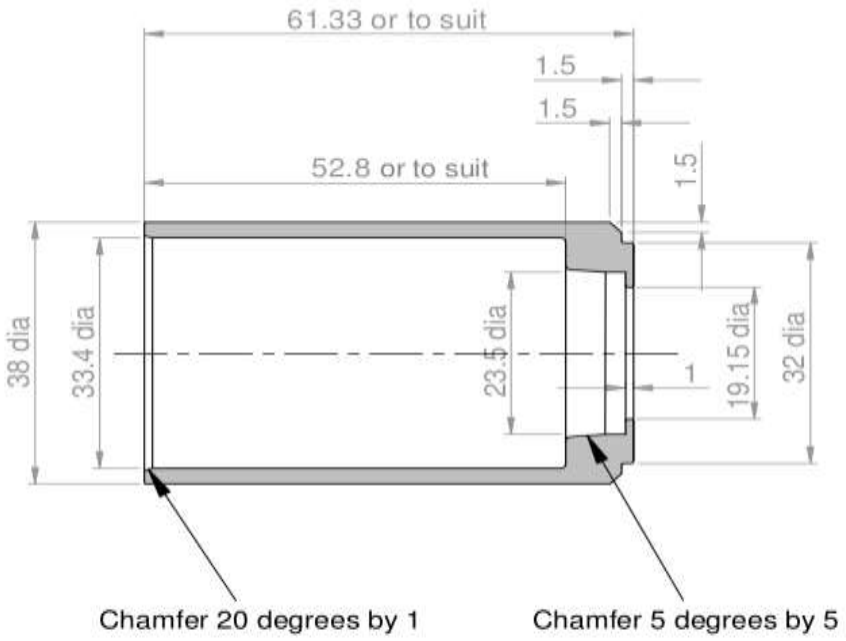
Disc spring: Uncompressed Compressed

Thickness of metal = 2.5 mm
Cone height = 1 mm
Uncompressed length of both discs = 2(2.5 + 1) = 7 mm
Compress to 0.25 of cone height or 0.25 mm
Compressed length of both discs = 2(2.5 + 0.25) = 5.5 mm
Overall compression = 7 - 5.5 = 1.5 mm
Solid length = 5 mm

Talbot front hub clamping inner races	
Spacer calculation	Not to scale
IAP 08/07/2011 Drawing 006 Rev 2	

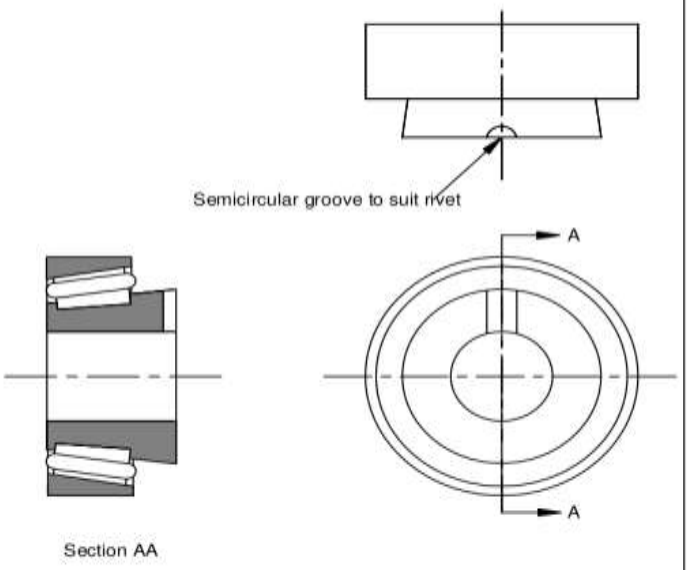


Taper sleeve
Mtl: Steel
Machine at one setting
To be clean and free from burrs

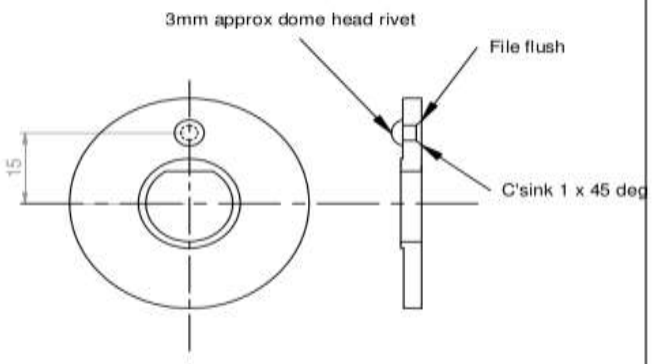


Inner race spacer Mtl: Steel
End faces to be parallel and smooth
Machine at one setting
Break sharp edges

Talbot front hub clamping inner races	
Taper sleeve & spacer	1.5 x full size
IAP 08/07/2011 Drawing 005 Rev 2	

