



SERVICE MANUAL

CHASSIS

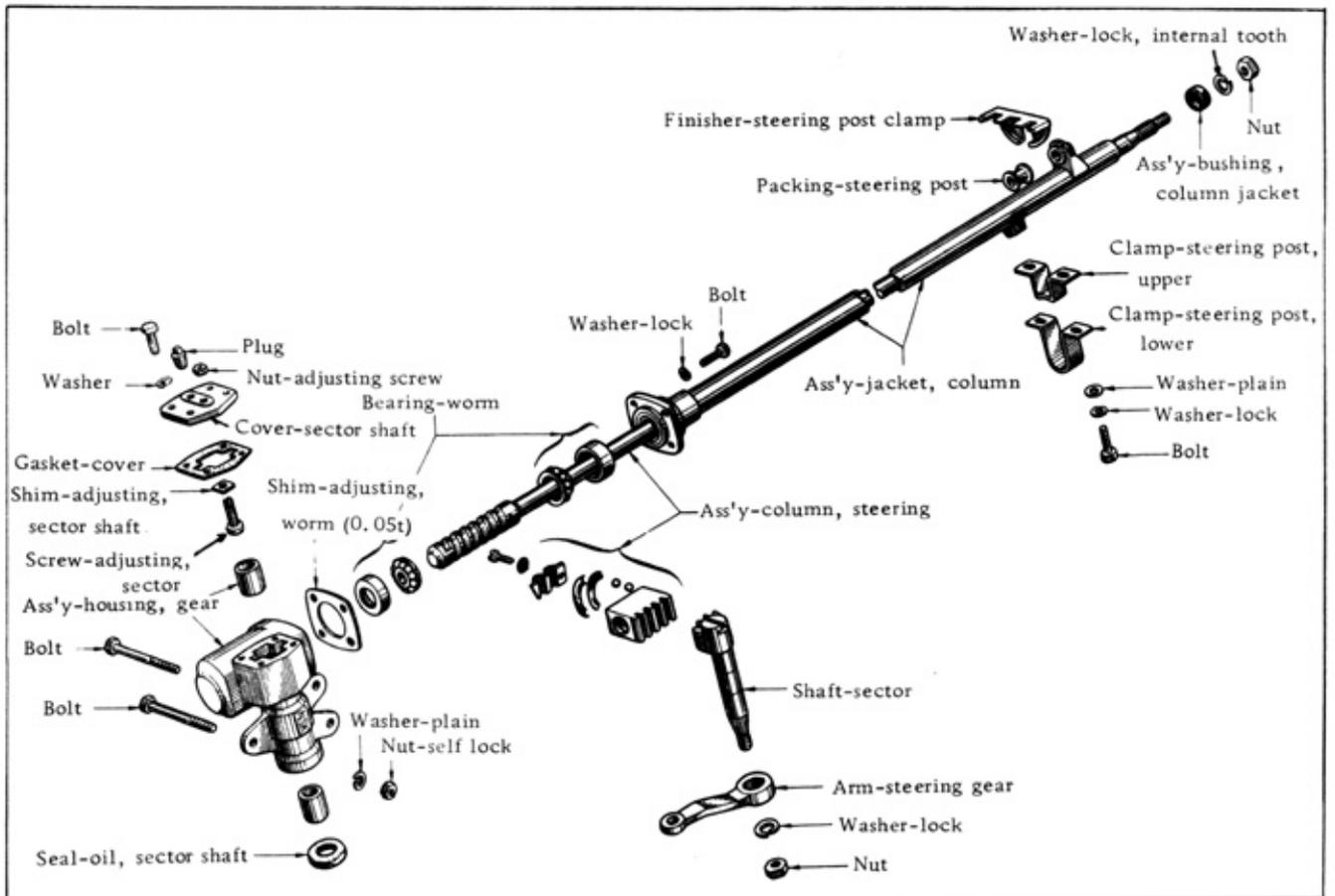
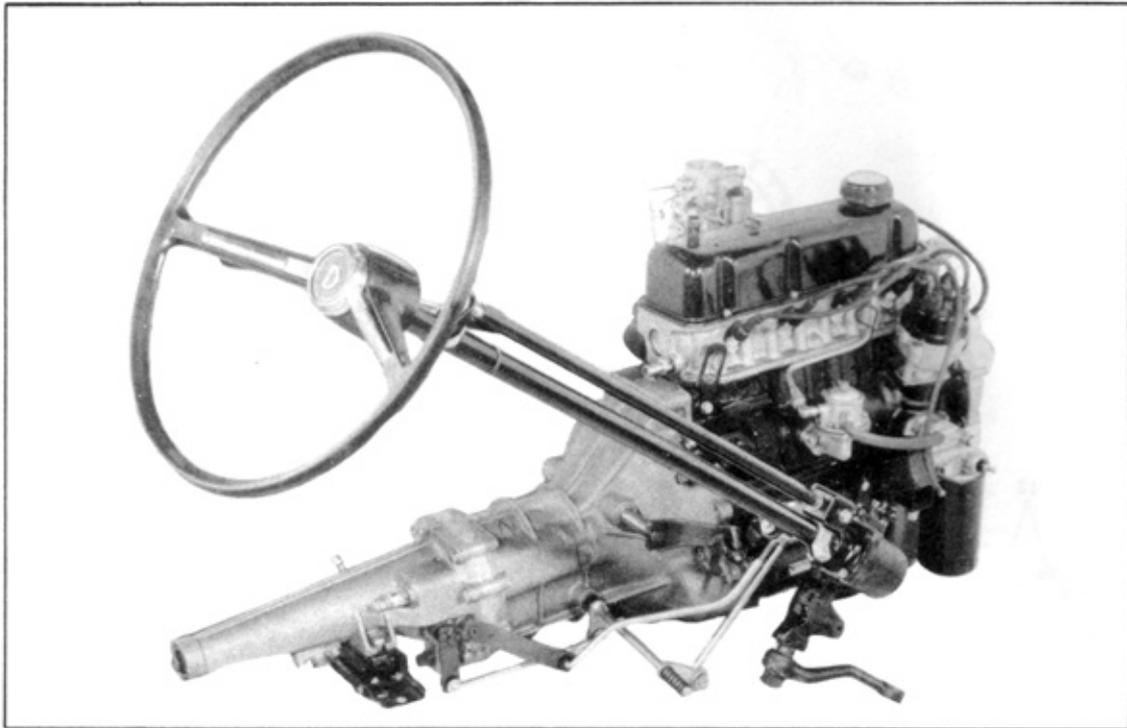
MODEL B10 SERIES



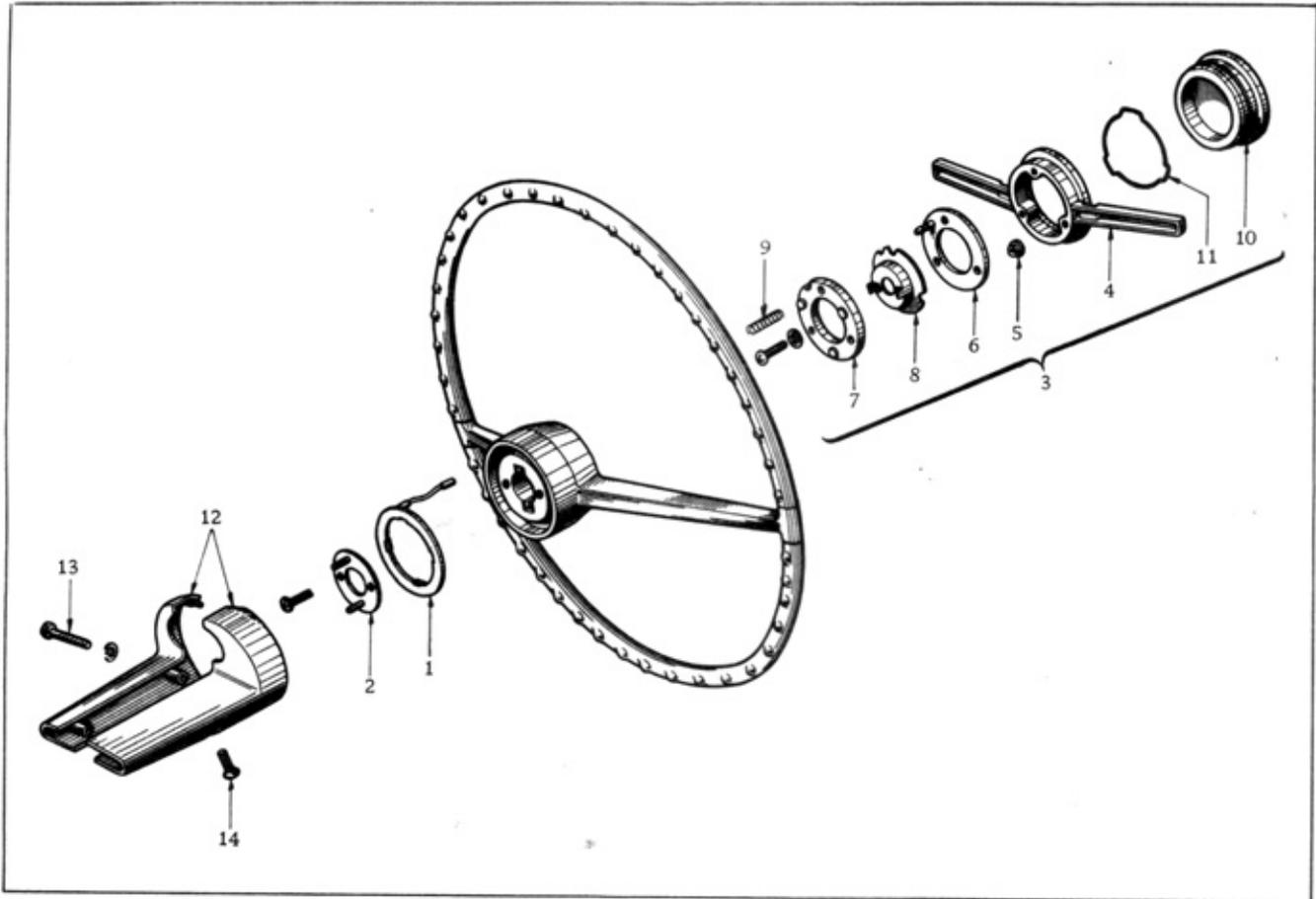
NISSAN MOTOR CO., LTD.

CHASSIS

STEERING

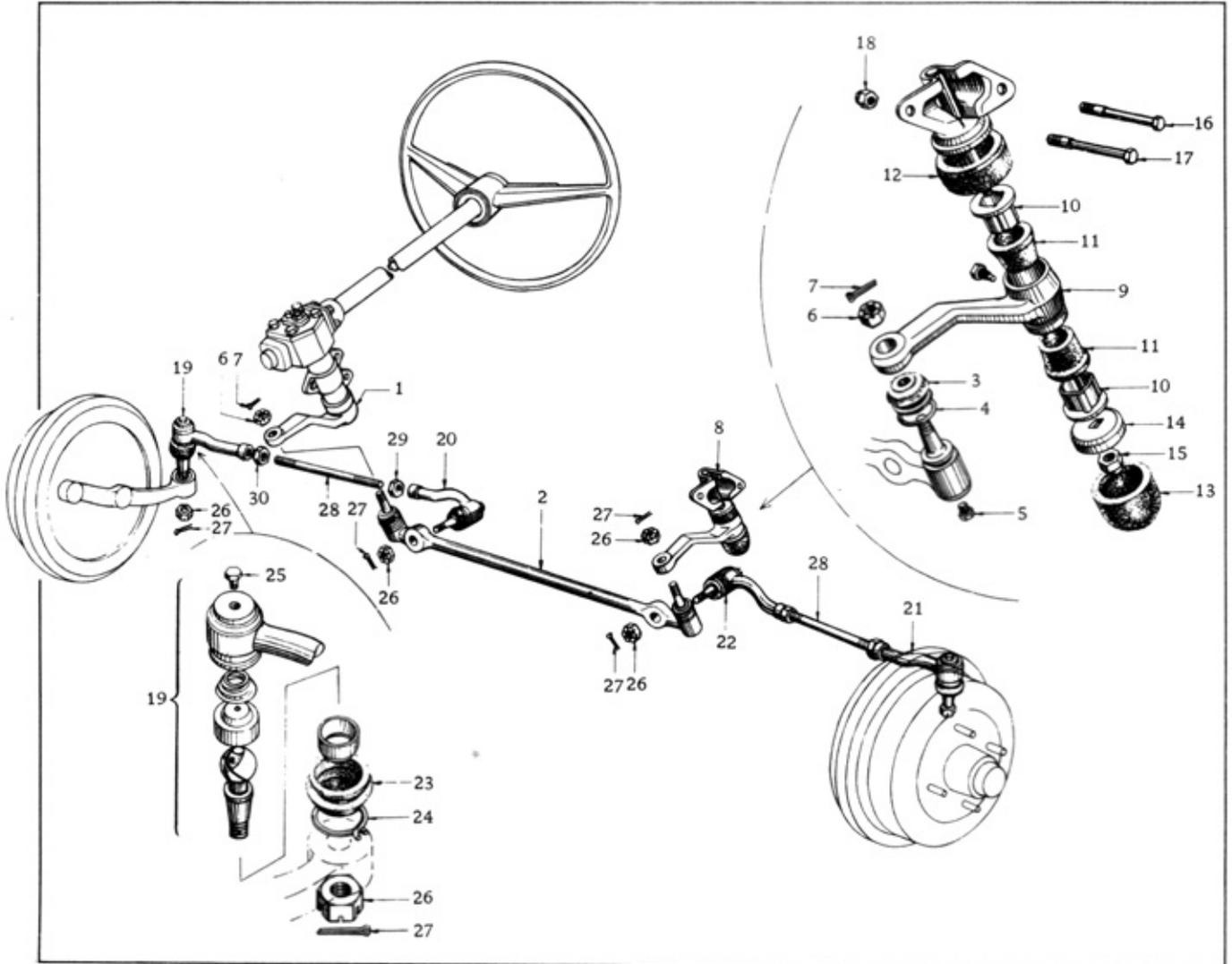


Components of Steering Gear Box



Steering Wheel

| | | | |
|---|----------------------|----|------------------------------|
| 1 | Ass'y-ring, slip | 8 | Seat-horn |
| 2 | Insert | 9 | Spring-horn |
| 3 | Ass'y-bar, horn | 10 | Button-horn |
| 4 | Bar-horn | 11 | Lock-horn button |
| 5 | Insulator-horn bar | 12 | Ass'y-shell, steering column |
| 6 | Ass'y-plate, contact | 13 | Screw |
| 7 | Ring-insulator | 14 | Screw |



Steering Linkage

| | | | | | |
|----|----------------------|----|-------------------------------------|----|-------------------------------------|
| 1 | Arm-steering gear | 11 | Bushing-rubber, idler shaft | 21 | Ass'y-socket, side rod outer (L.H.) |
| 2 | Ass'y-rod, cross | 12 | Cover-dust, idler shaft | 22 | Ass'y-socket, side rod inner (L.H.) |
| 3 | Cover-dust, side rod | 13 | Cover-dust, idler shaft, lower | 23 | Cover-dust, side rod |
| 4 | Clamp-dust cover | 14 | Washer-idler shaft, lower | 24 | Clamp-dust cover |
| 5 | Plug-filler | 15 | Nut-self lock | 25 | Plug-filler |
| 6 | Nut | 16 | Bolt | 26 | Nut |
| 7 | Pin-cotter | 17 | Bolt | 27 | Pin-cotter |
| 8 | Ass'y-idler | 18 | Nut | 28 | Bar-side rod |
| 9 | Arm-idler | 19 | Ass'y-socket, side rod inner (R.H.) | 29 | Nut-lock, side rod (L.H.) |
| 10 | Bushing-idler, shaft | 20 | Ass'y-socket, side rod inner (R.H.) | 30 | Nut |

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| Steering type | Recirculating ball type | |
|---------------------|-------------------------|---------|
| Gear ratio | | 15 : 1 |
| Rotational numbers | | 3.4 |
| Max. steering angle | In | 45° |
| | Out | 36° 36' |
| Gear oil capacity | .024 | (MP#90) |

The steering mechanism consist of the re-circulating ball type robust structure and gives light handling and stable functioning. The worm gear supported with upper and lower angular contact ball bearings to the housing is meshed with the sector arm through the circulating steel balls (60 numbers). This assembly is enclosed in an oil tight casing which carries two ball bearings at either end of the cam.

When the steering wheel is turned the tube revolves the cam, which in turn, causes the taper peg to remove over a predetermined arc thus giving the rocker shaft its desired motion, connected to the rocker shaft is a steering side cross rod lever, that links up with the steering linkage.

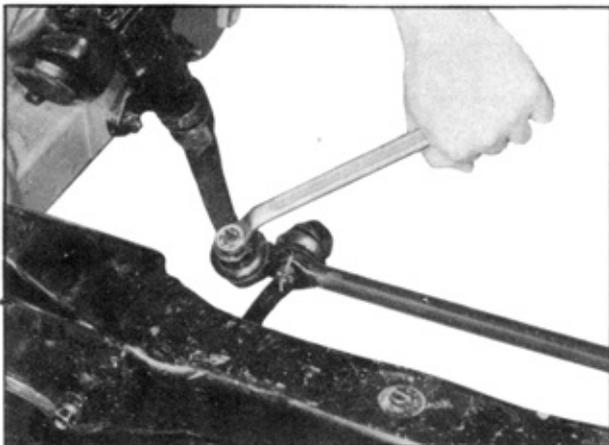
The steering linkage is the parallelogram system and connected to the rear side of the front axle.

Two shorter side rod, one on either side, connect the steering gear arm to the steering gear and idler arms respectively.

Side Rods

The side rods are held in position by a castilated nut and split pin at each end.

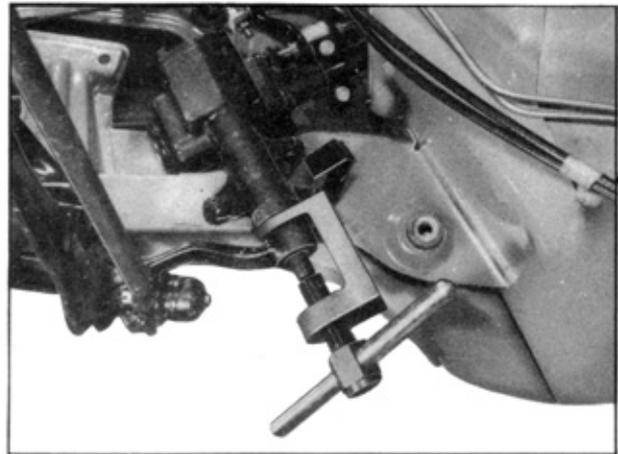
To remove the rod, withdraw the split pin



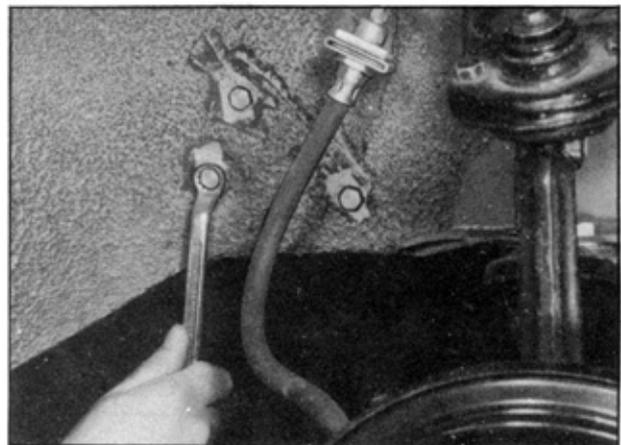
and release the nut at each end of the rod and then slightly tap the rods clear of the levers to which they are connected.

The steering gear arms and idler respectively by a nut and split pin each. Normally these levers need not be removed for any general maintenance.

The only occation requiring the removal would be when damage has occurred, under which circumstances the steering box or under idler should also be remove for inspection when the arm concerned can be withdrawn one the steering gear box or idler has been removed to the service bench, the gear arm should be with drawn front the shaft converned using a suitable extractor.



The gear arm must not be hammered from its shaft.



After the side and cross rods disconnected the idler can be detached from the body.

It is secured by two bolts to the front suspension member.

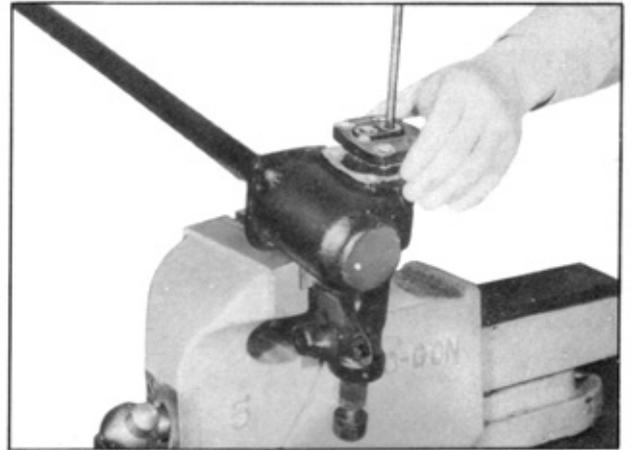
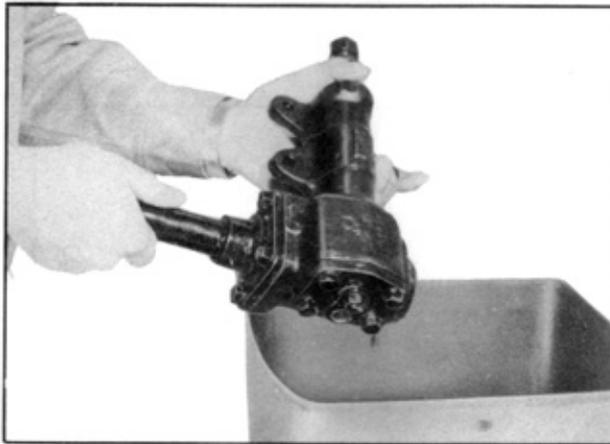
Holding the idler body on the bench, take off the rubber cover.

Pull out the idler shaft out of the body.

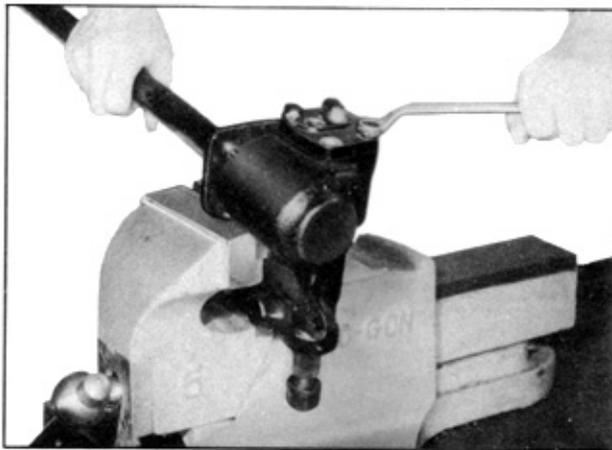
STEERING GEAR HOUSING

Removal

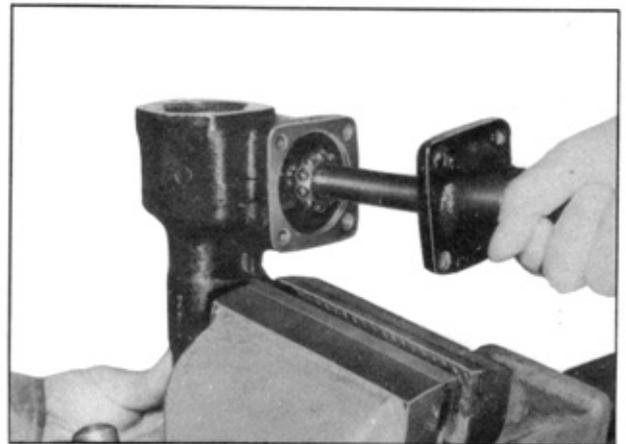
Take off the plug and drain out gear oil.

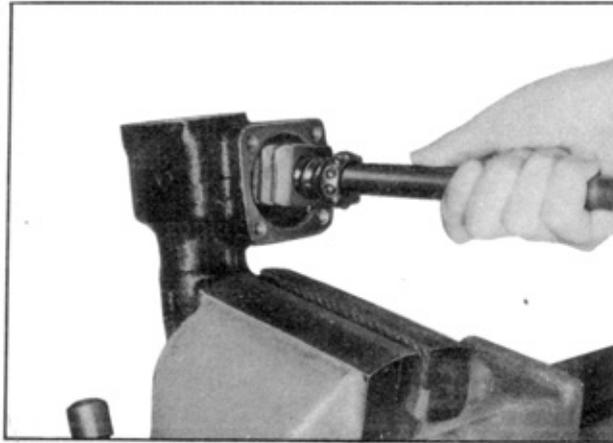


Separate the adjusting screw and the side cover and detach the sector shaft from body.
Unscrew the fixing bolts of rear cover.

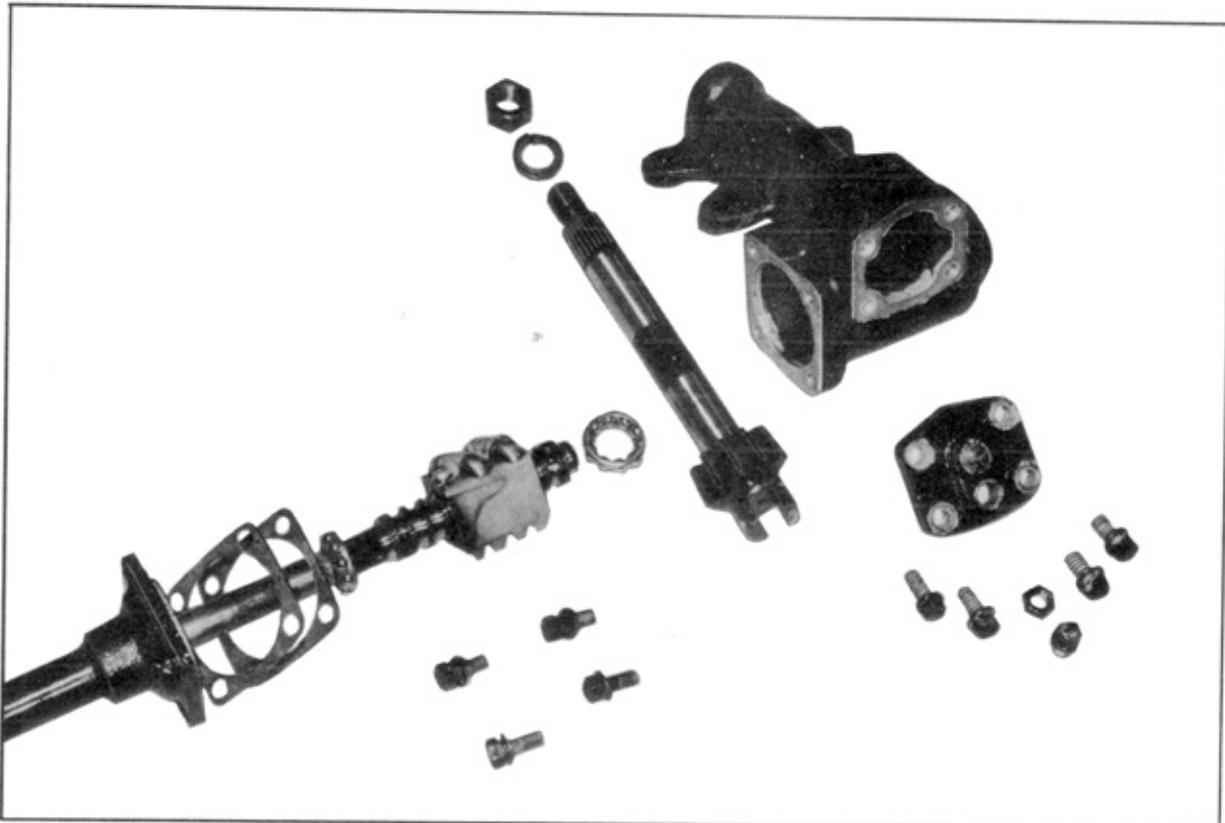


Unscrew the lock nut of adjusting screw, and then take off the side cover.





