

FRONT AXLE
(RIGID)



SERVICE INSTRUCTION LEAFLET

ISSUED BY
ROLLS-ROYCE LIMITED

RR/L1

SB/VK. 3/JSB.

Subject : OVERHAUL OF STEERING PIVOT PINS
20 h.p., 20/25 h.p., 25/30 h.p., Phantom I & II

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GENERAL:

20 h.p., 20/25 h.p., 25/30 h.p.:

On the earlier 20 h.p. chassis (Series F, G and H) the axle pivot upper bearing is a Hoffmann roller assembly, and the lower bearing consists of a chrome nickel steel bush pressed into the axle pivot, the end of the pivot pin forming the inner bearing element.

On the Series J chassis the upper bearing is as on the earlier models, but the bottom bearing consists of two concentric chrome nickel steel bushes which are a press fit to the pivot pin and the axle pivot respectively. Incorporated in the offside assembly is a pivot friction device which gives the desired damping to the steering.

On the Series K, L, M, N and O chassis the pivot friction device was discontinued but the two-piece lower bearing was retained.

On the 20/25 h.p. and 25/30 h.p. models, the pivot bearing arrangement is similar to the later 20 h.p. models, the assembly is, however, lubricated by either the Enots-Bijur or the Luvax-Bijur system.

Phantom I:

On the earlier Phantom I chassis (all series up to B.2) the upper nearside axle pivot bearing is a ball thrust assembly; the corresponding offside thrust bearing is a damping device comprising a fibre washer and a thrust washer positioned above a chrome nickel steel bush.

On the remaining chassis, the light type axle was used, embodying upper bearings of the roller pattern and dispensing with the damping device.

Phantom II:

On all Phantom II chassis, the upper pivot bearing is a Hoffmann roller assembly and the lower consists of a chrome nickel steel bush, pressed into the axle pivot, which bears on the pivot pin.

PRELIMINARY DISMANTLING: (ALL MODELS)

The work on the pivot pins will be facilitated by removing the axle from the car, rather than carrying out the overhaul in situ.

1. Jack up the front of the car and place a stand under each chassis side member. Withdraw the jack.

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2. Remove the front wheels and draw the front hubs as described in Service Instruction Leaflet RR/V1. Special tools are required for this.
3. Disconnect the brake cables from the torsion bars by removing the split pins and collars and withdrawing the cotter pins.
4. Disconnect the shock absorber links from the front axle.
5. Disconnect the actuating rods from the brake levers.
6. Disconnect the forward end of the side steering tube.
7. Remove the cross steering tube complete.
8. Remove the brake shoe carrier plate, the brake shoe pivot bolts and the brake shoe guides. Withdraw the spring eye pin from one brake shoe, withdraw the toggle lever pin connections and remove the brake shoes. Remove the brake back plate.
9. Undo the nuts on the road spring U-bolts, lower the front axle and mount it in a convenient working position.

On later chassis fitted with the centralised chassis lubrication system, it is necessary to disconnect the pipe lines stage by stage, but as no difficulty is envisaged in this respect the description of the system is omitted.

REMOVAL AND REFITTING OF AXLE PIVOTS:

All 20 h.p. Chassis except 'J' Series:

1. Remove the top cap by withdrawing the split pin and undoing the castellated nut, and withdraw the long bolt which passes through the pivot pin; lift out the top washer.
2. Undo the two bolts and remove the bottom flange taking care not to lose the thrust washer.
3. Loosen the setscrew in the axle neck and with a suitable drift drive out the pivot pin in the downward direction.
4. Tap the roller bearing out of its housing and prise out the gland situated beneath it.
5. Pull away the pivot axle. Should the bottom bush require renewal it must be pressed out from the top.

Re-assembly is the reverse of the foregoing and no difficulty should be encountered if the fit of the pin in the axle eye is checked before proceeding. The pin and bore are tapered 1:200 on diameter and should be a light driving fit, permitting the shoulder at the lower end of the tapered section to seat fully in the counterbore on the underside of the axle eye.

Should the fit be excessively tight, due to manufacturing tolerances, the pin should be lapped as necessary.

Oversize pivot pins are not supplied for these series and if excessive wear has occurred between the pin and the axle eye, replacement components will be necessary.

In correct adjustment the vertical float on the axle pivot is .005" - .015".

20 h.p. ('J' Series):

The procedure for dismantling is the same as for the earlier models except that when the bottom flange is removed the six washers comprising the pivot friction device will drop down. Three of these are serrated internally to engage the splined shank of the pivot pin and three have external serrations to engage the splined recess in the bottom flange.

Re-assembly of the pivot friction device is best carried out by placing the washers in the bottom flange in the following order: One thrust washer, one washer with internal splines, one with external splines, two with internal and two with externals, and then manoeuvring the bottom flange into position. This is done, of course, after the pivot pin has been fitted.

A further variation from the earlier models is the provision of a chrome nickel steel bush pressed onto the lower end of the pivot pin to mate with the lower axle pivot bush. Oversize pivot pins are not supplied for these chassis. Replacement pins are issued with the bearing bush fitted.

