SECTION J

THE FRONT SUSPENSION

Checking and Adjusting Front Wheel Alignment.

When checking the track width at the front and rear of the front wheels, use a trammel, or any special proprietary alignment equipment available.

The wheels should run parallel and have no toe-in. The correct setting is obtained with equal measurements back and front.

See that the tyres are inflated to the correct pressures.

Set the wheels in the straight-ahead position.

Set the arms of a trammel to the height of the hub centre.

Place the trammel to the rear of the wheels and adjust to the centre of the tyre treads. Chalk the tread of the tyres and mark chalked patch with the trammel vertically. Push the car forward one half-turn of the wheels and take the front reading from the same marks on the tyres.

If adjustment is necessary, proceed as follows:—

Slacken off the locknuts at the end of the short tie-rods.

By means of the spanner flats on the rods, rotate each of the tie-rods equally in the desired direction. These both have right-hand threads.

NOTE: To ensure that the steering gearbox rack is in the central position and that the steering geometry is correct, it is important that the tie-rods are adjusted to exactly equal lengths. This can be ascertained by measuring from the end of the flats to the locknuts.

To Measure Camber.

In the static position the wheel has 1° positive camber, but from this static position to full bump or rebound the camber changes to minus $\frac{1}{2}$°.

Ensure that the tyre inflation pressures are correct and that the load on the axle is 9 cwt. 3 qrs.

Make sure also that the wheels are in the straight-ahead position when the check is made.

To Measure Castor Angle.

In the static position this angle is 2° $\pm$ $\frac{1}{2}$°.

Check that the vehicle is on a level surface, that the front wheels are in the straight-ahead position, that the tyres are correctly inflated, and that the load on the axle is 9 cwt. 3 qrs.

To Measure King Pin Inclination.

In the static position this angle is 9°, but from full bump to rebound this varies by $1\frac{1}{2}$°, making it important to take the measurements with the correct load on the axle.

NOTE: To ensure correct checking of the steering angles we recommend the use of location jigs and jacks. This ensures that the chassis frame is square and in the correct static position.

Place the car on a flat surface, remove the rear wheel and drop the frame down onto the screw-type jack.

Place the front support under the centre of the front suspension wishbone pivots. Weight down or pull down the front end of the car firmly onto the front support. Use manually operated jacks to relieve the tyre grip when swinging the wheels to check the angles and to bring the frame members parallel to the ground surface.

Removing the Front Suspension.

Jack up the front of the car by a suitable jack placed under the centre of the front cross-member, until the front tyres are just clear of the ground.

Place two additional jacks under the spring pans.

Remove the front wheels. Block up under chassis.

Jack these up, taking some of the weight, until the hydraulic damper levers are just clear of the rebound rubbers.

Disconnect the hydraulic brake hoses.

Slacken the steering tie-rod nuts and screw the tie-rods out of the steering ball joints by means of the flats on the rods.

Remove the cotters 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 cotters, 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 bolts holding the hydraulic dampers to the top of the chassis cross-member.

Inside the outer ends of the front cross-member will be found the coil spring locating plates. These are each attached by one small bolt.

To Dismantle 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.