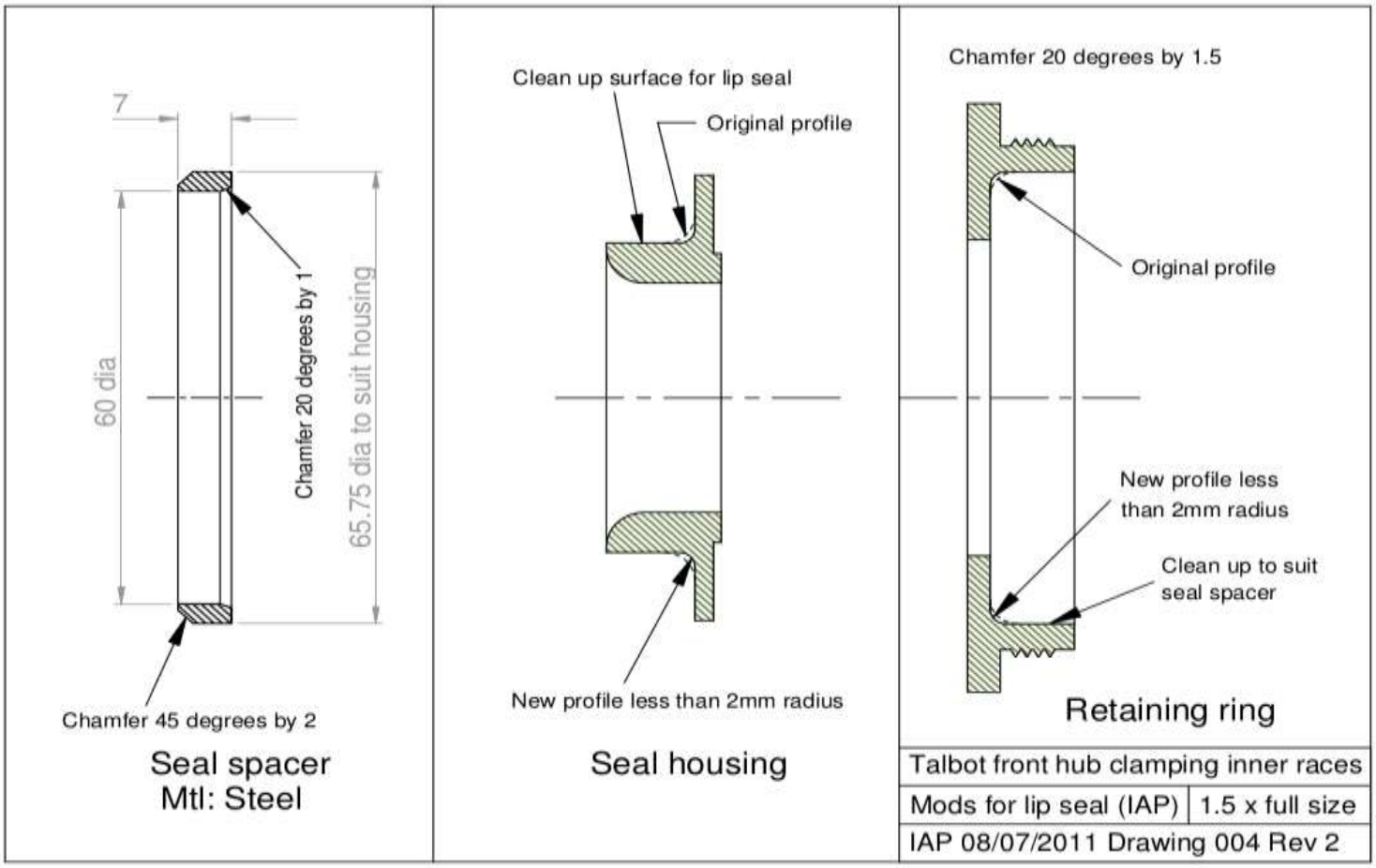


Modification to outer race



Modification to 'D' washer

Talbot front hub clamping inner races	
Mods to D washer & race	Full size
IAP 08/07/2011 Drawing 003 Rev 2	


7
60 dia
Chamfer 20 degrees by 1
65.75 dia to suit housing
Chamfer 45 degrees by 2
Seal spacer
Mtl: Steel
Clean up surface for lip seal
Original profile
New profile less than 2mm radius
Seal housing
Chamfer 20 degrees by 1.5
Original profile
New profile less
than 2mm radius
Clean up to suit
seal spacer
Retaining ring
Talbot front hub clamping inner races
Mods for lip seal (IAP)
1.5 x full size
IAP 08/07/2011 Drawing 004 Rev 2

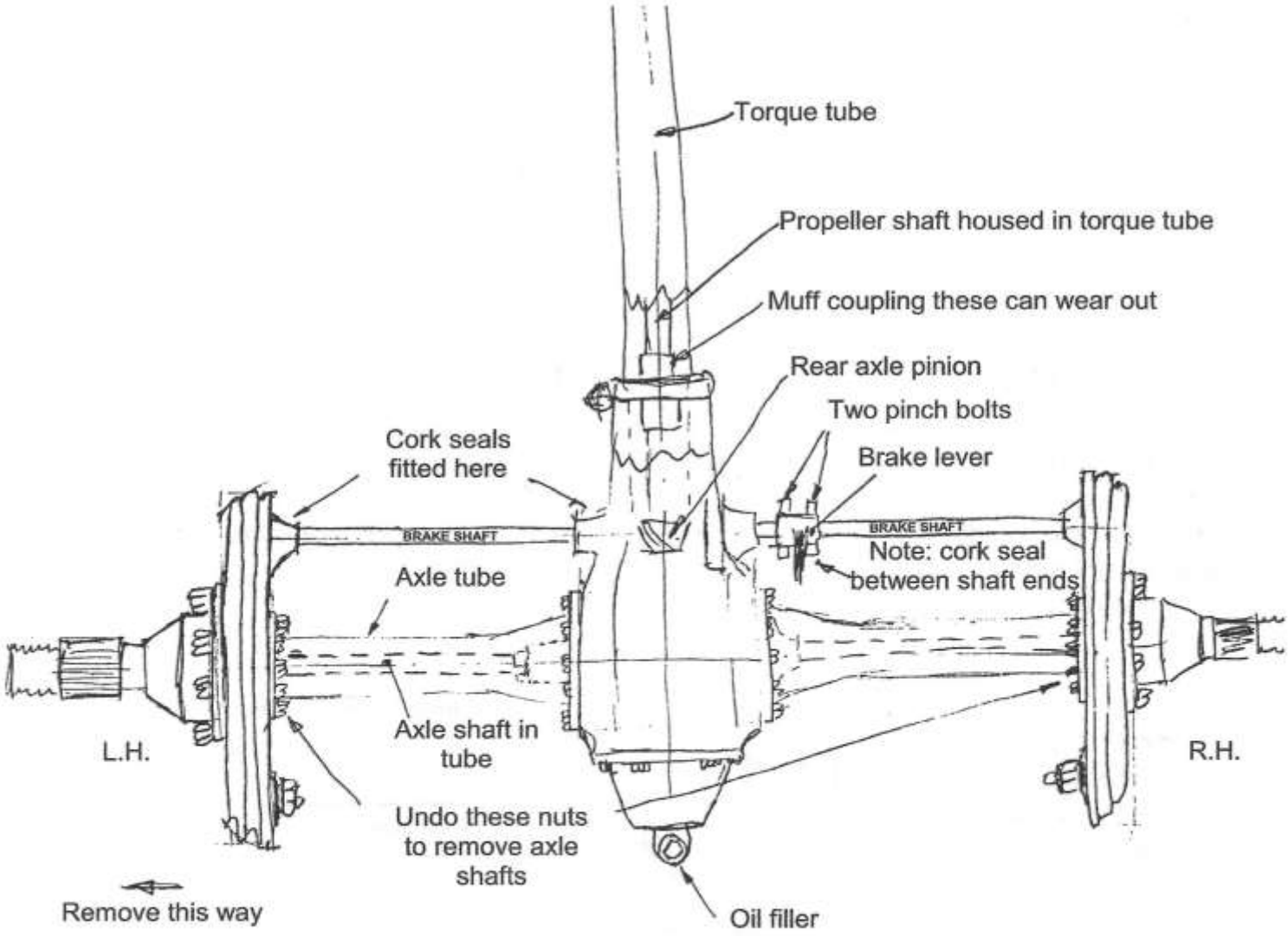
AA 12 - TALBOT REAR AXLE NOTES - ALL MODELS

(To be read in conjunction with the diagrams)

Removal of an axle shaft/bearing/brake plate assembly for inspection

Remove the wheel. If this is of the splined type, it will be necessary firstly to remove the splined hub before removing the brake drum and brake gear as described below. (If the wheel is of the stud mounted type you can proceed directly to removing the brake drum). Undo and remove the six castellated nuts retaining the outer hub shell, screw on fully the wheel knock off nut. Tap the knock off nut gently behind its ears with a copper hammer; this will remove the outer hub shell.

Remove the pinch bolt which clips the brake operating lever to the brake camshaft on the side you are working on, and clean the brake shaft of any road dirt so that it may later be withdrawn without damaging the cork seals in the brake back plate - see diagram below.



