

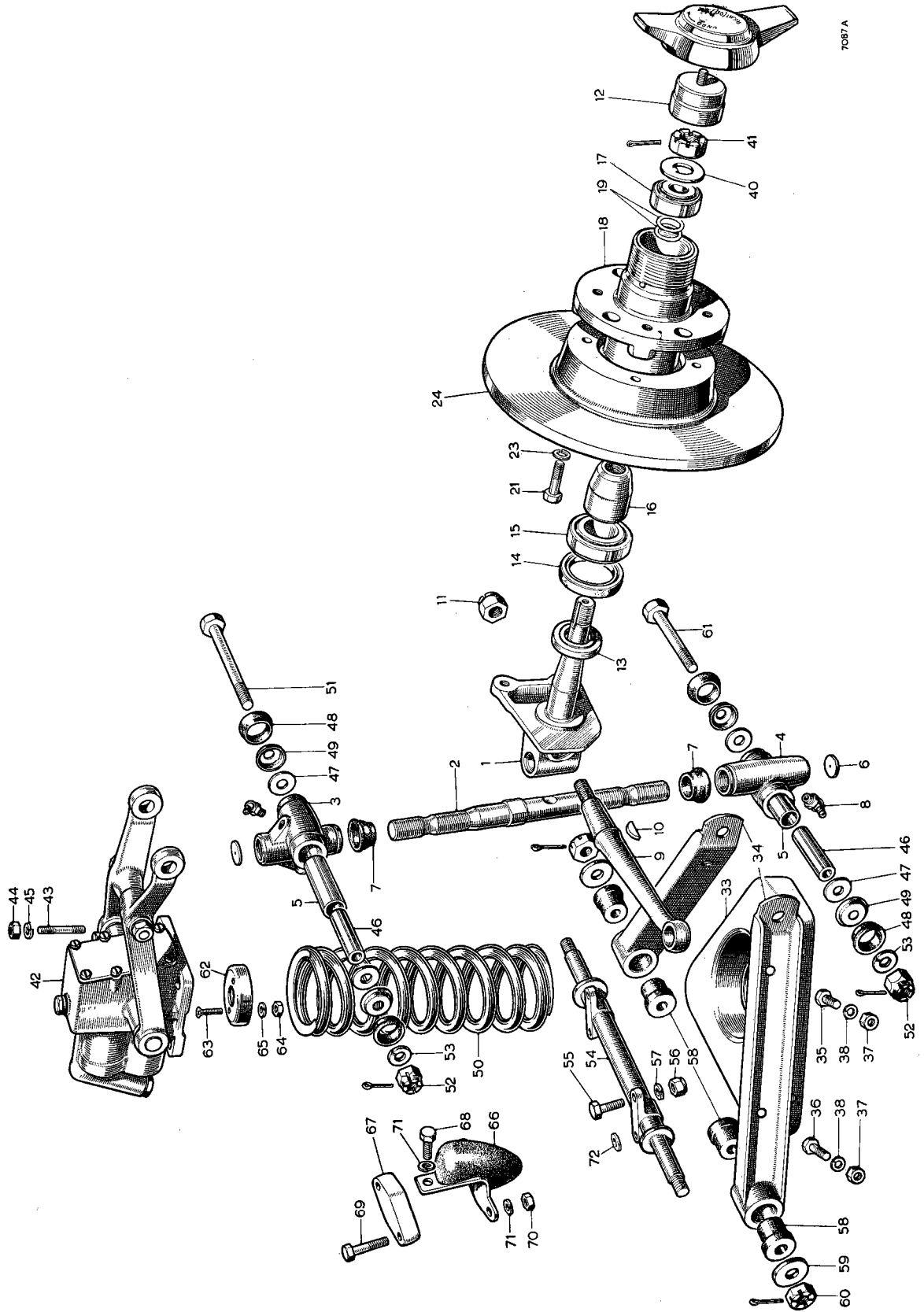
SECTION K

THE FRONT SUSPENSION

General description.