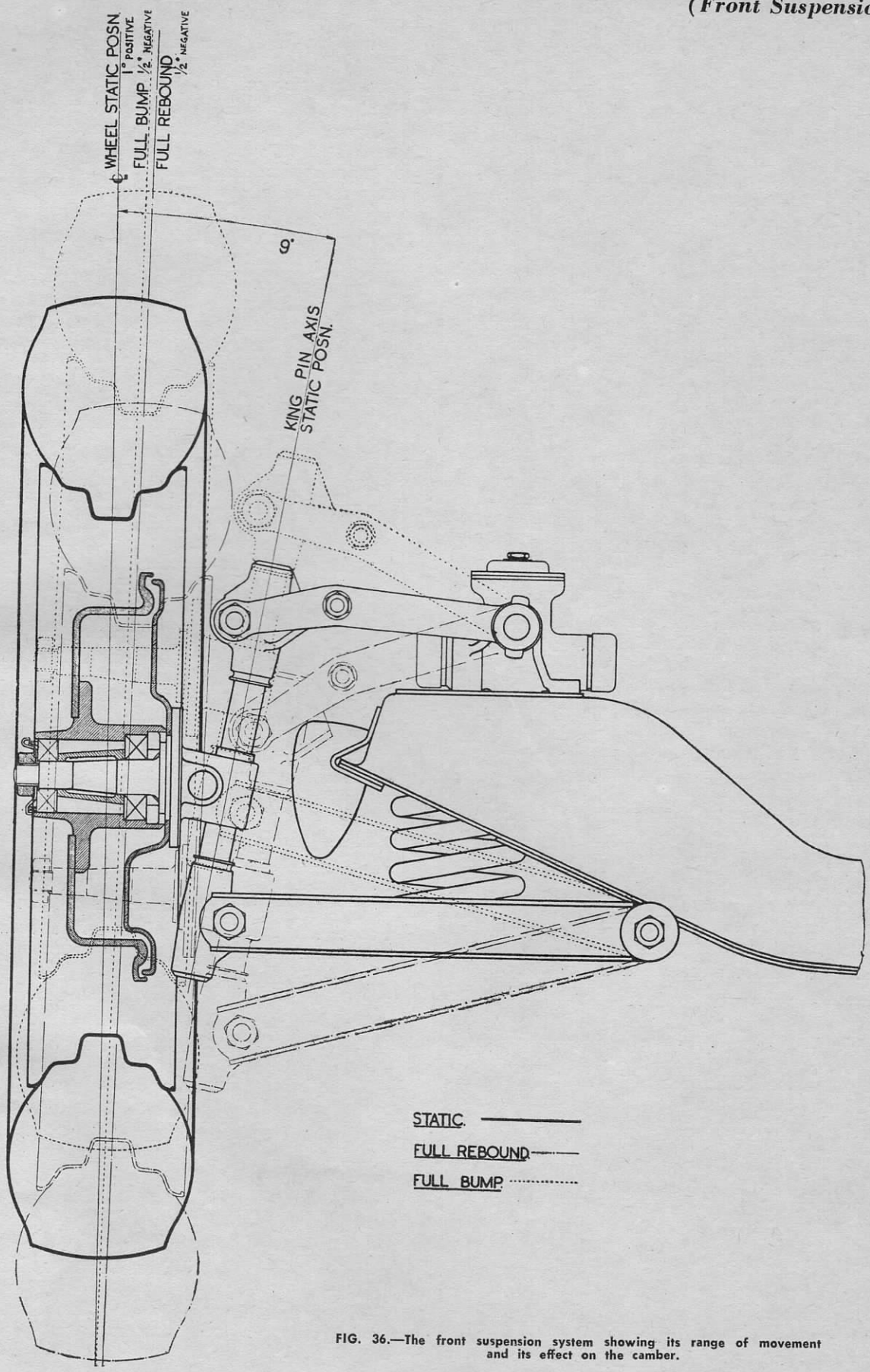

FIG. 36.—The front suspension system showing its range of movement and its effect on the camber.

Examination of Front Suspension Parts for Wear.

The following parts should be examined before reassembly:—

Bushes for Bottom Wishbone.

If these are split or perished, eccentric, or oil-soaked, they should be replaced. A bush in new condition should have the dimensions given in Fig. 38.

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 21/64 diameter.

Coil Springs.

Examine for cracks and check for tension, to details below:—

Free length	9.59 $\pm\frac{1}{16}$
Loaded to 1,095 lbs.	6.44 $\pm\frac{1}{32}$

Renew the springs if they are defective.

Swivel Link Assemblies.

