

SECTION H

THE REAR AXLE

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Lubrication.

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KEY TO THE REAR AXLE COMPONENTS

<i>No.</i>	<i>Description</i>	<i>No.</i>	<i>Description</i>	<i>No.</i>	<i>Description</i>
1.	Casing—rear axle. DW.	22.	Washer—packing—bearing (.002 in.).	42.	Bearing—rear hub.
2.	Bolts—differential carrier.	23.	Crown wheel and bevel pinion 10/43.	43.	Spacer—bearing. DW.
3.	Breather assembly.	24.	Bolt—crown wheel to case.	44.	Locknut.
4.	Plug—oil—drain and filler.	25.	Washer—lock—crown wheel bolt.	45.	Washer—tab—locknut.
5.	Washer—tab—drum retaining.	26.	Bearing—bevel pinion—rear.	46.	Drum—brake.
6.	Nut—differential carrier bolt.	27.	Bearing—bevel pinion—front.	47.	Screw—drum hub—axle shaft. DW.
7.	Washer—spring.	28.	Spacer—bearing.	48.	Tubular shaft assembly.
8.	Joint—carrier to case.	29.	Oil seal—bearing—front.	49.	Yoke—flange.
9.	Carrier.	30.	Dust cover—oil seal.	50.	Yoke—sleeve assembly.
10.	Stud.	31.	Washer—bevel pinion (.112 in.).	51.	Journal and needle—kit set.
11.	Nut.	32.	Shim—front bevel pinion bearing (.004 in.).	52.	Bearing assembly—needle.
12.	Washer—plain.	33.	Flange—universal joint.	53.	Gasket.
13.	Washer—spring.	34.	Nut—flange.	54.	Retainer.
14.	Case—differential.	35.	Washer—spring—flange nut.	55.	Circlip.
15.	Wheel—differential.	36.	Shaft—rear axle. DW.	56.	Lubricator—journal.
16.	Pinion—differential.	37.	Hub assembly—rear. DW.	57.	Bolt—shaft flange yoke—rear.
17.	Pin—pinion.	38.	Stud—wheel. DW.	58.	Nut—bolt.
18.	Peg—pin locating.	39.	Nut—wheel stud. DW.	59.	Hub extension R/H—rear. WW.
19.	Washer—pinion—thrust.	40.	Gasket—shaft to hub housing.	60.	Shaft—axle. WW.
20.	Washer—wheel—thrust.	41.	Seal—oil—rear hub.	61.	Welch plug—hub extension. WW.
21.	Bearing—differential.				

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THE REAR AXLE

GENERAL DESCRIPTION

The rear axle is of the three-quarter-floating type, incorporating hypoid final reduction gears. The axle shafts, pinion and differential assemblies can be withdrawn without removing the axle from the vehicle.

The rear axle wheel bearing outer races are located in the hubs; the inner races are mounted on the axle tube and secured by nuts and lock washers. Wheel studs in the hubs pass through the brake-drums and axle shaft driving flanges.

The differential and pinion shaft bearings are pre-loaded, the amount of pre-load being adjustable by shims. The position of the pinion in relation to the crown wheel is determined by a spacing washer. The backlash between the gears is adjustable by shims.

Suspension is by semi-elliptic leaf springs, rubber-mounted, and the shackles are fitted with rubber bushes of the flexing type.

LUBRICATION

The axle is filled or topped up with oil through the filler plug in the rear cover by means of an oil gun with a special adaptor.

It is of the utmost importance that only hypoid oils of the approved grades and manufacture be used if satisfactory service is to be obtained from the hypoid gears.

Inspect the oil level every 3,000 miles (5000 km.) and top up as necessary to the level of the filler opening with oil to Ref. B.

Every 6,000 miles (10000 km.) drain off the old oil and refill with new. The capacity of the axle is 2½ pints (3.3 U.S. pints; 1.56 litres).

The hub bearings are lubricated from the axle and no provision is made for any other attention.

Section H.1

REMOVING AND REPLACING A BRAKE-DRUM AND AXLE SHAFT

Jack up the car and place blocks under the spring as close as possible to the axle.

Remove the wheel.

Release the hand brake.

Unscrew and remove the two countersunk Phillips screws locating the drum and tap it from the hub. It may be necessary to slacken off the brake adjustment slightly if the shoes hold the drum.

Unscrew the countersunk Phillips locating screw in the axle shaft driving flange.

Withdraw the axle shaft by gripping the flange or

carefully prising it with a screwdriver. If the latter method is used the paper washer may be damaged and must be renewed when reassembling.

To replace the shaft and drum, reverse the above sequence of operations but note that in some models the flange locating screw is shorter than the drum locating screws, and make sure that the bearing spacer is in position.