Above: Talbot rear axle

Back off the brake adjuster fully and check that the brake drum is perfectly free to rotate, entirely clear of the brake shoes. You will sometimes find two counter-sunk screws in the brake drum, remove these and the brake drum should pull off. If it does not pull off, screw two bolts into the tapped holes provided in the drum. This will have the effect of jacking the drum away from the half shaft flange. After you have taken the drum off, the brake shoes may be removed by folding them out towards you. (This is the easiest way of dealing with the springs). Remove the brake adjuster wedges, and draw the brake camshaft out towards the outside of the car through the brake plate. Remove the eight 8mm nuts where the axle tube meets the brake back plate. The brake back plate and axle shaft should then come away by carefully tapping the back plate with a hide hammer, driving it from the centre of the car outwards. If it is tight, apply a little gentle heat to the alloy brake plate. This will cause it to expand and you should then be able to draw out the complete assembly of axle shaft, bearing and back plate, for attention on the bench.

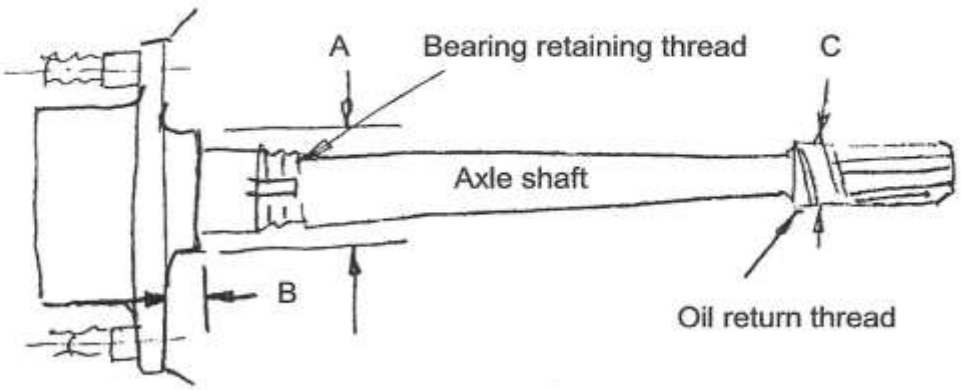
Looking at the shaft side you will find on early cars a conical housing which, after a light tapping, simply pulls away – on later cars there is a flat washer, which also pulls away. The wheel bearing is now revealed. It is retained on the shaft by a castellated nut and lock tab. (Note: This nut is handed left or right hand such that it tends to tighten in the normal direction of rotation i.e. on the left hand shaft the nut will have a left hand thread). Once this is removed, the half shaft can be pushed out of the bearing, toward the outside. The bearing will still be housed in the brake plate, but can be pushed out from the outside toward the centre. The cork oil seal is located in the brake plate behind the bearing.

Note: If it is required to inspect the axle shaft <u>only,</u> there is no need to dismantle the splined hubs, brake drums and brake gear, as the whole assembly may be drawn away as one unit once the eight 8mm nuts securing the back plate to the axle tube have been removed – taking care that the brake camshaft has been disconnected from the brake operating lever and is entirely free to pull away with the rest of the assembly.

Reassembly is generally the reverse procedure with the following precautions:

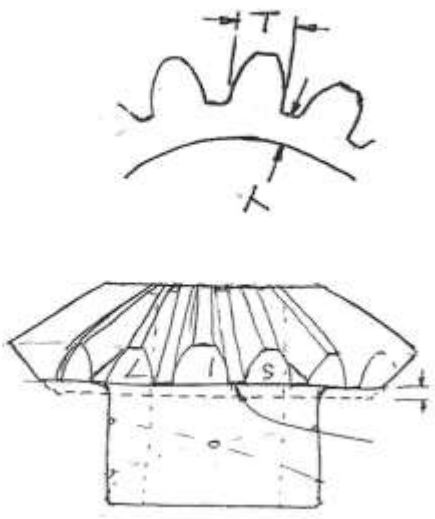
All parts to be clean, oil seal whether cork or a modern type should be well greased to prevent burning, bearing to be packed with Castrol LM high melting point grease, new lock tab to be fitted, nut must be secure, smear half axle end with a little jointing compound, brake adjuster parts, brake shoe ends, brake cams to be lubricated with grease, wheel splines also to be lubricated. (The best grease we have struck for this last place is motorcycle chain spray sold in aerosols.)

Right:
There are 2 types of shaft, dimension C either 30mm or 35mm.
Both types subdivided by the oil seal arrangements at the outer end. Dimension A can be either 2.000" or 1.852". Dimension B can be 0.692" or 0.588" respectively. All types are handed by the form of the threads.



Talbot differential gears

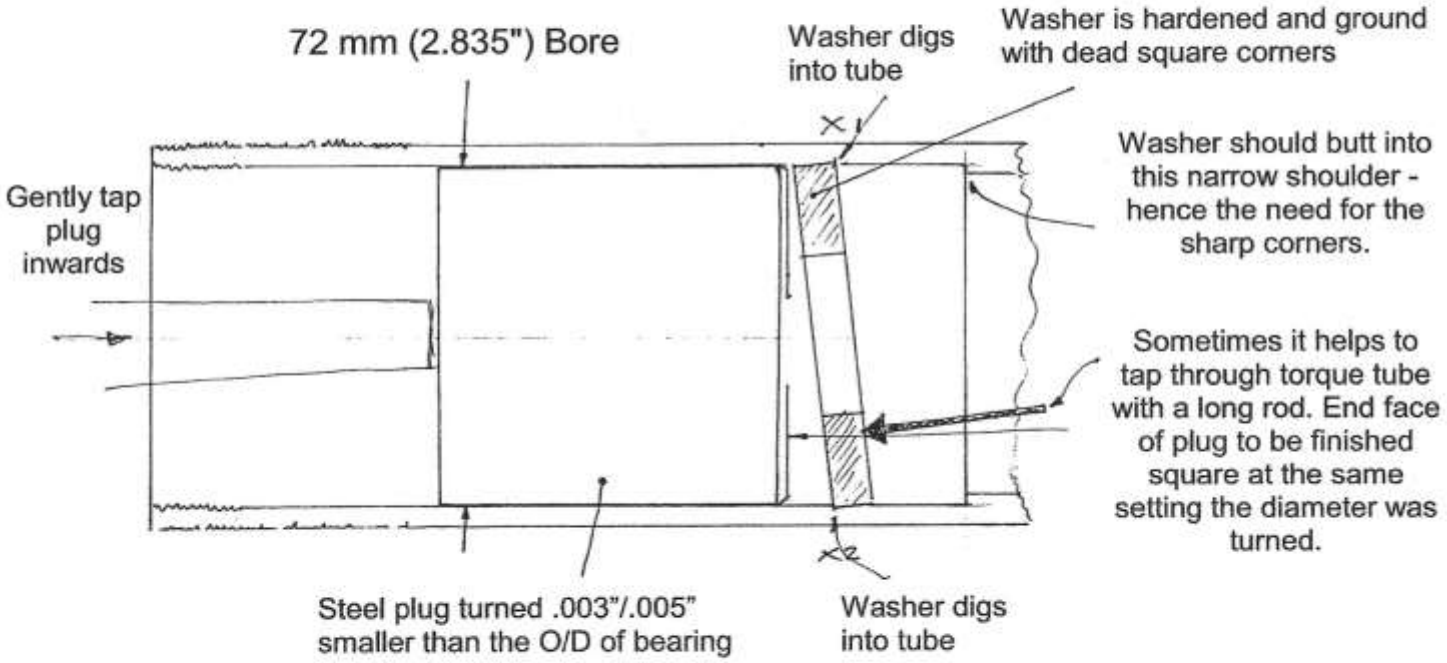
There are three distinct types of these gears. Basically, the early type is too weak in that the underside of the tooth is unsupported at its outer end. They must have had trouble during the currency of this model. The later cars are more or less proof against further trouble. Unfortunately you cannot fit into an earlier housing without total dismantling and machining out the thrust face to let the gear out further away from the planet gear. The same planet gear is common to all types. Conventional wisdom with ordinary spur gears, is that there should be at least the thickness of the tooth under the tooth to avoid any possibility of the tooth fracturing through flexing at the root.