Draw out the ball nut assembly.



Components of Steering Gear Housing

Assembling of steering gear housing is a reversal order of disassembly.

Assembling

Slip the nut over the worm with the ball guide holes up and the shallow end of the rack teeth. Align the grooves in the worm and nut by

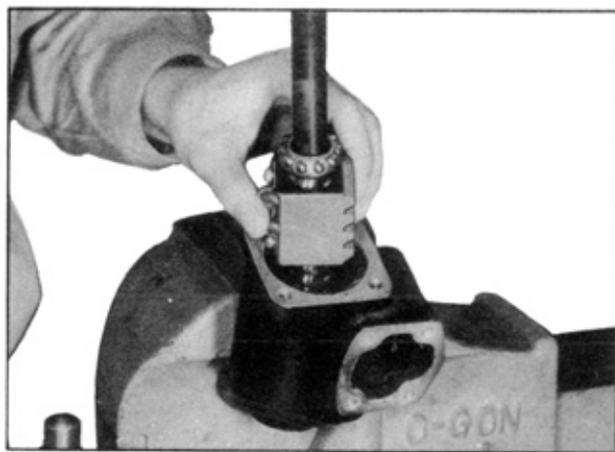
sighting through the ball guide holes count 60 balls into a suitable container. This is the proper number of balls for this ball nut.

Drop balls into each of two holes on the same side of nut. This operation may be performed from either side of nut, but two holes on the same side must be used, not two holes on same end.

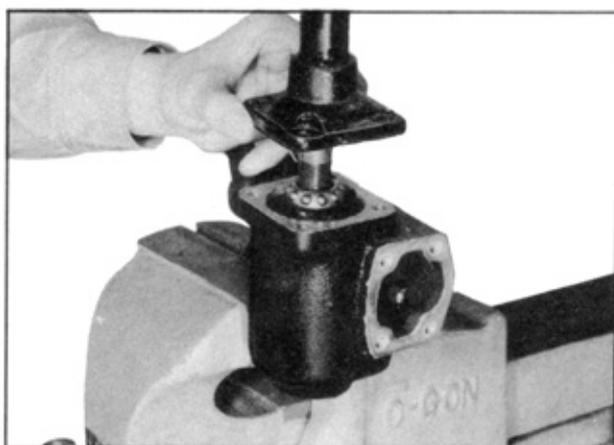
Shake the nut gradually away from hole being filled. Continue until the balls are installed in full. Place remaining balls in ball guides, in each of two halves.

Push the guide into holes of the nut. If the guides do not push all the way down easily, tap lightly into place. Assemble the ball guide clamp to the nut, being sure to use a lock washer under the clamp screw then tighten the screw securely.

Check the assembly by rotating the nut on the worm to see that it moves freely.



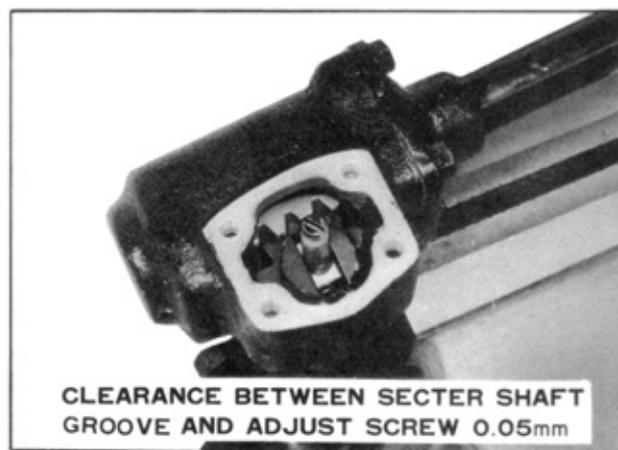
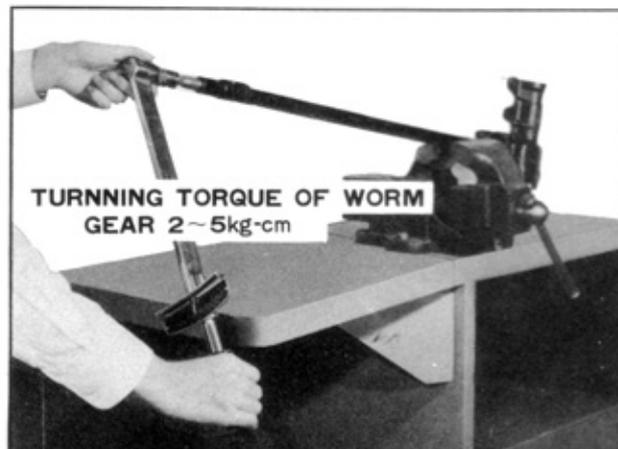
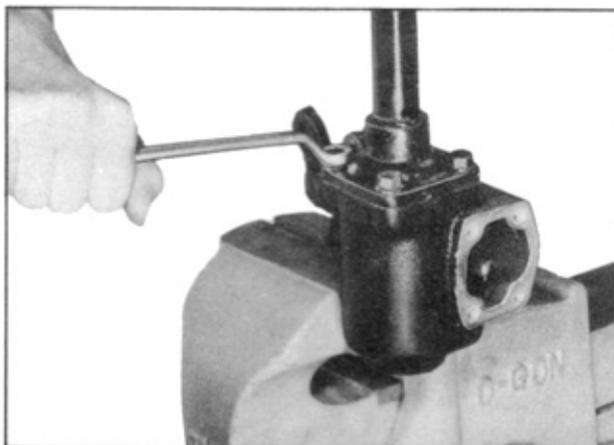
Insert the ball nut assembly with the worm bearing at rear side into the gear housing and smear the oil to the worm bearing.



Select the same thickness of shims at the disassembling time and connect the column assembly with it to the gear housing.

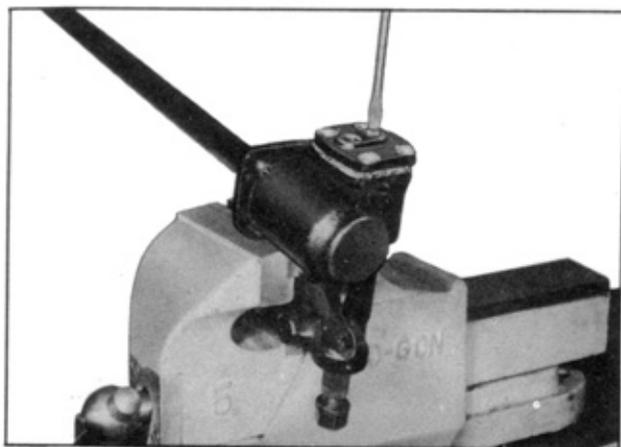
Tight the rear cover bolts.

| | |
|-------------------|----------------|
| Tightening torque | |
| Front rear cover | 1.8 ~ 2.5 kg-m |



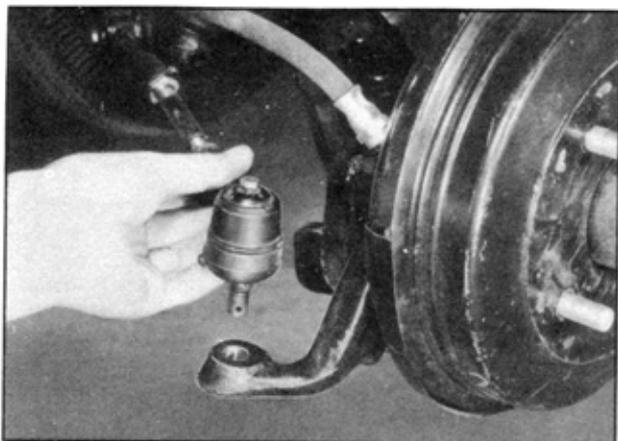
Fitting the side cover with adjust screw, fix the side cover to gear box by turning it for left way.

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Tightening torque
Side cover 1.8 ~ 2.5 kg-m

Set up the gear arm temporarily to the shaft.
Adjust the play at the gear arm top within 0.1 mm and then lock temporarily by the nut.

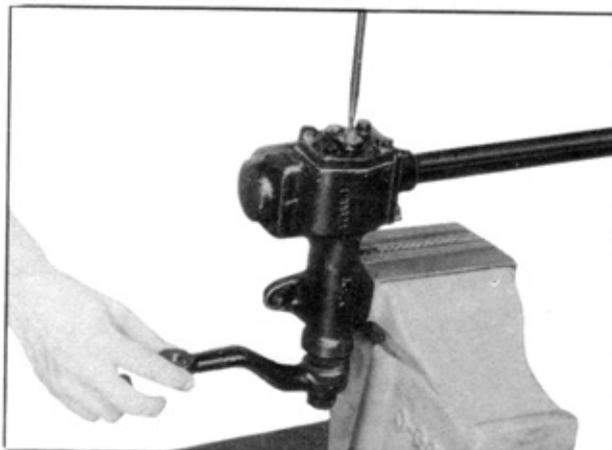
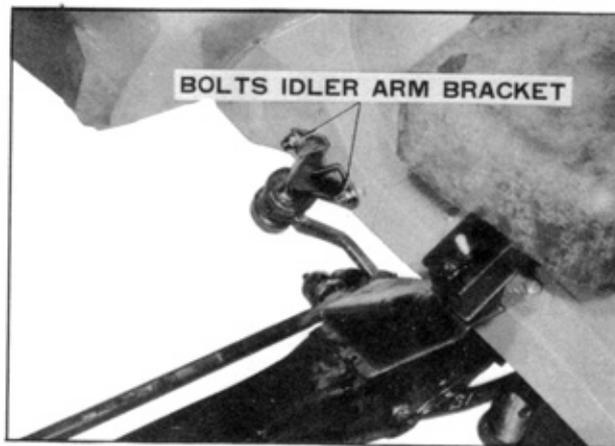


Rotating the gear arm several times for right and left way to find and correct center without any variation about back-lash.

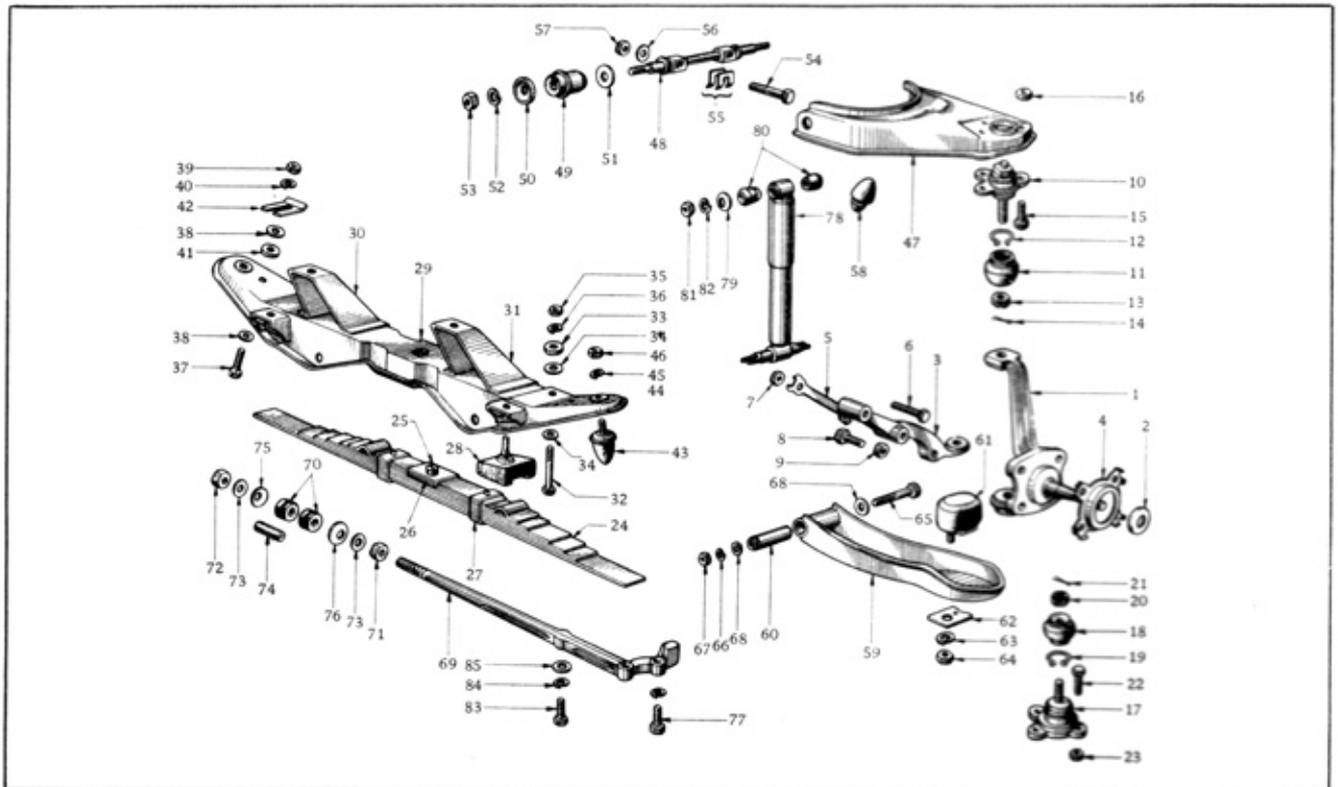


After then lock by nut surely and tighten the oil plug.

| Tightening torque | kg-m |
|---------------------------|-----------|
| Connecting bolt, gear box | 6 |
| Ball stud | 3.5 ~ 4.9 |
| Nut, steering wheel | 4 ~ 4.5 |
| Nut, idler arm bracket | 1.9 ~ 2.6 |
| Tie-rod end | 3.5 ~ 4.9 |



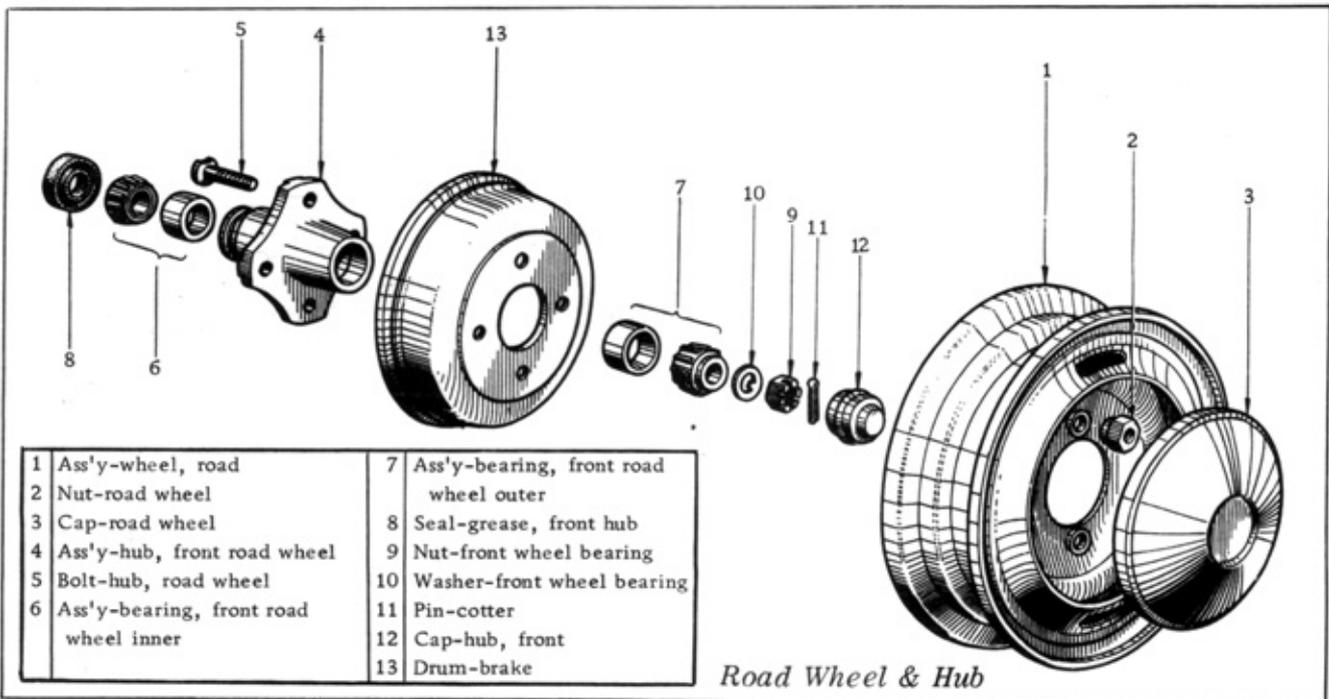
FRONT AXLE



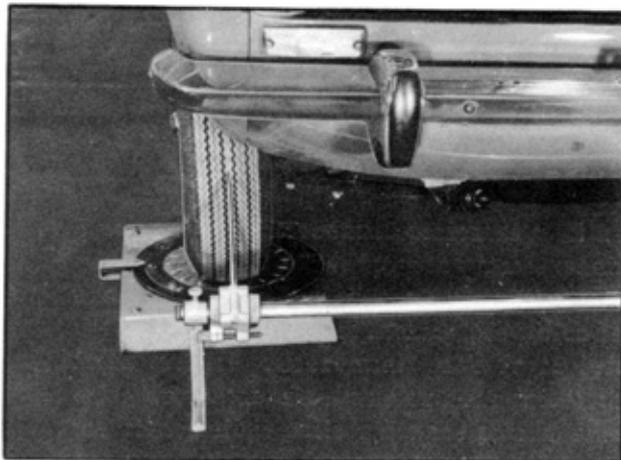
Front Axle & Suspension

| | | | | | |
|----|---|----|---------------------------------------|----|-------------------------------------|
| 1 | Ass'y-spindle, knuckle | 28 | Seat-pivot, front, spring | 57 | Nut |
| 2 | Collar-front spindle | 29 | Ass'y-member, front suspension member | 58 | Bumper-rebound |
| 3 | Arm-knuckle | 30 | Bracket-engine mounting front (R.H) | 59 | Ass'y-link, lower, front suspension |
| 4 | Catcher-grease front | 31 | Bracket-engine mounting front (L.H) | 60 | Bushing-rubber, lower link |
| 5 | Plate-lock, knuckle arm | 32 | Bolt-mounting suspension member | 61 | Support-rubber, front spring |
| 6 | Bolt | 33 | Washer-mounting bolt | 62 | Spacer-support, front spring |
| 7 | Nut | 34 | Shim-mounting | 63 | Washer-lock |
| 8 | Bolt-steering stopper | 35 | Washer-lock | 64 | Nut |
| 9 | Nut | 36 | Nut | 65 | Pin-lower link |
| 10 | Ass'y-joint, ball upper, front suspension | 37 | Bolt | 66 | Washer-lock |
| 11 | Cover-dust upper | 38 | Washer-plain | 67 | Nut |
| 12 | Clamp-dust cover | 39 | Nut | 68 | Washer-plain |
| 13 | Nut | 40 | Washer-lock | 69 | Rod-tension |
| 14 | Pin-cotter | 41 | Washer | 70 | Bushing-tension rod |
| 15 | Bolt | 42 | Shim-mounting | 71 | Nut-self lock |
| 16 | Nut | 43 | Bumper-bound | 72 | Nut |
| 17 | Ass'y-joint, lower ball, front suspension | 44 | Washer | 73 | Washer-plain |
| 18 | Cover-dust, lower ball joint, inner | 45 | Washer-lock | 74 | Collar-tension rod |
| 19 | Clamp-dust cover | 46 | Nut | 75 | Washer-special, tension rod |
| 20 | Nut | 47 | Comp.-link, upper, front suspension | 76 | Washer-special, tension rod |
| 21 | Pin-cotter | 48 | Spindle-upper link | 77 | Bolt |
| 22 | Bolt | 49 | Bushing-rubber, upper link | 78 | Shock-absorber, front |
| 23 | Nut | 50 | Washer-upper link outer | 79 | Washer |
| 24 | Ass'y-spring, front suspension | 51 | Washer-upper link inner | 80 | Bushing-rubber |
| 25 | Bolt-center | 52 | Washer-lock | 81 | Nut |
| 26 | Seat | 53 | Nut | 82 | Washer-lock |
| 27 | Clip | 54 | Bolt-spindle, upper link | 83 | Bolt |
| | | 55 | Shim-camber | 84 | Washer-lock |
| | | 56 | Washer-tooth lock | 85 | Washer-plain |

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Front Wheel Alignment Data

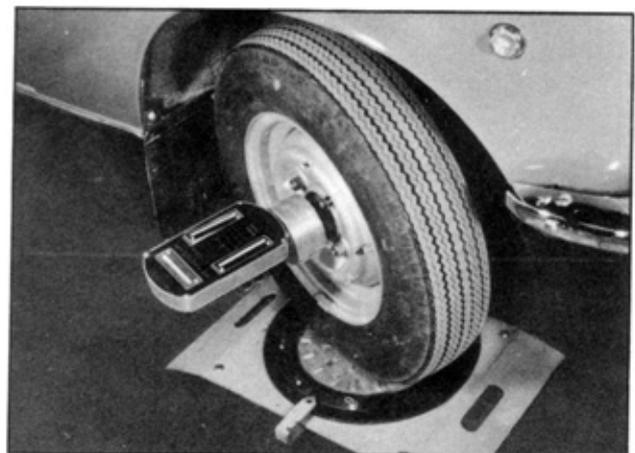


Toe-in

| | |
|--|--|
| Toe-in | 2 ~ 3 mm |
| Camber | 1°45' |
| Caster | 2°15' |
| King pin angle | 6°30' |
| Side slip | Less than 3 mm with each running distance 1 mm |
| Turning angle (Inside) | 45° |
| (Outside) | 36°36' |
| Rotation torque front hub (Motive) | Less than 9 kg-cm |
| Clearance of front hub to direction along the shaft | Less than 0.08 mm |
| Clearance of ball joint to direction along the shaft | Less than 0.9 mm |



Camber



Caster

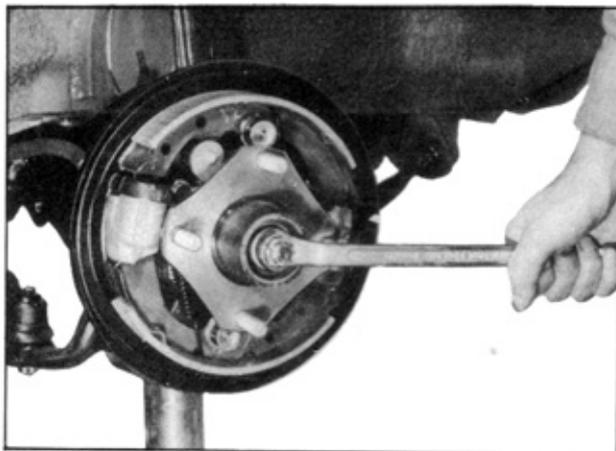
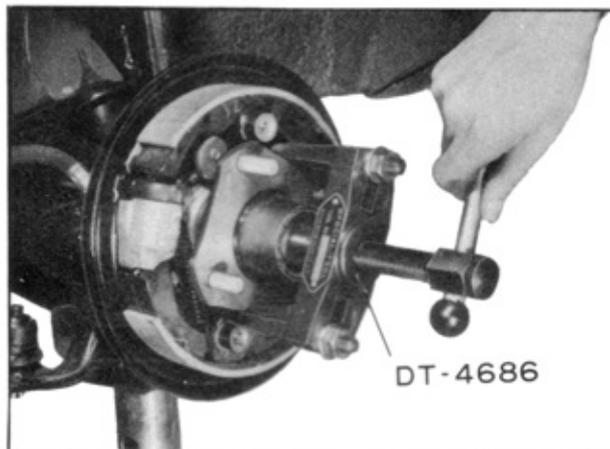
DISMANTLING THE FRONT HUB

To dismantle the front hub, first jack up the car until the wheel is clear of the ground and then place a stand under the side member.

Jack down the car on the stand.

Remove the wheel. If the drum appears to hold on the brake shoes, the shoe adjusters should be slackened. Take off the hub cap by a lever, and then extract the split pin from the spindle nut.

Using a box spanner, remove the spindle nut and the flat washer under it, extract the road wheel hub with the bearing from the knuckle spindle by the puller as shown the figure.

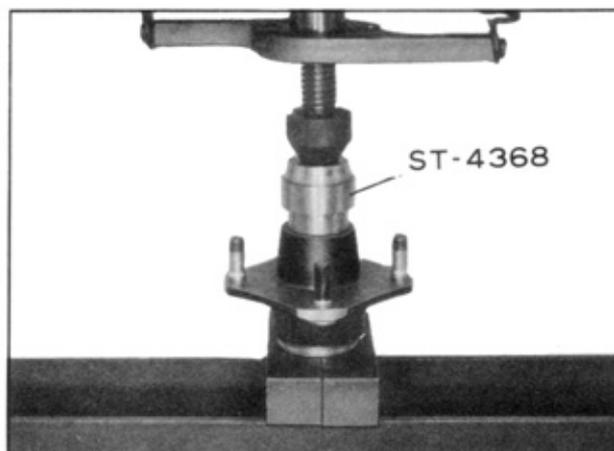
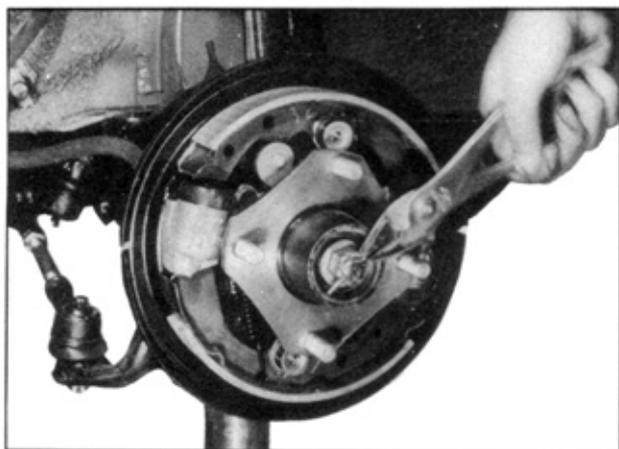


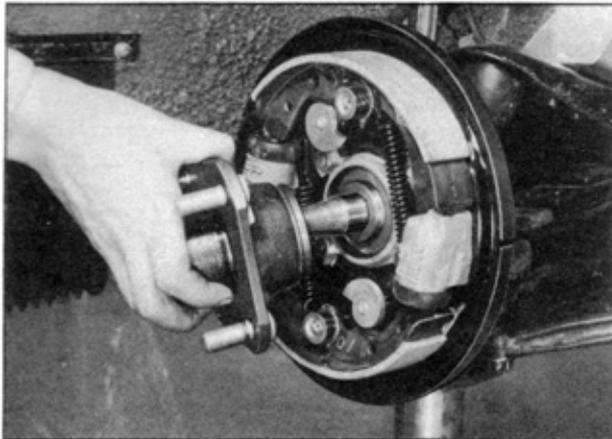
After the hub removed, the bearings can be dismantled. The inner bearing and oil seal can then be removed by inserting the drift from the opposite side of the hub.

Assembling the Wheel Hub

When assembling the inner bearing cone to the hub smear sufficiently the grease to the inner face of wheel hub.

Assemble the wheel bearing to the wheel hub as shown the figure.





Pack the hub with recommended grease. Replace the hub oil seal over the inner bearing. Renew the seal if it is damaged.

Adjusting for Pre-load of Wheel Bearings

| |
|---|
| Tightening torque of spindle nut |
| 1.6 ~ 1.8 kg-m (in the case of lubricated on the face of screw and washer somewhat) |
| 2.3 ~ 2.5 kg-m (without any lubrication) |

Rotating the wheel hub several times for setting smoothly, and then again tight the nut with the aforesaid torque.

| |
|----------------------------------|
| Torque for rotation of beginning |
| 25 ~ 30 kg-cm |

Fit the pin hole with the spindle nut within 40° ~ 70° degree turning back around the nut.

Again rotating the wheel hub, make sure as to beginning torque for rotation and end play for horizontal way along the spindle.

a) Torque of beginning for rotation

Less than 9 kg-cm

b) End play for horizontal way along the spindle

Under 0.08 mm

Lock the spindle nut by the new cotter pin and lock washer after final adjustment for pre-load.

