SECTION G

THE PROPELLER SHAFT

GENERAL DESCRIPTION.

The propeller shaft and universal joints are of the Hardy Spicer type with needle roller bearings. A single shaft connects the rear axle and the gearbox.

To accommodate fore and aft movement of the axle, the shaft is provided with a splined sliding joint at the front end. Each universal joint consists of a centre spider, four needle roller bearing assemblies and two yokes.

Removal of the Propeller Shaft.

Before removing the bolts and nuts securing the propeller shaft universal joint flanges to the gearbox flange and the rear axle flange, carefully mark the flanges to assist in refitting them in their original position. This is important.

Remove the bolts and nuts securing the propeller shaft to the gearbox flange and carefully support it while removing the bolts and nuts securing the shaft to the rear axle flange. The shaft can now be removed from the car downwards and rearwards.

Dismantling the Propeller Shaft.

Unscrew the dust cap at the rear end of the sliding joint and pull the joint off the splined shaft. Remove the enamel and dirt from the snap rings and bearing races. Remove all the snap rings by pinching their ears together with a pair of thin-nosed pliers and prising them out with a screwdriver.

If a ring does not slide out of its groove readily, tap the end of the bearing race slightly to relieve the pressure against the ring. Holding the joint in one hand with the splined sleeve yoke on the top, tap the radius of the yoke lightly with a copper hammer. The bearing should begin to emerge; turn the joint over and finally remove the bearing with the fingers. If necessary, tap the bearing race from inside with a small diameter bar, taking care not to damage the bearing face; or grip the needle bearing race in a vice and tap the flange yoke clear.

Be sure to hold the bearing in a vertical position and when free remove the race from the bottom side to avoid dropping the needle rollers.

Repeat this operation for the opposite bearing.

The splined sleeve yoke can now be removed. Rest the two exposed trunnions on wood or lead blocks to protect their ground surfaces, and tap the top lug of the flange yoke to remove the bearing race.

Turn the yoke over and repeat the operation.

To Examine and Check for Wear.

The parts most likely to show signs of wear after long usage are the bearing races and the spider journals. Should looseness, load markings, or distortion be observed, the affected part must be renewed complete, since no oversized journals or bearing races are provided.

It is essential that the bearing races are a light drive fit in the yoke trunnions. In the event of wear taking place in the yoke cross holes, rendering them oval, the yokes must be renewed. In case of wear in the cross holes in the fixed yoke, which is part of the tubular shaft assembly, it should normally be replaced by a complete tubular shaft assembly. Only in the case of emergency should any attempt be made to replace this yoke.

Reassembling the Propeller Shaft.

See that all the drilled holes in the journals are thoroughly cleaned out and free from grease. Assemble the needle rollers in the bearing races and fill with grease. Should difficulty be experienced in retaining the rollers under control, smear the walls of the races with petroleum jelly to retain the needle rollers in position while assembling.

Insert the spider in the flange yoke, ensuring that the lubricator boss is fitted away from the yoke. Using a soft-nosed drift, about $\frac{1}{32}$ smaller in diameter than the hole in the yoke, tap the bearing into position. It is essential that the bearing races are a light drive fit in the yoke trunnions. Repeat this operation for the other three bearings. Replace the circlips and be sure that these are firmly located in their grooves. If the joint appears to bind, tap lightly with a wooden mallet; this will relieve any pressure of the bearings on the end of the journals. Before replacing the sliding joint on the shaft, thread onto the splined shaft the dust cover, the steel washer and the felt washer. When assembling the sliding joint be sure that the trunnions in the sliding and fixed joints are in line. This can be checked by observing that the arrows marked on the splined sleeve yoke and the splined shaft are in line.

It is always advisable to replace the cork gasket and the gasket retainers on the spider journals by means of the tubular drift. The spider journal shoulders should be shellacked prior to fitting the retainers, to ensure a good oil seal.

Replacement of the Propeller Shaft.

Wipe the faces of the flanges clean, and place the propeller shaft in position on the car. Ensure that the flange registers engage correctly and that the joint faces bed down evenly all round, also that the markings, made on the flanges on removal, coincide. Insert the bolts and see that all the nuts, which are of the self-locking type, are evenly and securely tightened. The sliding joint is always placed at the gearbox end.