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THE FRONT SUSPENSION COMPONENTS



KEY TO THE FRONT SUSPENSION COMPONENTS

<i>No.</i>	<i>Description</i>	<i>No.</i>	<i>Description</i>	<i>No.</i>	<i>Description</i>
1.	Steering knuckle—L/H.	24.	Disc—brake.	53.	Spring washer—wishbone to link.
2.	Swivel pin—L/H.	33.	Spring pan assembly.	54.	Wishbone pivot.
3.	Link—swivel pin—upper L/H.	34.	Bottom wishbone assembly.	55.	Bolt—pivot to member.
4.	Link—swivel pin—lower—L/H.	35.	Screw—spring pan to wishbone.	56.	Nut—pivot to member bolt.
5.	Bush.	36.	Screw—spring pan to wishbone.	57.	Spring washer—pivot to member bolt.
6.	Plate.	37.	Nut—spring pan to wishbone screw.	58.	Bush for bottom wishbone.
7.	Seal—swivel pin.	38.	Spring washer—pan to wishbone screw.	59.	Washer for wishbone pivot.
8.	Grease nipple—link.	40.	Washer.	60.	Slotted nut for wishbone pivot.
9.	Steering lever—L/H.	41.	Nut (L/H thread).	61.	Bolt—bottom wishbone to link.
10.	Key—Woodruff No. 8—steering lever.	42.	Hydraulic damper.	62.	Spigot—spring.
11.	Nut for steering lever.	43.	Stud—hydraulic damper to cross-member.	63.	Screw—spigot to member.
12.	Grease-retaining cup.	44.	Nut—hydraulic damper to cross-member stud.	64.	Nut—spigot to member screw.
13.	Distance washer—hub.	45.	Spring washer—hydraulic damper to cross-member.	65.	Washer—spigot to member screw.
14.	Oil seal—hub.	46.	Distance tube—link.	66.	Check rubber.
15.	Bearing—hub—large.	47.	Thrust washer—link.	67.	Distance piece—check rubber.
16.	Distance piece—hub bearing.	48.	Seal—link.	68.	Screw—check rubber to member.
17.	Bearing—hub—small.	49.	Support—link seal.	69.	Bolt—check rubber to member.
18.	Hub assembly—front.	50.	Spring—coil.	70.	Nut for bolt—check rubber to member.
19.	Shims—bearing adjustment.	51.	Bolt—wishbone to link.	71.	Spring washer—check rubber to member.
21.	Bolt for brake disc mounting.	52.	Castle nut—wishbone to link.	72.	Plain washer—front outer head pivot to member bolt.
23.	Spring washer for disc mounting bolt.				

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THE FRONT SUSPENSION

GENERAL DESCRIPTION

The independent front suspension is the wishbone type with coil springing. The front wheels follow the road surface without influencing each other, and each wheel is permitted to rise and fall vertically. The suspension gives perfect stability with riding comfort, and by the combination of the direct-acting rack and pinion steering gear it also provides light and accurate control under all conditions.

The inner mountings of the lower wishbones are fitted with flexing rubber bearings which require no lubrication and form a silent and resilient connection to the box-section chassis frame cross-member.

The steering swivel pins are of a special design, with the top and bottom bearings threaded to provide large areas and absorb both thrust and journal loads. The swivel pin threads are of opposite hand on each side of the car and are therefore not interchangeable. The steering connection from wheel to wheel is provided by the

steering gearbox rack bar and two short tie-rods, with ball joints at each end. The outer ball joints are fitted with grease gun nipples, but the inner ball sockets are enclosed in the telescopic rubber dust excluders and are automatically lubricated from the steering gearbox.

Section K.1

REMOVING THE FRONT SUSPENSION

Lift the front of the car with a jack placed under the centre of the front cross-member until the front wheels are just clear of the ground.

Remove the front wheels.

Place the jack under each spring pan in turn and lift until the hydraulic damper arms are just clear of the rebound rubbers.

Disconnect the hydraulic brake hose (Section M.18).