Above: Talbot differential gears

Talbot pinion assemblies – all types

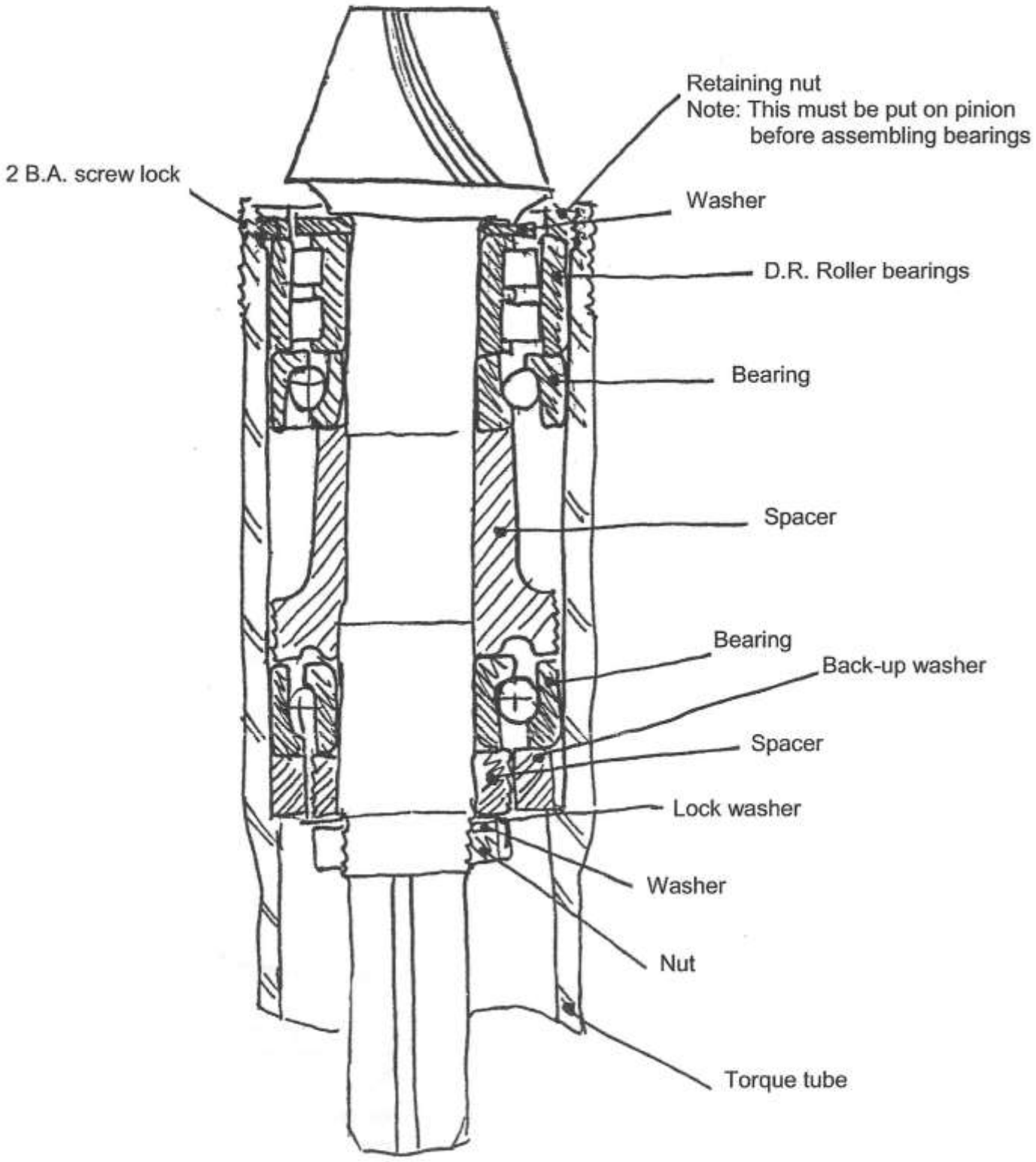
The diagram opposite shows the arrangement of all types of Roesch Talbot pinion assemblies. The diagram below shows how to deal with a misplaced back-up washer.



Above: Talbot rear axle - misplaced back-up washer in the torque tube.

This involves turning up a steel plug to a diameter of .003"/.005" smaller than the outside diameter of the bearings.

Inevitably this procedure raises burrs inside the housing at X1 and X2. The best you can hope to do is to get the washer back enough at X2 to scrape inside to remove the burrs at X2. Then you tap it outwards until it eventually lays flat on the end of the flat plug, after which you can use the plug to seat it correctly.



Above: Roesch Talbot - all types - order of assembly of the rear axle pinion bearings

TALBOT MANUAL TRANSMISSIONS
SECTION C: TORQUE TUBE & REAR AXLE

By Michael Marshall

C.1 - TORQUE TUBE: GENERAL DESCRIPTION

The torque tube and final drive pinion form an integral assembly, quite separate from the rear axle, and are therefore treated together, see Fig. 20.

The drive from the rear half of the universal joint behind the gearbox is transmitted by splines to the front of the propeller shaft and by splines at the rear to a muff coupling which, in turn, is splined to the front of the final drive pinion.

The propeller has no bearing at its front end, being supported by the Hook's universal joint, but has a ball type steady bearing approximately half way along the torque tube.

Fig. 21 shows a complete pinion assembly. This can be withdrawn once its securing ring is unscrewed anti-clockwise. (This ring is itself locked by a radial grub screw in the wall of the tube).

