

SECTION J

THE STEERING GEAR

General Description.

Maintenance.

- Section No. J.1 To remove the steering wheel and telescopic extension.
- Section No. J.2 To replace the steering column bushes (top and bottom).
- Section No. J.3 To take out the steering column.
- Section No. J.4 Removal and replacement of the steering gearbox.
- Section No. J.5 Dismantling the steering gearbox.
- Section No. J.6 Adjustment of the inner steering ball joint.
- Section No. J.7 Adjustment of the rack damper.
- Section No. J.8 Steering arm ball joints.

GENERAL DESCRIPTION

The steering gear is of the direct-acting rack-and-pinion type, providing light and accurate control under all conditions.

It consists of a rack bar and toothed pinion, both working in the plain bearings of the housing.

No adjustment for bearing wear in the box is provided, except by the fitting of the necessary new parts.

When in new condition the backlash in the tooth engagement is hardly perceptible, i.e. .001 in. to .003 in. (.025 mm. to .075 mm.).

The steering mast is attached to the steering gearbox by a rubber-bushed coupling to insulate it from road shocks.

MAINTENANCE

All working parts are immersed in oil and an oilgun nipple is provided in the centre of the box. (See Fig. J.1.)

Felt bushes are fitted to the steering column. (See illustration on page J.2.) These are impregnated

with oil and graphite, and no lubrication should be necessary, but if after long periods a dry squeak develops, this may be cured by a small application of oil.

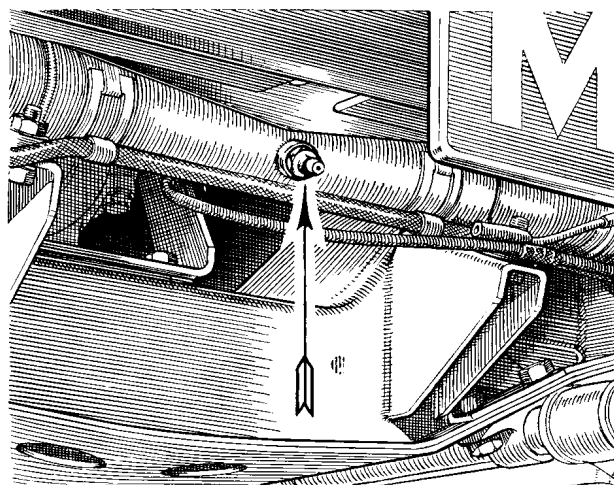
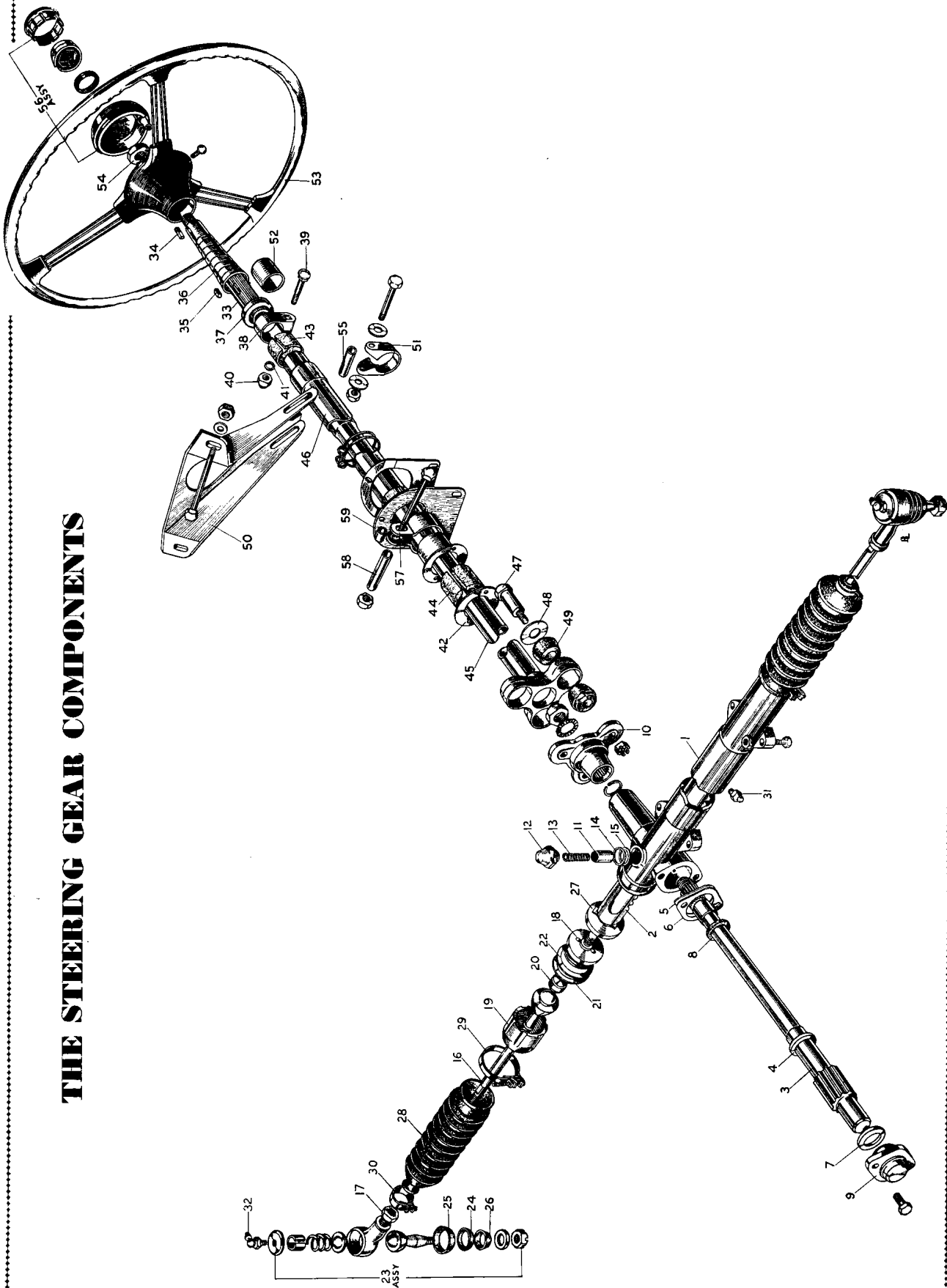