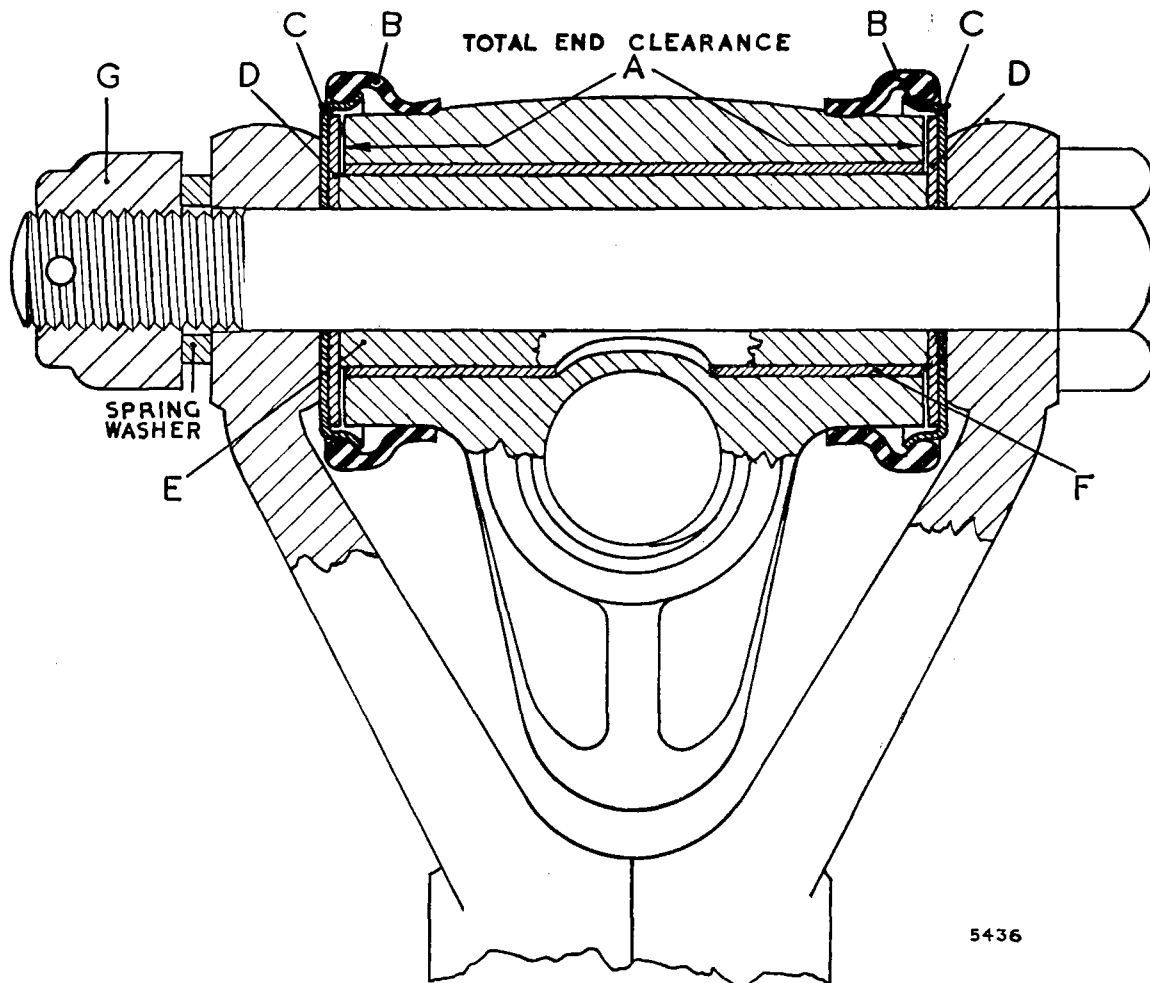


Fig. K.1

The assembly of the king pin swivel link

Slacken the steering tie-rod nuts and screw the tie-rods out of the steering ball joints, using a spanner on the flats on the rods.

Remove the split pins and nuts from the two outer fulcrum bolts. Draw out the bolts and take away the front hub and swivel pin units complete. (Take care of the thrust washers, rubber seals, retainers, and fulcrum pins.)

Release the jacks from under the spring pans.

Press down the lower wishbone assemblies and remove the coil springs.

Remove the four bolts holding the spring pan to the levers.

Remove the split pins, nuts, and washers from the ends of the inner lower fulcrum pin and slide off the levers and the rubber bushes.

Remove the bolts holding the lower fulcrum pins to the chassis cross-member.

Remove the nuts from the studs securing the hydraulic dampers to the top of the suspension cross-member.

Inside the outer ends of the suspension cross-member will be found the coil spring locating plates. These are each attached by two bolts and nuts.