Check the swivel links. The dimension across the thrust faces should be 2.327 ±.0015. If these are appreciably worn the assembly of link and bush should be renewed. If the bush ony is worn, a new one should be pressed in and reamed and burnished to .750 ±.0005.

NOTE: When pressing in this bush see that the hole in the bush faces the threaded bore.

Check the threaded bores 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 ±.0015 long by .7485 to .7480 diameter.

Examine the case-hardened thrust washers for ridges; the faces should be flat and parallel within .0005.

The thickness should be .068 to .066, the bore .510 to .505 and the outside diameter 1.25.

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.

Check that all grease nipples are clear.

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

Replacing the Front Suspension.

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

Bolt on the hydraulic dampers.

The dampers are interchangeable from side to side.

Bolt up the lower fulcrum pins. The two rear inner 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 quite a loose fit in the lever, but when clampd up by the nut and washer will expand into their housings. These bushes do not rotate on their surfaces, the angular movement being taken up by 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, and then clamp up with the washer and nut and fit the cotter 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 tighten up the spring pan bolts solid, but leave them half a turn slack.

Press down the lower wishbone assemblies.

Smear each end of the coil springs with grease to prevent any 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.

Assemble the hub units and swivel pins.

NOTE: The stub-axle and nut is right-hand thread for the right-hand side and left-hand thread for the left-hand side.

The king pin bearing threads are also right-hand thread for the right-hand side and left-hand thread for the left-hand side.

Fit the front hub units to the suspension levers.

Ensure that the thrust washers, rubber seals and retainers are assembled in the right order.

Lubricate these parts and the fulcrum pins during assembly and again afterwards with the grease gun.

Do not tighten up the top or the bottom slotted nuts solid, but leave them half a turn slack.

Connect up the hydraulic brake hoses.

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.

Bleed and adjust the front brakes.

Fit the front wheels.

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

Now tighten the spring pan bolts and then tighten and cotter up the outer fulcrum bolts.

Check and adjust the front wheel alignment.

Reassembly of 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 clearance for the pivot pin in each direction.

If the brake plate has been removed from the swivel pin assembly, the lower link must also be centralised in a similar manner before the brake plate is replaced and 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 and make sure that the links have a total end clearance of .008 to .013 between the end faces of the link and the thrust washers.

NOTE: Make sure to locate the lower link assembly correctly because it cannot be set once the brake back plate is fitted.

Removal and Replacement of the Brake Drum and Hub.

Prise off the hub cover, raise the car until the wheel to be operated on is clear of the ground, and unscrew the stud nuts and remove the wheel.

The brake drums are attached to the wheel hubs by countersunk-headed screws, the inner ends of which are riveted over. These screws must not be disturbed and a complete brake drum and hub assembly must be used for replacement. The brake-drum, complete with hub, must be removed to give access to the brake shoes. In some cases, the hub and brake drum are cast in one piece.

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

Remove the grease-retaining disc and felt washer.

Place the hub extractor (Special Tool, Part No. 68822) in position over the wheel studs and replace the stud nuts to retain it in position. Use the central extractor screw to withdraw the brake drum and hub assembly.

The inner ball race bearing spacer and oil seal will remain on the stub axle and must be withdrawn with the aid of the special service extractor Part No. 68895. Care must be taken not to damage the oil seal at the rear of the bearing.

Important.—When the front hub has been removed the inner bearing, oil seal and hub distance washer must be removed from the stub axle and replaced in the hub before it is refitted to the stub axle. If the hub is pressed on the shaft without first fitting the bearing and oil seal to it, the inner bearing will re-enter its housing but the oil seal will only be pushed further from its correct position.

Replacement of the 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.

Replace the bearing spacer with the chamfered side towards the small outer bearing and then press the large bearing into position. Replace the oil seal and distance washer. The metal face of the oil seal and the recessed side of the distance washer are fitted away from the bearing.