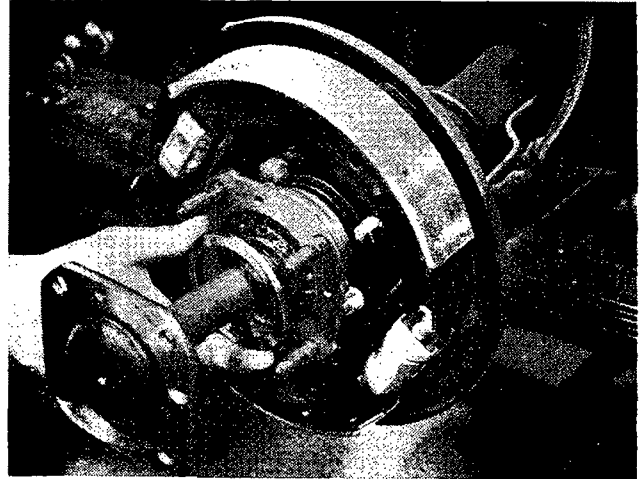


Fig. H.1.

Withdrawing an axle shaft. Note the bearing spacer which here is being replaced in the hub.

Section H.2

REMOVING AND REPLACING A HUB

Remove the drum and axle shaft as detailed in Section H.1.

Remove the bearing spacer.

Knock back the tab of the locking washer and unscrew the nut with a suitable spanner.

Tilt the lock washer to disengage the key from the slot in the threaded portion of the axle casing; remove the washer.

The hub can then be withdrawn with a suitable puller such as special tools Nos. 18G.304 and 18G.304B. The bearing and oil seal will be withdrawn with the hub.

The bearing is not adjustable and is replaced in one straightforward operation.

When reassembling it is essential that the outer face of the bearing spacer should protrude from .001 in. (.025 mm.) to .004 in. (.091 mm.) beyond the outer face of the hub and the paper washer, when the bearing is pressed into position. This ensures that the bearing is gripped between the abutment shoulder in the hub and the driving flange of the axle shaft.

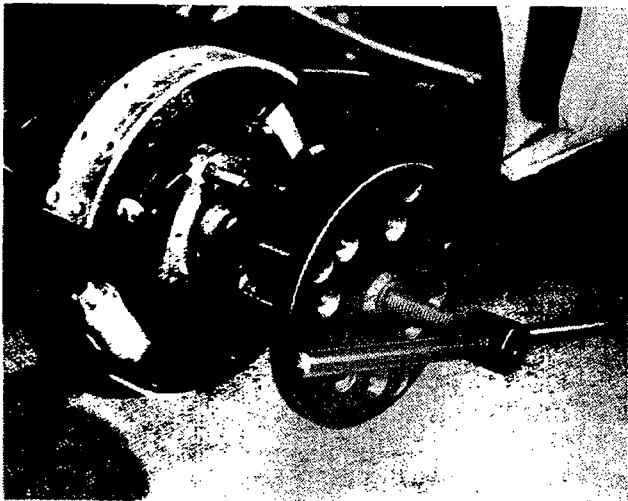


Fig. H.2

Using the special service extractor on the rear hub

Section H.3

RENEWING THE BEVEL PINION OIL SEAL

Mark the propeller shaft and the pinion driving flanges so that they may be replaced in the same relative positions. Disconnect the propeller shaft.

Knock back the lock washer and unscrew the nut in the centre of the driving flange. Remove the nut and washer and withdraw the flange and pressed-on end cover from the pinion shaft.

Extract the oil seal from the casing.

Press a new oil seal into the casing with the edge of the sealing ring facing inwards.

Replace the driving flange end cover, taking care not to damage the edge of the oil seal. Tighten the nut with a torque wrench to a reading of 140 lb. ft. (19.34 kg. m.).

Reconnect the propeller shaft, taking care to fit the two flanges with the locating marks in alignment.

Section H.4

REMOVING THE DIFFERENTIAL PINIONS

Drain the oil from the axle casing.

Remove the axle shafts as detailed in Section H.1.

Mark the propeller shaft and pinion shaft driving flanges so that they may be replaced in the same relative positions; unscrew the self-locking nuts and disconnect the joint.

Unscrew the 10 nuts securing the bevel pinion and gear carrier to the axle casing; withdraw the gear carrier complete with the pinion shaft and differential assembly.

Make sure that the differential bearing housing caps are marked so that they can be replaced in their original positions, then remove the four nuts and spring washers. Withdraw the bearing caps and differential assembly.

Tap out the dowel pin locating the differential pinion shaft. The diameter of the pin is $\frac{3}{16}$ in. (4.8 mm.) and it must be tapped out from the crown wheel side as the hole into which it fits has a slightly smaller diameter at the crown wheel end to prevent the pin from passing right through. It may be necessary to clean out the metal peened over the entry hole with a $\frac{3}{16}$ in. (4.8 mm.) drill in order to facilitate removal of the dowel pin. Drive out the differential pinion shaft. The pinions and thrust washers can then be removed from the cage.

Section H.5

REPLACING THE DIFFERENTIAL PINIONS

Examine the pinions and thrust washers and renew as required.

Replace the pinions, thrust washers and pinion shaft in the differential cage and insert the dowel pin. Peen over the entry hole.

Reassembly is now a reversal of the instructions given in Section H.4. Refill the axle with fresh oil to Ref. B (page P.2).