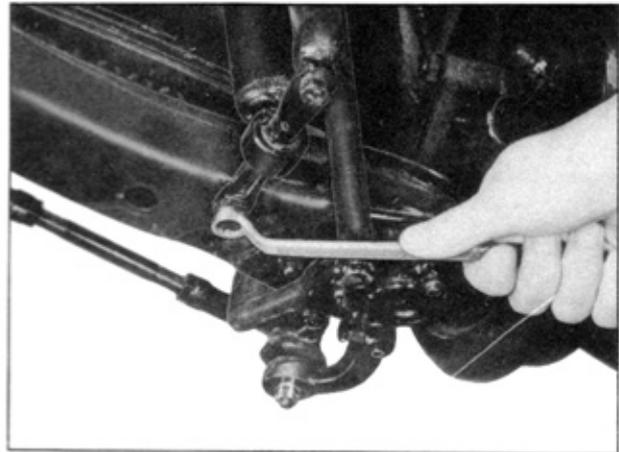
FRONT SPRING

Removal

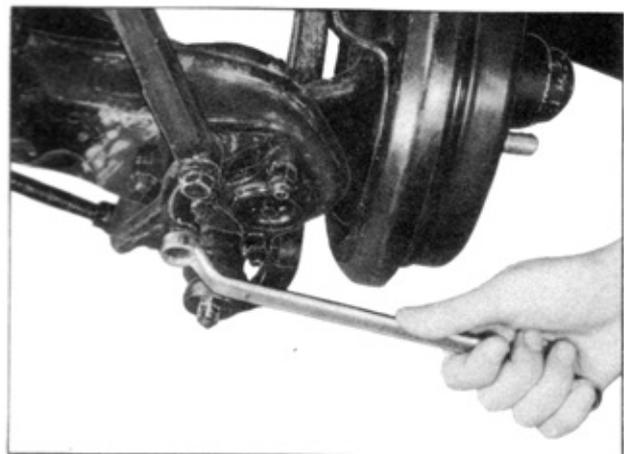
Take out the wheel cap and loose slightly the wheel nut.

Jack up the front suspension member and set on the stands with the side member.

Remove the wheels and attached bolts (2) at the lower side of front shock absorber.

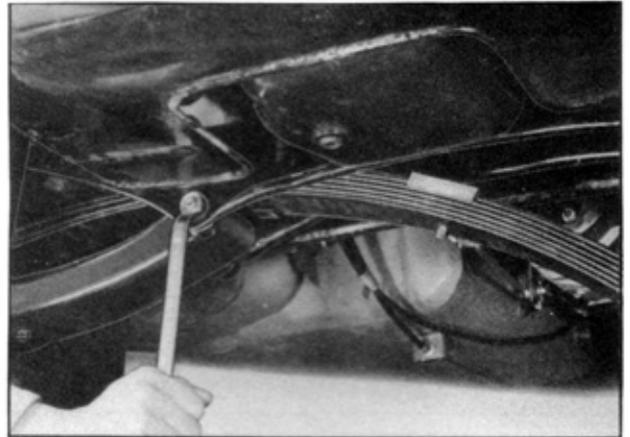
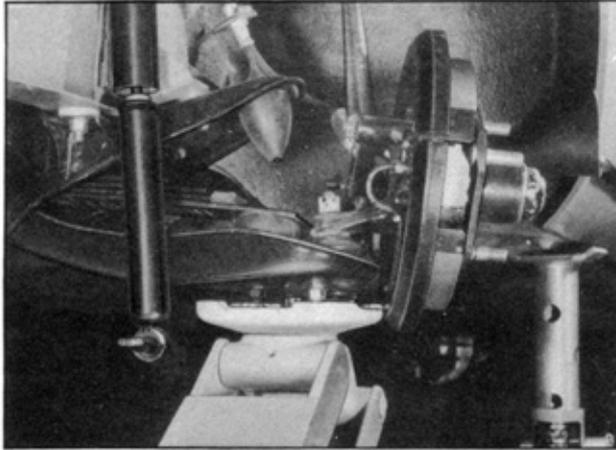


Screw out the bolts (2) at the side of lower link on the tension rod.



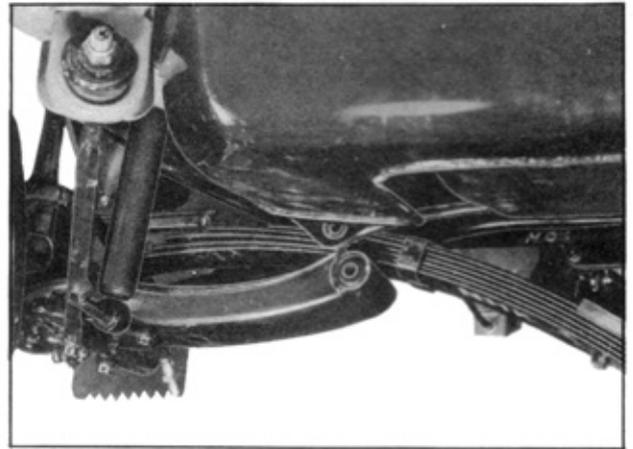
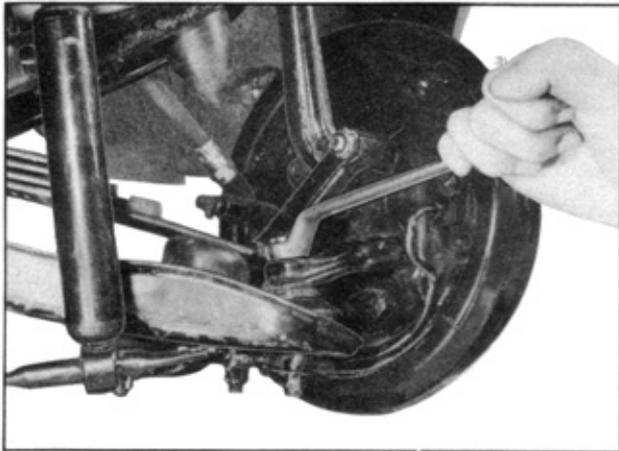
Screw out the attached nut at a front side of tension rod (Leave alone other side nut).

Jack up the end of lower link on the side of removed tension rod.



Remove the nut of lower ball joint after pulling out the cotter pin.

Remove the jack at the end of lower link, then take off the lower link pin.



Supporting the front spring, remove the lower link pin at the unscrewed side of tension rod.

Inspect upon weakness, crack and faults etc.

Free camber

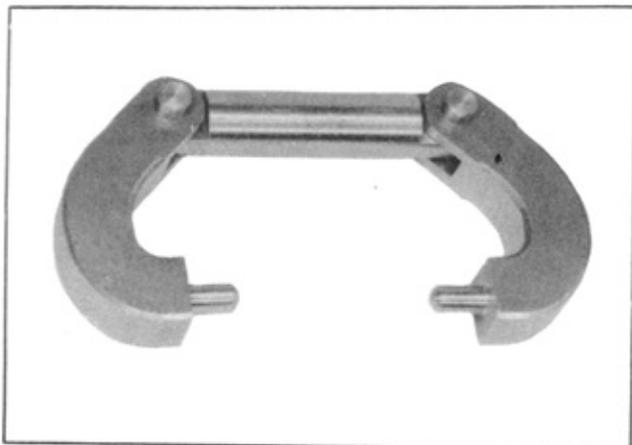
120 mm

Fixing the Front Spring

Fitting the spring to the lower link at remained side without removing and set it temporarily.

To fix the spring correctly for the pivot seat so as to fit the center pin for the center hole of suspension member.

Jack up the end of spring at the tension rod (removed side) and fix it temporarily by the special tool (ST-4369 Front Spring Clamp).



Lower the jack and fix the pin of lower link temporarily.

| Tightening torque | kg-m |
|--------------------------|-----------|
| Lower ball joint | 5.5 ~ 7.6 |
| Lower link pin | 4.2 ~ 5.3 |
| Tension rod (Front side) | 4.2 ~ 4.5 |
| (Rear side) | 4.2 ~ 5.3 |

Connect the lower ball joint to swivel axle and then attach the wheels.

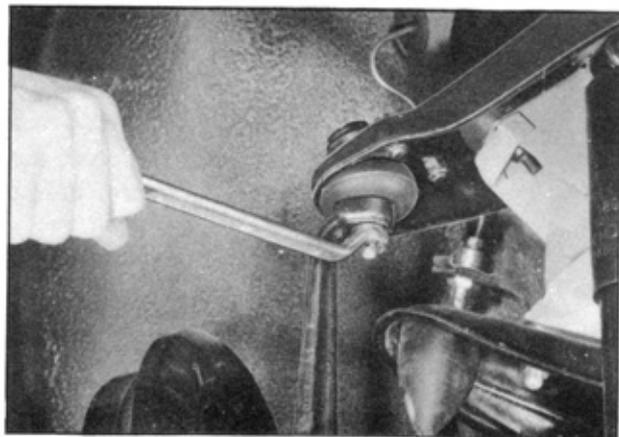
Tightening up the lower link pin and wheel nut correctly.

UPPER LINK

Removal

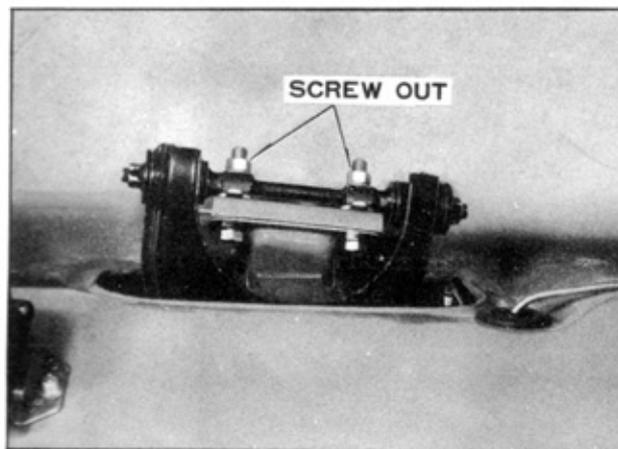
Jack up the front of car and hold on the stand by side cross member.

Remove the fixing nut at the upper of swivel axle.



Remove screen of the hood ledge and then unscrew the bolt of upper link spindle.

Fixing of the upper link is a reversal for removal of it.



| Tightening torque | kg-m |
|----------------------------------|-----------|
| Upper ball joint | 3.5 ~ 4.9 |
| Fixing nut of upper link spindle | 4.2 ~ 5.3 |

LOWER LINK

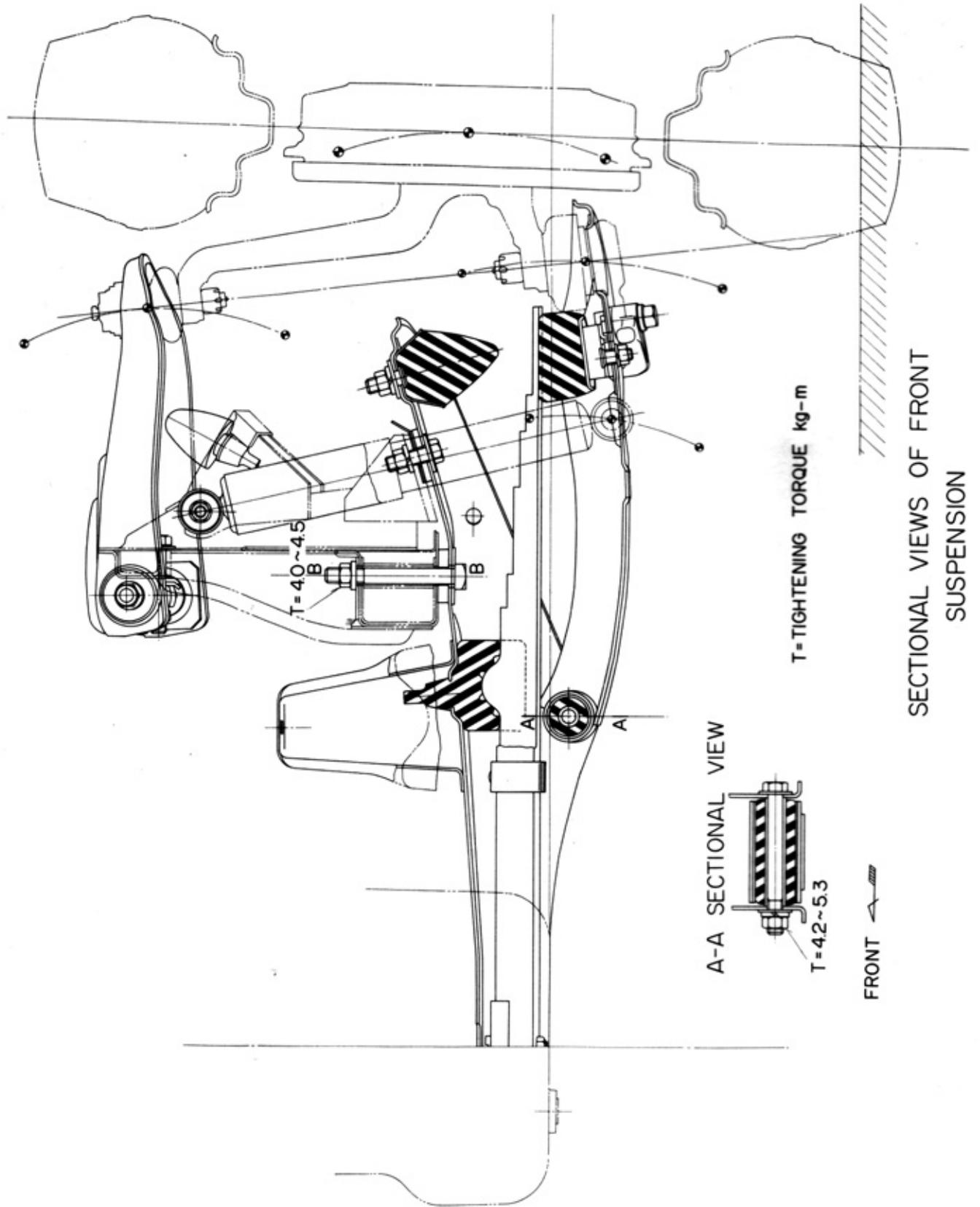
Disassembling

- Jack up the front of car and keep the side cross member on the stands.
- Take out the lower fixing nuts of front shock absorbers.
- Dismount the tension rod.
- Screw out the fixing nut of swivel axle and then pull out the pin of lower link.

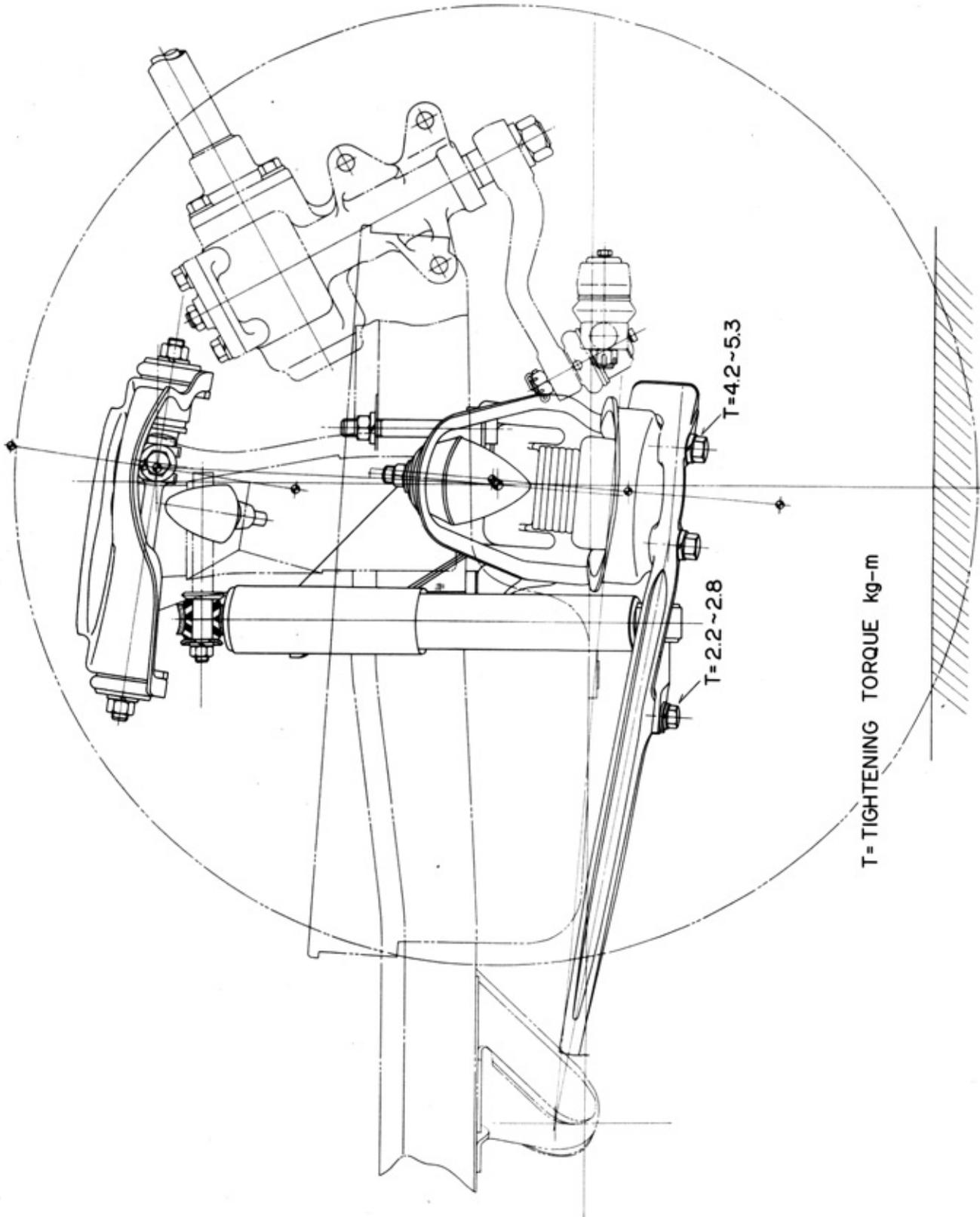
Assembling

Order of assembling is a reversal of disassembling.

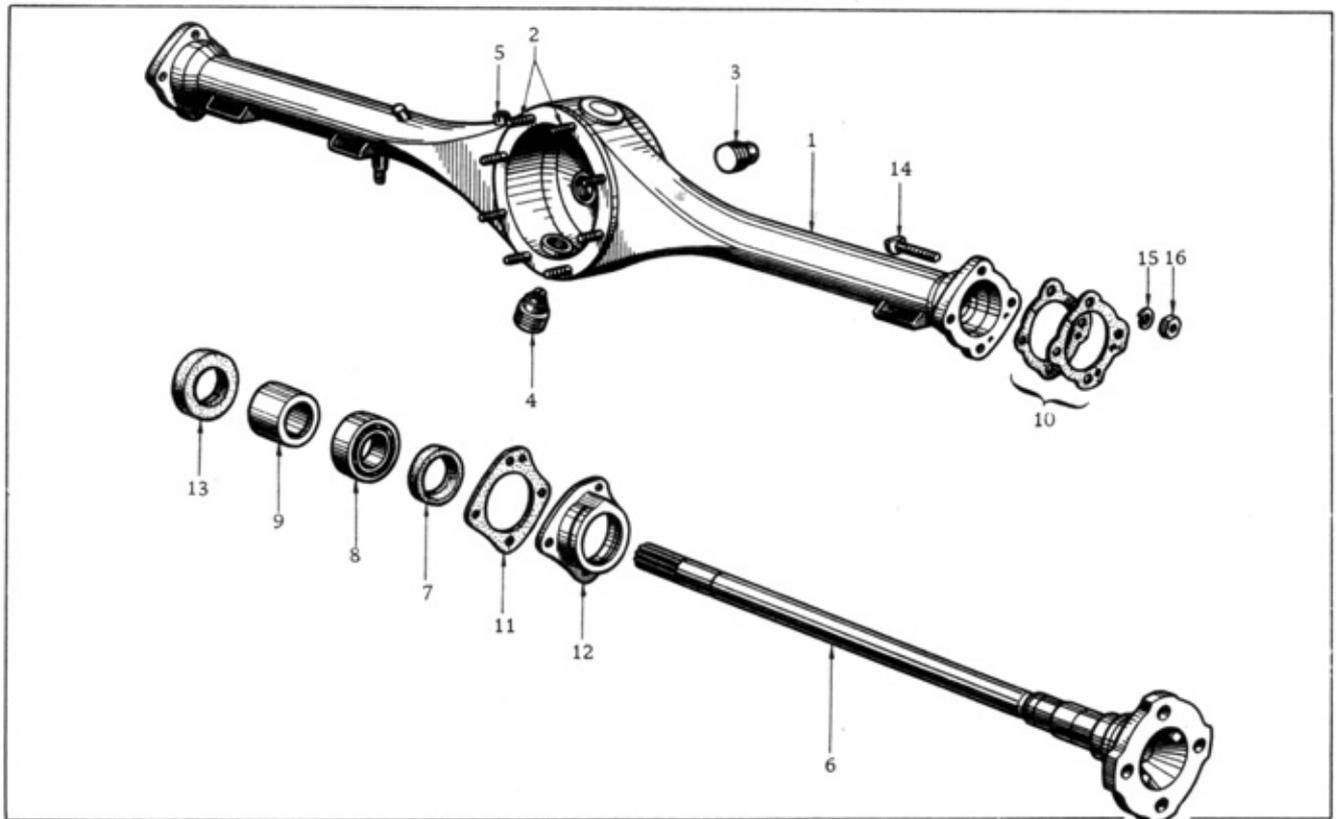
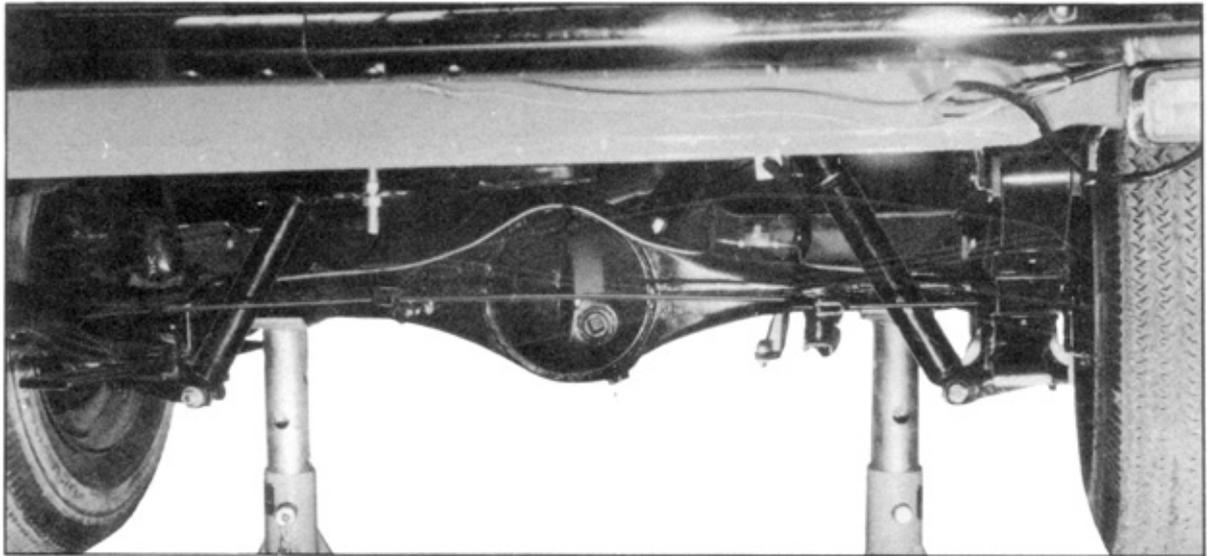
| Tightening torque | kg-m |
|-------------------|-----------|
| Lower ball joint | 5.5 ~ 7.6 |
| Lower link pin | 4.2 ~ 5.3 |



SECTIONAL VIEWS OF FRONT
SUSPENSION

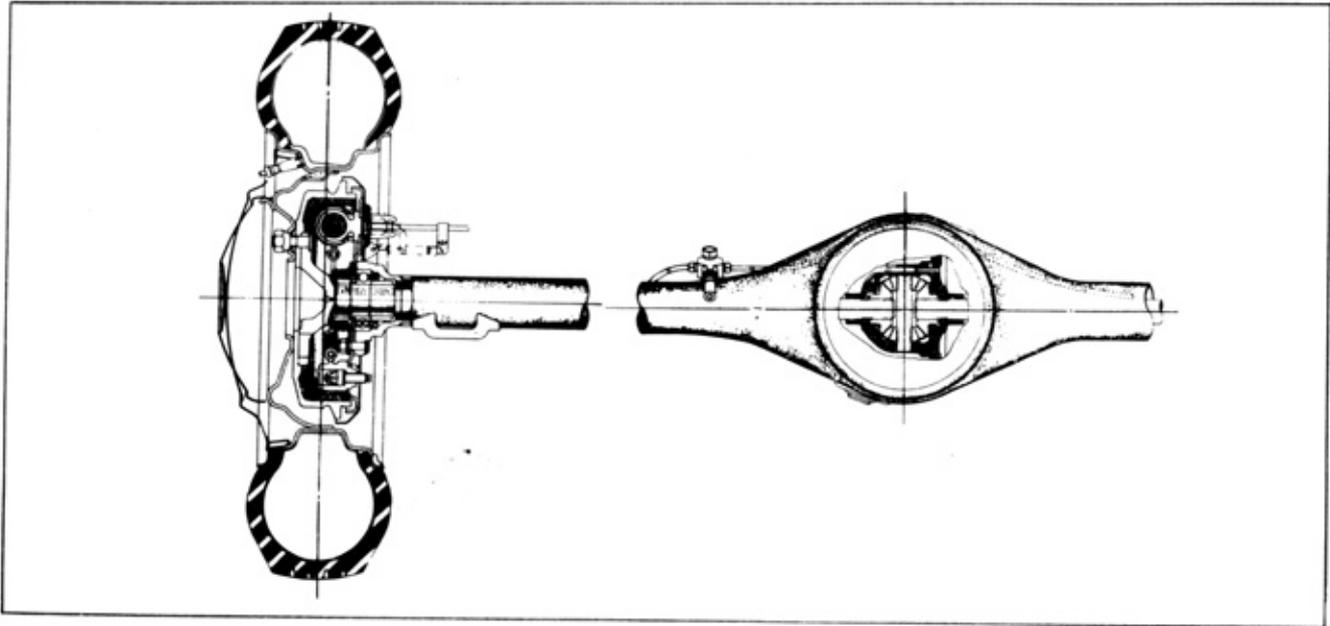


REAR AXLE



Rear Axle Case & Shaft

| | | | | | |
|---|-------------------------|----|---------------------------------|----|---------------------------|
| 1 | Comp. -case, rear axle | 6 | Ass'y-shaft, rear axle | 11 | Packing-grease catcher |
| 2 | Stud-gear carrier | 7 | Spacer-rear axle bearing | 12 | Catcher-grease (L. H.) |
| 3 | Plug-taper | 8 | Bearing-rear axle | 13 | Seal-oil, rear axle shaft |
| 4 | Ass'y-plug, drain | 9 | Collar-bearing, rear axle shaft | 14 | Bolt |
| 5 | Ass'y-breather (rubber) | 10 | Shim-rear axle case end | 15 | Washer-lock |
| | | | | 16 | Nut-lock |



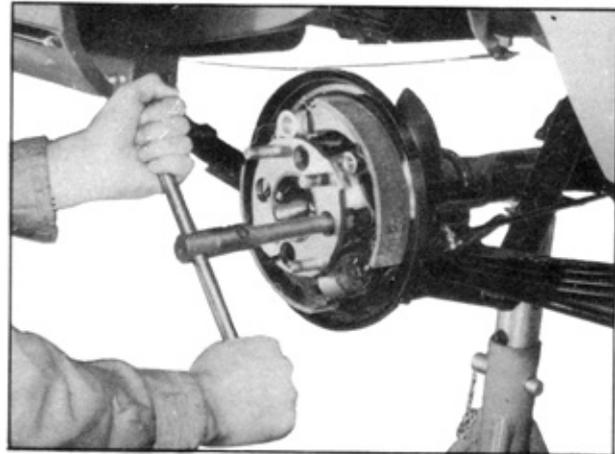
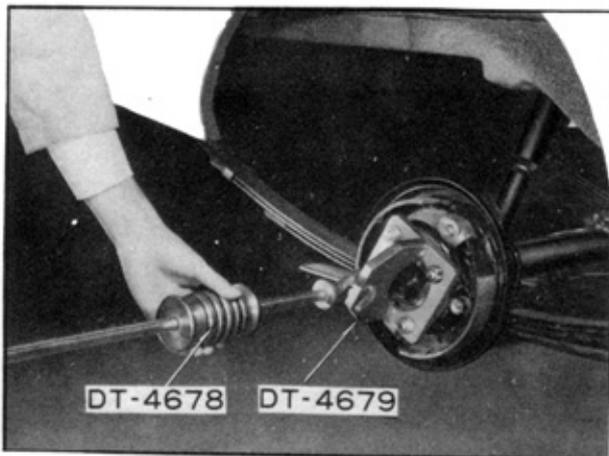
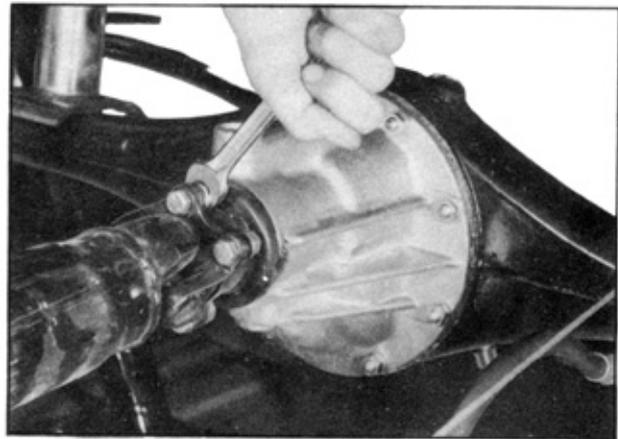
Component of Rear Axle

Axle Shaft Removal

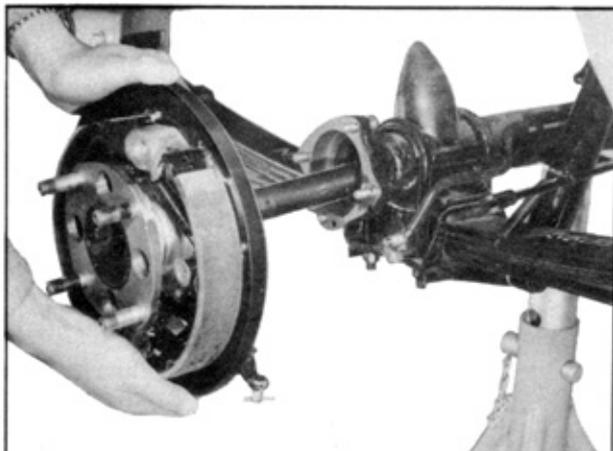
Choke all the wheels not being operated upon, jack up the car.