Fig. J.1.

The oil nipple in the centre of the steering gearbox is readily accessible from underneath the front number-plate.

THE STEERING GEAR COMPONENTS



KEY TO THE STEERING GEAR COMPONENTS

No.	Description	No.	Description	No.	Description
1.	Rack housing—steering.	21.	Shim—ball seat adjuster (.003 in.).	41.	Washer—clamp bolt.
2.	Rack—steering.	22.	Shim—ball seat adjuster (.005 in.).	42.	Plate—bottom bush.
3.	Pinion—steering.	23.	Ball socket assembly—outer.	43.	Bush—top.
4.	Thrust washer—top—pinion.	24.	Cap—inner—grease retaining.	44.	Bush—bottom.
5.	Shim (.005 in. thick)—tail bearing.	25.	Cap—outer—grease retaining.	45.	Inner column—welded—complete.
6.	Shim (.007 in. thick)—tail bearing.	26.	Pressure ring—for caps.	46.	Outer column.
7.	Thrust washer—bottom—pinion.	27.	Lock washer—ball housing—inner.	47.	Bolt—column flange to box flange.
8.	Seal—pinion.	28.	Seal—ball joint.	48.	Washer—column flange bolt.
9.	Tail bearing—pinion.	29.	Clip—large.	49.	Rubber bearing—column.
10.	Flange—pinion.	30.	Clip—small.	50.	Support bracket—top.
11.	Damper pad—rack.	31.	Grease nipple ($\frac{3}{16}$ in. straight)—rack housing.	51.	Clamp—steering column.
12.	Housing cap—damper pad.	32.	Grease nipple ($\frac{3}{16}$ in. \times 90°)—steering arm.	52.	Distance tube—column adjustment.
13.	Spring—damper pad.	33.	Adjustable top end.	53.	Steering wheel.
14.	Shim (.003 in.)—damper pad housing.	34.	Key—steering wheel.	54.	Nut—steering wheel.
15.	Shim (.020 in.)—damper pad housing.	35.	Key—connector.	55.	Distance-piece—steering column clamp.
16.	Tie-rod.	36.	Spring cover.	56.	Decorative horn push and steering column control head assembly.
17.	Locknut or tie-rod.	37.	Cover cup.	57.	Clip—steering column steady.
18.	Ball housing—male.	38.	Clamp—steering column.	58.	Distance tube—long.
19.	Ball housing—female.	39.	Bolt—clamp.	59.	Distance tube—short.
20.	Ball seat.	40.	Nut—clamp bolt.		