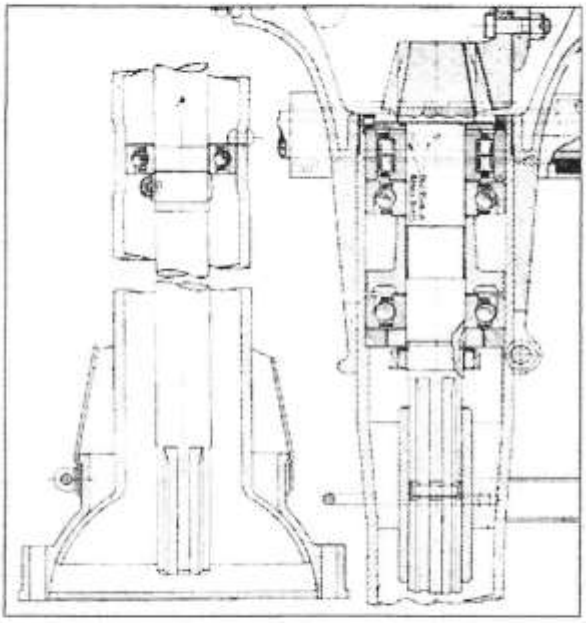


Fig. 20

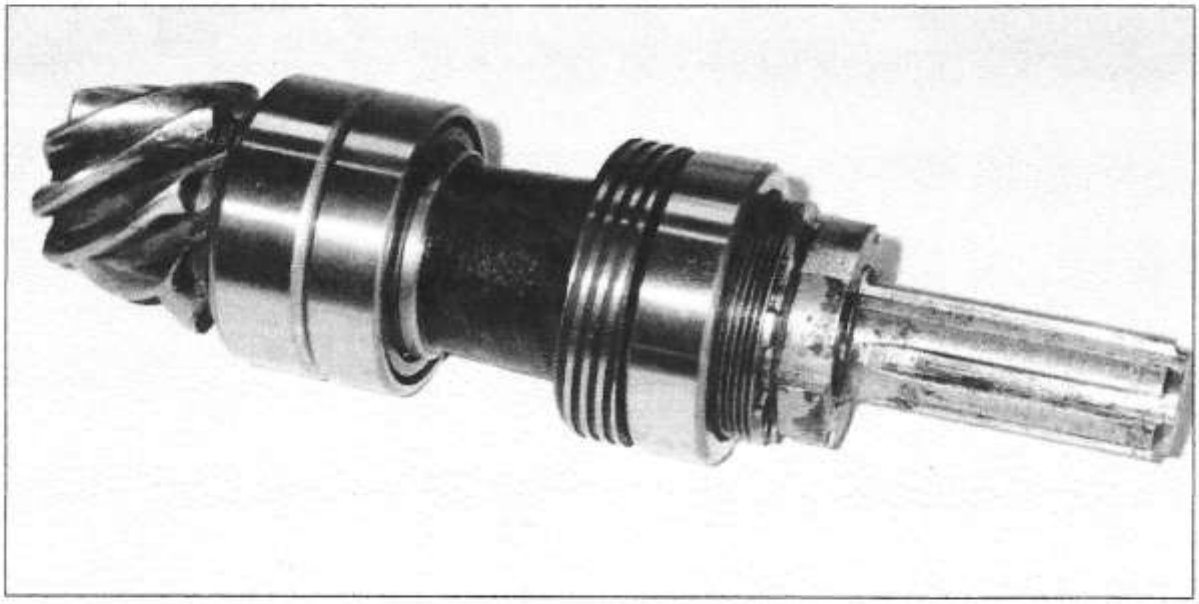


Fig. 21 (14HP)

C.2 – TORQUE TUBE: LUBRICATION

Originally, no means of lubrication were provided, the front splines of the propeller shaft benefiting from some carry-over of oil from the gearbox which in some cases, but not all, reaches the steady bearing. The final drive pinion bearings are lubricated by the oil in the rear axle, but the design makes no provision for the lubrication of the splines in the muff coupling, with the result that these can run dry and can become ***very*** worn – see C.4. 2.

C.3 – TORQUE TUBE: ADJUSTMENTS

None.

C.4 – TORQUE TUBE: REPAIRS AND IMPROVEMENTS

C.4.1 - Steady Bearing

The design in this area makes it easy to insert the propeller shaft incorrectly. Often, when inserted (as it must be) from the front, the front of the propeller shaft is left protruding beyond the rim of the tube by a good 20mm - rather than the 5mm or so indicated in the drawing - because the outer race has stopped short of its intended position, see Fig. 20.

Being unable to see this, the assembler is inclined to encourage the shaft to assume its correct position by hitting it on its end. Although this *can* position the shaft correctly, it does so by overriding the screw clamp intended to locate the bearing against a shoulder on the shaft. As a result, the bearing may not get to its intended location and, even if it is partially seated, there is then nothing to stop the shaft wandering forwards and striking the gearbox output shaft and damaging the front bearing of the gearbox output shaft. (See B.4.4).

This can be prevented by applying any encouragement directly to the outer race of the intermediate bearing using a length of tubing. Scaffolding tubing is ideal. Once in position, forward movement of the propeller shaft may be prevented, even if the bearing is not a secure fit in the tube, by putting a Tecalemit nipple just forward of the bearing. This also allows the bearing to be given an occasional shot of oil.

The best type of modern bearing to fit is one with double seals. To allow any additional lubrication via the Tecalemit nipple, or take advantage of any oil dribble back from the gearbox, the seal on the forward side may be removed.

C.4.2 – Lubrication of Muff Coupling

Fig. 22 provides an extreme example of the wear that can take place between the muff coupling and the propeller shaft due to the lack of any lubrication.

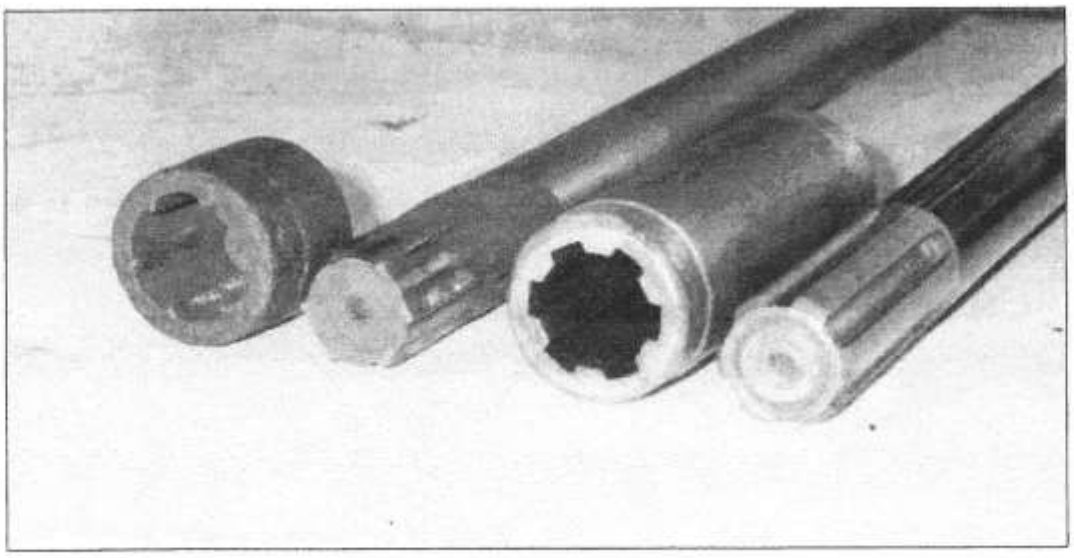


Fig. 22

The portion of muff coupling and the propeller shaft on the left hand side were taken from a 14/45. Practically nothing remains of the splines, only little triangular protrusions. Compare these with the splines of their replacements on the right side.

The consequences of failure during the car's brisk ascent of Porlock Hill the week before do not bear contemplation. As the ultra smooth free-revving engine effortlessly attained hyper RPM the driver would have been faced by the immediate necessity of arresting the rearwards progress, or rather regress, of a car whose self-servo brakes, being designed to deal with a hazard ahead of the car, are not noticeably effective when going backwards!

To prevent the splines of the muff coupling running dry, a 4mm dia. hole can be drilled right through the pinion shaft from the pinion end to allow oil from the rear axle to reach the inside of the coupling. This is not that difficult to do in a lathe with a special series long drill, plenty of cutting oil, very frequent clearing of swarf and a lot of patience. In addition if this assembly isn't going to be dismantled a Tecalemit grease nipple can be fitted just above the muff coupling in the torque tube which allows access to lubricate the coupler with thick oil periodically.