Lower the axle on to the blocks and remove the wheel using a screw driver unscrew the drum locating screws, release the hand brake and tap the drum off with the mallet. If the brake linings should hold the drum when the hand brake is release, slack off the brake shoe adjuster a few notches.

Take off the six bolts of the brake disc and remove the axle shaft as shown Figure. Tap with swing hammer holding the wheel studs bolt with the rear axle shaft stand draw out the shaft and disc assembly by gripping it outside of the disc.



Remove of Axle Shaft and Disc Assembly

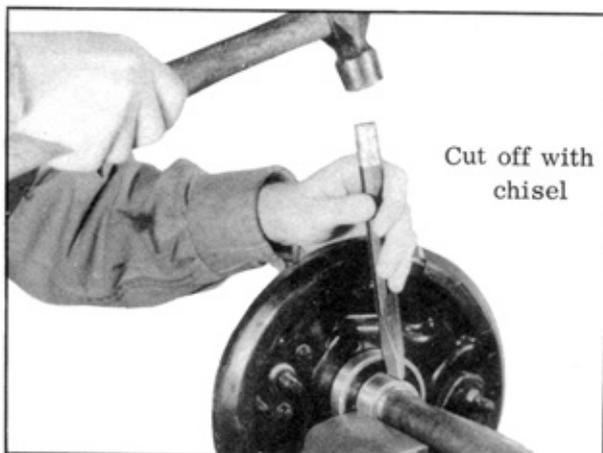


DT-4679
Special Stand

DT-4678
Swing Hammer

Disassembly and Assembly of Axle Shaft

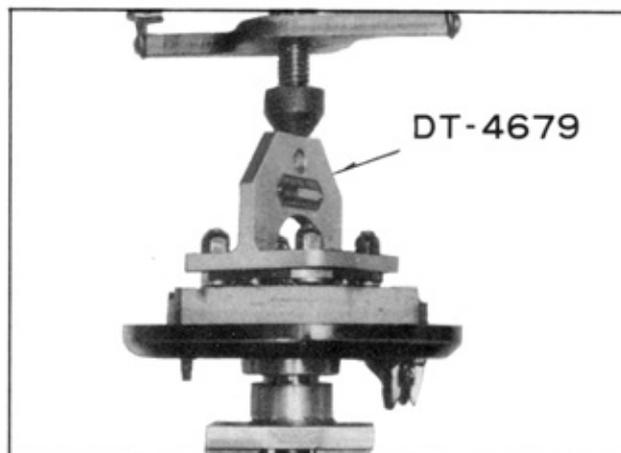
When replacing the differential axle shaft do not forget the adjusting washer between the top of the axle flange and the brake disc assembly so as to keep the end play of the axle shafts.



Order of Rear Axle Shaft & Brake Disc

The rear axle bearing with the brake disc assembly if replaceable in one operation by pressing into place. When fitting the axle shaft it should be compressed the bearing and new collar into the shoulder of the case end after inserting the end shim between its flange and hub.

The following points must be taken into consideration.



1. Nominated Hypoid gear oil No. MP90 must be used. (In warmer district than 32°C use MP# 140)
2. It is prohibited to use any other kinds of gear oil or any oil of different viscosity. The same brand must always be selected.

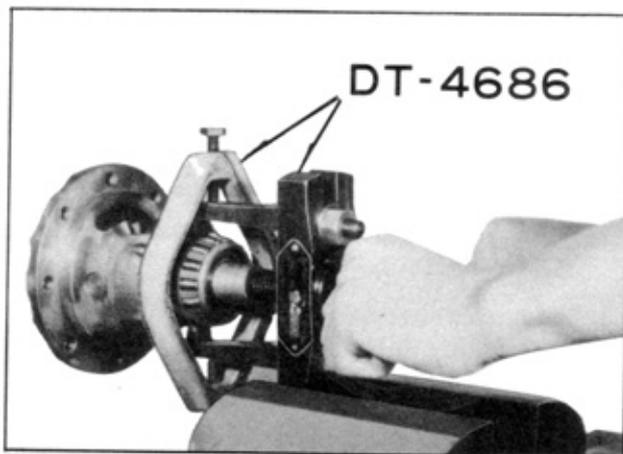
The standard capacity of oil is about oil 0.75 ℓ. The method of feeding oil should be done by taking off the feeler plug at the rear cover of the housing and fill in full up to the feeding hole.

Dismounting & Disassembling of Differential Gear Carrier

- 1) Take off and drain out the gear oil.
- 2) At the time of dismounting the gear carrier, pull out the both left and right axle shaft with the disc of the brake assembly.
- 3) Take off the joint flange from the side of propeller shaft.
- 4) Pull off the nuts of the housing and dismount forward the carrier ass'y.
- 5) Take off the side bearing cap of carrier and pry with a lever the differential gear case and the bearing.
- 6) Dismount the differential side bearing. As illustrated in Figure with the aid of side

bearing puller, pull out the bearing. The puller should be handled with care in catching the hedge of bearing inner race which is hard to hook. Both the left and right bearing should be arranged separately.

- 7) Dismount the differential drive gear. (Ring gear) by loosening the 8 fixing screws on the differential gear case, and spreading out the lock washer. Loosen them in a diagonal line considering to keep from the gear bending.



*Using of Side Bearing Puller
(DT-4686)*

- 8) Take out the differential pinion as well as the side gear. The pinion mate shaft should first be pulled out by striking out the pinion mate shaft locking pin which is fixed on the differential case from left side (from the side of ring gear fixed) to the right before pulling out the pinion, side gear and the thrust washer. The gear as well as the thrust washer should be arranged separately as left and right, front and rear.
- 9) After taking out the nut of the carrier, pull out the companion flange. The drive pinion flange wrench should be employed, setting its four points in the holes of flange to keep it from moving, take off the nuts with the box wrench.
- 10) Take out the drive pinion of gear carrier by striking out lightly to the backwards the front end (at the side of companion flange) of drive pinion with the drift of soft metal.

Thus, the pinion would be taken out together with the inner race of rear bearing and roller, distance piece, and the adjusting shim and the oil seal, outer race and pinion of front and rear bearing as well as the pinion adjusting shim left in the carrier.

- 11) Pull out the rear bearing inner race of the drive pinion.

As illustrated in Figure the drive pinion rear bearing inner race replace and the adapter should be employed in this case. The adapter in the round from is for fixing and the other for taking off. It is easy to handle with the vice fixing one end of replacer.

- 12) Taking out the rear bearing outer race of gear carrier.

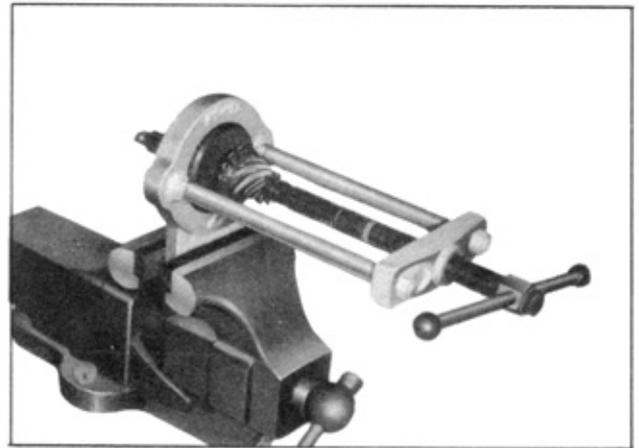
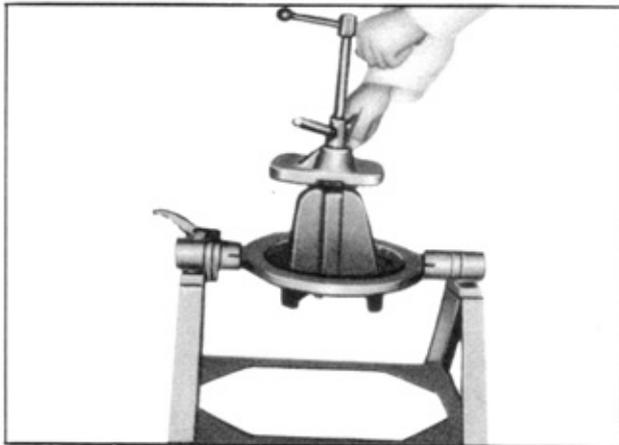
The drive pinion bearing outer race replacer as illustrated in Figure should be employed in this case. In other upon the stud so as to make the screw at the center of carrier, and set the adapter at the lower trim of the race.

Supporting the tommy bar (1) and screw up till the corn (7) closely touches the adapter, then screw the wing nut to take out the rear outer race.



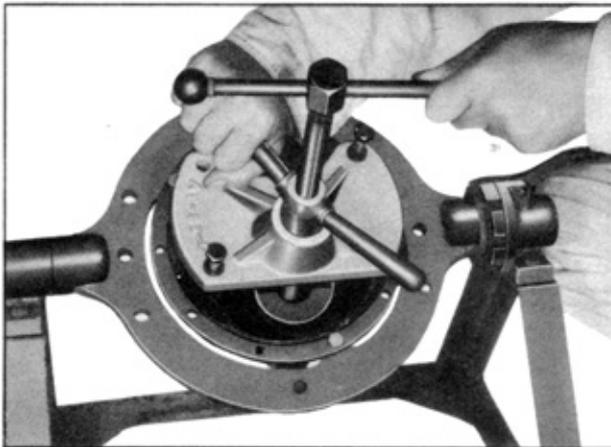
Tool No. DT4782, DT4631 & DT4689

Pull out the Bearing Race

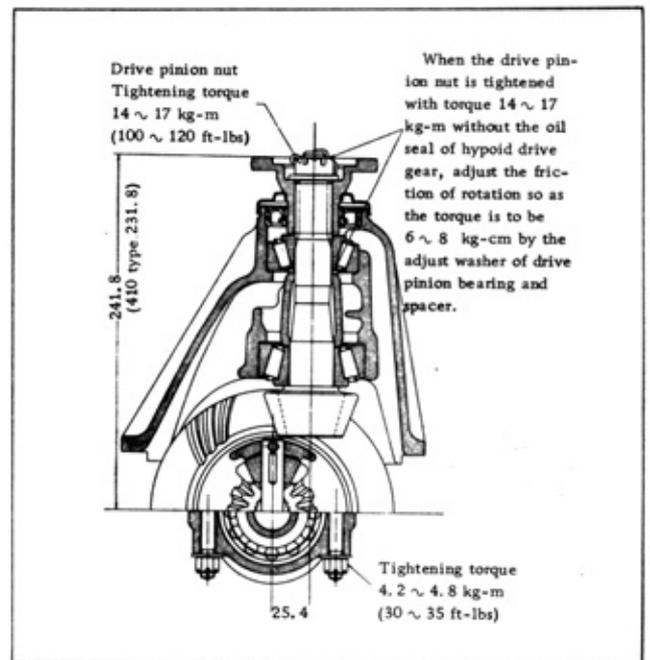


Inner Race Replacer

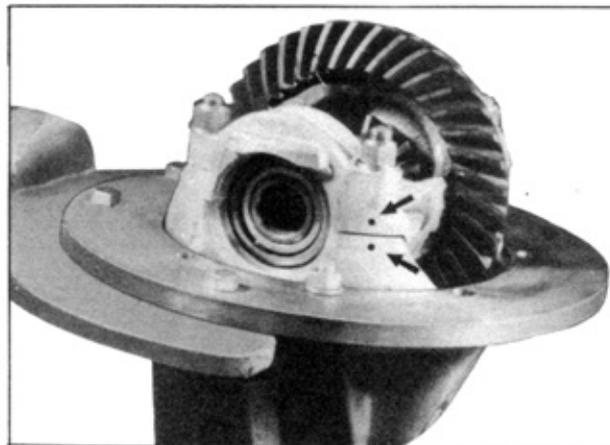
- 13) To pull out the front bearing outer race from the gear carrier, set the tool body (3) as illustrated in Figure pull it out with adapter (B) in the way of rear race.

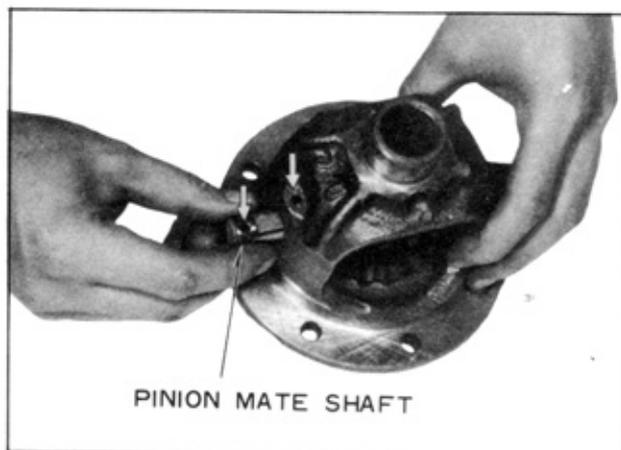
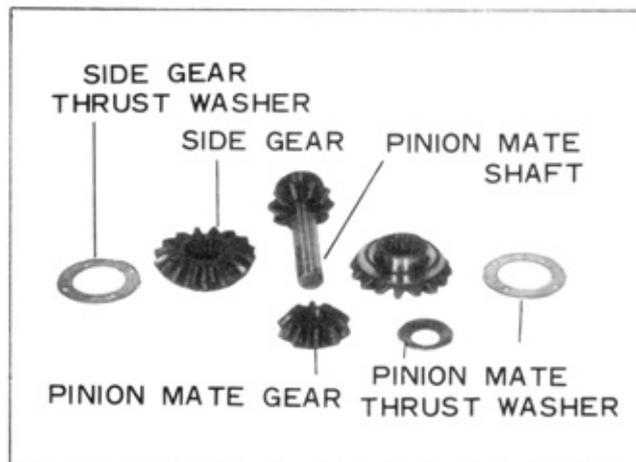


Drive Pinion Front and Rear Bearing Outer Race Replacer



Section of Differential Case





INSPECTION & REPAIRING OF DISASSEMBLED PARTS

Every parts after they are disassembled should be cleaned and cleaned by the compressed air before making an inspection and adjustment.

- 1) Each bearing should be inspected in every unit of ass'y regard with the defect and defacement before deciding to re-use them.
- 2) The axle should be inspected in respect of the crack and the defacement of spline measuring the shake with the gauge by holding the both end. The difference over 0.4 mm should be adjusted with 0.8 m/m or replaced.
The clearance between the end of rear axle case and brake disc should be adjusted

with the adjusting end shim.

- 3) Every gear should be inspected as to the locking condition defacement or any defects on the surface to see if they can be reused. In case of insufficient standard back lash, deformation or damage found, replacement is necessary.
Specially the drive pinion and drive gear should be replaced in a set whenever the locking condition gets worse and the defacement is already in progress, because it would cause the noise in later operation and be difficult to adjust even with proper adjustment is made.

The perfect driving condition at the surface of drive pinion gear should be about from $\frac{2}{3}$ to $\frac{3}{4}$ mm in unloaded driving while the gear surface should start to touch from tip to full surface in an ordinary loaded driving.

The inspection of this condition can be made as it is.

If it is hard to inspect them as it is, do otherwise by cleaning the both surface with the rugs before disassembling and paint thinly and evenly with the mixed with thin oil on the gear surface (drive side) then turn the pinion with hand to print the track of it on the gear. Which shows the situations of considerably worn out gear.

In case of unloaded test, it is perfect that the gears contact for about three quarter at the center of $\frac{1}{4}$ of whole gear length from tooth (interior tip end of the gear) on the pitch line.

- 4) Lock the side gear with pinion together with respective thrust in the gear case. In case of the back lash over 0.2 mm and the clearance between the side gear and thrust washer exceeds 0.5 mm replace the thrust washer.
The else worn out parts should also be replaced.
The contact when ring gear is too close to pinion center in case of back lash should be adjusted closely or it gives much noise.
- 5) Put the drive gear (ring gear) on the buoy block as it is fixed in the differential gear case, and measure with the dial indicator. Revolve the drive gear to turn around the differential gear case as the bearing do

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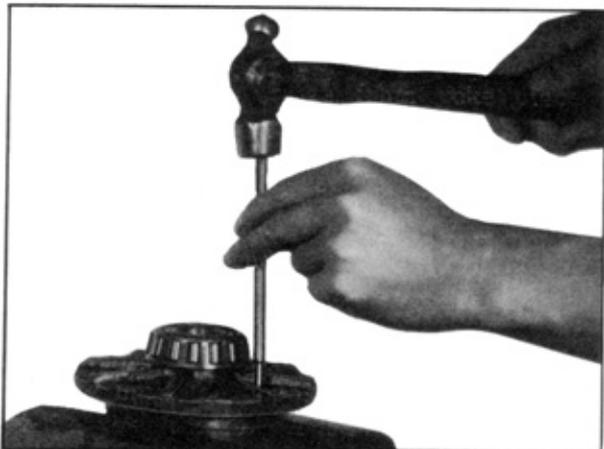
not move on the buoy block. Measure the shake at the rear side of gear by the scale and the shake should be within 0.08 mm. In mounting the gear, clean well the fitting face and rear face (measured face) of it and fix correctly, then there should not be any shaking.

ASSEMBLING ADJUSTMENT

Assembling Differential Gear

- 1) Assemble the pinion and side gear in the differential case.

Every parts should be cleaned and oiled with new gear oil, then the pinion mate side gear and the thrust washer should be assembled by the mentioned inspection and selection before pushing in the pinion mate to shaft. Inspection should be made again in the clearance of between the washer or the back lash. Adjustment must be made in case any abnormal, is found. Strike in the pinion shaft locking pin from the right side of the case (opposite side of drive gear) and must be fixed by setting well the striking hole of it after putting it to the required piston so as the pin should not loosen.



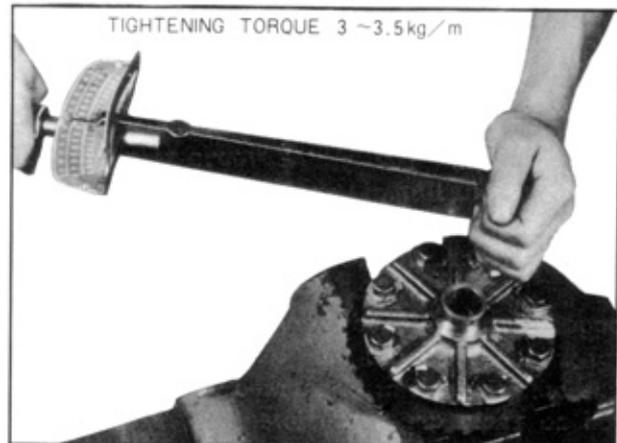
- 2) Fix the drive gear (Ring gear) with the differential case.

The drive gear as well as the drive pinion should be well inspected to they must be replaced as a set whenever the replacement is required.

Otherwise, they would not properly lock after assembling is completed.

In mounting in the case, the fitting surface

must specially be cleaned and fixed with 8 set screws as well as lock washer bend the washer with sureness after the drive gear shake is adjusted. In tightening up the screw, it should be set and supported by vice or any other setting tools so as not to damage it and screw up in a diagonal line with a wrench which fit correctly with the head of the screws. The standard screwing torque for this is 3~3.5 kg-m. Screw in for sure, striking lightly the head of screw by one quarter pound hammer.



- 3) Mount the side bearing in the differential case.

Press in the both side of the bearing by the drift.

It is important in this case to assemble by putting the side bearing adjusting shim to give the bearing a proper preload in fixing with the carrier.

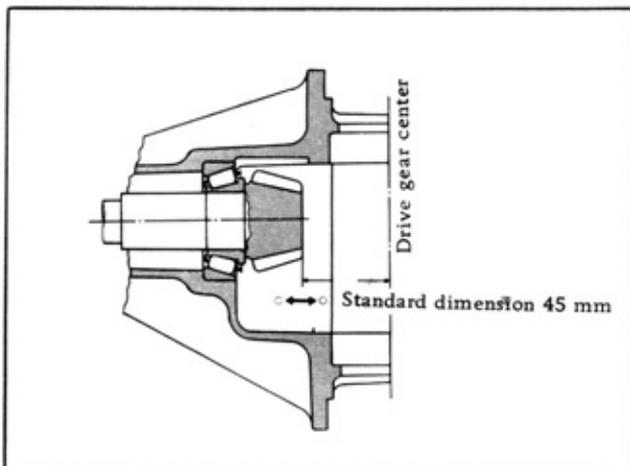


ASSEMBLING & ADJUSTMENT BY GEAR CARRIER ASS'Y

It is to decide the assembling & adjustment of gear which is very important in an rear axle ass'y and should be carried in accordance with the exact sample shown by the manufacturer.

The construction and mechanism must well be comprehended referring to Figure and the adjustment & repairing exactly according to the condition of practical use based on the adjustment by exact calculation.

(A) The Preparation for Mounting the Drive Pinion in the Gear Carrier



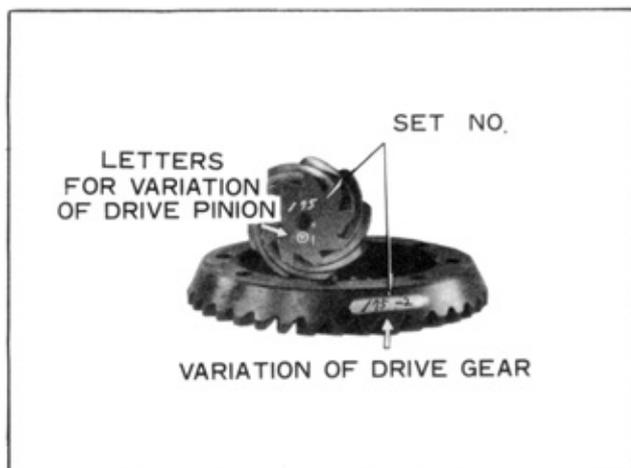
- (1) If the drive gear, drive pinion, and bearing are to be reused as they are as a result of disassembling and inspection, they should be assembled in on order of disassembling at the previous condition of adjusting shim. In case any item should be replaced or required to reuse even if any item is worn out prepare the various shim as mentioned later because the position of drive pinion to be fixed with carrier must be adjusted by the adjusting shim between the carrier and pinion rear bearing outer race.
- (2) There are few numbers with 0 & + or - besides set number marked by an electric pen on the tip head surface of drive pinion.



Adjustment of Pinion Height

They show the manufacturing variation in a figure at the unit of 0.001 in. (0.025 mm) to decide the thickness of adjusting shim for adjustment of standard position. (The standard pinion height is 45 mm from axle center as shown in Figure.)

If the figure is difficult to discriminate due to the corrosion, scrape off the oxidize substance on the surface by a somewhat narrow grind stone with care not to scrape off even the mark. Adjust to the direction of on arrow in accordance with the Pinion mark.



- (3) The thickness of drive pinion adjusting shim are arranged as following. The use of the adjusting shim will be explained in the following paragraph

of adjustment. Supposing the drive gear and the drive pinion were replaced as a new set and the height of drive pinion previously used was right, prepare the shim of thickness which equals to the difference of figures on the new and this pinion. Deduct the previously used shim in case it is plus, increase in case of minus and have the general idea of required thickness of the shim for assembling to prepare.

| | Part No. | Thickness |
|-----------------------------|-------------|-----------|
| Drive pinion adjusting shim | 38153 18000 | 0.050 mm |
| " | 38154 18000 | 0.075 mm |
| " | 38155 18000 | 0.125 mm |
| " | 38156 18000 | 0.250 mm |
| " | 38157 18000 | 0.500 mm |

It is convenient to inspect the condition before disassembling in a way as mentioned later in the measurement of pinion height. Besides the condition of defacement on the carrier, the pinion bearing must be taken into consideration though it will be explained in detail later.

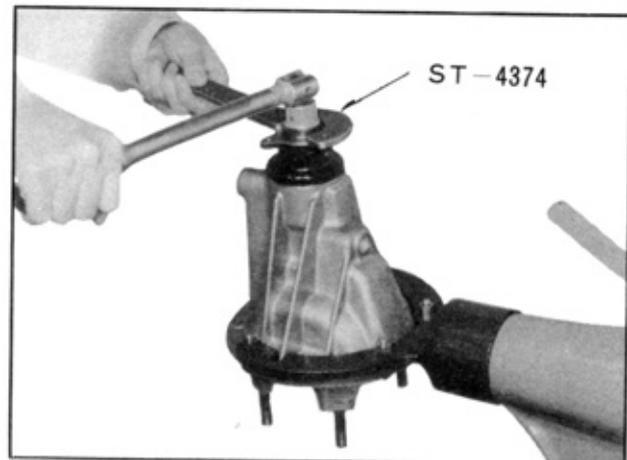
(B) Fixing and Adjustment of Drive Pinion

- (1) Drive pinion rear bearing outer race should be mounted in the carrier in this case, after inserting the properly selected adjusting shim as previously mentioned between the carrier and bearing race, mount the outer race by the special tool of drive pinion front, rear bearing outer race replacer.

For adjustment of previously mentioned pinion height, the shim at the rear side of this outer race is increased or decreased, and the race also must be taken off in each time for this adjustment, therefore the tools must be handled properly to avoid such a

situation as to make the bearing hole of carrier in on oval.

Referring to Figure for handling method of tool, set the adapter ring on the corn to guide the body of tool at the small hole of carrier put the rear outer race on the corn as the bearing surfaces inside at the tip end of screw and put the split adapter inside race. At the same time, supporting it by the bar, twist up the corn till the adapter and race come to the setted position then screw up the wing so as the race be housed properly at the setted position.