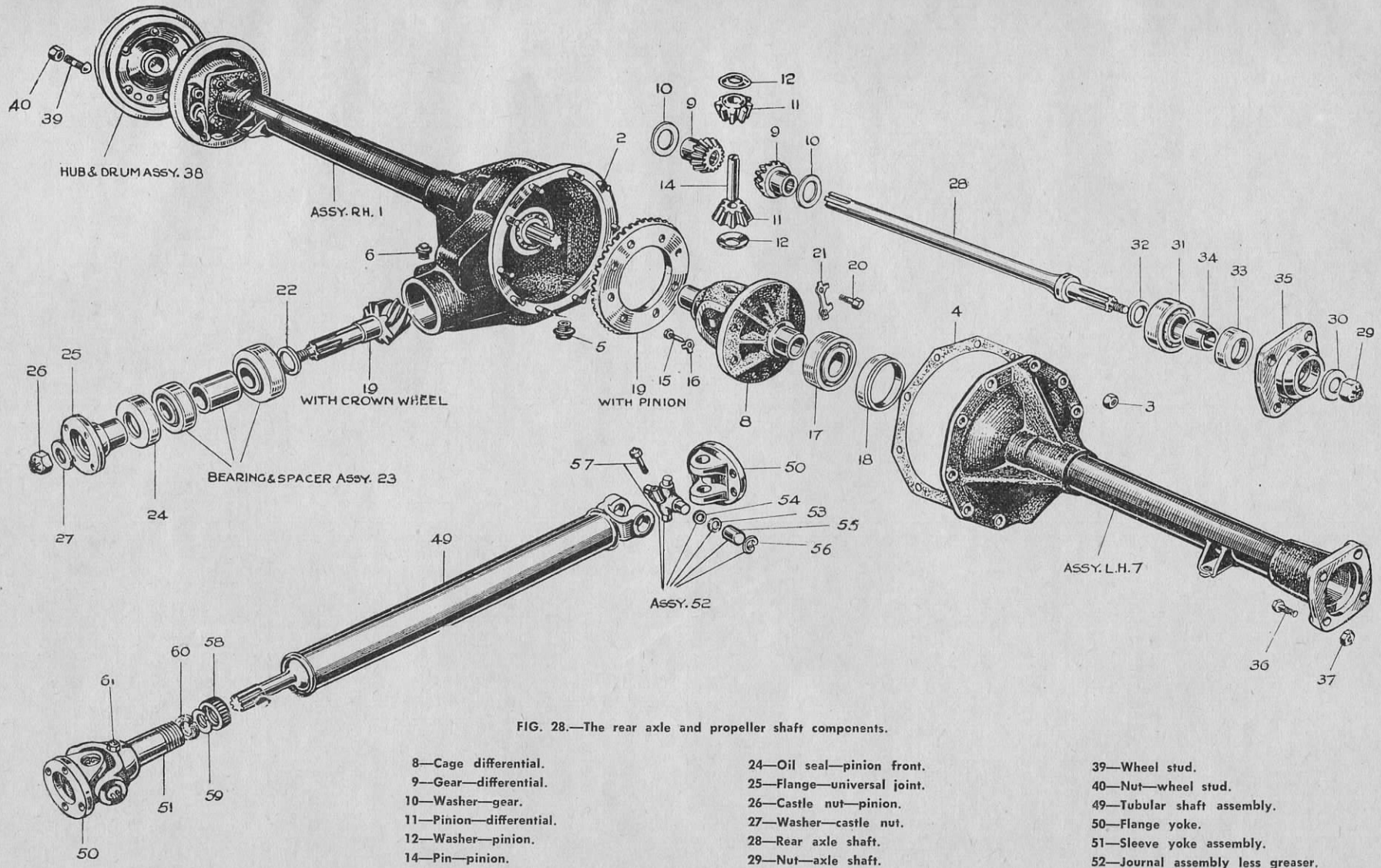

FIG. 28.—The rear axle and propeller shaft components.

1—Axle tube assembly—R.H.
2—Stud cover.
3—Nut—axle cover stud.
4—Joint.
5—Drain plug.
6—Oil filler plug.
7—Axle tube assembly—L.H.
8—Cage differential.
9—Gear—differential.
10—Washer—gear.
11—Pinion—differential.
12—Washer—pinion.
14—Pin—pinion.
15—Locking bolt—pinion pin.
16—Tab washer—locking bolt.
17—Bearing—differential.
18—Distance collar—bearing.
19—Crown wheel and pinion.
20—Bolt—crown wheel.
21—Locking tab—crown wheel bolt.
22—Distance washer—pinion—rear.
23—Bearing and spacer assembly.
24—Oil seal—pinion front.
25—Flange—universal joint.
26—Castle nut—pinion.
27—Washer—castle nut.
28—Rear axle shaft.
29—Nut—axle shaft.
30—Washer—axle shaft nut.
31—Bearing—rear hub.
32—Distance washer—hub bearing.
33—Oil seal—hub.
34—Collar—oil seal.
35—Support—brake plate.
36—Bolt for support.
37—Nut—3/8th B.S.F. (Phillidas).
38—Hub and brake-drum assembly.
39—Wheel stud.
40—Nut—wheel stud.
49—Tubular shaft assembly.
50—Flange yoke.
51—Sleeve yoke assembly.
52—Journal assembly less greaser.
53—Gasket—journal.
54—Retainer—gasket.
55—Needle bearing assembly.
56—Snap ring.
57—Grease nipple.
58—Dust cap.
59—Steel washer.
60—Cork washer.
61—Grease nipple.