Section K.2

DISMANTLING THE SWIVEL PINS

Unscrew the upper and lower links from the ends of the swivel pins. The left-hand swivel pin has a left-hand thread at each end.

The stub axle is located by a collar on the swivel pin and the stem of the steering lever engaging a groove in the pin. To separate the two the steering lever must be withdrawn from the stub axle, but this procedure is not advised unless absolutely necessary.

Section K.3

EXAMINING PARTS FOR WEAR

Examine the following parts before reassembling:

Bushes for bottom wishbone

If these are split, perished, eccentric, or oil-soaked they should be renewed.

Bottom wishbone

Examine the end holes for elongation and the assembly for looseness. If there is any sign of slackness between the wishbone arms and the pan separate the components and check the bolt holes for elongation. The bolt holes are $\frac{3}{16}$ in. (8.33 mm.) diameter.

Coil spring

Examine for cracks and check for tension, if necessary, to details in the 'GENERAL DATA' section. Renew the springs if they are defective.

Swivel link assemblies

Check the swivel links. The dimension across the thrust faces should be 2.327 in. (59.11 mm.). If these are appreciably worn the assembly of link and bush should be renewed. If the bush only is worn a new one should be pressed in, reamed, and burnished to .750 in. (19.05 mm.).

NOTE.—When pressing in this bush see that the hole in the bush faces the threaded bore. (See Fig. K.1.)

Check the threaded bores of the links on the swivel pins. When new, these are a free turning fit without slack. An appreciable amount of slack is permissible in these threaded bearings and they do not require renewal unless they are very slack.

Check the fulcrum pin distance tubes for scoring or wear. These should be 2.337 in. (59.36 mm.) long by .7480 in. (19.00 mm.) diameter.

Examine the case-hardened thrust washers for ridges; the faces should be flat and parallel within .0005 in. (.01 mm.).

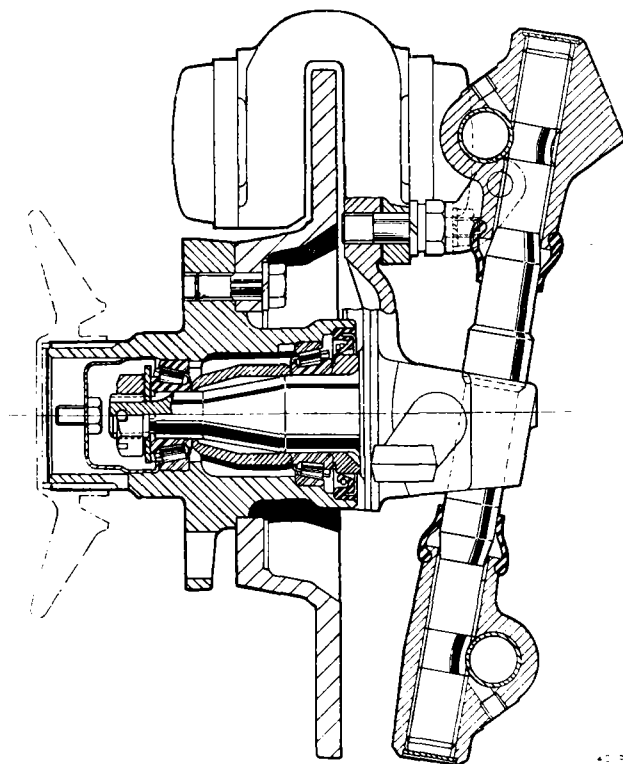


Fig. K.2

A section of the front hub and brake disc. The brake unit is shown out of position for clarity

The thickness should be .068 to .065 in. (1.73 to 1.68 mm.), the bore .510 to .505 in. (12.95 to 12.83 mm.), and the outside diameter 1.25 in. (31.75 mm.).

When the swivel links, distance tubes, and thrust washers are assembled the total end clearance between the link and the thrust washers should be .008 to .013 in. (.2 to .33 mm.) (see [A], Fig. K.1).

Check that all grease nipples are clear.

Examine the rubber seals, and if these are perished or split renew them.