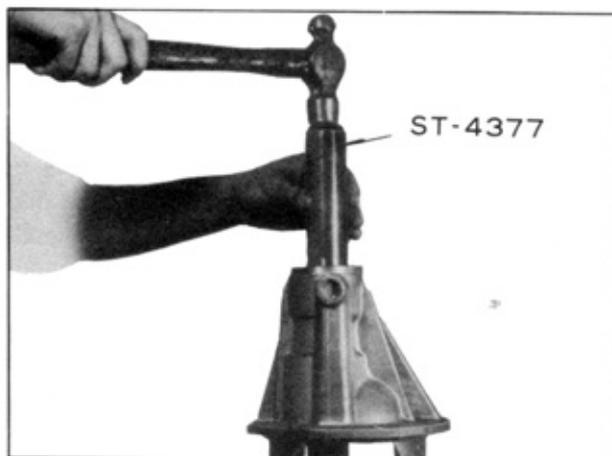


- (2) Mount the front bearing outer race in the carrier.

For mounting the front outer race, take off at first the adapter from the front end of the carrier and fix the tool at the side of stud in opposite side, tighten the screw as to be the center of carrier as shown Fig. 24 then mount it by using adapter as in a way of mounting the rear outer race.

- (3) Mount the rear bearing inner race and roller to the drive pinion. By using the round adapter attached to the drive pinion rear bearing inner race replacer which was employed at disassembling, press in the drive pinion.

This might as well be done in pressing in by the use of a certain drift.



- (4) Mount the drive pinion in the carrier and adjust by measuring the position. The pinion height must be adjusted as mentioned in the previous paragraph by mounting temporarily the pinion in the carrier and the bearing be given a regular preload. On the other hand, the bearing of drive pinion should be newly oiled after the pinion is inserted from the inside of the carrier, the inserted end of pinion should be locked with front bearing cone and tightened up by the pinion nut fixing with the companion flange till the regular revolving torque is required. As this is not yet at the final assembling, the bearing spacer (distance piece), bearing adjusting shim and oil seal are not mounted. At the time of inserting the front

bearing, as pushing in the inner race by pulling out the drive pinion from the rear side of the carrier.

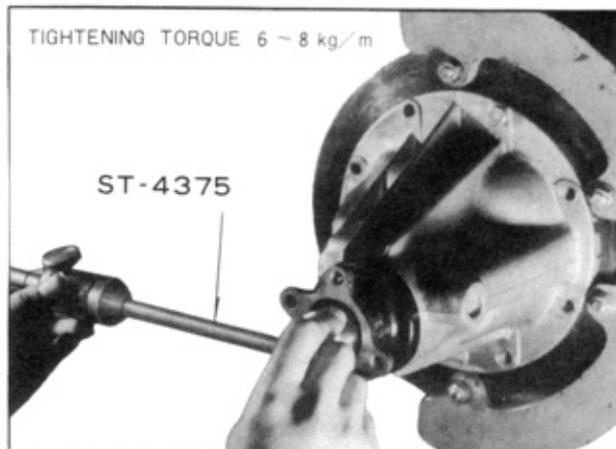
Put the rear side of the carrier downward and set the tool under it, then supporting the end surface of drive pinion, press in the bearing by using the drift. The operation would be easier by using the drive pinion front bearing inner race inserter as shown in.

Tighten up the pinion nut by turning it slowly with hands with the use of preload gauge as Figure to the degree that support the bearing preload at 6 ~ 8 kg-cm.

When the drive pinion is mounted in the previously mentioned condition it is necessary to measure the height of rear surface of the pinion whether in is higher or lower than the standard. Make use of the special drive pinion arrangement gauge.

The standard height of the pinion is 45 mm from the bottom of the side bearing fixed with the carrier.

The fixing position can be measured by setting an arc of circle on both sides of arrangement gauge at the position of side bearing and insert the thickness gauge in the clearance between the tip of gauge bar and the pinion such as to push in by scraping of the carrier in diagonal, otherwise preload and the pinion height of the bearing would come out of order and tend to cause an unexpected trouble in future.

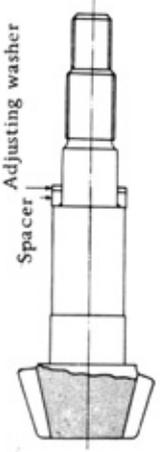


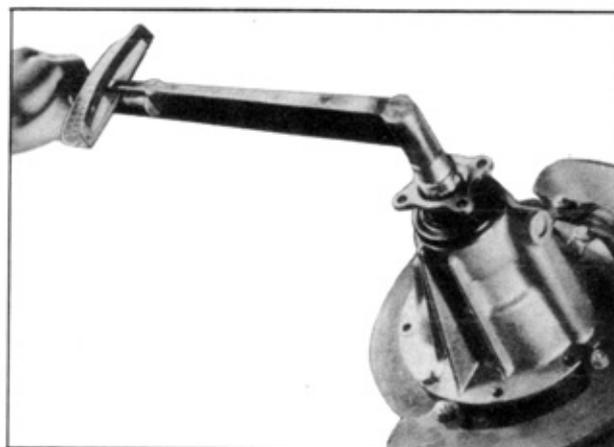
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Drive Pinion Spacer

| Part No. | Thickness mm |
|-------------|--------------|
| 38165 18000 | 5.75 |
| 38166 18000 | 6.00 |
| 38167 18000 | 6.25 |

Drive Pinion Adjust Washer

| Part No. | Thickness mm | |
|-------------|--------------|--|
| 38125 18000 | 2.30 ~ 2.32 |  |
| 38126 18000 | 2.32 ~ 2.34 | |
| 38127 18000 | 2.34 ~ 2.36 | |
| 38128 18000 | 2.36 ~ 2.38 | |
| 38129 18000 | 2.38 ~ 2.40 | |
| 38130 18000 | 2.40 ~ 2.42 | |
| 38131 18000 | 2.42 ~ 2.44 | |
| 38132 18000 | 2.44 ~ 2.46 | |
| 38133 18000 | 2.46 ~ 2.48 | |
| 38134 18000 | 2.48 ~ 2.50 | |
| 38135 18000 | 2.50 ~ 2.52 | |
| 38136 18000 | 2.52 ~ 2.54 | |
| 38137 18000 | 2.54 ~ 2.56 | |
| 38138 18000 | 2.56 ~ 2.58 | |
| 38139 18000 | 2.58 ~ 2.60 | |

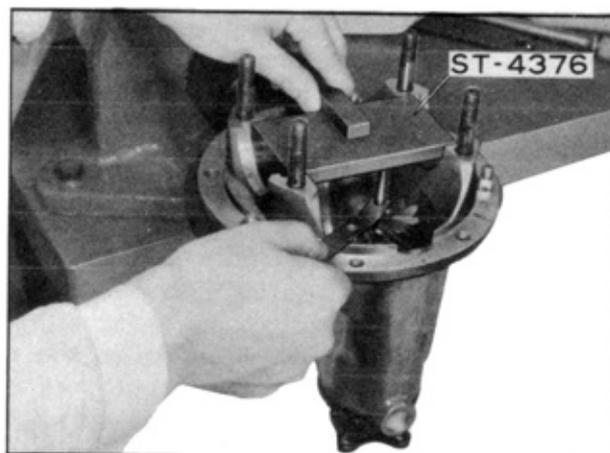


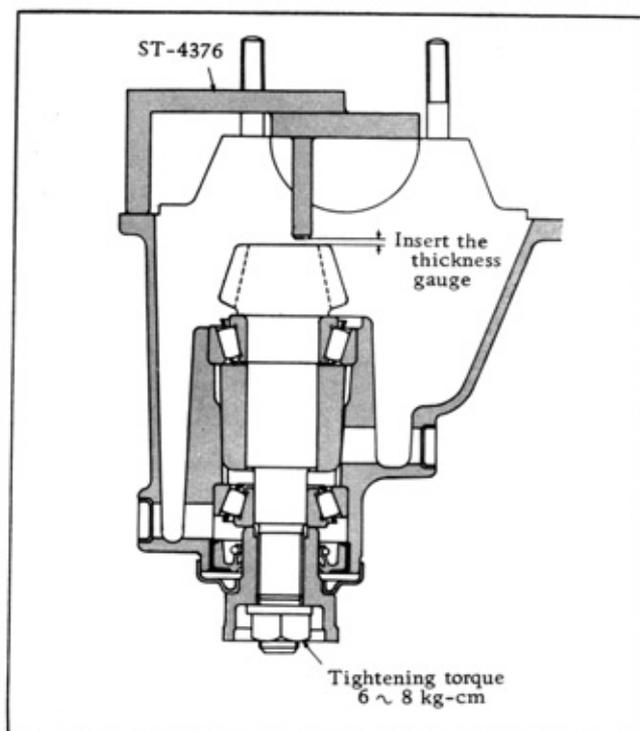
the bearing preload in this case, it must be adjusted by increasing or decreasing the number of four kinds of adjusting shim as shown in the following list and measuring with the use of the drive pinion bearing preload gauge as Figure so as to make revolving torque of pinion at 6~8 kg/cm if there should not by an error in the pinion with the head mark at 0 and the clearance should be sealed at 0.2 mm (0.008 in.) by the feeler gauge, thus pinion is regarded as at the correct position because the height of the gauge is made shorter for 0.2 mm than the standard size (45 mm).

- (5) The formal adjustment of the drive pinion, bearing and preload. After the fixing position of drive pinion is decided as mentioned in the previous paragraph, take off the pinion nut & companion flange to mount again the drive pinion bearing spacer (distance piece) and nut. Tighten up the nut as Figure by using the torque wrench at the regular torque of 14 ~ 16.8 kg-m. The preload supportedly the bearing in this case is different according to the condition of the bearing adjusting shim inserted.

The more of the shim inserted, much the play of pinion to the direction of axle is increased.

The less of the shim inserted, the more the bearing tightened by the previously mentioned nuts and cause it to be burned if left and turned as it is. Therefore, for readjustment of





Remarks

When measuring the height of the pinion head, set the semi-circular side portions of the gauge on the side bearing seats; insert a feeler gauge into the clearance between the tip of the gauge center rod and the pinion head, and adjust the pinion. The gauge rod is made 0.2 mm (8/1000 in.) shorter than the standard measurement (45 mm).

Therefore, adjustment is made by selecting a feeler gauge in accordance with the plus or minus value marked on the pinion head.

If it is necessary to adjust the pinion height, take off the drive pinion as well as pinion rear bearing outer race from the carrier to adjust by increasing or decreasing the number of the adjusting shim. In other words, read the mark on the head of the drive pinion, before adjusting by increasing or decreasing the number of drive pinion adjusting shim to insert the feeler gauge which is deducted for the number of mark from 0.008 in. in case of minus side added for the number of mark to 0.008 in. in case of plus.

For instance, the mark shows +2, adjust the position of drive pinion by deducting the number of shim so as to make the clearance at 0.008 in. + 0.002 in. = 0.001 in. it is necessary to give the bearing a right preload. At the time of pushing the outer race into the carrier, it must be done in a right way, otherwise.

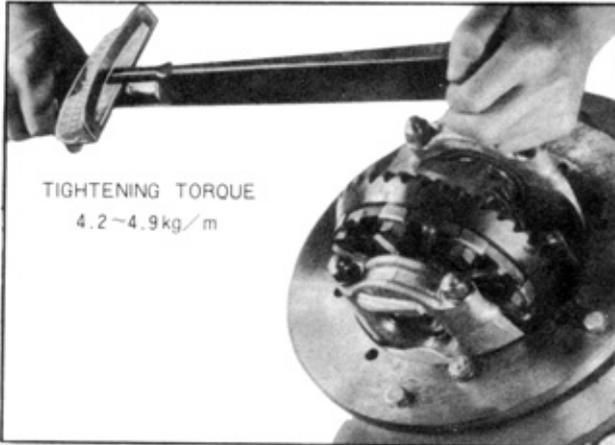
Specially when the old bearing is to be used again in assembling, the adjustment should be made at the lower torque than standard in accordance with the conditions of practical use so as not to give it an over preload.

- (6) When the former adjustment of preload of the bearing is completed as in the previous paragraph, inspect the pinion height again. Unless anything wrong is found, loosen the pinion nut, take off the flange, insert the new oil seal in the rear of the carrier and formerly fix the flange, washer and pinion nut. The nut should be tightened up at the standard torque. In case the cotter pin hole fitted, the adjustment should be made not by tightening the nut, but by filling the washer.

(C) Mounting the Differential Gear Ass'y in Carrier

- (1) Mount the complete unit of differential gear in the carrier and fix the bearing cap. There is an engraved mark on the side of cap which should be fitted with mark on the leg of bearing housing when mounting. It is important to note that the fixing part of the cap of each bearing housing is machinery finished up.

The differential gear case is inserted by the bearing adjusting shim with the side bearing as explained in (3) of (A) and by housing in the bearing housing of carrier, the bearing must be given the regular preload. The screwing torque of the fixing nut of the side bearing cap is at 4.2~4.9 kg-m and should be equally locked with fixing cotter pin.



So far, only the differential unit is mounted and the drive gear is locked with the drive pinion, therefore, the following adjustment must be made to acquire the regular side bearing preload & the gear back lash.

(2) Adjustment of side bearing preload & back lash.

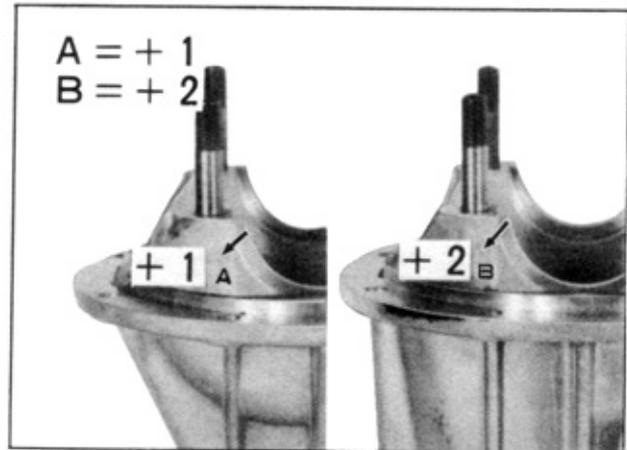
To give the right preload on the side bearing of differential gear case and in pressing the bearing in the differential case adjust by inserting inside the bearing adjusting shim of thickness calculated in accordance with the following method of computation. There is a marked numeral of adjusting basis on the bearing housing of the gear carrier and differential case. The numeral is the manufacturing error in a unit of 1/1000 in. against each standard measurement of A. B. C. D. in Figure.

To measure the width of the side bearing on left and right, use the standard gauge (17.5 mm thickness) and dial gauge on a flat board. In this case, place the load on the bearing with the aid of weight block for about 2~2.5 kg to acquire the steady figures. Calculate the error on minus side against the each standard measurement of 17.5 mm on the unit basis of 1/1000 and assume each of them as E & F. Take the left side bearing, for example. When the measured

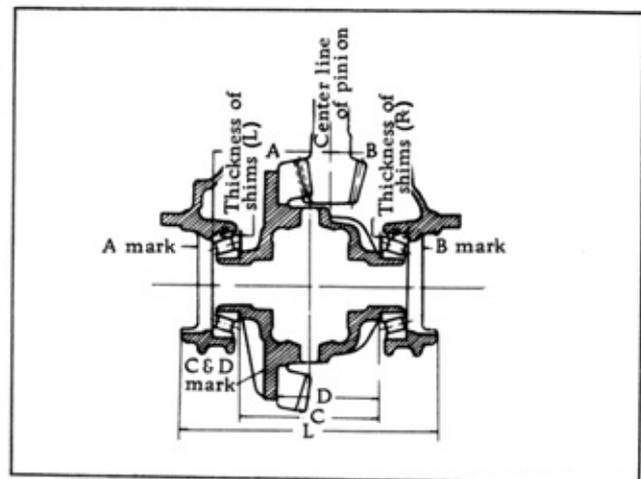
width is 17.3 mm it is -0.2 mm (0.008 in.) against the standard measurement and the E is, by excluding the minus sign, 0.008 in.

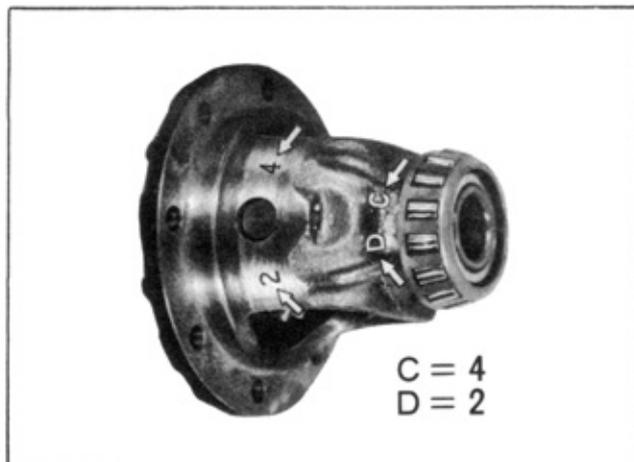
The thickness of the shim is acquired by applying the numerals to the following method of computation.

It may as well be assembled by using the shim of thickness which is in accordance with above method of computation. The left and right bearing must be well pressed in otherwise the preload changes.



Measure the back lash of the drive pinion & ring gear as Figure by using the dial indicator to make sure that it is within 0.1 mm-0.2 mm (0.004"-0.008"). If it is much, move to left by taking off the right shim, for adjustment.





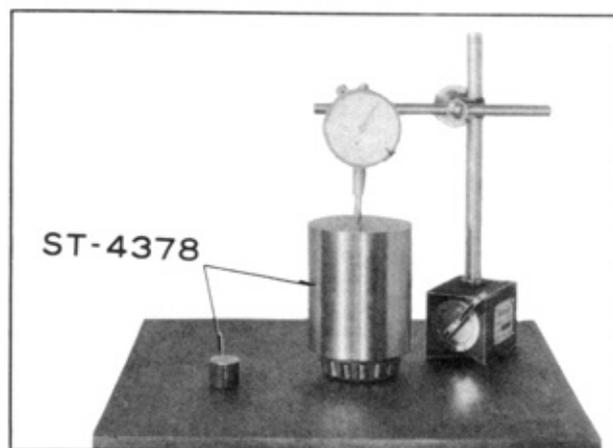
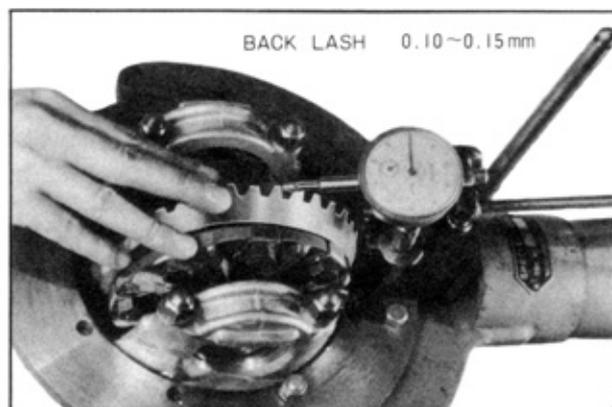
A example of calculation

A = +1, B = +2, C = -1, D = +3, N = +2,
E = 0.2, F = 0.15

$$T_1 = (+1 - (-1) + 3 - 2 + 8) \times 0.025 + 0.2 = 0.475 \text{ mm (Thickness of the shim on the L side)}$$

$$T_2 = (2 - 3 + 2 + 8) \times 0.025 + 0.15 = 0.375 \text{ (Thickness of the shim on the R side)}$$

The numeral marked by the electric pen on the side of the drive gear shows that of the recommended back lash besides the set number.



Thickness of shim on the left side (Ring gear side)

$$T_1 = (A - C + D - N + 8) \times 0.025 + E \text{ mm}$$

Thickness of shim on the right side (Pinion mate side)

$$T_2 = (B - D - N + 8) \times 0.025 + F \text{ mm}$$

* A, B : Letters on the flange of gear carrier
C, D : Letters on the diff. case
E, F : Difference the standard width between E & F

Remarks: + (plus means the valve less than standard width 17.50 mm

N : Letters on the drive gear (variation)

After the Operation

If it is necessary to use the bearing again at the time of repairing, the thickness of each shim of left & right must be reduced for 0.001"-0.003" on the basis of 80% or 60% against standard preload in accordance with the practical condition of use, because over preload is given to the bearing with the shim of thickness calculated from above method of computation.

Side Bearing Adjusting Shim

| Part No. | Thickness (mm) |
|-------------|----------------|
| 38453 18000 | 0.050 |
| 38454 18000 | 0.075 |
| 38455 18000 | 0.125 |
| 38456 18000 | 0.250 |
| 38457 18000 | 0.500 |

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Mounting the Gear Carrier Ass'y on the Rear Axle Housing

Interior of the axle housing should be cleaned well.

The carrier packing should also be replaced with new one.

Mount the gear carrier ass'y without mistaking its upper side with down side and through 8 studs, then fix with the lock washer & nut. The

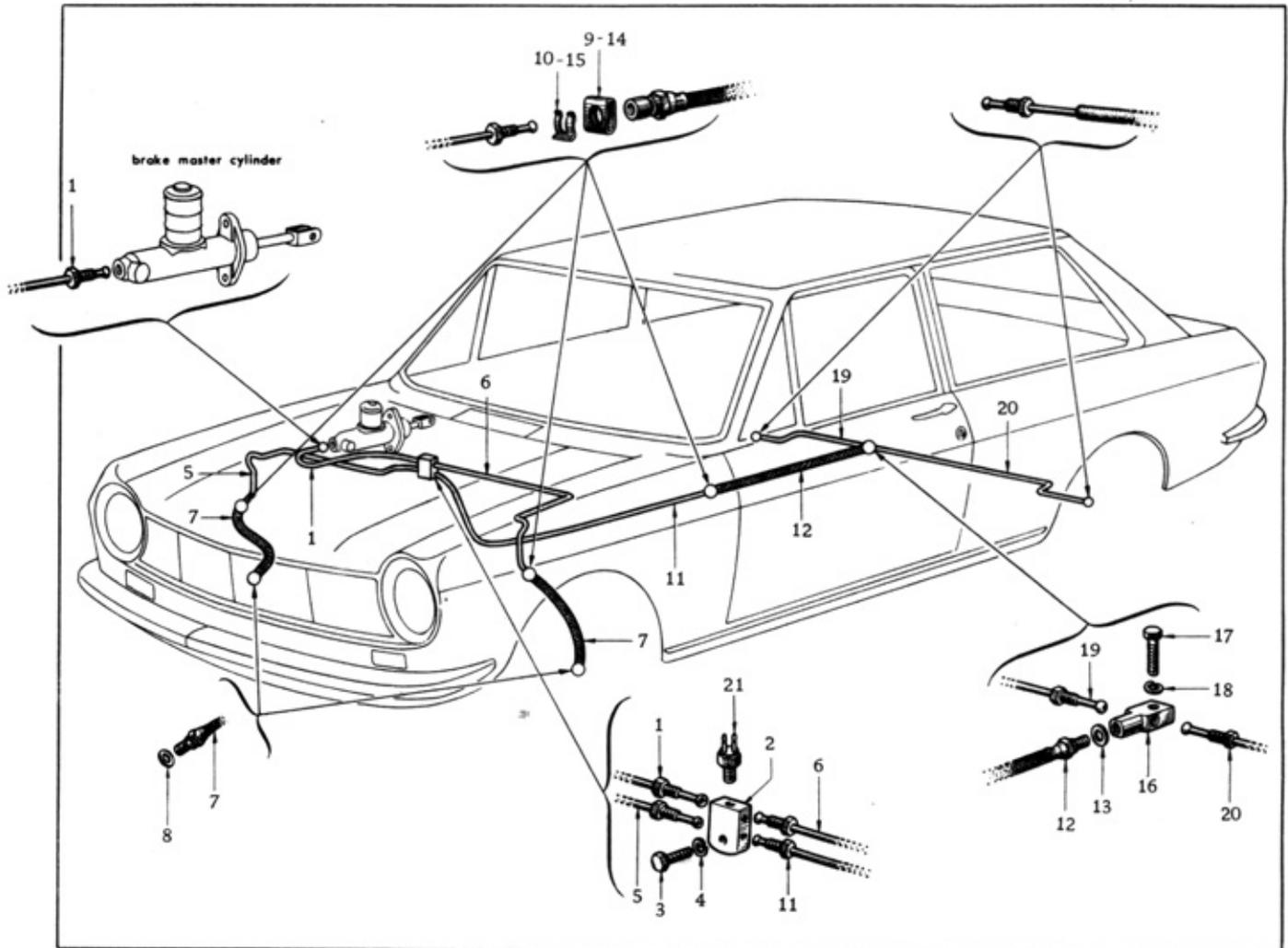
nut must be tightened in a diagonal line so as not to cause the oil leaks.

When it is mounted on the vehicle, feed the gear oil immediately. The oil of the designated hypoid gear oil No. 90 should be feed.

Feed the oil till it comes up to the down side of the feeding hole.