SECTION H

THE REAR AXLE

GENERAL DESCRIPTION.

The rear axle is of the semi-floating type. It is of unit construction and no repairs or adjustments apart from those connected with the half-shafts and rear wheel bearings, brake drums and shoe mechanism can be carried out without removing the complete axle unit from the car.

The rear wheel bearing outer races are carried in an extension of the rear axle casing and the inner races bear directly on the axle half-shafts. The wheel hubs are attached to the axle shafts by splines and a tapered split collar.

Contrary to previous M.G. practice, the axle half-shafts can only be withdrawn after removing the wheel, wheel hub and brake drum, brake back plate assembly and the wheel bearing housing.

The brake drums are of cast iron integral with the hub or permanently attached to the wheel hub flanges by countersunk-headed screws, which must not be disturbed.

Hypoid-type final reduction gears are used and the axle housing is divided close to its centre for assembly purposes, the pinion assembly being mounted in the right-hand half of the axle casing.

The bearings of the differential and crown wheel assembly are carried in recesses machined in the axle casing and cover, which are bolted together, and, since no inspection apertures are provided, all adjustments have to be carried out by pre-measurement in conjunction with special gauges.

Adjustment of the position of both the crown wheel and the pinion in the axle is effected by distance-pieces, which are selected on initial assembly, and there is no other provision for adjustments. The crown wheel and pinions are only supplied in pairs.

The rear brake gear is of the normal two-shoe type operated hydraulically from the brake pedal and also mechanically by hand-operated mechanism actuating the same shoes. The operating cylinder for the shoes is mounted vertically on the brake plates and acts directly on the brake shoes.

Adjustment is by means of a serrated snail cam with screwdriver operation through holes in the brake drum disc.

Suspension is by means of semi-elliptic leaf springs with rubber interleaving and rubber mounting. The shackles and the spring anchorage are both fitted with flexing rubber bushes needing no lubrication.

Removing and Replacing the Brake Drum and Hub.

The brake drums are permanently attached to the wheel hubs by countersunk-headed screws, the inner ends of which are riveted over. These screws should not be disturbed, and if it is necessary to fit a new drum or hub a complete assembly should be used as the hubs and brake drums are machined after assembly. On some models the hub and drum are made in one piece.

Jack up the axle so that the wheel to be operated on is clear of the ground and place chocks on either side of the wheels remaining on the ground. Release the handbrake fully.

Remove the hub cover and take off the wheel.

Remove the split pin from the axle nut and unscrew the nut. The axle half-shafts are threaded right-handed on both sides of the car and are interchangeable.

The wheel hub is locked to the axle half-shaft by means of a tapered split collar in addition to the driving splines. It is therefore to be expected that some resistance will be evident when the extractor is used to free the hub from the taper.

When replacing the rear hub it is essential to make quite sure that the tapered split collar is right home against the inner race of the wheel bearing before any attempt is made to offer up the hub. It is, in fact, advisable to tap the collar lightly into position with a hide hammer, taking the utmost care not to damage it in any way. It is also essential to see that the parallel portion of the collar engaging the oil seal is absolutely free from blemishes before it is replaced and that the oil seal is not damaged in any way.

Removal and Replacement of the Brake Plate Assembly.

Jack up the axle and remove the wheel.

See that the handbrake is fully released and then remove the hub.

If it is required to remove the brake plate assembly to the bench for attention, the oil pipe should be disconnected.

The brake plate assembly is attached to the axle by four bolts with the nuts fitted on the inner side of the flange.

Reassembly takes place in the reverse order to dismantling and it is essential to make sure that the retaining nuts are screwed up tight.

Do not forget to bleed the brakes if the pipe line has been disconnected.

Removing and Replacing a Rear Axle Half-Shaft.

Jack up the axle as outlined or raise the rear of the car with a sling attached to the bumper supports.

Remove the wheel and see that the handbrake is fully released.

Remove the hub and brake drum assembly and the brake plate and shoe assembl.y

Withdraw the split collar from the axle half-shaft.

Fit the special tool (Part No. 68823) to the end of the axle shaft and, release the shaft complete with bearing, housing and oil seal. The half-shaft can then be pressed out of the bearing.

Reassembling is a reversal of the foregoing.

When replacing an oil seal in the wheel bearing housing, see that the sealing edge of the bore is towards the bearing. It should be a good press fit in the axle end cap.

Do not forget to see that the split collar is perfectly clean and free from blemish, particularly on its parallel portion, and pushed well home against the bearing inner race before replacing the wheel hub. It is advisable to tap it lightly into contact with the axle bearing with a hide hammer, taking the utmost care not to damage it in any way in the process.

Removing the Rear Axle from the Car.