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Section J.1

TO REMOVE THE STEERING WHEEL AND TELESCOPIC EXTENSION

Remove the clamping nut from the telescopic adjustment clamp and extract the clamping bolt.

This will permit the wheel to be withdrawn to its full extent and enable the plated helical sleeve to be contracted towards the wheel to reveal the key at the upper end of the column which engages the long key-way in the splined adjustable shaft.

Remove the key from the column by pushing a strip of thin metal into the keyway and under the key. Lift it out of its housing in the column sufficiently to enable it to be picked out.

This will release the steering wheel and telescopic column assembly which can then be removed to a bench for further dismantling if necessary, but this will seldom be required.

Take off the "M.G." medallion at the wheel boss. There is a countersunk locating screw which enters from the side.

Undo the large nut holding the wheel to the shaft.

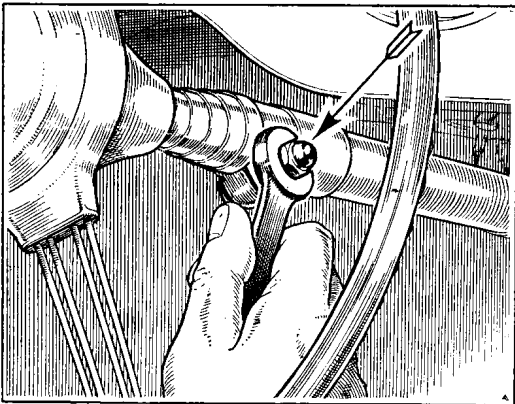


Fig. J.2.

The clamping nut for the adjustable steering column.

Support the hub of the wheel suitably and with a shouldered copper drift carefully drive the splined shaft out of the wheel, taking care of the flat key locating the wheel to the splined shaft. Alternatively an extractor can be used to part the two components.

Section J.2

TO REPLACE THE TOP AND BOTTOM STEERING COLUMN BUSHES

Remove the wheel and extension as described in Section J.1.

Pick out the old felt bush and feed in the new one which should be coated with graphite grease on the face which contacts the inner column.

Bottom

Remove the thin cover-plate by undoing the three small screws. Then pick out the old felt bush and insert a new one after first coating it with graphite grease on its inner face.

Section J.3

TO TAKE OUT THE STEERING COLUMN

Remove the steering wheel as in Section J.1.

Take out the bolt and nut from the support clip under the dash. Then take out the bolt and nut holding the steering column to the body steady bracket (this is on the engine side of the bulkhead).

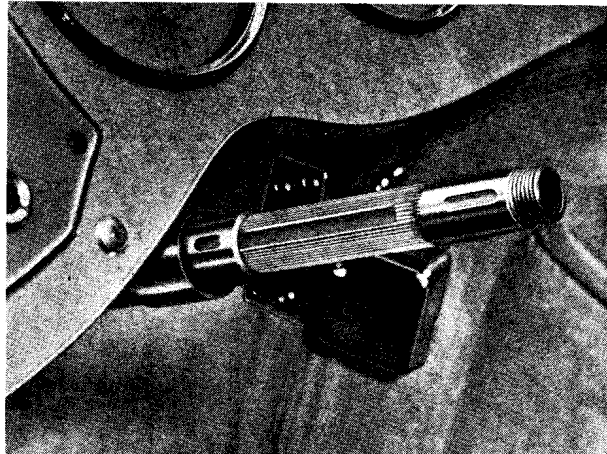


Fig. J.3.

The splined upper end of the steering column, showing the keyways.

Remove the split pins, take off the nuts and unscrew the three bolts at the universal joint. Do not lose the rubber inserts.

This will free the inner and outer columns, which may be pulled out towards the front in the space between the radiator and the wing.

When reassembling note that the screws on the universal joint should be tightened fully up against their shoulders.

Section J.4

REMOVAL AND REPLACEMENT OF THE STEERING GEARBOX

Raise the car at the front and block up under the chassis. Remove the wheels and disconnect the two track-rods at their outer ends.

Detach all electric cables which, it will be found, are secured to the unit by means of clips.