Section K.4

REASSEMBLING THE SWIVEL PINS

The swivel pin assembly may be reassembled without difficulty by carrying out the removal instructions in the reverse order, provided the following points are given special attention:

- (1) The swivel pin and links fitted to the left-hand side of the car have left-hand threads at each end and those fitted to the right-hand side have right-hand threads.
- (2) The swivel pin links screw onto threads on each end of the swivel pin and the threads are waisted at their centre to avoid fouling the pivot bolts passing through the links. Before the pivot bolt is replaced the link must be correctly positioned on the thread.

First screw the link onto the swivel pin until the waisted portion of the pin lines up with the pivot bolt hole.

Place the pivot bolt in position in the link and screw the link to the extent of its maximum travel on the swivel pin thread; this is about three revolutions total. Screw the link back approximately one and a half times to obtain the maximum clearances for the pivot pin in each direction.

The lower link must also be centralized in a similar manner before the swivel pin is fitted to the suspension arm.

- (3) Before the lower steering knuckle link is bolted in position ensure that both thrust washers and rubber seals are fitted correctly (see Fig. K.1) and make sure that the links have a total end-clearance of .008 to .013 in. (.2 to .33 mm.) between the end faces of the link and the thrust washers.

Section K.5

REPLACING THE FRONT SUSPENSION

Bolt up the coil spring top locating plates inside the front cross-member.

Replace the hydraulic dampers.

The dampers are interchangeable from side to side.

Bolt up the lower fulcrum pins. The two front outer bolts have their nuts uppermost and the six other bolts have their nuts below.

Fit the rubber bushes into the lower levers. These bushes will be found to be a loose fit in the lever, but when clamped up by the nut and washer will expand into their housing. These bushes do not rotate on their surfaces, the angular movement being taken up by the flexing of the rubber.

Special care should be taken when assembling these bushes to maintain a central location so that the expansion of each half of the bush is equal.

To attain this insert each bush so that it protrudes equally each side of the housing (see Fig. K.4), and then clamp up with the washer and nut and fit the split pins. When central, the outer flanges of the bushes should all be of equal proportions.

It is essential to clamp up the bushes when the lower suspension levers are set parallel with the ground to ensure even stresses on the bushes in service.

Fit the spring pans between the levers, but with the heads of the bolts inside the spring pan.

Do not fully tighten up the spring pan bolts—leave them half a turn slack.

Press down the lower wishbone assemblies.

Smear each end of the coil springs with grease to prevent any slight squeaking in operation.

Push the coil springs up into the cross-member and over the locating plates.

Jack up the lower wishbone assemblies until they are approximately parallel to the ground.

NOTE.—The king pin bearing threads, the stub axles, and the stub axle nuts are right-hand-threaded on the right-hand side of the car and left-hand-threaded on the left-hand side.

Fit the swivel pin and hub units to the suspension levers.

Ensure that the thrust washers, rubber seals, and retainers are assembled in the right order (see Fig. K.1).

Lubricate these parts and the fulcrum pins during assembly and again afterwards with the grease gun, using the recommended lubricant as detailed on page P.7.

Do not fully tighten up the top or bottom slotted nuts—leave them half a turn slack.

Connect up the hydraulic brake hoses. See the correct method as explained in Section M.18.

Screw the steering tie-rods into the outer steering ball joints. Screw the rods right in and then slack off five complete turns. This will give a rough wheel alignment and render subsequent accurate alignment easier.

Adjust and bleed the front brakes as detailed in Section M.2.

Fit the front wheels.

Bounce the front end of the car up and down a few times. This allows the suspension fulcra to settle down.

Tighten the spring pan bolts and the outer fulcrum bolts, fitting new split pins.

Check and adjust the front wheel alignment.

Section K.6

REMOVING AND DISMANTLING A FRONT HUB

Apply the hand brake and raise the front of the car until the wheel to be operated on is clear of the ground.

Remove the wheel.

Remove the wheel brake unit as detailed in Section M.7.

Withdraw the grease retainer by applying a suitable extractor to the thread on the cap.

Extract the split pin from the stub axle nut and remove the nut, remembering that the stub axle on the left-hand side of the car has a left-hand thread.

Draw off the hub and brake disc assembly, using special tool 18G304. The brake disc can now be removed from the hub by removing the four securing screws and spring washers.

Remove the distance washer, which will have remained on the stub axle.