Replace the hub on the stub axle shaft and fit a new felt washer. Refit the grease retainer and replace and tighten the hub nut.

Removing and Replacing the Front Coil Spring.

Jack up the front end of the car until the wheels are clear of the ground, using a 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 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.

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

Smear each end of the coil spring with grease.

Fitting New Rubber Bushes to Lower Wishbone Inner Fulcrum.

Remove the coil springs as detailed and take out 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.

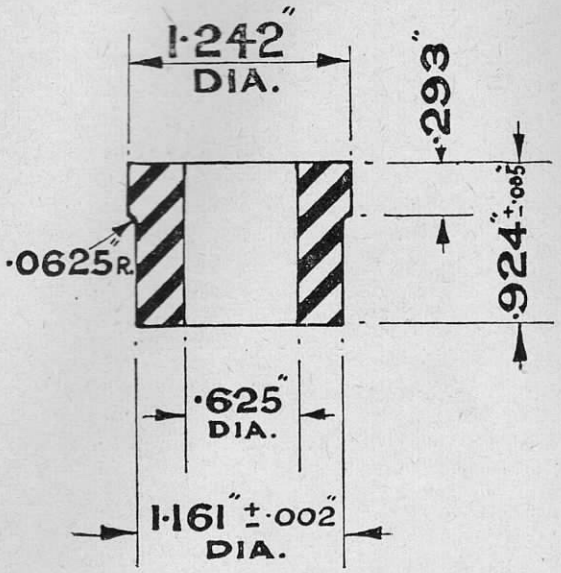

FIG. 37.—The dimensions of the lower wishbone bushes when in new condition.

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, 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 tighten up the spring pan bolts solid, but 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 washer, rubber seals and retainers are assembled in the right order.

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

Remove the jack from under the wishbone assembly.

Finally tighten up the spring pan bolts.

Grease Leakage from Front Hub.

The front hubs on earlier models have been subject to grease leakage from the outside felt, and later cars have a grease cap fitted to the hub end, which eliminates this trouble.

For existing cars without grease caps a special service cap is available, which is retained in position by a spring and provided with a rubber sealing gasket. Full details can be obtained from the nearest M.G. Dealer.

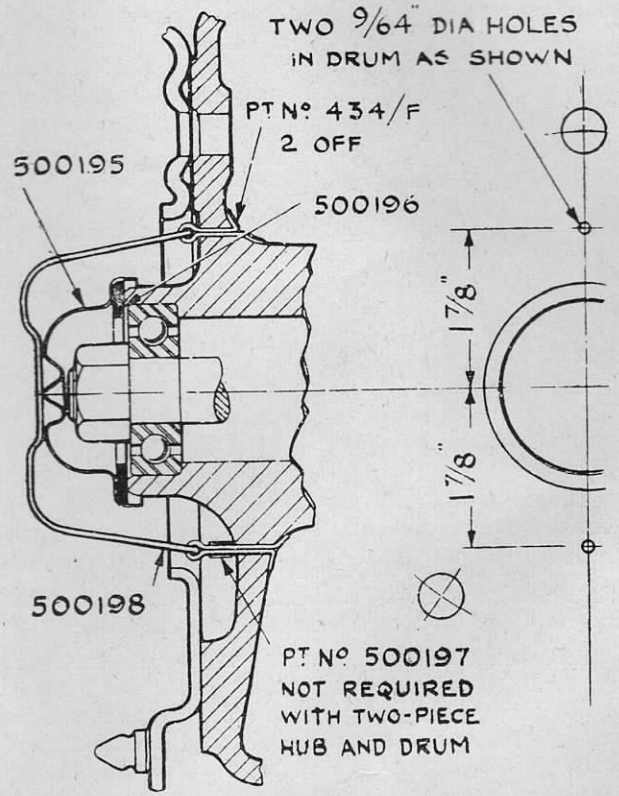

FIG. 38.—The method of fitting the oil seal on the front hub.