Raise the rear of the car by means of a suitable sling and block up under the chassis just forward of the spring front mountings.

Remove both road wheels and release the handbrake. Disconnect the brake flexible pipe at its junction to the bracket on the chassis.

Disconnect the brake cable casings from their anchorages to the spring brackets by removing the retaining nuts and spring washers.

Disconnect the brake cables by removing the clevis pin attaching the forked yoke to the brake shoe actuating levers on the brake plates.

Disconnect the shock absorber arms at their lower ends.

Mark the propeller shaft coupling flanges so that they are replaced in the same relative positions. Now uncouple the propeller shaft at the rear flange by unscrewing the four coupling nuts and bolts. Support the tail end of the propeller shaft.

Undo all the spring "U" bolt nuts so that the axle rests on the rebound straps.. Take the weight of the axle by means of jacks or a suitable axle stand.

Remove the rebound straps, lower the exhaust pipe and the axle can now be withdrawn sideways.

Reassembly is a reversal of the dismantling procedure, but do not forget to bleed the hydraulic brake system after coupling up the flexible hose.

Important Points Concerning Axle Attention.

Attention requiring the dismantling of the axle and the replacement of parts is not advised unless this is absolutely necessary and unless you are equipped with the necessary checking gauges and a full range of distance-pieces and spacers from which to select the required new sizes. The fitting of a replacement axle, when possible, is better.

Dismantling for examination and cleaning is permissible provided care is taken to refit the distance pieces and spacers in exactly the same locations.

No adjustment is provided in the accepted sense. The crown wheel and pinion are set in their correct relation to each other by means of distance-pieces and spacers selected to provide the correct location of the components on initial assembly. Should the components be dismantled, their relative positions should carefully be observed and each part marked suitably so that it can be reassembled correctly.

Various components can be replaced by correctly combining the markings on the original components against those on the new parts in the manner detailed in subsequent sections.

It is important that the repairer be quite clear on this point before he undertakes the dismantling of the axle.

Spacers between the outer races of the differential bearings and faces of the recesses machined in the axle casing and cover control the position of the crown wheel in relation to the centre line of the pinion.

Adjustment of the pinion position is made by varying the thickness of the pinion washer, and that of the crown wheel by the varying thickness of the differential bearing spacers.

The following operations are possible without the use of special tools:—

(a) To replace a crown wheel and pinion with a pair carrying markings which are identical to the originals.

(b) To replace a crown wheel bearing alone, since these are of the controlled width type, provided genuine M.G. replacements are used.

(c) To replace an axle cover which carries markings identical to the original.

The following replacements are possible by calculations alone:—

(d) To replace the differential cage by one carrying a different marking from the original.

(e) To replace an axle cover carrying different markings rfom the original.

The following replacements can be carried out by calculation and the use of special tools:—

(f) To replace an axle case carrying different markings from the original.

(h) To replace bearings on the pinion shaft.

Operations (a), (b) and (c) merely call for the fitting of the new parts in the positions occupied by the old. The remaining operations entail special precautions and are detailed subsequently.

The axle or half-shafts, rear hub bearings, brake-drums and shoe mechanism can all be dismantled and replaced with the axle in position on the car.

Dismantling the Axle and Removing the Differential Assembly.

Remove the axle from the car.

To dismantle the axle, first remove the hub and brake drum assemblies and the brake back plates.

Take out the axle half-shafts.

Remove the series of bolts joining the axle casing and cover together and carefully part them, taking care to see that both halves of the axle are suitably supported to avoid damage to the differential assembly. The withdrawal of the axle cover from the casing releases the differential and crown wheel assembly, which can now be taken out.

Note that spacers are fitted between the differential bearings and the bearing housings and that they are important because they control the position of the differential assembly in the axle.

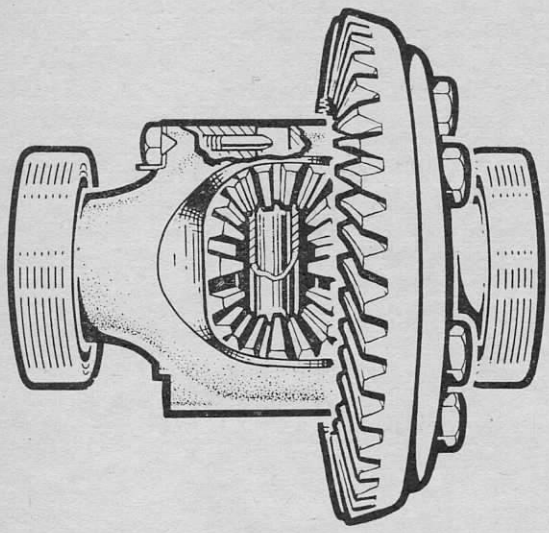

FIG. 29.—The differential and crown wheel assembly with the ball races in position on the differential cage. The bolt locking the shaft for the differential pinions is clearly seen at the upper left-hand of the cage.