BRAKE SYSTEM

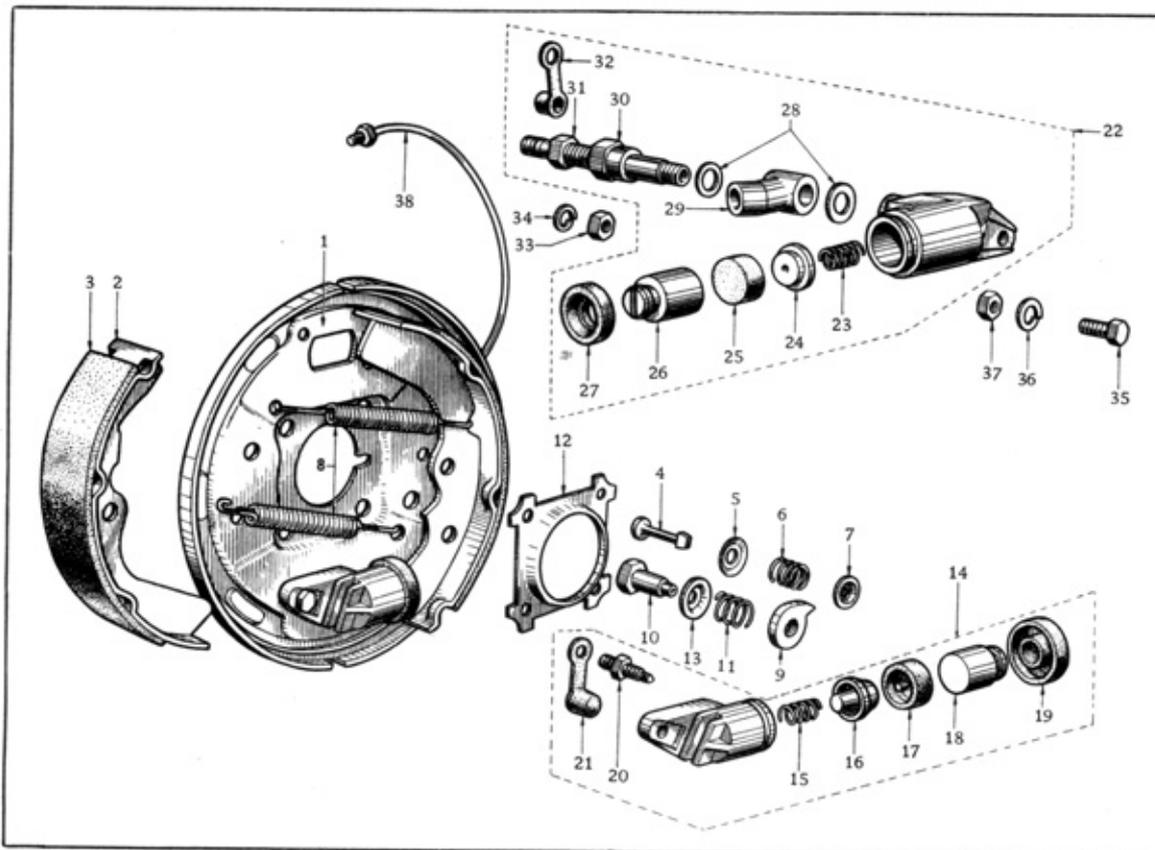


Brake Piping

A hydraulic brake system on four wheels and a mechanical hand brake on rear wheels.

| | | | | | |
|---|--|----|-------------------|----|------------------------------|
| 1 | Ass'y-tube, brake master cylinder to 5 way connector | 8 | Gasket-brake tube | 15 | Spring-lock |
| 2 | Connector-brake tube 5 way | 9 | Plate-lock | 16 | Connector-brake tube 3 way |
| 3 | Bolt | 10 | Spring-lock | 17 | Bolt |
| 4 | Washer-lock | 11 | Tube-brake rear | 18 | Washer-lock |
| 5 | Ass'y-tube, front brake (R.H) | 12 | Ass'y-hose, brake | 19 | Ass'y-tube, brake rear (R.H) |
| 6 | Ass'y-tube, front brake (L.H) | 13 | Gasket-brake tube | 20 | Ass'y-tube, brake rear (L.H) |
| 7 | Ass'y-hose, brake | 14 | Plate-lock | 21 | Ass'y-switch, stop lamp |

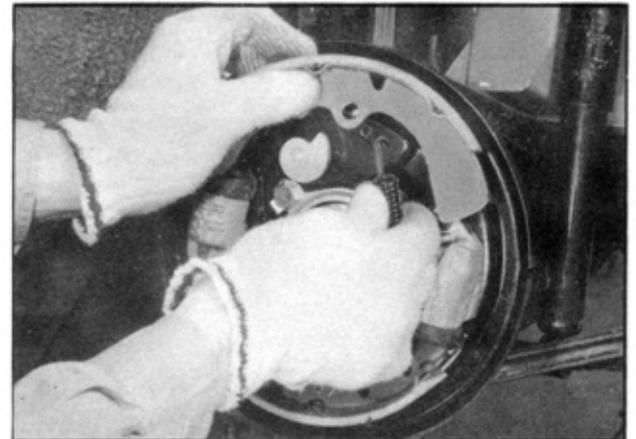
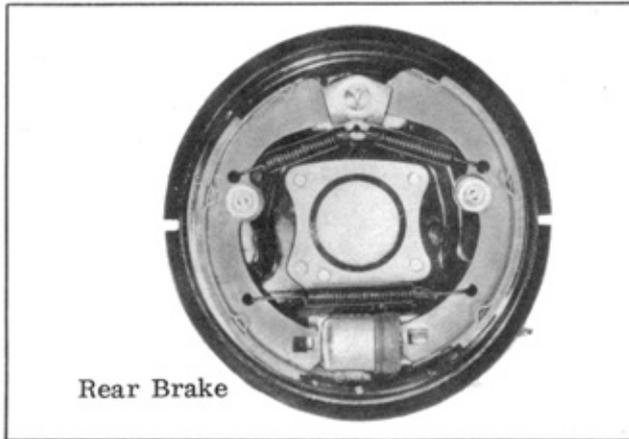
| | Front | Rear |
|-------------------------------------|--|----------------------------|
| Type | 2 leading | Leading-trailing |
| Drum diameter | 203.2 mm | 203.2 mm |
| Master cylinder dia. | 17.46 mm | |
| Wheel cylinder dia. | 20.64 mm | |
| Max. oil pressure | 175 kg/cm ² (100 kg/cm ²) by foot | |
| Remained pressure | 0.3 ~ 0.7 kg/cm ² | |
| Lining material | Akebono B40 | Akebono B40 |
| Lining dimension (L. x W. x Th.) | 35 x 195 x 4.8 mm | 35 x 195 x 4.8 mm |
| Lining area | 273 cm ² | 283 cm ² |
| Hand brake type | | Mechanical for rear wheels |



Front Brake

| | | | | | |
|----|-------------------------|----|------------------------------------|----|--------------------------|
| 1 | Ass'y-disc, front brake | 14 | Ass'y-cylinder, front wheel, fore | 27 | Cover-dust |
| 2 | Ass'y-shoe, front brake | 15 | Spring-piston | 28 | Packing |
| 3 | Lining-brake | 16 | Seat-spring | 29 | Connector |
| 4 | Pin-anti shoe rattle | 17 | Cup-piston | 30 | Bolt-connector |
| 5 | Seat-spring | 18 | Piston-cylinder | 31 | Screw-bleeder |
| 6 | Spring-anti shoe rattle | 19 | Cover-dust | 32 | Cap-bleeder |
| 7 | Retainer-shoe rattle | 20 | Screw-bleeder | 33 | Nut |
| 8 | Spring-return | 21 | Cap-bleeder | 34 | Washer-lock |
| 9 | Cam-adjusting | 22 | Ass'y-cylinder, front wheel, after | 35 | Bolt |
| 10 | Stud-adjusting cam | 23 | Spring-piston | 36 | Washer-lock |
| 11 | Spring-adjusting cam | 24 | Seat-spring | 37 | Nut |
| 12 | Baffle-front brake disc | 25 | Cup-piston | 38 | Ass'y-tube, bridge front |
| 13 | Spacer-adjusting cam | 26 | Piston-cylinder | | |

Front Brake Drum



Raise the body until the wheel and tire clean the floor and remove the wheel and tire from the hub.

Remove the brake drum from the hub.
Check the drum for defects or wear.

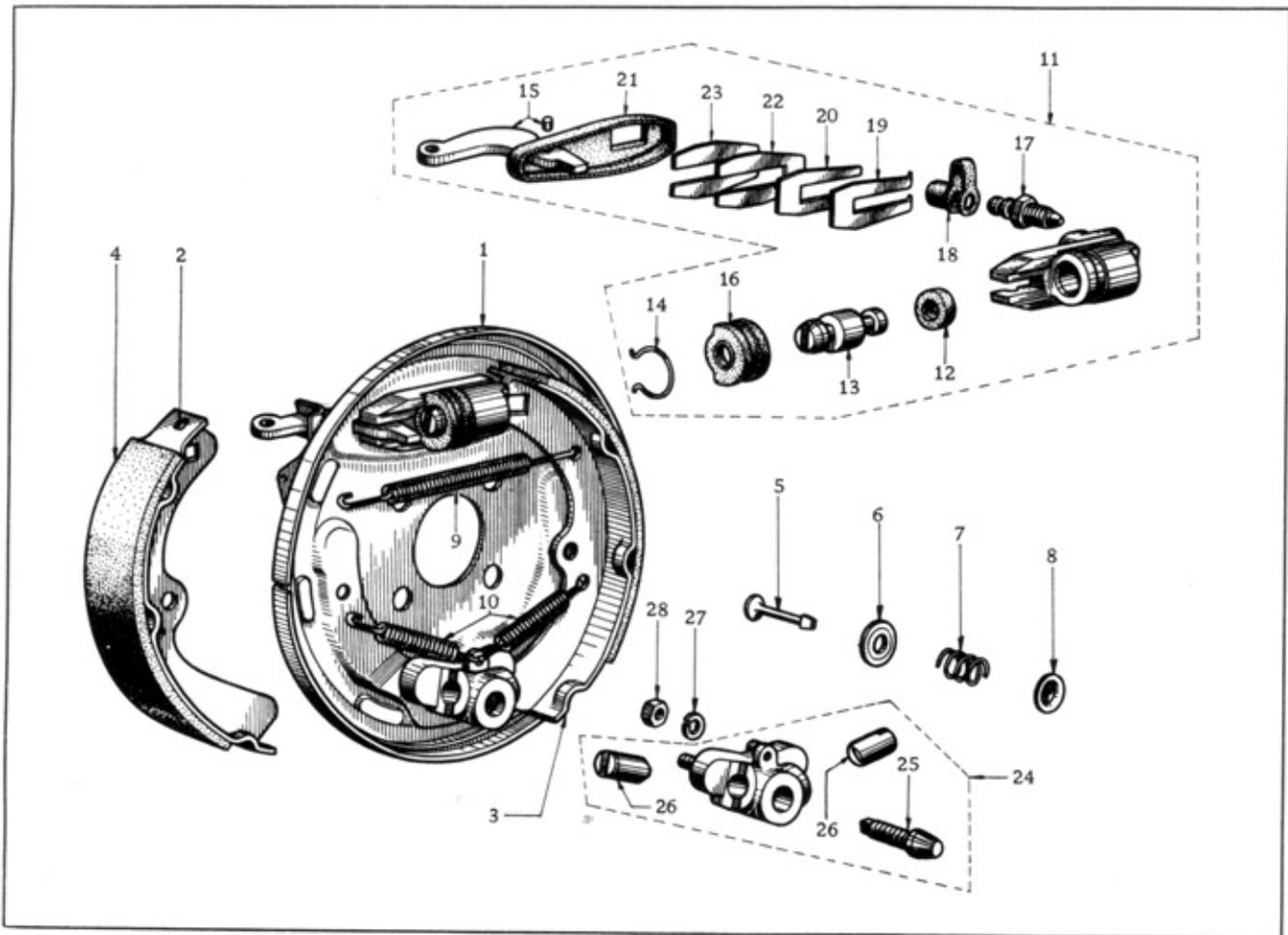
Detach the return spring and remove brake shoes.

Disconnect bridge tube, flexible tube and wheel cylinder.

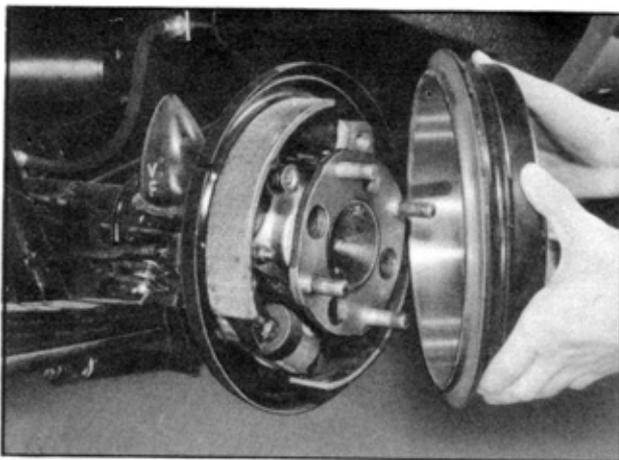
Remove the disc from spindle.



Component of Rear Brake

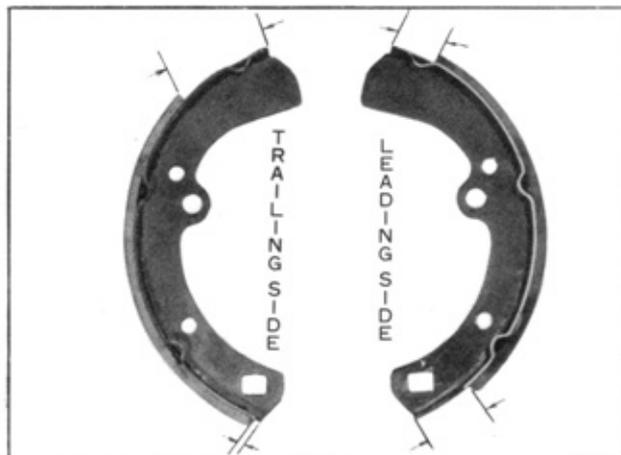


Rear Brake



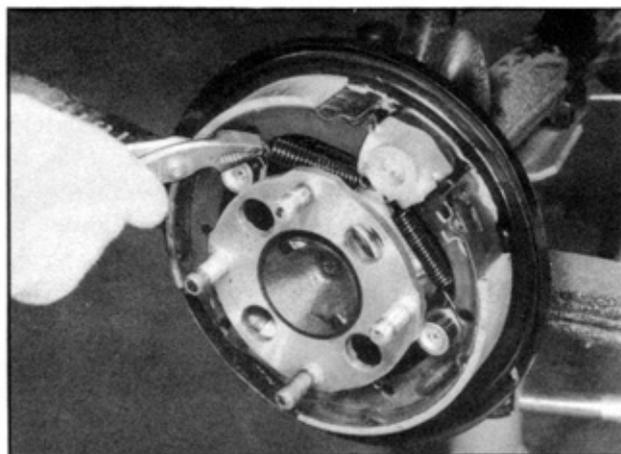
| | | | |
|----|-------------------------------------|----|----------------------------|
| 1 | Ass'y-disc, rear brake | 14 | Ring-snap |
| 2 | Ass'y-shoe, rear brake fore | 15 | Ass'y-lever |
| 3 | Ass'y-shoe, rear brake after | 16 | Cover-dust A |
| 4 | Lining-brake | 17 | Screw-bleeder |
| 5 | Pin-anti shoe rattle | 18 | Cap-bleeder |
| 6 | Seat-spring, anti shoe rattle | 19 | Shim-adjusting A |
| 7 | Spring-anti shoe rattle | 20 | Shim-adjusting B |
| 8 | Retainer-shoe rattle | 21 | Cover-dust B |
| 9 | Spring-return, brake shoe cylinder | 22 | Plate-A |
| 10 | Spring-return, brake shoe adjusting | 23 | Plate-B |
| 11 | Ass'y-cylinder, rear wheel | 24 | Ass'y-adjuster, rear brake |
| 12 | Cup-piston | 25 | Wedge-adjuster |
| 13 | Piston-cylinder | 26 | Tappet-adjuster |
| | | 27 | Washer-lock |
| | | 28 | Nut |

Disassembling the Rear Brake



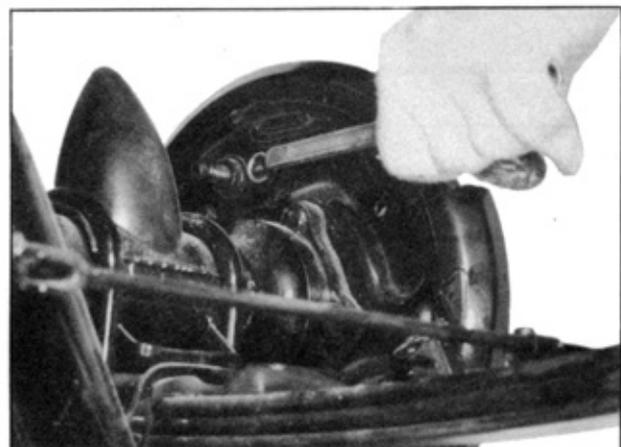
Take off the wheel and brake drum on the stand.

Detach the return spring by a spring plier or plier, and take off anti-rattle.

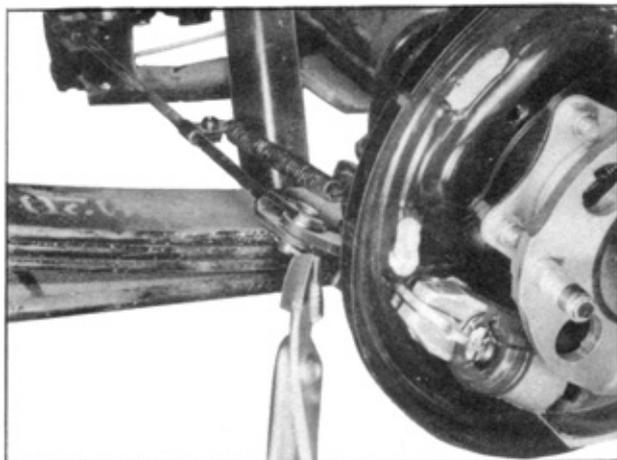


Removing Return Spring

Detach the shoes and adjuster from the flange.

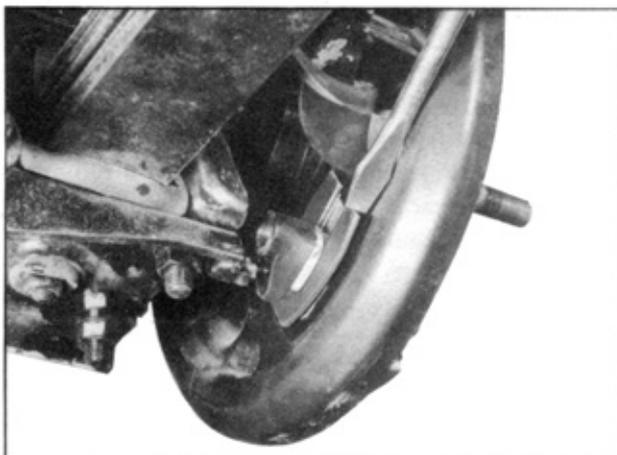


To remove the wheel cylinder, detach the spring at side brake cross rod and pull out the pin of cross rod end.



Disconnect the brake tube from back of flange.

Push out the plate.



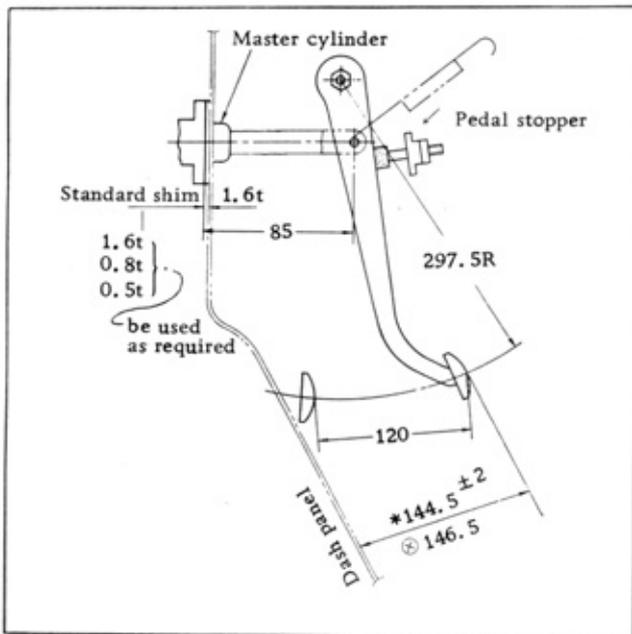
Assembling is a reversal of disassembling.

The Brake Pedal Adjustment

| | Thickness | Part No. |
|------------------------------------|-----------|-------------|
| Adjusting shim for master cylinder | 1.6 mm | 30611 27260 |
| | 0.8 mm | 30612 22760 |
| | 0.5 mm | 30613 32760 |

When the brake pedal free-travel, which is the movement of the brake pedal before the push rod touches the master cylinder piston, the

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pedal should be adjusted by the adjusting shims.

To check pedal free travel check, push the brake pedal down by hand pressure, and check the free travel. Select adjusting shim from 1.6 mm, 0.8 mm and 0.5 mm size. Adjust the brake pedal height $\oplus 146.5$ mm when stopper is free from lock nut, and then lock stopper at the dimension of distance $*144.5 \pm 2$ mm as shown in the figure.

Bleeding the Hydraulic Brake System

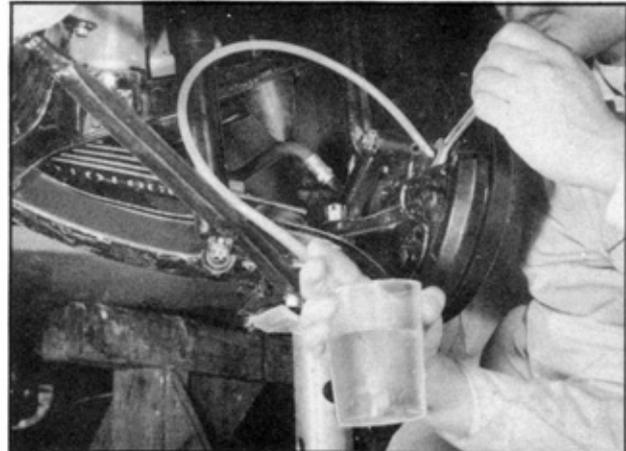
Bleeding should be carried out at first by the nearest wheel from the master cylinder

Thoroughly wipe the bleeder connection end from any mud or dust present, so that the outlet

hole is free from foreign matter.

Connect a vinyl hose to the wheel cylinder bleed valve.

Dip the end of the vinyl hose in a jar containing some brake fluid.



Push out the bleeder valve several turns and work on the brake pedal, depressing it quickly and releasing slowly repeatedly until no air bubbles are evacuated from the bleeder valve.

Keeping pedal pressed down, retighten the bleeder valve and remove the vinyl hose.

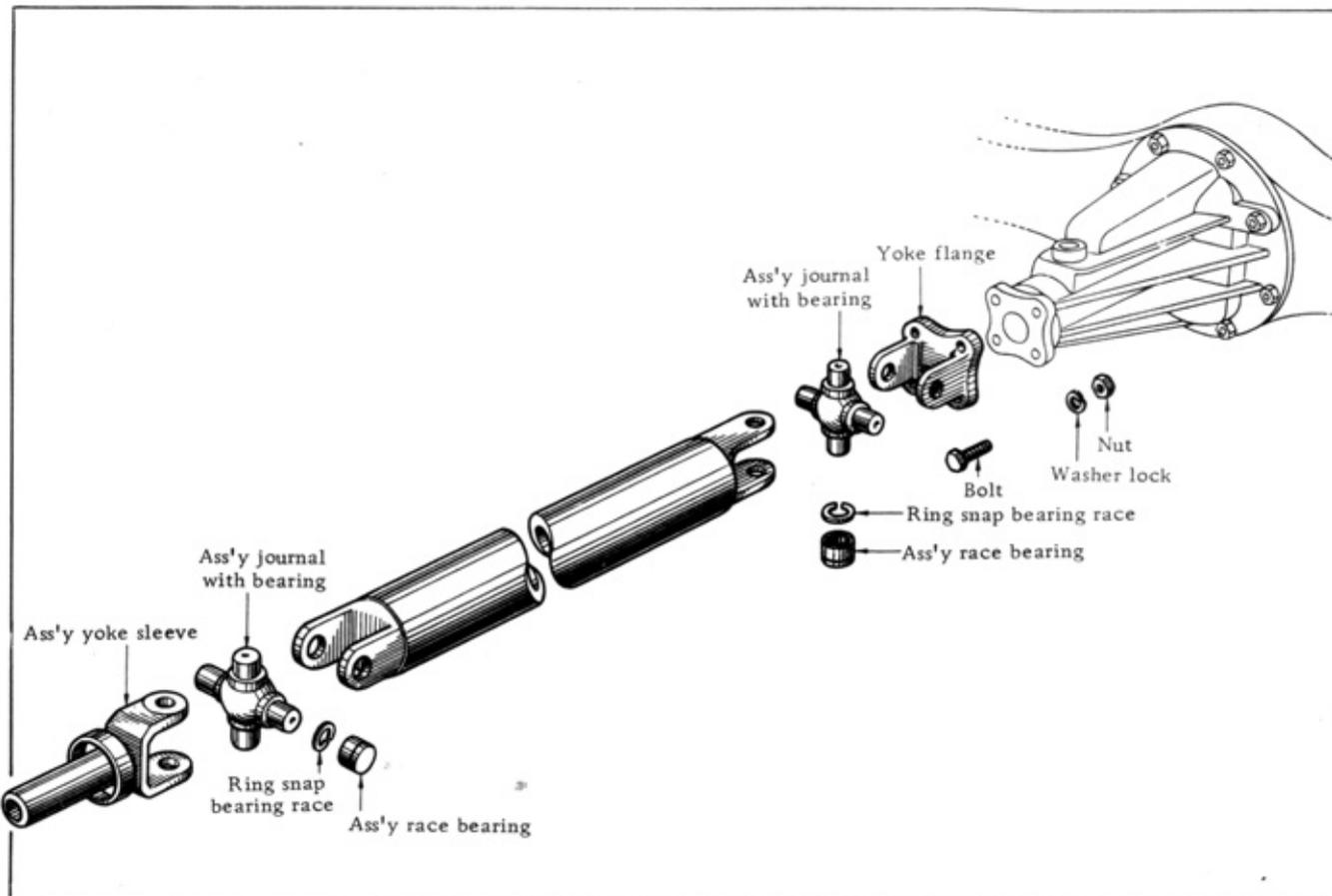
Repeat the above said procedure *Fill up brake fluid in the reservoir.

When bleeding the hydraulic lines, never let the fluid level in the reservoir tank drop below the plate contained in the tank.

Fluid with drawn in the bleeding operation should not be reused.

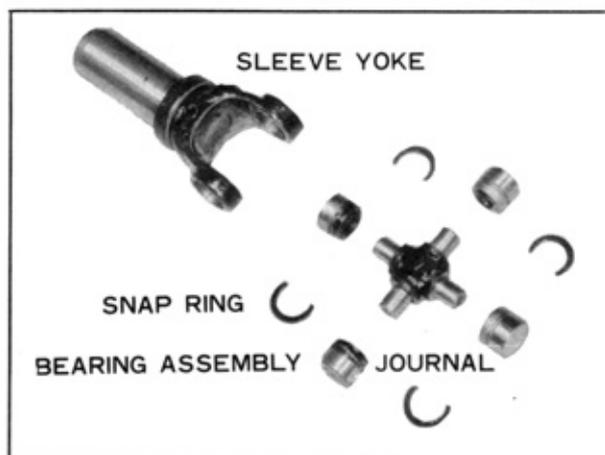
Full up the reservoir with new one.

PROPELLER SHAFT



Propeller Shaft

| | |
|--|-----------------------|
| Distance between joints | 1178 mm |
| Tube outer diameter × thickness | 63.5 mm × 1.6 mm |
| Sleeve yoke specification | Involute spline |
| Out dia. × inner dia. × pitch | 20 × 80 × 1 mm |
| The allowance of unbalance | 15 g-cm/4000 r. p. m. |
| <p>Check the joint every 40,000 km (24,000 mile).</p> <p>If an abnormal bending (such as a play or noise) is seen, replace the journal & bearing race and make an adjustment by the snap ring.</p> | |



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Removal

Disconnect the flange yoke and the pinion flange by removing bolts at the rear end of the propeller shaft.

In this case, draw out the sleeve yoke from the end of transmission, holding the disconnected rear end of the propeller shaft.



Before disassembling, mark all components of shaft so as to assemble them in the former position and avoid that the propeller shaft balance may be some how affected.

Universal Joint

Remove snap rings from yoke place the propeller shaft in a rise.

Remove the snap rings secured the journal bearings in the yoke flange with a pair of pliers.

If the snap ring does not snap out of the groove, tap the end of the bearing with wooden hammer slightly. This will relieve the pressure against the snap ring.

Remove slightly on the end of the journal bearing until the opposite bearing is pushed out of the yoke flange. Turn the assembly over in the vise and drive the first spider bearing back out of its lug by driving on the exposed end of the spider.

Use a brass drift with a flat face.

Wash and clean the bearing and shaft with cleaning solvent.

Inspect the drive shaft about cracks broken welds, scored journal bearing, surfaces, or bent shaft.

Parts with any of these faults must be replaced.

Inspect the sleeve yoke for worn splines, worn bearing surfaces and bearings and plugged lubricant fittings.

Assembling

Assembling operation is a reversal of disassembly.

Install spider in yoke flange.

Insert the journal into the yoke flange. Tap the journal bearing into the yoke flange, using a brass drift smaller than the hole in the yoke. Tap the other bearing into the opposite end of the yoke flange until the bearing is in line with the snap ring grooves.

With a pair of pliers, install the snap rings on both ends of the yoke flange.

Insert the flange assembly in the sleeve yoke.