20/25 h.p. and 25/30 h.p. Chassis:

1. Disconnect the lubrication pipes as necessary.
2. Undo the two securing nuts and remove the top cap; lift out the distance washer.
3. Undo the two securing nuts and remove the bottom flange, taking care not to lose the thrust washer or damage the internal lubrication pipe.
4. Loosen the setscrew in the back of the axle neck and drive out the pivot pin in the downward direction.
5. Tap out the roller bearing and prise out the gland beneath it.
6. Pull away the axle pivot. Should the lower bush require renewal it must be pressed out from the top and the replacement positioned with its lower face flush with housing face.

For these models, oversize (+ .010" and + .015") pivot pins are available. These are supplied with the lower bearing bush and internal oil restrictor already in position. Should oversize pins be fitted, it is necessary to ream the axle eyes 1:200 taper on diameter to the desired fit.

As with the earlier models, a light drive fit is necessary, permitting the shoulder of the pin to seat in the counterbore on the axle eye underside.

Phantom I. (Series 'V' to B.2):

1. Using a C-spanner, undo the domed cap above the top bearing.
2. Undo the nuts and remove the steering lever, which also forms the bottom flange.
3. Withdraw the split pin, undo the pivot pin nut and lift out the damping washers. The damping washers are fitted to the offside only; the corresponding component on the nearside is a ball thrust race.
4. From the top, press or drive out the pivot pin together with the bottom bush. The bush is invariably very tight in its housing and considerable force will be required to displace it.
5. Take away the pivot axle. Should the top bush require renewal it must be pressed out from below.

The parallel portion of the axle eye bore is 1.000" in diameter and if wear has occurred it will be necessary to parallel ream to 1.005" and fit the oversize pivot pin. The pin should be a light driving fit in the axle eye.

RE-ASSEMBLY:

1. Fit the top bush to the pivot axle.
2. Place the axle pivot in position on the axle eye and tap the pivot pin in, lining up the key and keyway, until its lower face is about $\frac{1}{2}$ " below the bottom face of the pivot axle.
3. Place the lower bush in position on the pin and with a suitable drift, start driving it up into its housing.
4. Drive the pin and the bush alternatively until the pin is fully home, and then drive up the bush until a clearance of .012" - .027" is obtained above the axle eye, and the pivot pin nut can be tightened down and give the correct degree of friction to the damping device, or in the case of the nearside, the correct clearance to the ball race.

Having obtained the correct clearance between the axle pivot and the axle, and adjusted the damper and corresponding ball race, the remainder of the operation is the reverse of the dismantling.

Series C2 - H2:

1. Withdraw the split pin and undo the castellated nut securing the top cap, remove the cap and withdraw the bolt passing through the pivot pin.

2. Undo the four 5/16" nuts and remove the bottom flange, taking care not to lose the distance washer.
3. Undo the pivot pin nut, lift out the locking washer, loosen the setscrew in the back of the axle neck and with a suitable drift, drive pivot pin out in the downward direction.
4. From beneath, drive out the top bearing and lift out the grease retaining washer immediately beneath it.
5. Pull away the pivot axle taking care not to lose the dust cover positioned over the bottom bush. Should the bush require renewal it must be driven out from above.

Re-assembly is the reverse of the foregoing and no difficulty should be encountered if the fit of the pivot pin in the axle eye is checked before proceeding. A light drive fit is required, permitting the shoulder of the pin to nip the bottom bush dust cover. Care is necessary to ensure that the groove in the pin registers with the setscrew in the axle neck.

Oversize pivot pins are not supplied for these models and in the unlikely event of wear taking place to the axle eye, replacement components should be fitted. However, as these front axles are in short supply, it may in some cases be possible to effect a repair by chromium-plating the tapered portion of the pin, but the practice is not recommended as the plating inevitably suffers damage when the pin is fitted.

Phantom II:

1. Undo the nuts and remove the top cap.
2. Remove the split pins, undo the nuts and remove the bottom flange, taking care not to lose the thrust washer.
3. Undo the pivot pin nut, lift out the locking washer, loosen the setscrew in the back of the axle neck and with a suitable drift, drive out the pivot pin in the downward direction.
4. From beneath, drive out the top bearing assembly.
5. Pull away the pivot axle, taking care not to lose the dust excluder positioned over the bottom bush. Should the bush require renewal this must be driven out from above.

Re-assembly is the reverse of the foregoing and no difficulty should be encountered if the fit of the pivot pin in the axle eye is checked before proceeding. A light drive fit is required, permitting the shoulder of the pin to nip the bottom bush dust excluder. Care is necessary to ensure that the groove in the pin registers with the set screw in the axle neck. The correct vertical float of the pivot axle is .005" - .015".

Oversize pivot pins are not supplied for these chassis and if the axle eyes are worn, replacement components should be fitted. However, it may be possible in some cases to effect a repair by chromium-plating the tapered portion of the pivot pin, but this practice is not recommended as the plating is inevitably damaged in refitting.