Remove the outer ball joint on the same side as the steering column, taking care not to lose its position for reassembly.

Undo the engine steady rod and remove its mounting bracket from the chassis.

Remove the three screws and nuts at the universal joint on the steering column and then detach the steering gearbox from the frame (four bolts and nuts).

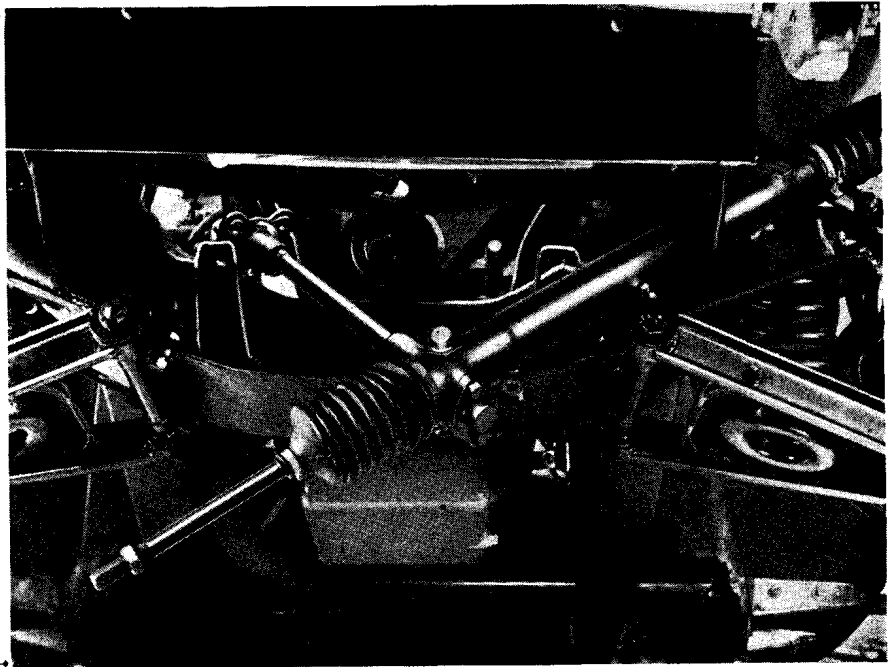
By sliding the complete unit to one side it will be

Hold the rack bar in suitable clamps in a vice, knock back the lock washers and undo the ball joint caps with the special spanner, Tool No. T.114 (see Section Q). The ball seat and shims should now drop out.

Screw out the ball seat housing with a special claw spanner, Tool No. T.113 (see Section Q).

Note.—Should the ball joint caps come away complete with the ball seat housing it will be necessary to dismantle with the use of Tool No. T.122 (see Section Q).

Fig. J.4.
Showing the method of withdrawing the steering gearbox assembly from the front under side of the vehicle.



possible to pull the track-rod, from which the ball end has been removed, through the large hole in the chassis and then the whole unit may be lifted away to the front.

Replacement is a reversal of this process.

Section J.5

DISMANTLING THE STEERING GEARBOX

Undo the clips and remove the concertina rubber dust excluders.

Unscrew the rack damper housing cap and remove the damper spring. The pressure pad can then be lifted away. A number of shims will be found under the cap (see Fig. J.5), which should be kept carefully.

Remove the pinion shaft cap bolts and cap.

Remove the coupling nut and slide off the coupling.

Take off the circlip against which the coupling locates.

Withdraw the pinion shaft, holding the gear with the pinion upwards and leaving behind the thrust washer. This thrust washer is trapped behind the rack teeth.

Remove the rack damper and shims and withdraw the rack bar from the housing.

Examination

Fractures in the teeth, hollows or any roughness on the surfaces of the teeth will render the parts unserviceable.

Check the rack bar and pinion shaft in the housing for wear or scoring.

The diameter of the rack bar is 1.121 in. to 1.120 in. (28.47 mm. to 28.45 mm.) and the bore of the housing is 1.136 in. to 1.130 in. (28.85 mm. to 28.7 mm.) at the pinion end and 1.124 in. to 1.126 in. (28.55 mm. to 28.60 mm.) at the other end.