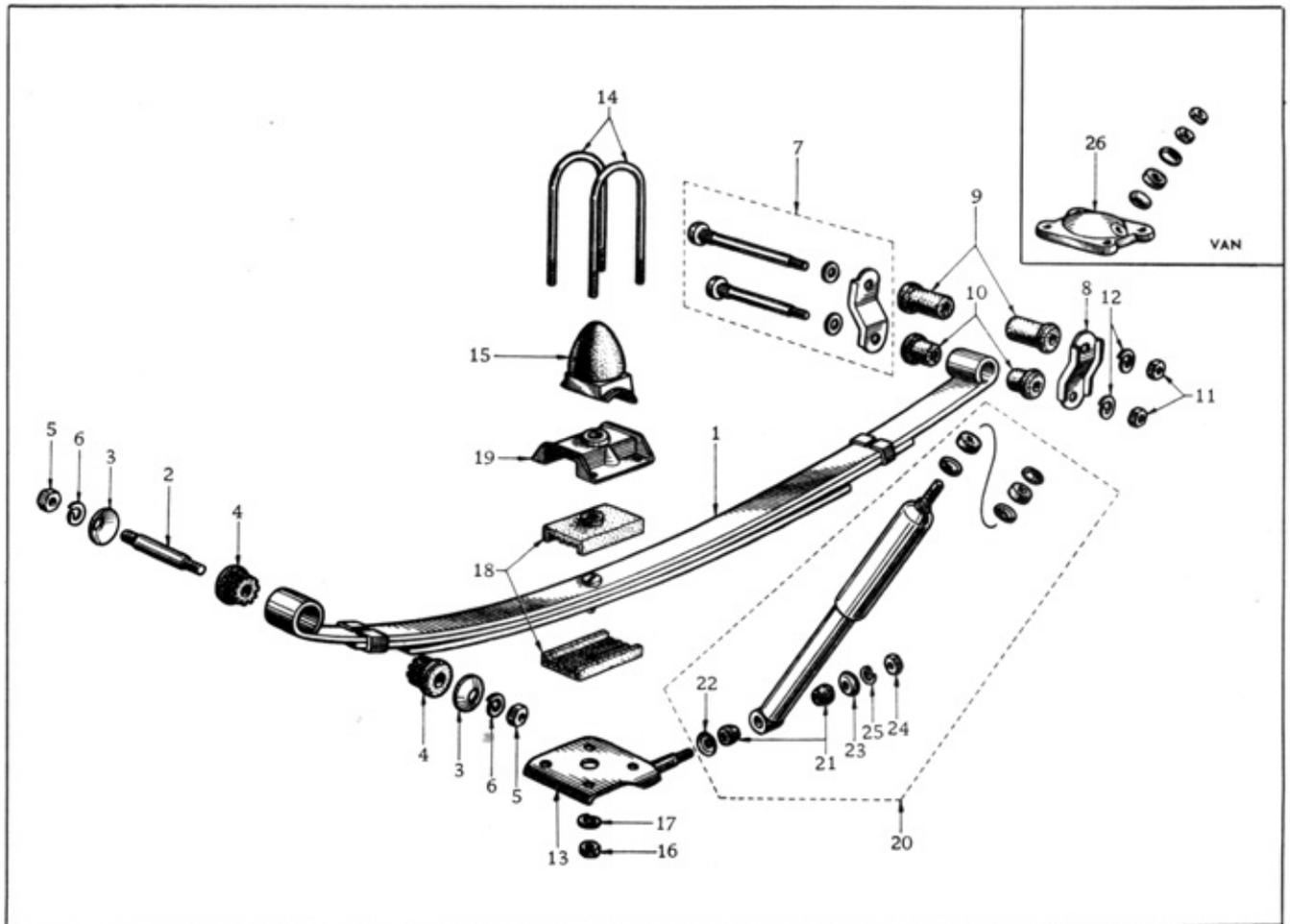
Place the other yoke bearing into the opposite end of the yoke, and tap this bearing into the yoke until the bearing is in line with the snap ring grooves. Install the snap rings on both ends of the yoke. After assembling all parts, make sure about tightness on the around spider.

In the case of excess clearance, adjust with over size snap rings as follows:

Snap Ring (Over Size)

| Part No. | Thickness | Distinguished painted colour |
|-------------|-----------|------------------------------|
| 37146 18000 | 1.46 | White |
| 37147 18000 | 1.48 | Yellow |
| 37148 18000 | 1.50 | Red |
| 37149 18000 | 1.52 | Green |
| 37150 18000 | 1.54 | Blue |
| 37151 18000 | 1.56 | Brown |
| 37152 18000 | 1.58 | |

REAR SUSPENSION

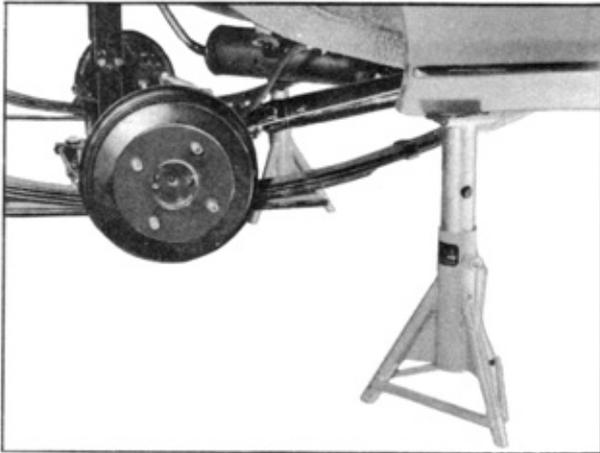


Constructure of Rear Suspension

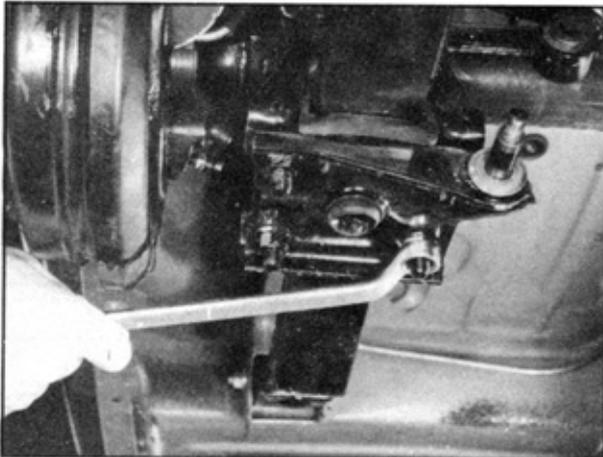
| | | | |
|----|----------------------------------|----|-----------------------------|
| 1 | Ass'y-spring, rear | 14 | Clip-rear spring |
| 2 | Pin-rear spring front | 15 | Ass'y-bumper, rear axle |
| 3 | Cap-front bracket, rear spring | 16 | Nut |
| 4 | Bushing-rubber, rear spring | 17 | Washer-lock |
| 5 | Nut | 18 | Pad-seat, rear spring |
| 6 | Washer-lock | 19 | Plate-location, rear spring |
| 7 | Ass'y-shackle, rear spring | 20 | Kit-shock absorber, rear |
| 8 | Plate-shackle, rear spring inner | 21 | Bushing-rubber, rear shock |
| 9 | Bushing-rear spring rear upper | 22 | Washer-shock absorber |
| 10 | Bushing-rear spring rear lower | 23 | Washer-shock absorber |
| 11 | Nut | 24 | Nut |
| 12 | Washer-lock | 25 | Washer-lock |
| 13 | Seat-rear spring lower | 26 | Bracket-rear shock absorber |

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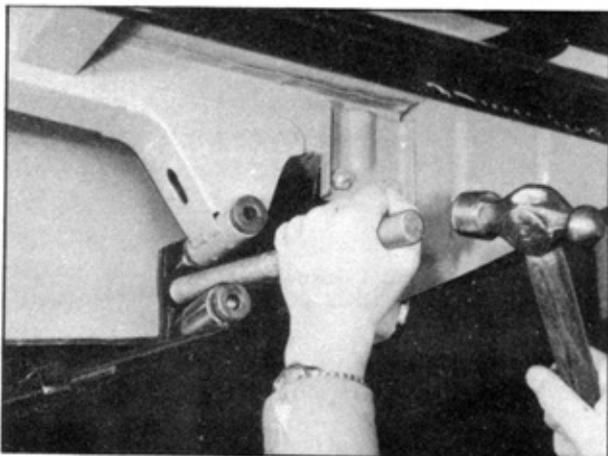
Disconnect From Body



Jack up the body and hold at the side member on the stand.

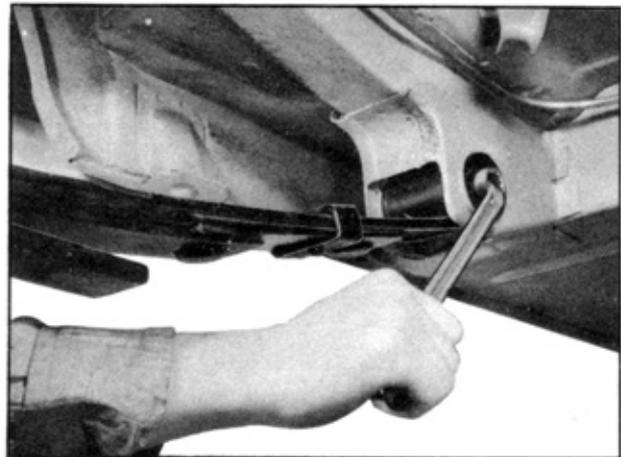


Take off the shock absorber from spring seat. Jack up the rear axle housing to release load. Disconnect bumper, U bolt, location plate, seat pad and spring seat etc.



Disconnect the shackle, rear spring front pin and then separate the rear spring as showing the figure.

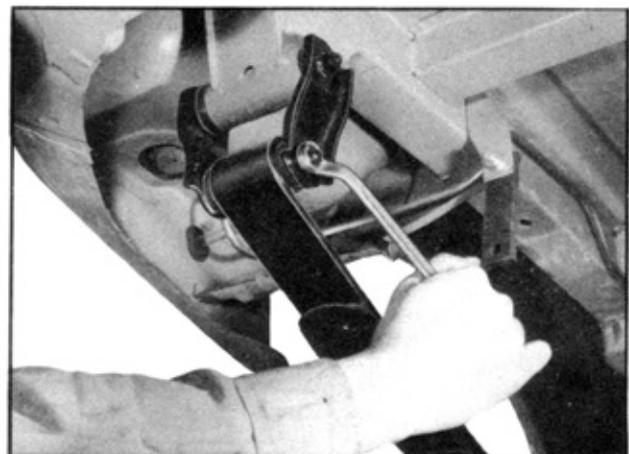
Fixing to the Side Member



Attach the bushing to the rear spring and rear spring bracket.

Connect the front side of rear spring to rear spring bracket.

Front pin
Tightening torque 3.5 ~ 4.0 kg-m



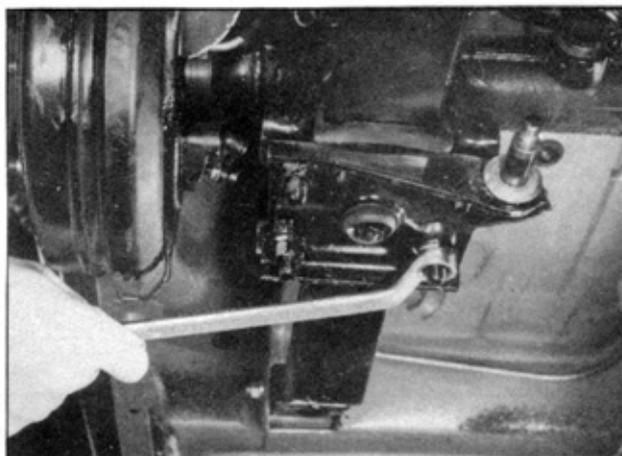
Connect the rear side of spring to the bracket.

Shackle pin
Tightening torque 2.0 ~ 2.5 kg-m

Set up the seat pad, location plate, rear axle bumper, U bolt, and spring seat.

U bolt

Tightening torque 3.5 ~ 4.0 kg-m

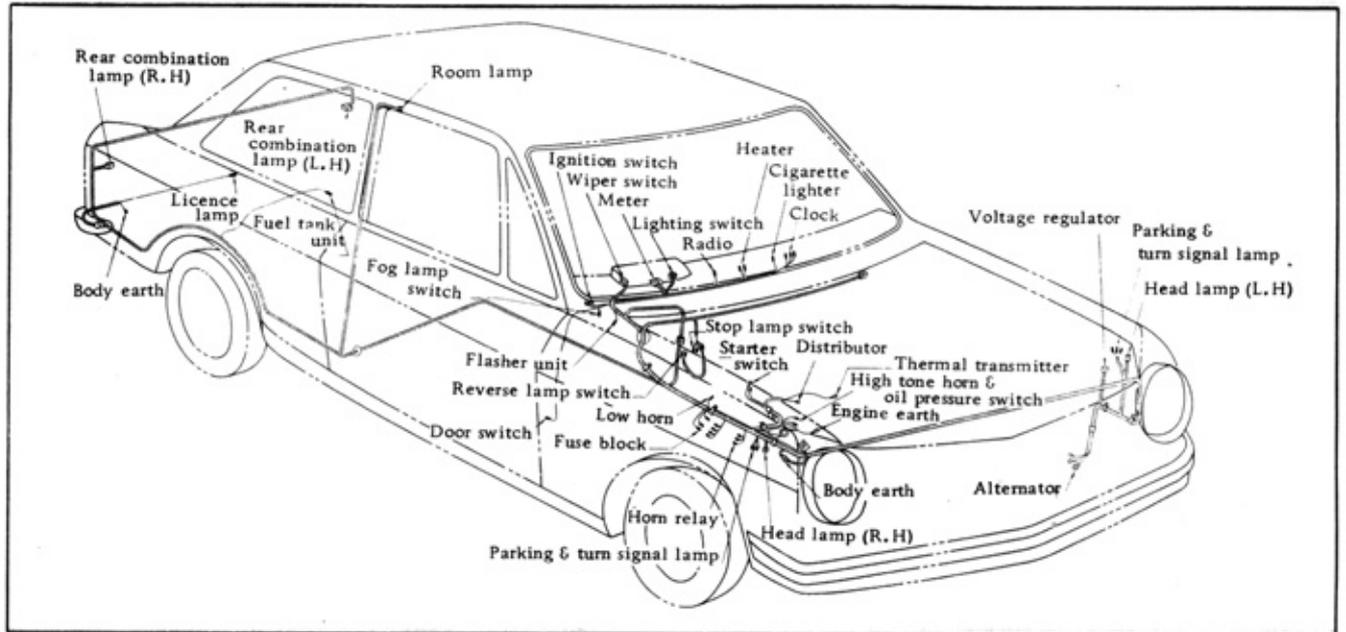


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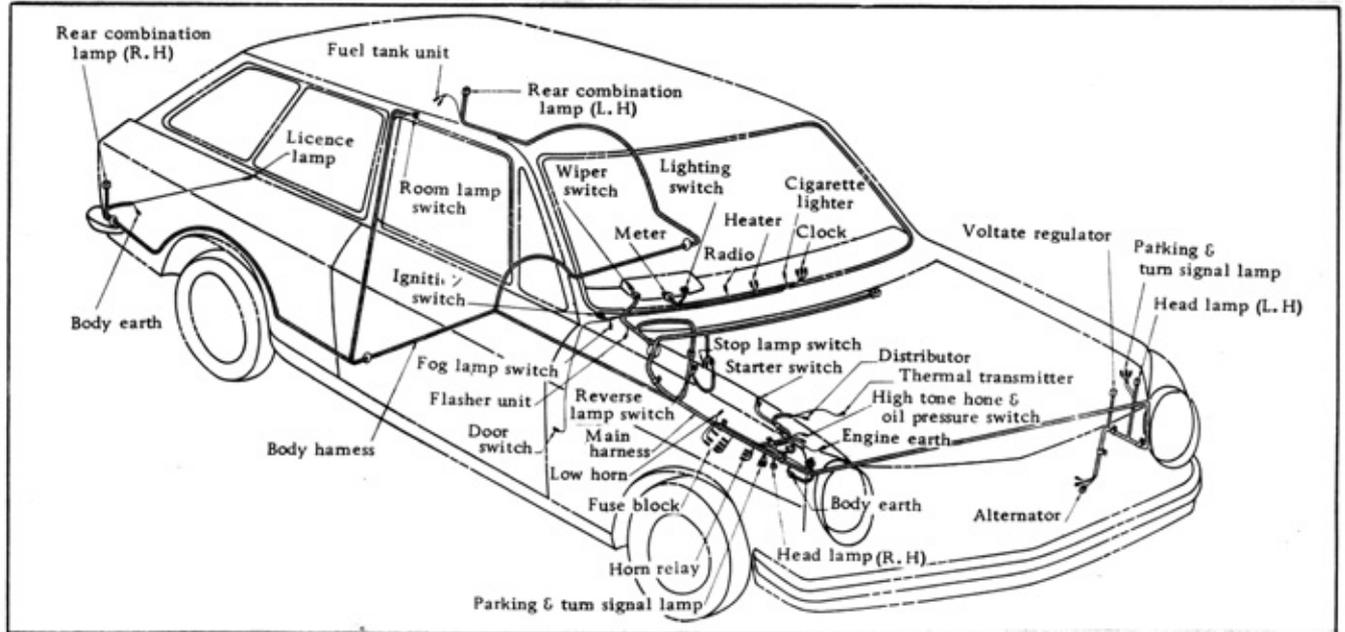


ELECTRICAL SYSTEM

Wiring Harness

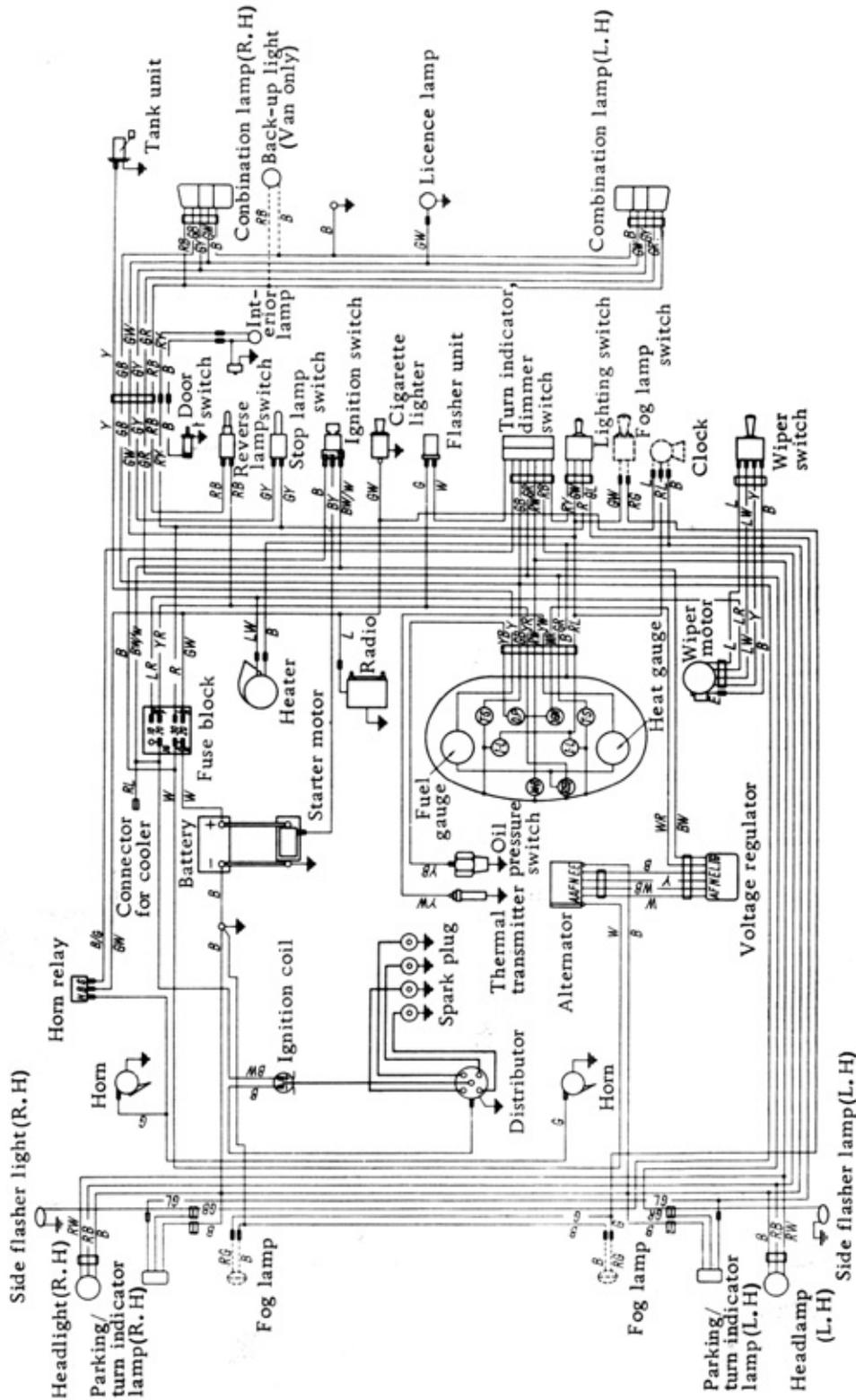


B10 Type Wiring Harness



VB10 Type Wiring Harness

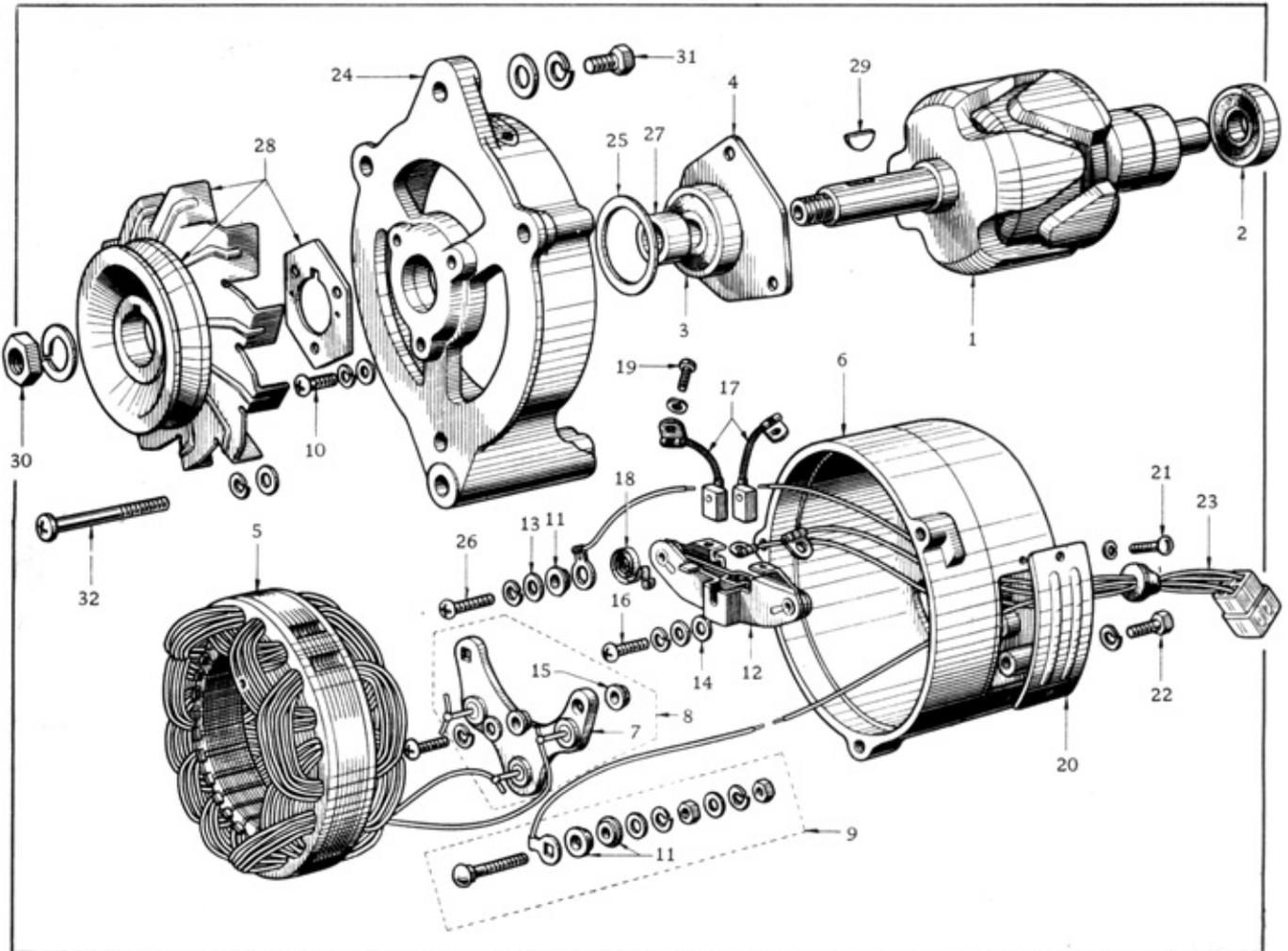
WIRING DIAGRAM



Wiring Colour

| | |
|---|--------|
| ⊖ | Black |
| ⊕ | White |
| ⊖ | Red |
| ⊕ | Green |
| ⊖ | Yellow |
| ⊕ | Blue |

| | |
|---|----------------------------|
| ⊖ | Instrument light |
| ⊕ | Turn indicator pilot light |
| ⊖ | Ignition warning light |
| ⊕ | Oil pressure warning light |
| ⊖ | Main beam pilot light |
| ⊕ | Regulator |



Alternator (Hitachi)

| | | | |
|----|--------------------|----|------------------|
| 1 | Ass'y-rotor | 17 | Brush |
| 2 | Bearing-ball | 18 | Spring-brush |
| 3 | Bearing-ball | 19 | Screw |
| 4 | Retainer-bearing | 20 | Cover-brush |
| 5 | Ass'y-stator | 21 | Screw |
| 6 | Ass'y-cover, rear | 22 | Bolt-terminal |
| 7 | Set-diode | 23 | Ass'y-wire, lead |
| 8 | Ass'y-diode set | 24 | Cover-front |
| 9 | Ass'y-terminal | 25 | Retainer-bearing |
| 10 | Screw | 26 | Screw |
| 11 | Bushing-insulator | 27 | Spacer |
| 12 | Holder-brush | 28 | Ass'y-pulley |
| 13 | Washer-insulator | 29 | Key |
| 14 | Washer-insulator | 30 | Nut-pulley |
| 15 | Bushing-insulating | 31 | Bolt-set |
| 16 | Screw | 32 | Bolt-through |

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ALTERNATOR

| | |
|----------------------------|--|
| Alternator Model | Hitachi LT125-02 AC300/12WR |
| Nominal output | 12V-250W |
| Constant | Successive |
| Pole | - side ground |
| Constant revolution | 2,500 r.p.m. |
| No load minimum revolution | 1,000 r.p.m. down |
| Output current | 14V (normal temp.) 2,500 r.p.m. 14V 24.5A up (normal temp.) 2,500 r.p.m. 14V 21.5A up (high temp.) |
| Regulator Type | TLIZ10A |
| Element | Tirrill type (leaf spring) Constant voltage relay Pilot lamp relay |
| Constant voltage relay | 3 contact point type |

| | Primary side | Secondary side |
|-------------------|--|----------------|
| Adjust, valve | 14 ~ 15V | 14 ~ 15V |
| Dynamo revolution | 4,000 r.p.m. | 4,000 r.p.m. |
| Load | Battery + resisting load 21.5A approx. | Battery |

Note: Use battery charged in full.

Pilot lamp relay (3 contact point type)

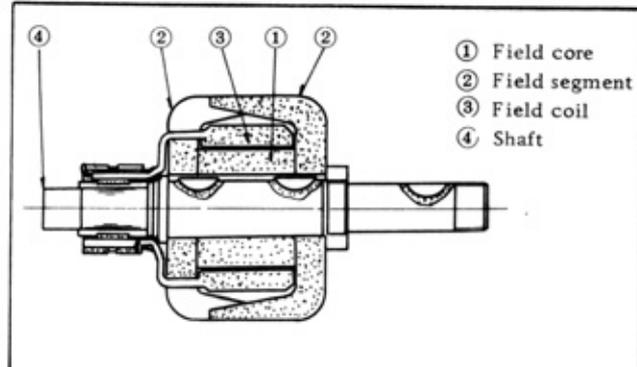
| Put-off voltage | Put-on voltage |
|-----------------|----------------|
| 4.5 ~ 5.2V | 0.5 ~ 3V |

GENERATOR

Construction and Feature

Different from the DC generator, the AC generator turns the magnetic pole and fixes armature making it generates 3-phase alternate current, and rectifies all waves with the silicon diode, (+) (-) each three, that are built within, and takes out as direct current.

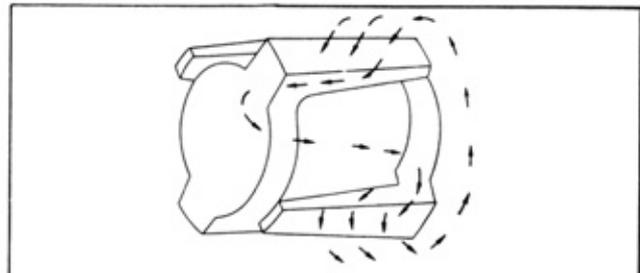
The sealed ball bearings are used to support the rotor. Clearance between the brush and brush holder is also made so as to prevent it from dust. Thus the AC generator will increase milage without maintenance. Each 3 diodes are pressed in the rear cover and the diode base respectively.