It is essential that they be replaced in their original locations on assembly, so make a note of the positions from which they are removed.

NOTE: All original spacers are marked 0/s and n/s.

It must also be noted that the axle casing and cover are marked on the surface of one of the outside webs or tubes with one of the following figures:—

Zero, 1, 2, 3, 4, 5, 6, all being positive.

Dismantling the Differential and Crown Wheel Assembly.

When the differential assembly has been removed from the axle casing, it is dismantled by bending back the tab of the locking plate of the bolt locating the differential pinion shaft, withdrawing the bolt and removing the shaft.

The differential pinions can now be removed from the differential cage by swinging them round with their dished thrust plates until they register with the openings in the differential cage, through which they can be removed.

The differential cage gears can then be withdrawn from inside the differential through the openings, together with their thrust washers.

The crown wheel is attached to the differential cage by bolts locked by lock plates. Bending back the tabs of the lock plates and removing the bolts releases the crown wheel from the differential cage.

NOTE: The crown wheels are marked on their back faces with one of the following figures: +2, +1, Zero (or no marking), —1, —2.

Examining Parts for Wear.

Before examination all parts should be cleaned.

The crown wheel bearings are of the ball type and should be renewed if necessary. They are controlled dimensionally and must only be replaced by genuine M.G. replacements. Failure to observe this instruction will only lead to complications later.

The pinion shaft bearings are of the taper roller type and should be renewed, as a set, complete with distance-piece, if they do not run smoothly on their rollers.

The crown wheel and pinion are lapped as a pair.

It is essential, therefore, that crown wheels and pinions be stored and used in pairs as originally supplied, otherwise satisfactory results cannot be obtained.

If the inner races of the roller bearings are loose on the pinion, check with a new set of bearings, and if these are also loose on the pinion shaft it is an indication that the shaft has worn; a new crown wheel and pinion should be fitted.

Fractures in the teeth, hollows or any roughness on the surface of the teeth will render both crown wheels and pinions unserviceable.

The axle casing or axle cover (or both) should be renewed if new replacement bearings are not a light drive fit in the bores machined in their housings. Any looseness of the bearings should be overcome by renewing the bearing, the axle cover or axle casing.

The cage should be replaced if there is excessive wear in the bores in which the differential gears revolve.

The oil seals should be renewed if they are not a press fit in the pinion housing or wheel bearing housing, or if their central portion is loose in the outer metal casing, or if the spring is fractured or broken.

The differential gears, pinions and pins should be renewed if there is any doubt about their condition, although more latitude in wear is permissible in these parts without detrimental effects than is the case with the crown wheel and pinion.

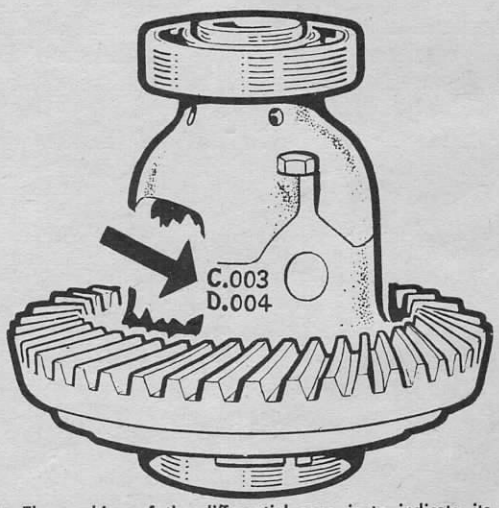

FIG. 30.—The marking of the differential cage is to indicate its assembly dimensions is clearly shown in this illustration, which bears a "C" dimension of .003 and a "D" dimension of .004.

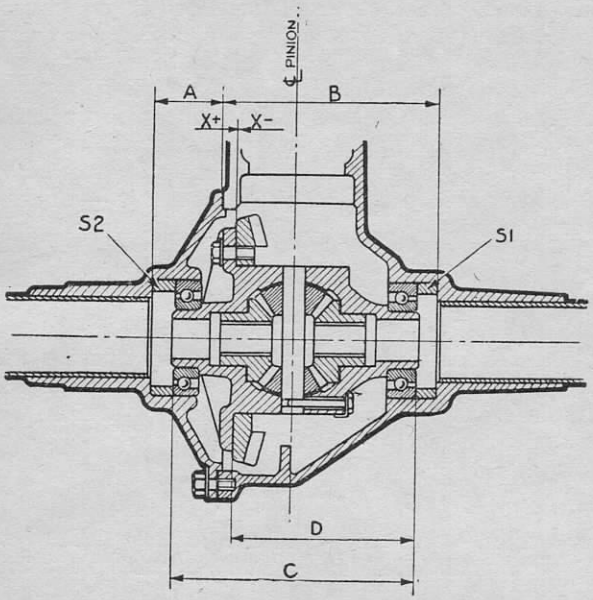

FIG. 31.—This diagram indicates the significance of the "A", "B", "C" and "D" dimensions.