The centre of the outer hub bearing may now be withdrawn together with the shims which are fitted between the bearing and the distance piece.



Fig. K.3

Withdrawing the front hub, using special tool 18G304

Remove the oil seal and draw out the centre of the inner bearing and the bearing distance piece.

Place the hub on a press with the outer end downwards and press out the outer bearing ring. Press out the inner bearing ring in the same manner with the inner end of the hub downwards.

Section K.7

REASSEMBLING AND REPLACING A FRONT HUB

If all grease has been cleaned from the hub and the bearings washed for examination, ensure that they are repacked with grease before the hub is reassembled.

Press the two bearing outer rings into the hub. Insert the bearing distance piece. Fit the inner bearing centre, the oil seal, and the distance washer, with the metal face of the oil seal and the chamfered side of the distance washer away from the bearing.

Mount the assembly on the stub axle shaft and fit the adjusting shims and outer bearing centre. Adjust the bearing end-float if necessary, and, finally, lock up as detailed in Section K.8.

Pack the assembly with grease and replace the grease-retaining cap. Replace the wheel brake unit as detailed in Section M.10

Section K.8

ADJUSTING THE FRONT HUB BEARINGS

The end-float in the hub bearings must be checked and adjusted whenever the hub has been dismantled for attention or when the play in the hub bearings becomes excessive. The end-float is adjustable by means of shims situated between the outer bearing and the bearing distance piece.

Proceed as follows to obtain the correct setting:

- (1) Assemble the hub, **using no shims**, and mount the assembly on the stub axle. Fit the stub axle nut and washer and tighten the nut until the hub bearings bind. This will pull the outer rings of the bearings fully against their locating flanges inside the hub.
- (2) Remove the stub axle nut and washer and pull out the centre of the outer bearing. Insert a sufficient thickness of shims to **produce an excessive amount of end-float** and note the total thickness of the shims used. Fit the bearing centre, stub axle nut, and washer and tighten the nut.
- (3) Measure accurately the total amount of end-float in the bearings. Remove the stub axle nut, washer, and inner bearing centre. Reduce the number of shims to a thickness which will give an end-float of between .001 and .002 in. (.025 and .051 mm.).

- (4) Replace the stub axle nut and washer and fully tighten the nut, when the hub bearings should be felt to bind slightly. Slacken off the nut approximately one castellation to allow the hub to rotate freely. Insert a new split pin through the hole provided in the hub and lock the stub axle nut.

Section K.9

REMOVING AND REPLACING THE FRONT COIL SPRING

Apply the hand brake and jack up the front end of the car until the wheels are clear of the ground, using a suitable jack placed under the centre of the front cross-member.

Remove the front wheel on the side affected.

Place an additional jack under the lower spring pan and jack up until the hydraulic damper levers are clear of the rebound rubber.

Remove the lower fulcrum bolt.

Swing up the hub unit and rest it on a suitable block.

Release the jack from under the spring pan, press down the lower wishbone assembly, and remove the coil spring.

Replacement is carried out in the reverse manner to that detailed for removal.

NOTE.—Take care that the thrust washers, rubber seals, and retainers are assembled in the right order (see Fig. K.1).