Excessive wear in the muff coupling may easily be detected by jacking up one rear wheel and, with the car in gear, checking backlash at the rim. This should be not much more than an inch or so. In the above case it was over three inches.

D.1 – REAR AXLE: GENERAL DESCIPTION

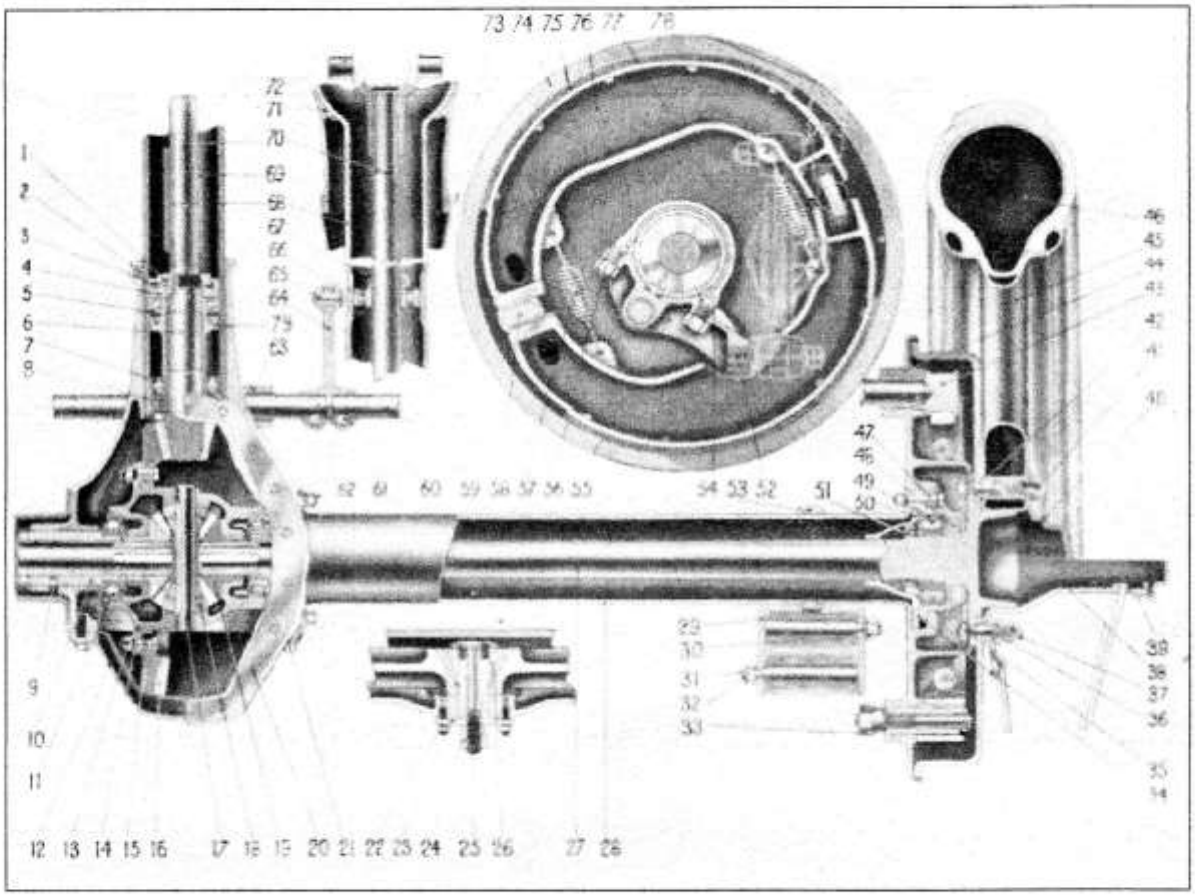


Fig. 23

The above illustration of the 14HP arrangement has been chosen as it is slightly more suitable for reproduction than that of the 18HP (Fig. 20); the parts being of very similar design but lighter.

Note: Great care should always be taken when jacking up *any* rear axle to change a wheel, when an upwards load of roughly a quarter of the car's weight has to be applied by the jack. With a Talbot (especially a 14HP) the jack should be applied under the spring ends, or as close as possible to this point – Never under the differential!

With the weight of the car supported on axle stands under the chassis, the rear axle may be lifted to be able to release its shackles and supported on axle stands Fig. 24.

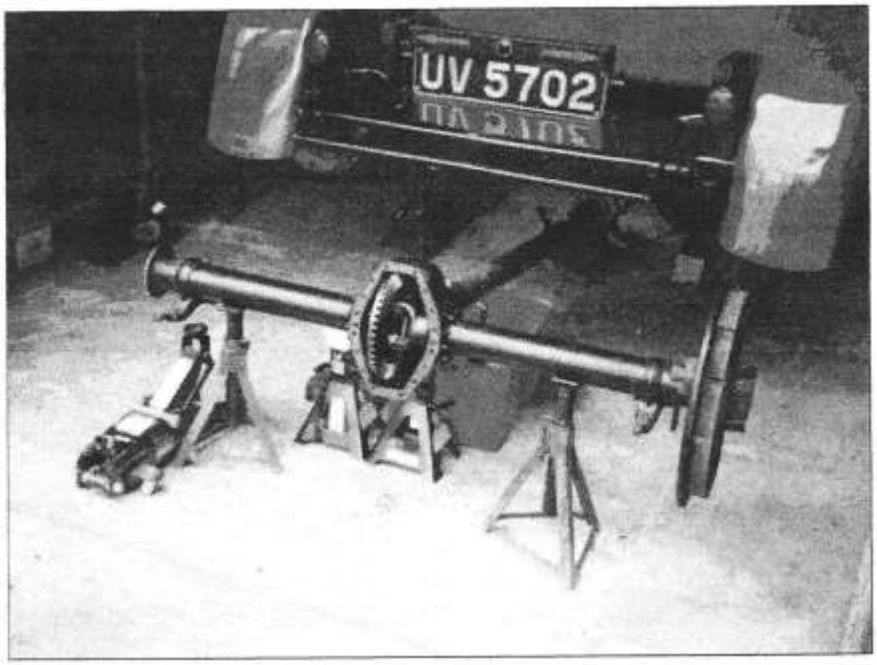


Fig. 24

D.2 – REAR AXLE: LUBRICATION

Use Castrol D140 or any good gear oil of your choice. There is only one lubrication point: in the differential cover casting. It should be filled until the level comes about a quarter of an inch below the rear of the spout. You don't need to see into the spout; it's easy to use the tip of one's finger as a dipstick.

D.3 – REAR AXLE: ADJUSTMENTS

D.3.1 – Meshing of crown wheel and pinion.

This is the only adjustment which may, very occasionally, be required – and then only if the rear axle is giving an audible hint, by whining and/or clunking, that the backlash is insufficient or excessive.

Any adjustments that may be called for are best carried out after cleaning the whole back axle, checking all parts for cracks and condition, and fitting new bearings throughout. To attempt any significant adjustment to the meshing crown wheel and pinion meshing without doing this is a false economy.