To Replace a Differential Cage.

Selecting an Axle Casing Spacer.

All differential cages are stamped with two letters —"C" and "D"—together with a figure. The prefix "C" indicates the dimension over the differential bearings and the dimensional range is from .000 to .012. "D" indicates the dimension from the crown wheel back face to the outside face of the right-hand bearing outer race and the range is from .000 to +.006.

Differential cages can be interchanged by applying the following procedure:—

Balance the "D" dimensions of the two cages and from the result select differential bearing spacers which will produce the same final location of the crown wheel on assembly.

Example (1).

If the "D" dimension of the old cage was .005 and the "D" dimension on the new cage is .002, giving a difference of +.003, then this difference must be added to the old spacer thickness.

That is to say, if the old spacer is marked .503 the new spacer must be .506 thick.

Example (2).

If the "D" dimension of the old cage was .001 and the "D" dimension of the new cage is .005, giving a difference of —.004 then this difference must be subtracted from the original spacer thickness.

That is to say, if the old spacer was .509 thick, then the new spacer must be .505 thick.

Selecting an Axle Cover Spacer.

In this case subtract the "D" dimension from the "C" dimension on both the old and the new differential cages.

If the resultant of the dimensions on the new cage is greater than that on the old cage, the new spacer for the axle cover is less than the old one by the difference and vice versa,

Example (1).

Old: "C" .006 — "D" .005 = .001.
New: "C" .007 — "D" .002 = .005.
The new resultant of the new cage is the greater by .004 therefore the new spacer should be .004 less in thickness than the old one.

Example (2).

Old: "C" .002 — "D" .001 = .001.
New: "C" .001 — "D" .005 = —.004.
The old resultant is here the greater by .005, therefore the new spacer must be .005 thicker than the old one.

Assembling the Differential and Crown Wheel.

The differential is assembled by first inserting the differential gears inside the differential cage with their thrust washers in position.

NOTE: When new washers are fitted it is necessary to see that they are properly bedded in or it may be difficult to insert the pinions.

The differential pinions are next inserted through the opening of the cage with their distance-pieces and thrust washers. The pinions are then rotated in the cage until they register with the holes in the cage for the shaft.

The pinion spindle, which should be a light push fit in the cage, is then inserted, taking care to line up the locking bolt holes.

NOTE: The slot in the shaft can be used as a guide.

Fit the locking bolt and turn up the tab of its locking washer.

Fit the crown wheel to the differential cage after making sure that the mating surfaces are perfectly clean and the edges free from burrs.

Check the crown wheel for truth by spinning the assembly on a roller fixture with a dial gauge registering against the outer edge of the crown wheel. The maximum permissible error of alignment is .001 and if the figure registered is in excess of this the crown wheel should be removed from the differential cage and the flange of the cage checked for truth. If necessary, fit a replacement cage.

Provided the flange is true within the permissible error, clean all parts carefully and reassemble the crown wheel to the cage in a different position from that in which it was first assembled and checked, then re-check. This process should be repeated several times before finally deciding to discard the crown wheel and pinion.

The differential ball races can now be pressed on.

If a new crown wheel or differential cage has been fitted it is essential to measure the "C" dimensions over the outer ball races, and "D" dimensions from the crown wheel back face to the right-hand bearing outer race outside face.

To Replace a Pinion.

(a) The old pinion in a new axle casing.

(b) New pinion and new matched set of bearings and distance-piece in an old casing.

(c) New pinion and old bearings and distance piece in an old casing.

(d) Old pinion and new matched set of bearings and distance-piece in an old casing.

In all cases the pinion must be set accurately in the axle casing, remembering that the roller races and their distance-pieces are supplied in sets giving the correct amount of pre-load on assembly. They can, therefore, only be replaced as sets and not individually.

The pinions may be marked on their heads with one of the following figures:—

A ringed figure +2, +1, Zero (or no marking), —1, —2, and possibly an unringed figure —2, or —1.

The pinion washer controls the position of the pinion in relation to the axis of the crown wheel. and it is fitted between the head of the pinion and its rear bearing.

Adjustment of the pinion position is made by varying the thickness of the pinion washer. These are available in a range of thicknesses varying by .001 and are marked on spares replacements only.

The pinion is fitted to the axle in the following way:—

Fit the pinion bearing outer races in the pinion housing, then assemble the rear pinion bearing inner race to the special dummy pinion spindle (Part No. 68829) and place in position in the housing, inserting it through the cover opening in the axle casing.

Fit the front bearing inner race.*

***NOTE:** The bearing spacer is omitted because the correct pre-load can only be obtained with the bearing in position when the universal joint flange is locked up tight. This is due to the calculated compression of the bearing spacer under this locking load.