If it proves necessary to fit any new parts other than those detailed in Sections H.2, H.3, or H.5 the axle assembly must be set up as in Section H.7.

Section H.6

DISMANTLING THE CROWN WHEEL AND PINION

Remove the differential assembly as detailed in Section H.4.

Remove the differential bearings from the differential cage, using special tool 18G47C with adaptors 18G47T. Note that the word 'THRUST' is stamped on the thrust face of each bearing and that shims are fitted between the inner ring of each bearing and the differential cage.

Knock back the tabs of the locking washers, unscrew the nuts from the bolts securing the crown wheel to the differential cage, and remove the crown wheel.

Knock back the tab of the locking washer and unscrew the pinion nut; remove the driving flange and the pressed end cover.

Drive the pinion shaft towards the rear; it will carry with it the inner race and the rollers of the rear bearing, leaving the outer race and the complete front bearing in position.

The inner race of the front bearing may be removed with the fingers and the outer races of both bearings withdrawn with special tool 18G264, using adaptors 18G264E and 18G264F.

Slide off the pinion sleeve and shims; withdraw the rear bearing inner race from the pinion shaft with special tool 18G285, noting the spacing washer against the pinion head.

Assembly and adjustment procedure are detailed in Section H.7.

Section H.7

ASSEMBLING AND SETTING THE CROWN WHEEL AND PINION

Apart from the fitting of components as detailed in Sections H.2, H.3, and H.5 it is not permissible to fit any new parts (e.g. crown wheel and pinion, pinion bearings, differential bearings, etc.) to the axle assembly without working through the procedure given in this Section. Furthermore, if a new crown wheel or a new pinion is needed, a **mated pair—crown wheel and pinion—must be fitted.**

Fitting a new crown wheel and pinion involves four distinct operations:

- (1) Setting the position of the pinion.
- (2) Adjusting the pinion bearing preload.
- (3) Setting the crown wheel position.
- (4) Adjusting the backlash between the gears.

The following special service tools are required to enable these operations to be carried out correctly:

- Bevel pinion and differential setting gauge.
- Bevel pinion inner race remover and replacer.
- Bevel pinion outer race remover and replacer.
- Bevel pinion preload gauge.

1. SETTING THE PINION POSITION

- (1) Fit the bearing outer races to the gear carrier, using the special pinion race replacing tool.
- (2) Smooth off the pinion head with an oil-stone, but do not erase any markings that may be etched on the pinion head.
- (3) Assemble the pinion and rear bearings with a washer of known thickness behind the pinion head.
- (4) Position the pinion in the gear carrier without the shims, bearing spacer, and oil seal.
- (5) Fit the inner ring of the front bearing and the universal joint driving flange and tighten the nut gradually until a bearing preload of 10 to 12 lb. in. (·12 to ·14 kg. m.) is obtained.

- (6) Remove the keep disc from the base of the magnet. Adjust the dial indicator to zero on the machined step 'B' of the setting block.
- (7) Clean the pinion head and place the magnet and dial indicator in position (Fig. H.4). Move the indicator arm until the foot of the gauge rests on the centre of the differential bearing bore at one side and tighten the knurled locking screw. Obtain the maximum depth reading and note any variation from the zero setting. Repeat the check in the opposite bearing bore. Add the two variations together and divide by two to obtain a mean reading.
- (8) Take into consideration any variation in pinion head thickness. This will be shown as an unbracketed figure etched on the pinion head and will always be minus (—). If no unbracketed figure is shown the pinion head is of nominal thickness. Using the mean clock gauge reading obtained and the unbracketed pinion head figure (if any), the following calculation can be made:
 - (a) **If the clock reading is minus** add the clock reading to the pinion head marking, the resulting sum being minus. **Reduce** the washer thickness by this amount.

Example:

Clock reading	—·002 in
Pinion marking	—·005 in
Variation from nominal	—·007 in.

Reduce the washer thickness by this amount.

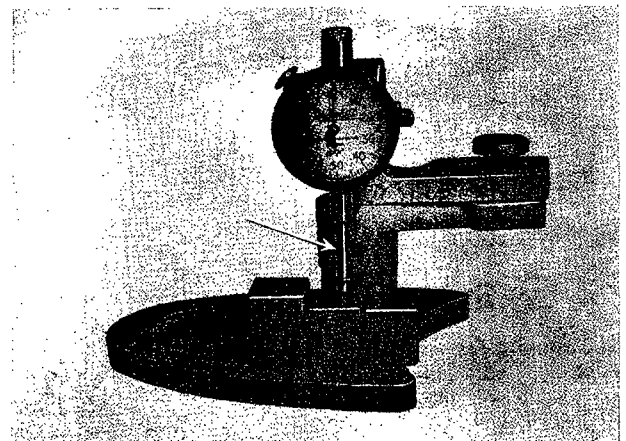


Fig. H.3

Setting the gauge to zero on the special block for determination of the pinion position. The arrow indicates the extension to the contact foot.