If a whine or clunk has developed in a known car, or when making a precautionary check on a recently acquired car, a preliminary examination may be made after draining all oil and removing the differential assembly cover plate and swilling the gears with paraffin. Rotating the crown wheel at least one revolution the backlash, measured if possible with a DTI should not be much less than .005", or much more than .008". If the backlash significantly exceeds these limits and/or is not consistent to within +/- .002" as the crown wheel is rotated, then specialist corrective action outside the scope of these notes may be necessary.

D.4. – REAR AXLE: REPAIRS AND IMPROVEMENTS

D.4.1 – Fitting a rear axle breather

If the rear axle continues to leak oil after fitting new seals throughout, the cause *may* be a build-up of internal pressure due to using a sealed type steady bearing in the torque tube and/or having a very well fitting, and lubricated torque tube socket. If so, fitting a breather having a simple ball valve to release excess pressure when warm, yet not let in the cold night air, should improve matters. See Fig. 25

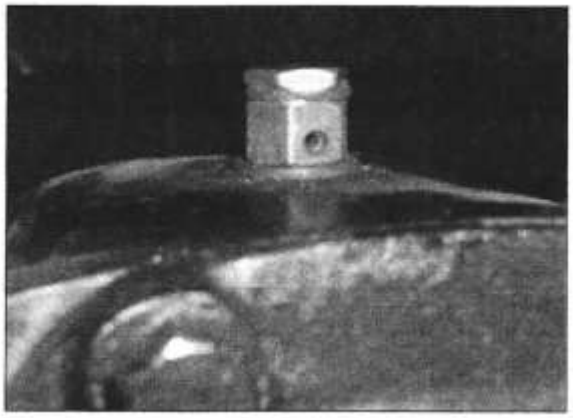


Fig. 25

D.4.2 – Replacement of a broken half shaft

Talbot half shafts are all very strong at their outer ends where they have integrally forged solid ends to carry the wheel hubs. However, they can fail at their inner ends due to juddery clutches; also by strained half shaft tubes, particularly in the case of the 14HP models with simple parallel tube rather than the tapered tubes of the larger models.

To identify which half shaft has failed, jack up one rear wheel and, with the front wheels chocked and the car in gear, turn and waggle that wheel. Then repeat the procedure with the other wheel. The one which was the easiest to turn and the most wobbly is the one that has failed. If both wheels are equally easy to turn, and not wobbly, the loss of drive is most probably due not due to a broken half-shaft, but to failure of the crown wheel and pinion, or clutch (very unlikely).

Having determined which half-shaft has broken, drain and remove the petrol tank, also drain the oil and remove the differential cover plate. Then, with the weight of the car supported by secure stands under the rear chassis member(s) jack the axle up and remove the wheel and brake drum. Remove the brake shoes. Undo the brake operating arm and withdraw the brake actuating shaft. (If the nearside brake operating shaft is removed, the felt oil seals where it passes through the differential housing may be renewed, or replaced by modern lip-type seals.)

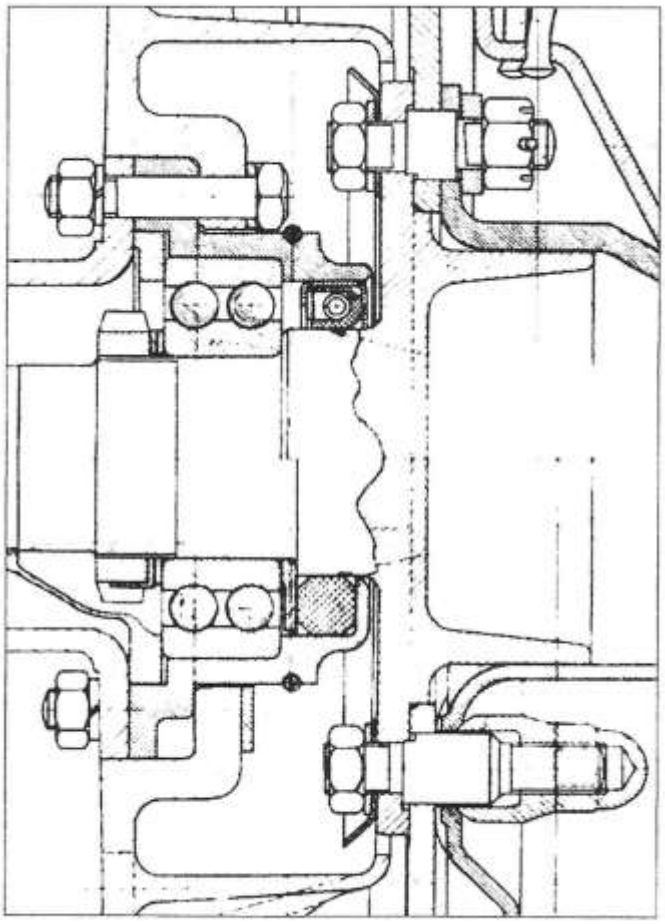


Fig. 26

Remove the nuts from the bolts which secure the brake and bearing assembly to the tube containing the broken shaft, taking great care not to knock the bolts outwards, i.e. towards the brake, as this could cause the heads of the bolts inside the brake back-plate to dislodge, or override, the spring steel circlip whose purpose is to retain these bolts in position during assembly. See Fig. 26. If one of these bolts should go in, it will be irretrievable and you will have to re-assemble the back-plate and bearing housing assembly from scratch – very annoying!

With the nuts removed, tapping with a hide hammer should free the back-plate from the outer flange of the tube. For the reasons given above, do not be tempted to tap the exposed ends of the bolts. Once on the bench, light tapping on the conical sleeve now revealed should allow it to be pulled off by hand, revealing the locking ring securing the double roller bearing and allowing the outer portion of the broken shaft to be carefully knocked out.