Fit the spindle nut and tighten it up to give the correct pre-load of 6 to 8 in./lb. to the bearings. This can be checked by applying the special tool. Part No. 68839.

Rotate the spindle eight or ten times to seat the bearings.

Fit the checking fixture (Part No. 68829) in the axle cover opening and make sure that the locating arm makes firm contact with the side of the dummy spindle head.

This leaves a gap between the dummy pinion head and the checking anvil of the fixture, and this is the actual thickness of the pinion washer required for a standard pinion or one that has no marking.

Select a washer which will just slide between these faces and fit it behind the pinion head when reassembling.

To assist manufacturing conditions it is occasionally necessary that a pinion be assembled away from the standard position. If this is so the variation is marked on the pinion head in a ring such as (+2), the sign + meaning that the centres are increased by .002. Correction has to be made for this, and when the figure is + (plus) the amount must be taken from the washer thickness, and if the figure is — (minus) then the amount has to be added to the washer thickness.

Example (a).

A washer fitting the gap of the dummy pinion with a marking of .127 must be replaced by a washer having the marking .129 when refitting a pinion with the marking —2 or —.002.

Example (b).

A washer fitting the gap of the dummy pinion bearing the marking .127 must be replaced by a washer marked .125 when the pinion is markekd +2 or +.002 on its head.

A plain or unringed figure may be marked on the pinion head in addition to a ringed figure, but this is only an indication of the variation of the pinion head thickness from standard and is always minus. It has no bearing on the pinion setting.

When the correct spacing washer has been decided upon the actual pinion assembly can take place, but the importance of making the measurements correctly must be appreciated, since it is impossible to check the adjustment when the axle is assembled.

The actual pinion assembly is carried out by threading the special pinion washer just selected on the pinion shaft, bevelled side against the pinion, and pressing on the rear roller bearing inner race with its projecting side against the washer. This subassembly is then inserted in to the casing through the axle cover opening and located in position in the pinion housing of the axle casing.

The distance-piece and forward roller bearing inner race are next passed on to the pinion shaft, with the projecting side of the inner race facing forward. These components are followed by the pinion flange with its retaining washer and nut. Tighten up the nut firmly.

Rotate the pinion, using special tool, Part No. 68839, to ascertain that the correct degree of pre-load is present. The pinion should present the same resistance to rotation as was evident when using the special dummy spindle, namely 6 to 8 in./lb.

If the pre-load is correct, undo the nut and remove the washer and flange; fit the oil seal (sharp edge of the bore towards bearing), replace the pinion flange retaining washer and nut.

If the pre-load is not correct the distance-piece and bearing assembly will have to be replaced by the selection process until the correct pre-load is obtained.

Finally tighten up the nut and fit the split pin.