The pinion shaft is .748 in. to .7485 in. (19.00 mm. to 19.01 mm.) diameter at the top and .624 in. to .6235 in. (15.85 mm. to 15.84 mm.) at the bottom. The bore of the housing is .7505 in. to .750 in. (19.06 mm. to 19.05 mm.) and the bore of the cap .6255 in. to .626 in. (15.90 mm. to 15.91 mm.). If a new cap is fitted this will be found to be supplied with an undersize bore and will need reaming in line with the housing with a special reamer, Tool No. T.112 (see Section Q).

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Make sure that the oil groove is fitted to the top when reaming.

Check the felt washer and the rubber bellows and renew if necessary.

Examine the steering rod balls and caps for wear and renew as necessary or readjust as detailed later.

Replacement is a reversal of the above process.

Note.—When replacing the pinion shaft see that the thrust washers have their chamfered sides towards the pinion. End float should be .002 in. (.05 mm.) to .005 in. (.13 mm.) and is set by the shims.

The oilway in the cap should be at the top and the damper pad must be adjusted as detailed under J.7.

With the rack in the central position engage the pinion with the arrow uppermost.

Refit the coupling with a coupling bolt in line with the arrow on the shaft. This will ensure that the steering wheel spokes are in the correct position in the car.

Oil all parts before reassembling and refill the box with $\frac{3}{4}$ pint (.4 litre) of lubricant as specified on page P.2 (Ref. B).

Section J.6

ADJUSTMENT OF THE INNER STEERING BALL JOINT

Fit the lock plate and shims and screw home the ball seat housing into the rack bar.

Insert the ball seat.

Screw the ball cap home against its shoulder after inserting the ball-ended tie-rod. The ball should have no play, but must be a free rolling fit. Adjustment can be altered by varying the shims, which are supplied in .003 in. (.08 mm.) and .005 in. (.13 mm.) sizes.

Section J.7

ADJUSTMENT OF THE RACK DAMPER

This is provided to ensure the required amount of damping in the steering tie-rods, and to maintain the minimum of backlash in the gear teeth.

This should be adjusted in the following manner :—

Check the damper spring, which should have a free length of approximately 1.024 in. (26.01 mm.), and should give a load of 80 lb. (36.3 kg.) when compressed to .75 in. (19.05 mm.).

Note.—The steering wheel fixing nut should be tightened with a torque spanner set to 500 in./lb. (5.75 m./kg.).

When the steering gearbox is completely assembled, fit the plunger, spring and cap, but omit the shims. Screw down the cap until the plunger bottoms. While screwing down the plunger rotate the pinion shaft. When it is felt to just lock the rack bar in the housing the plunger has bottomed. With feeler gauges take a measurement of the gap left and add to this measurement .051 in. (1.30 mm.).

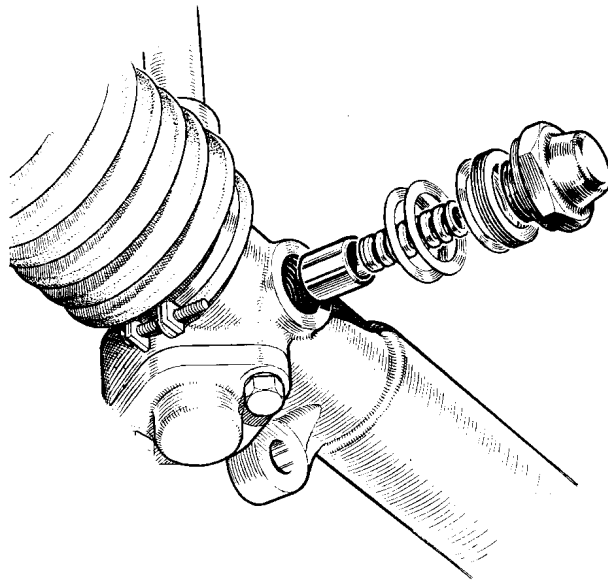


Fig. J.5.

The steering gearbox damper assembly, showing its components.

Select shims to this total amount and insert under the cap. This gives the correct standard pre-load. If, when checked on the road, this is found to be too slack or too tight, it is permissible to decrease the added measurement of .051 in. (1.30 mm.) to .030 in. (.76 mm.) or increase to .070 in. (1.78 mm.).

Section J.8

STEERING ARM BALL JOINTS

If it is found necessary, through slackness, to renew the ball joints on the outer ends of the tie-rods, the complete assembly must be changed, as no adjustment is provided. If necessary, the dirt excluders may be renewed separately.