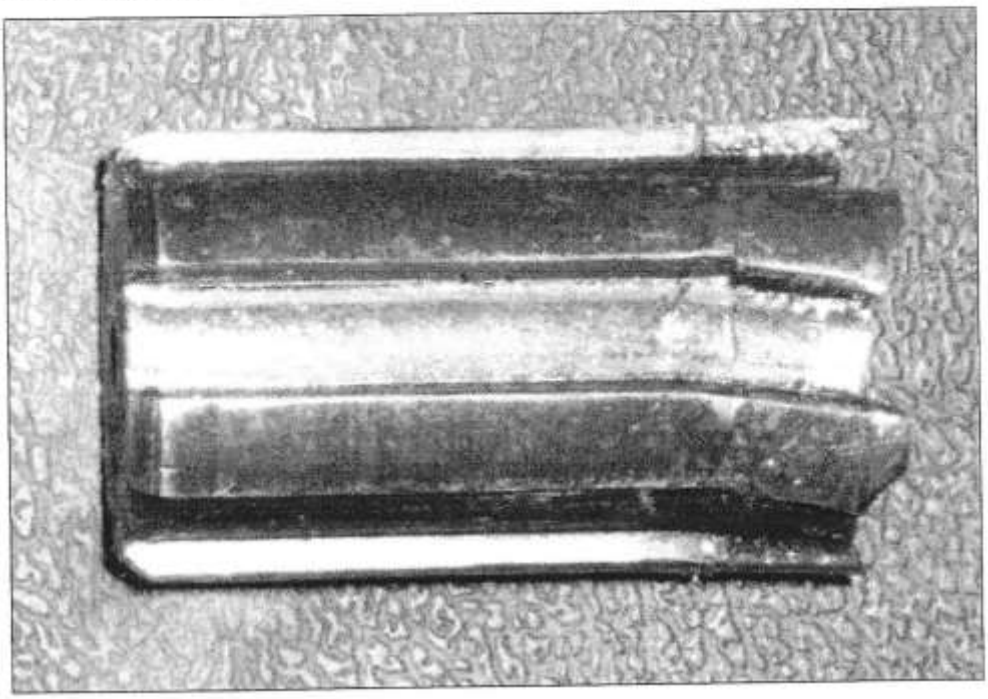


Fig. 27

You must now retrieve the inner part of the broken half shaft (Fig. 27) from its drive gear. The simplest procedure is to remove the rear axle half-tube altogether. To do this, use a jack or packing to take the weight of the differential housing, disengage the spring shackle, remove the bolts securing the inner flange to the differential housing and, using a hide hammer or piece of wood, 'wake-up' the tube until it comes free. Alternatively, you could free the outer end of the tube by releasing the spring attachment clamp.

This should allow you to grip the end of the offending broken bit (Fig. 26) and pull it out. If you can't get hold of it you will have to poke it out from the differential end. Finally, install a new outer bearing and seal and re-assemble everything in reverse order.

You should now take the opportunity to extract and inspect the 'good' shaft for any marks indicating a similar future failure, as replacing the broken one with one which is presumably stronger will put more stress on the other one - which may not be as good as you would like to think. Sometimes the replacement of one shaft is soon followed by failure of the other.

Ideally, the inner halves of used Talbot half shafts should be crack tested, but as they may be difficult to find you may have to put up with what you can get. At the very least you should assure yourself by careful visual examination, or dye penetration test, that the replacement shaft does not show the beginnings of any cracks just outboard of its splines.

Talbot half-shafts are 'handed' by the oil retention spiral grooves and the wheel fixings. Whilst it is possible to convert a second hand NS shaft to an OS shaft by filling in the oil spiral and changing the wheel fixings from LH to RH, this is open to the possible objection that the stresses it is called upon to resist will be in the opposite direction to those it has got used to. This is why it is recommended above to check both shafts when you have the opportunity before seeking just the shaft to replace the one which has failed. You might need a pair!

Talbot rear Axle Ratios

Ratio	Crown wheel Teeth	Pinion Teeth	MPH per 1000rpm	Max Cruising @3500rpm	Max speed @4500rpm
5.22	47	9	17.0	59.5	76.5
4.9	49	10	18.1	63.4	81.4
4.6	46	10	19.2	67.2	86.7
4.36	48	11	20.3	71.1	91.4
4.0	48	12	22.2	77.7	99.8

To remove a back axle in sections

1. Jack up the car until the rear wheels are off the ground and place axle stands under the chassis in front of the rear spring hangers.
2. This should mean the torque tube is resting on the chassis bracket under the rear chassis hoop
3. Remove the split pin and take out the cotter pin holding the rear brake rod
4. Remove the two bolts holding the rear brake rod operating lever onto the two rods.
5. Remove the two brackets which hold the handbrake rod and speedometer cable to the torque tube. Fix the speedometer cable out of the way.
6. Remove the o/s lower rear shock absorber arm nut to release the arm from the axle.
7. Remove the o/s rear wheel, but put the hub cap back on to protect the threads
8. Remove the rear spring hanger shackle nuts
9. Undo the bolts holding the o/s axle tube assembly to the rear axle centre casting
10. Pull the o/s rear axle tube off the car.
11. Remove the n/s lower rear shock absorber arm nut to release the arm from the axle.
12. Remove the n/s rear wheel, but put the hub cap back on to protect the threads
13. Remove the rear spring hanger shackle nuts
14. Undo the bolts holding the n/s axle tube assembly to the rear axle centre casting
15. Pull the n/s rear axle tube off the car, being careful to take the weight so as not to put weight on the brake operating rod which has to pass through the axle casing.
16. It is now possible to work on either rear axle assembly as required.
17. Place a trolley jack under the centre of the rear axle and take the weight.
18. Remove the two chassis cross members and hang the brake rod out of the way.
19. Undo the nuts holding the torque tube to the gearbox, and gently break the seal between the casting and the gear box.
20. Lower the rear axle casting gently towards the ground, onto a small trolley or a piece of wood so it can be drawn backwards.
21. If possible use two people. One to steady the centre of the rear axle and the other to pull the prop shaft out of the gearbox.
22. If this is not possible put a jack about 1 foot in from the end of the axle centre, place lots of soft padding under the front of the torque tube to protect it and gently pull.
23. The jack gives a bit of a counterweight effect so the front end does not fall too fast.

Notes
Propeller shaft is 57"13/16ths long 1.470 m and is 1⅛" diameter.

The rear axle tubes bolt onto the back plates with the spring shackle parallel to the brake rod and the shock absorber mounting stud.

Notes on MJ 8243
Distance from front of prop shaft to front of bearing holder, 29"
The writing on the bearing and the bearing holder face each other.
Clamp is mounted on front face of bearing, towards the engine.

SPARES & MAINTENANCE

How to get a half shaft from a Talbot 14/45

First, remove the petrol tank and the cover off the diff-housing and see if the crown wheel revolves when someone winds the engine (in gear) if it does, it is most likely a half shaft sheared.

Jack up the car with wooden blocks under the axle and see which wheel can make the crown wheel revolve (car out to gear) this is the one that is OK.

To draw a half shaft:- Remove the wheel, brake drum and brake shoes, uncouple and draw out the brake operating cross shaft.

Undo the ring of 10 nuts to be seen near the centre of the brake back plate and then the half shaft together with the back plate can be removed.

You will need to tap it gently near its centre in order to face it off its register (careful, it's an alluminium casting brittle with age).

Removing the broken bit of shaft in the housing may be difficult and it may be necessary to draw the other half shaft and the pin with the two bevel gears from the diff in order to poke it out.

To release the half shaft from the back plate, a cone shaped oil retainer which is pressed into a recess must first be removed by tapping it sideways in all directions, you will then see the ring nut that retains the half shaft in its bearing.

If it is not a half shaft, the axle must come out and it can be released at the shackle if it is not siezed into its bush, or at the clamp strap if the brake shaft has been removed as above, this will allow the axle to come completely back.

After releasing the gear box end you will have to unscrew the torque tube as otherwise the axle cannot be removed without taking off the bodywork!!!

The clamp bolt for the torque tube must be completely removed and not just loosened as it also levels the correct position.

To remove the crown wheel carrier from the diff- housing, undo the 2 rings of 10 nuts which hold the axle tubes to the diff housing, remove the tubes and then completely remove the 2 grub screws which will then allow the diff bearing carriers to be unscrewed and completely removed.

The crown wheel, C-W carrier and bearings will then fall out (phew!)

To remove the pinion and bearings:- Remove the grub screw and the ring nut will come undone. Gently lever under the head of the pinion and it will come out with its bearings and possibly the muff coupling too. (Advise given to George Stevens by Anthony Rawlings)

CLUB SPARES AVAILABLE