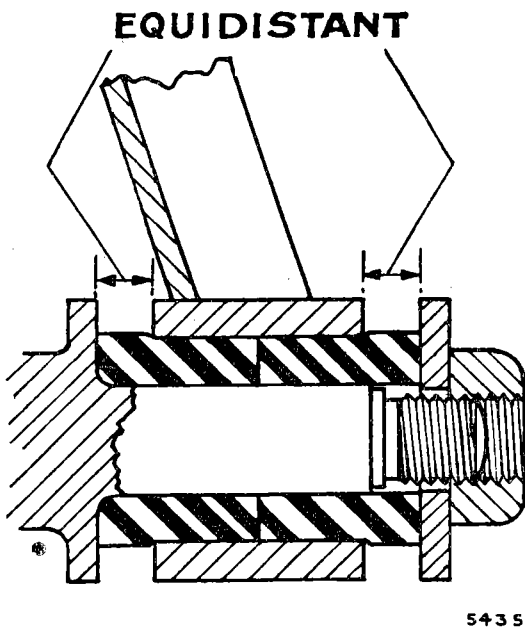


Fig. K.4

The correct method of clamping the rubber bushes of the lower suspension arm

K.8

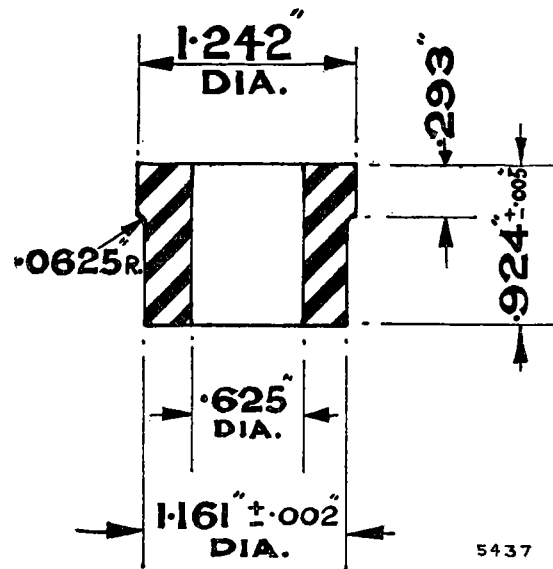


Fig. K.5

The dimensions of the lower wishbone bushes when in new condition

Lubricate these parts and the fulcrum pins during and after assembly.

Smear each end of the coil spring with grease and ensure that the upper end of the spring is correctly located.

Section K.10

FITTING NEW RUBBER BUSHES

Remove the coil springs as detailed in Section K.9.

Remove the four bolts holding the spring pan to the levers.

Remove the cotters, nuts, and washers from the ends of the inner lower fulcrum pin and slide off the levers and the rubber bushes.

Fit the new rubber bushes into the levers. These will be found to be quite a loose fit in the lever, but when clamped up by the nut and washer will expand into their housing. These bushes do not rotate on their surfaces, the angular movement being taken by the rubber deflecting torsionally in itself. Special care should be taken when assembling these bushes to maintain a central location so that the expansion of each half of the bush is equal.

To attain this insert each bush so that it protrudes equally each side of the housing (see Fig. K.4), and then clamp up with the washer and nut. When central, the outer flanges of the bushes should be of equal proportions.

It is essential to clamp up the bushes when the suspension levers are set parallel with the ground to ensure even stresses on the bushes.

Now fit the spring pan between the levers, but with the heads of the bolts inside the spring pan.

Do not fully tighten up the spring pan bolts—leave them half a turn slack.

Press down the lower wishbone assembly.

Smear each end of the coil spring with grease and push the spring up into the front cross-member and over its top locating plate.

Jack up the lower wishbone assembly until it is approximately parallel to the ground.

Swing down the hub unit and fit the lower fulcrum bolt.

NOTE.—Take care that the thrust washers, rubber seals, and retainers are assembled in the right order. (See Fig. K.1.)

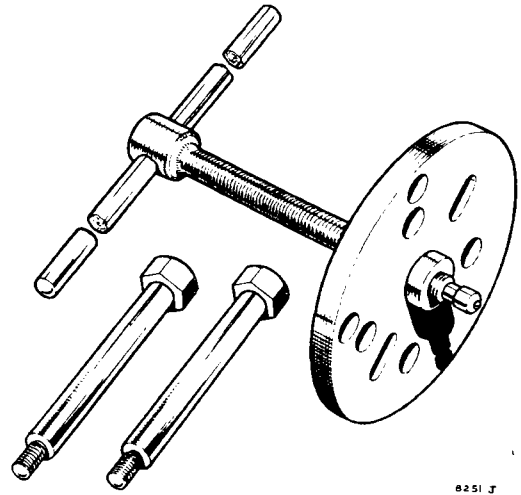
Lubricate these and the fulcrum pin with the grease gun during and after assembly.

Remove the jack from under the wishbone assembly.

Finally, tighten up the spring pan bolts and insert the split pins in all castellated nuts.

SPECIAL TOOLS

18G304. Hub Remover (basic tool)



18G304C. Adaptor Bolts

The remover 18G304 is a basic tool used for numerous applications. When used with the adaptor bolts 18G304C the most difficult hub can be withdrawn with ease and without damage.