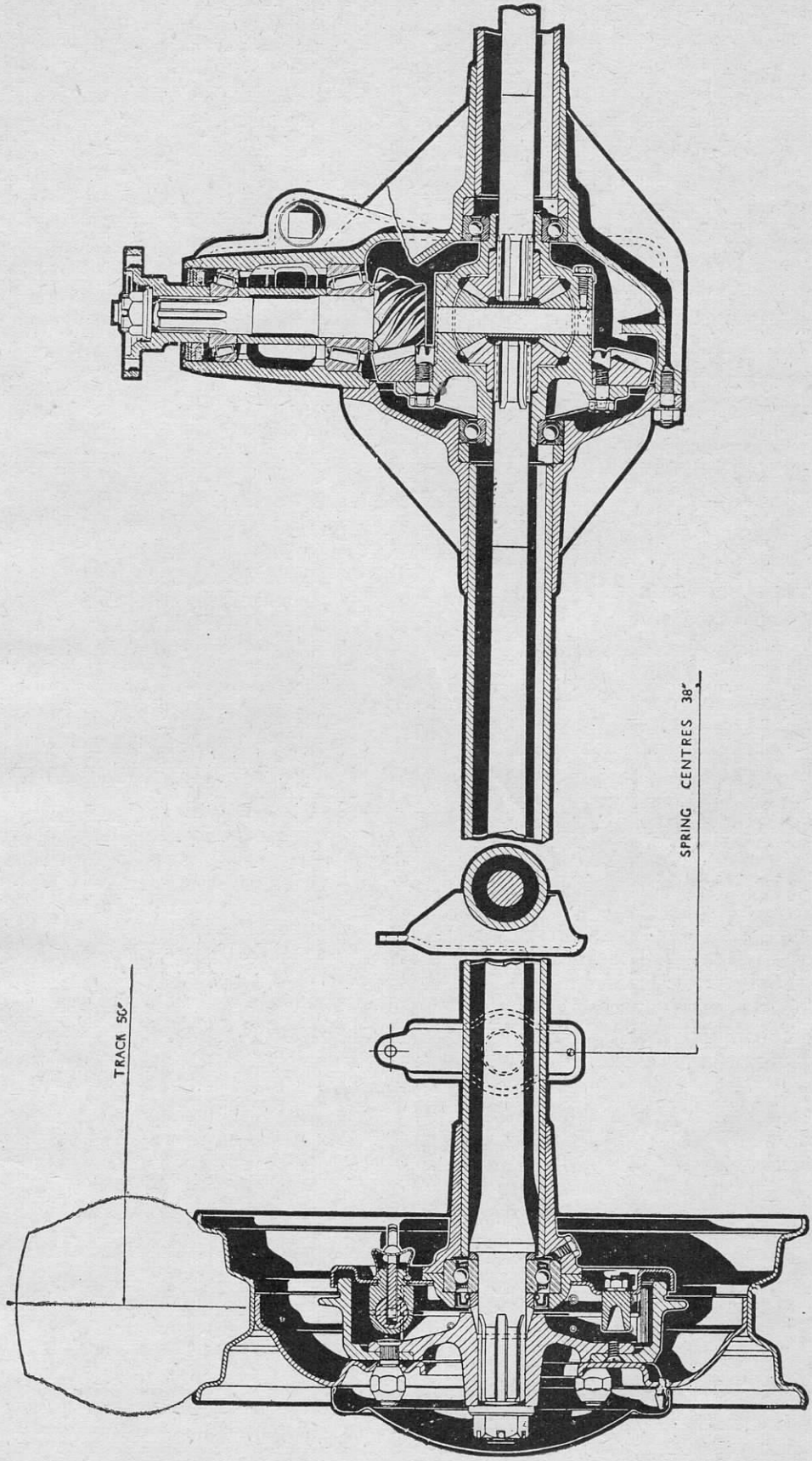

FIG. 32.—The M.G. Midget (Series "TD") rear axle.

To Fit a New Axle Casing.

When a new axle case is being fitted it is necessary to refit the pinion and select a new distance collar for the differential bearing in the following manner.

Compensation for variations in the depth of the differential bearing bores is made by taking note of the markings on the old and new axle casings. For example:—

If the old casing is +.002 and the new one +.004, the positive difference .002 is added to the existing differential bearing distance collar. That is to say, if the old distance collar is marked .505, then the required new distance collar is .507.

Similarly, if the old casing is +.005 and the new one +.001, the resulting difference is negative, —.004, and must be subtracted from the bearing distance collar, i.e., if the old distance collar is .509, the required new distance collar is .505.

The distance collars are manufactured in steps of .001 and measurements should therefore be made to the nearest thousandth of an inch.

To Fit a New Axle Housing Cover.

When a new axle cover is being fitted it is not necessary to make any adjustment to the pinion.

Compensation must, however, be made for variations in the depth of the differential bearing housing in the same manner as that outlined for the axle casing and the same calculations for the selection of the required new distance collar for the differential bearings involved.

To Replace a Crownwheel and Pinion Having Markings Different from the Original.

NOTE: The crown wheels and pinions are manufactured in matched pairs and are not replaceable individually. The necessity for replacing either a pinion or crown wheel therefore necessitates the fitting of a new pair of components and the operations of fitting a new pinion and a new crownwheel are involved.

The crown wheels are marked on their back faces with one of the following markings: +2, +1, Zero (or no marking), —1 and —2.

Rear off the markings from the back face of the old crown wheel and note the difference between this and the markings on the new crown wheel.

For example: If the old one is marked —1 (—.001), and the one +2 (+.002), the dimension difference is +.003. To reassemble correctly it is thus necessary to fit a new distance collar in the axle casing which is .003 thicker than the old one, and a new one .003 thinner than the old one in the axle cover.

Note that the combined thickness of these distance collars must remain the same.

The setting of the pinion is carried out as described.

Reassembling the Axle.

Provided that no replacement parts are fitted, the assembly of the axle is quite straightforward if proper note is taken of the positions of various distance-pieces, washers and spacers on dismantling, and they are replaced in exactly their original locations.

The assembly of the axle cover to the axle casing is carried out with a gasket between their joint surfaces. The calculations made for adjustment provides for the thickness of the gasket, but it is important that a genuine M.G. replacement is used. (Thickness of gasket is .005 when compressed.)

The differential assembly should be assembled in the axle casing, making sure that its bearing in the axle casing is right home in its housing and that a gasket is in position on the joint surface. The axle cover is then placed in position over the axle casing and carefully pushed home till the joint faces are in contact.

The ten nuts fastening the halves of the axle housing together are then screwed lightly in position and finally tightened up a quarter of a turn at a time in a diagonal sequence to ensure even tightening and absence of distortion.

The brake back plates, the axle half-shafts, and the hub and brake drum assemblies should then be refitted in the manner already described.