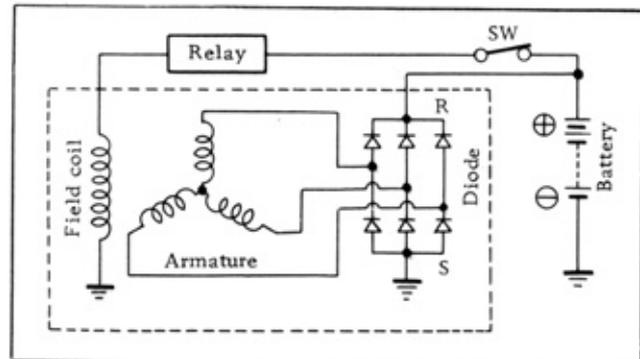
Sectional View of Rotor

The clip ring pressed in the shaft is soldered at both ends of the field coil to pass magnetic current.

The pole of rotor makes out the magnetic circuit as shown in Figure and all the poles are magnetized by doughnut coil.

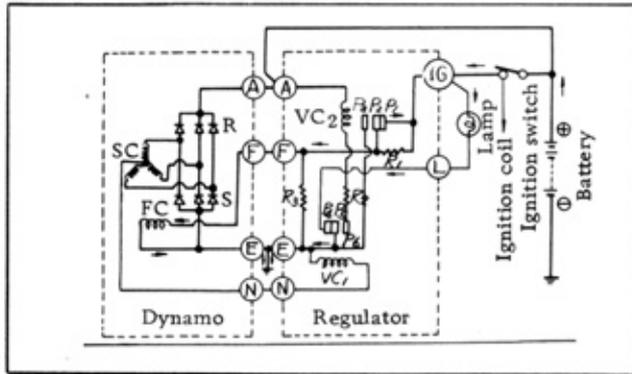


Magnetic Circuit

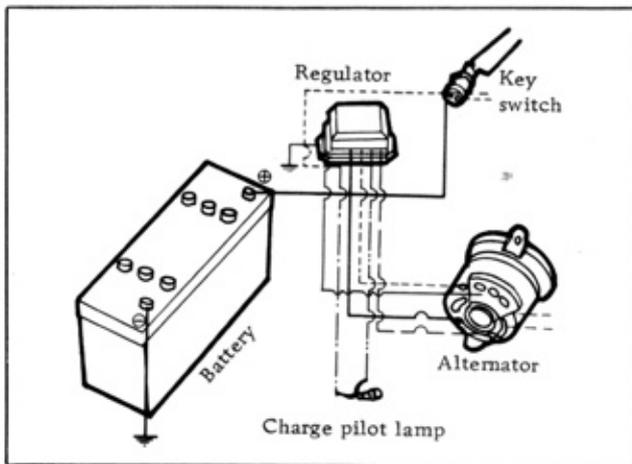


Connection within Dynamo

The armature is of a three phase Y connection type and the silicon diode rectifies all waves. It pulls out the neutral point and adds voltage having conducted 3 phase half wave rectification in the circuit of relay and controls the voltage coil of the pilot lamp relay.



Charging System



Outside Connection

When the ignition switch is put on, the battery current flows in the arrow marked direction passing through the dynamo E terminal, brush slip ring, field coil, slip ring, brush, dynamo F terminal, relay F terminal and IG terminal and completes the field circuit. It is difficult for the dynamo to stand up only by residual magnetism of the field core, so that magnetization is necessary until voltage rises to suit charging after the engine has started.

This is because the diode is used and when the voltage to add to it is so low, large proportional resistance shows up and current does not

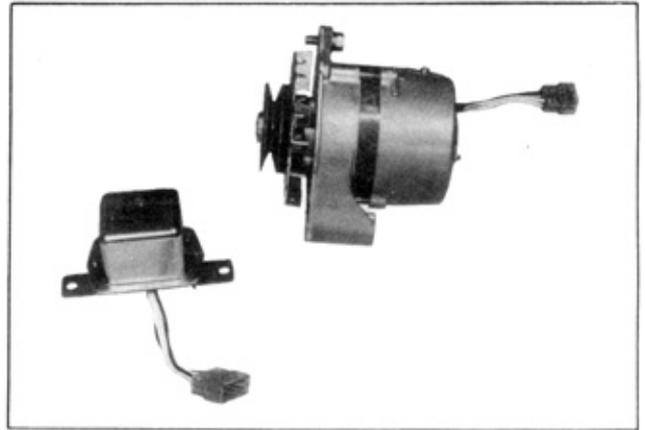
flow through the field coil unless the dynamo makes very high revolution.

Disassembly and Assembly

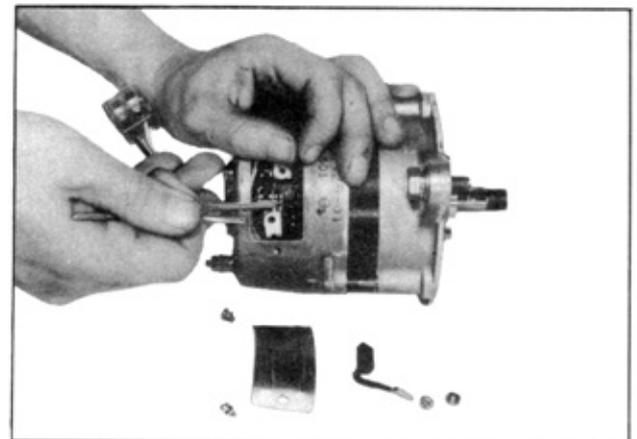
A. Disassembly

The dynamo is disassembled in the following order.

a)

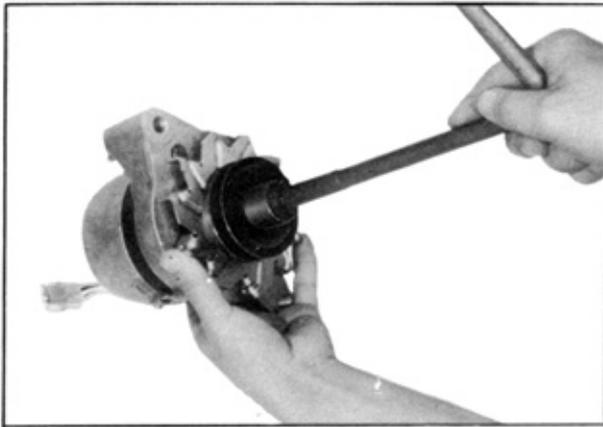


b) Remove the brush cover and pull off the brush, 2 ea.

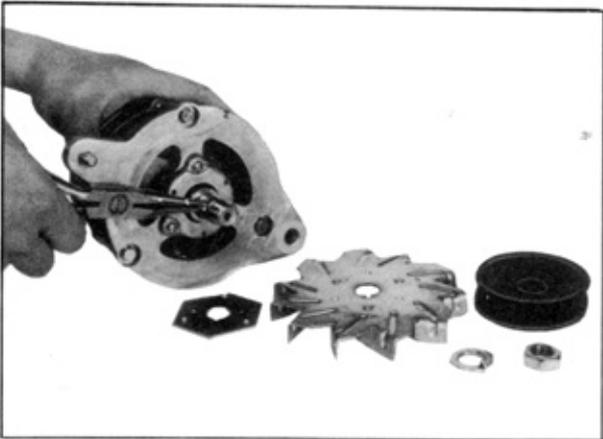


c) Remove the cover of bearing and take off the hex. bolt of shaft.

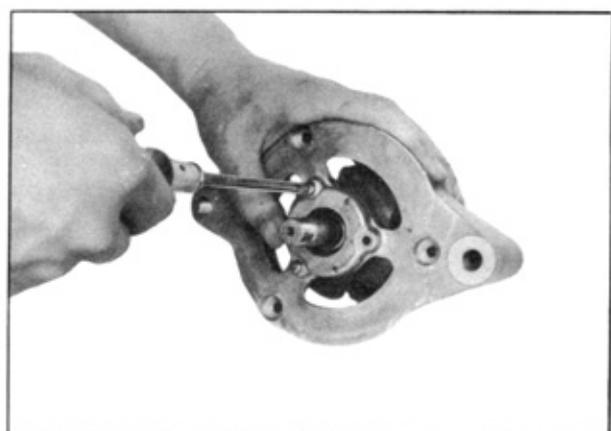
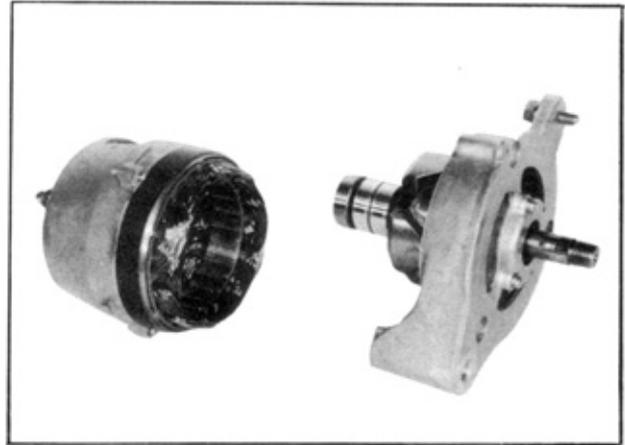
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- d) Remove the hex. nut of pulley and pull off the pulley and the half-moon key. Be careful not to injure the fan when the nut is removed.



- e) Remove the through bolt tightening bolt front cover and rear cover, pull off the front cover and rotor. Use a hammer of wood or plastic if necessary.



Remove the ball bearing from the front cover. Remove the bolt or tightening the bearing plate and or pull off the bearing with such as hand press.

Slacken N terminal bolt on the rear cover side and remove the clip terminal, then the rear cover and the stator can be separated.

g)



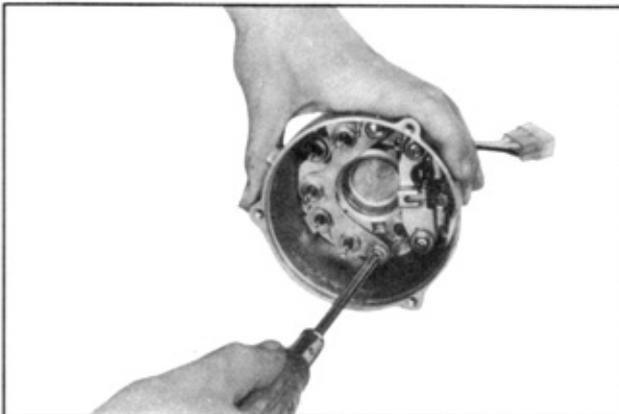
Remove the rear cover and stator.

- Separate the silicon diode, 3 ea. from the stator coil lead wire, 3 ea. by melting soldering with an electric iron.

Slacken N terminal bolt on the rear cover side and remove the clip terminal, then the rear cover and the stator can be separated.

NOTE: When temperature within diode gear up over 150°C the diode will lose functioning, so that use the electric iron, 100 ~ 200W, for around 2 seconds at the soldered portions.

h)



Remove the diode set and brush holder from the rear cover.

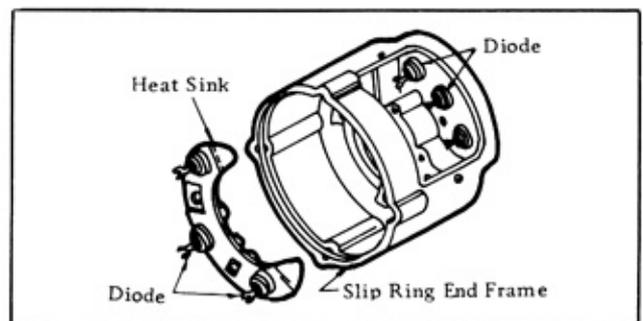
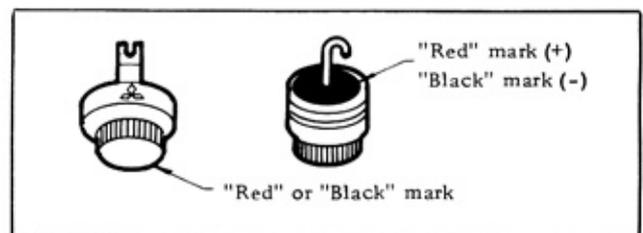
When be careful not to lose small parts such as screws, washers and bushings.

B. Assembly

Assembly is done in the reverse sequence of disassembly.

Always make sure the polarity of alternator or regulator before replacing the diode either positive or negative. The polarity of alternator or regulator is usually marked on the name plate or label which is attached to each model.

In case the alternator or regulator shows the positive ground, the red coloured diode should be mounted in the frame of slip ring end and the black coloured diode in the heat sink.

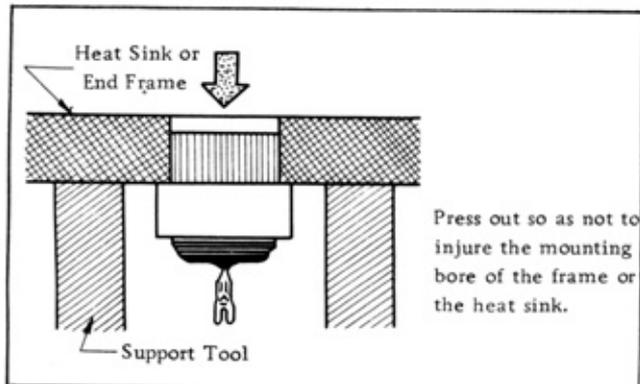


Exploded View

DATSUN 1000

Removal

To remove a diode, use a suitable tool to support the end of the frame, or heat sink, and push the diode out by using an arbor press as shown the below.

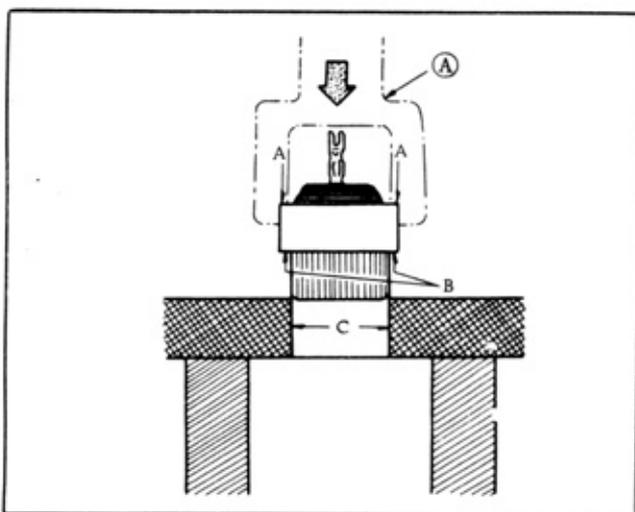


Installation

Support the heat sink or end frame with a suitable tool and then press the diode in the heat sink and end frame by using the tool shaped (A) which fits over the outer diode edge A portion.

Press down perfectly the diode in the mounting bore of C portion to the lower edge of B portion of the diode.

Checking the replaced diodes.



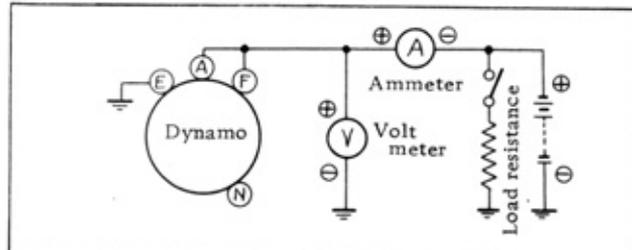
Inspection of Troubles

A. Inspection of Output

For inspection of output, remove the dynamo from the vehicle and connect wiring as shown in

Figure and drive it with motor.

(For inspection of output of dynamo without removing it from the vehicle, refer to "Inspection of AC Generator" to be published later.)



NOTE: Use the battery charged in full up to the normal capacity.

Through the wiring shown in Figure, magnetic current flows from the battery to the field coil of dynamo. In this state, raise revolution of dynamo slowly up to the speed where there is no reverse flow (2 A approx.) to the field coil and read the revolution. Correct revolution is approx. 1000 rpm. without load.

Next, increase load resistance to the maximum and almost stop flowing of load current, and put off the switch. Then, raising the load current slowly, increase revolution of dynamo. Observe thus oncreasing output current as revolution of dynamo increases. If there is no large difference from the specification, it is correct.

No matter how the battery is over-charged or discharged, if the charging current is small, first make sure either the dynamo or the relay is in disorder. See the charging current by inserting the ammeter between A terminal of relay and the battery.

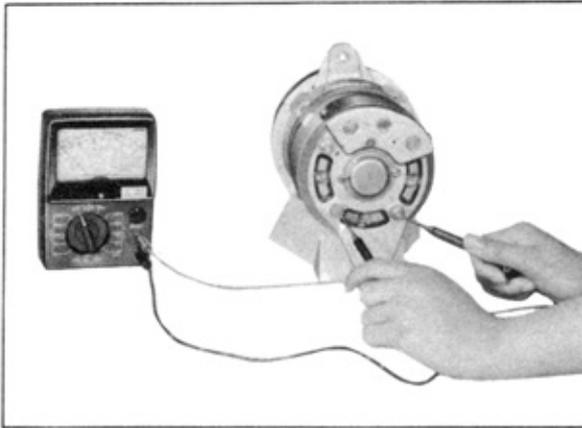
Disconnect wire passing from the dynamo F terminal to the relay F terminal at the relay F terminal and make the removed lead wire short circuits at the relay A terminal, when if the charging current highly increases, the relay is in disorder.

B. Short Circuits on Diode "-" Side

It can be judged as the pilot lamp does not flare even if the key switch is turned on. Actually a trouble such as "diode open" is very rare and short circuits at the polar line are also rare. Ordinarily, there are many cases of "+" side short circuits.

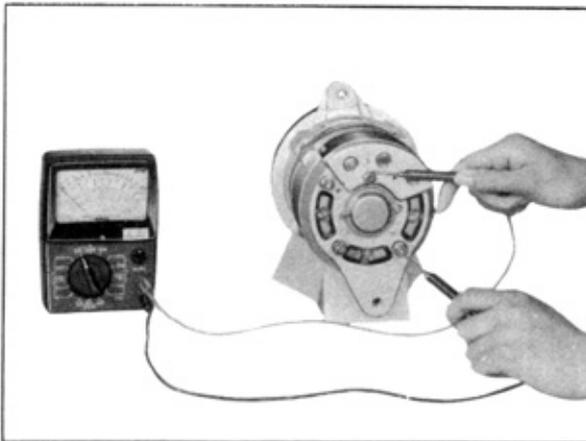
C. Inspection of Diode with Tester

a) Simple Inspection



Check between the terminals, A-N as shown in Figure. Set the dial of tester for conductivity and put the tester needles at both terminals alternately.

When one shows low resistance and the other shows pretty high resistance, the 3 diodes in the diode set are all right.



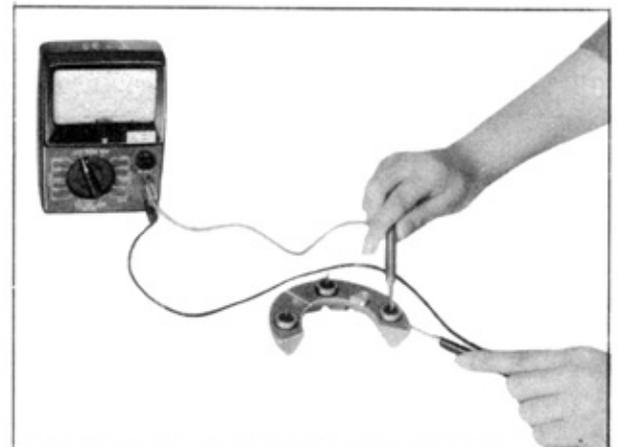
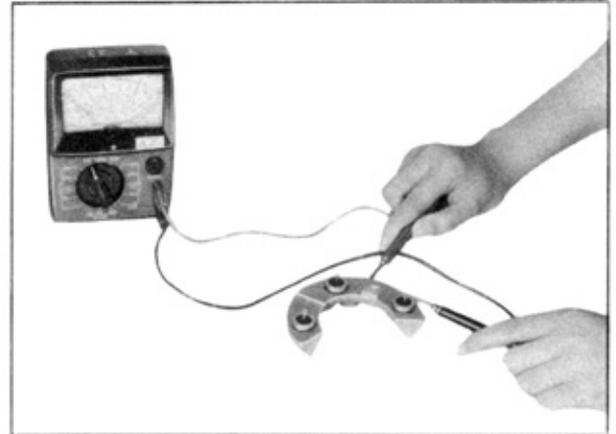
Check between the terminals, A-E same as above.

When the same result is obtained, 3 diodes are also all right.

However, when there is no disorder found in this simple test and the dynamo output is

somewhat lower than the standard, 1~2 diodes are often in opening, when one by one checking will be necessary.

b) Separate Inspection



Check resistance with the tester between the diode base commonly used for 2 diodes and lead wire on the rear cover - 2 times charging the poles

When one side shows low resistance and the other shows high resistance, there is no disorder. If both sides are low, there will be short circuit and both sides are high there will be open.

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D. Inspection of Diode with Lamp

a) Simple Inspection

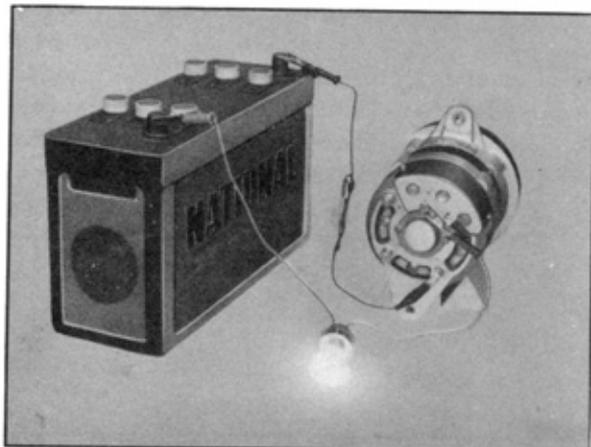
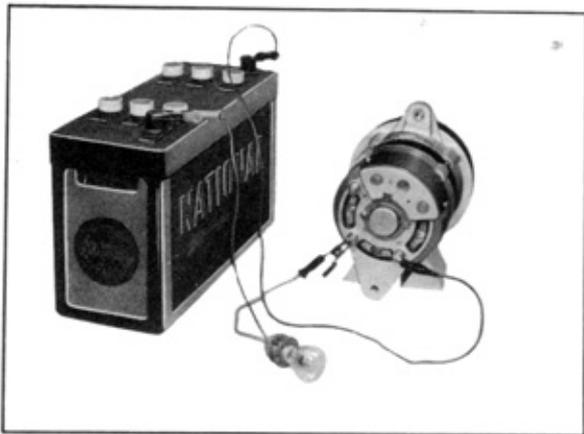
Check positive diodes

| Test Method | Test | Lamp | Method |
|------------------------------------|---------------------------|----------|-----------|
| | Connection | Lamp | Result |
| Should be conductive Ⓐ to Ⓑ | Connect ⊕ to Ⓐ and ⊖ to Ⓑ | Light | Good |
| | | No Light | Defective |
| Should be non-conductive Ⓑ to Ⓐ | Connect ⊖ to Ⓐ and ⊕ to Ⓑ | No Light | Good |
| | | Light | Defective |

Check negative diodes

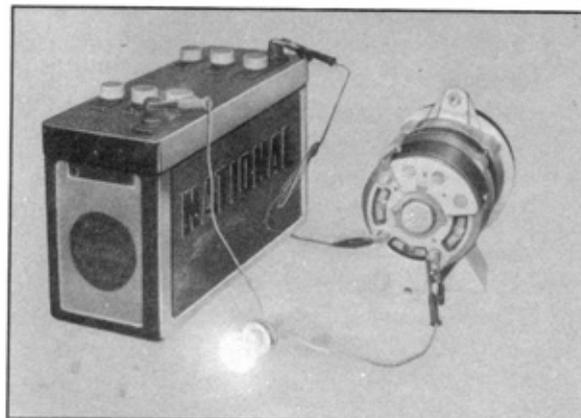
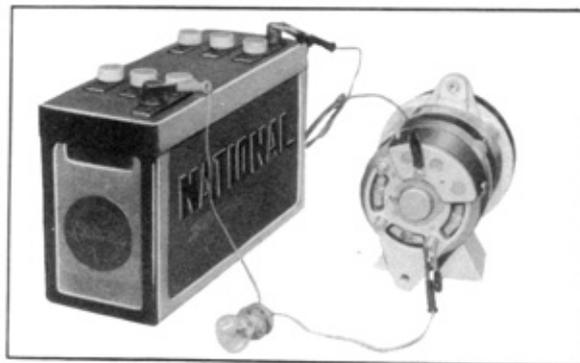
| Test Method | Test | Lamp | Method |
|------------------------------------|---------------------------|----------|-----------|
| | Connection | Lamp | Result |
| Should be non-conductive Ⓐ to Ⓑ | Connect ⊖ to Ⓐ and to Ⓑ | Light | Good |
| | | No Light | Defective |
| Should be conductive Ⓑ to Ⓐ | Connect ⊖ to Ⓑ and ⊕ to Ⓐ | Light | Defective |
| | | No Light | Good |

The soldering for the lead wires should be performed in less than 20 seconds, as the excessive heat may damage the diodes.



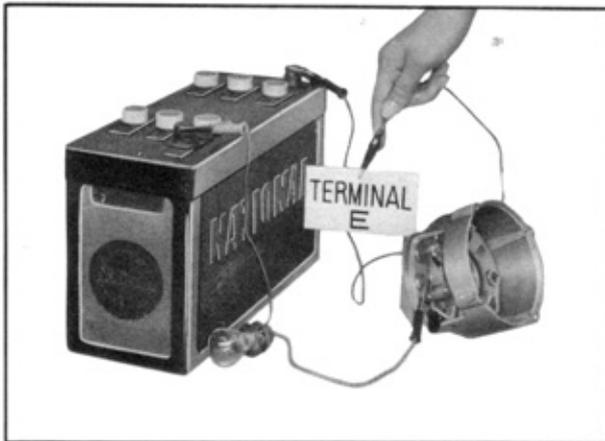
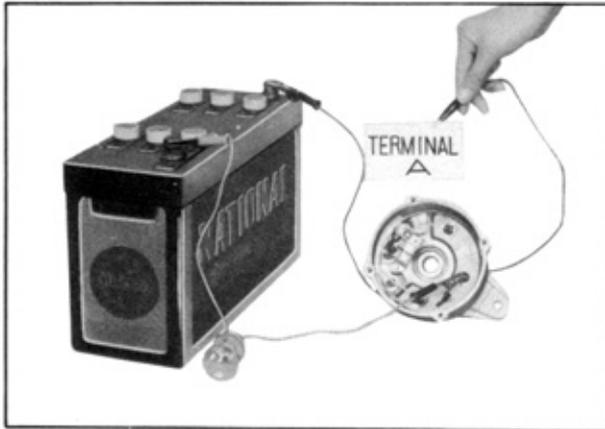
Check between the terminals, A-N as shown in Figure.

Connect with the lamp (12V) in straight and put both ends at A and N terminals alternately. On one side the lamp flares and on the other the lamp is off, when 3 diodes of the diode set are all right.



The same step is taken between the terminals, N-E. When the same result is obtained, 3 diodes pressed in the cover are all right. However, if the simple test is all right, but when the dynamo output is lower than the standard, 1 ~ 2 diodes may often be opening, so that one by one check will be necessary.

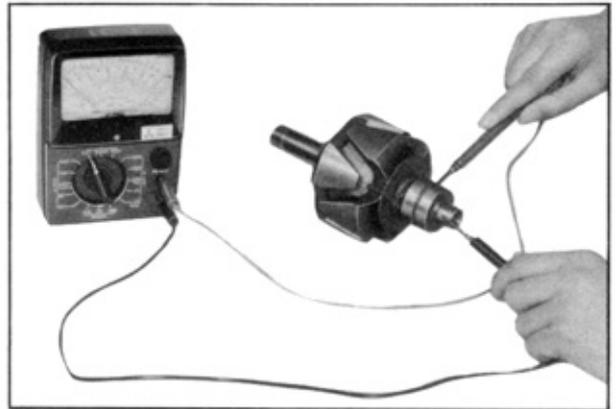
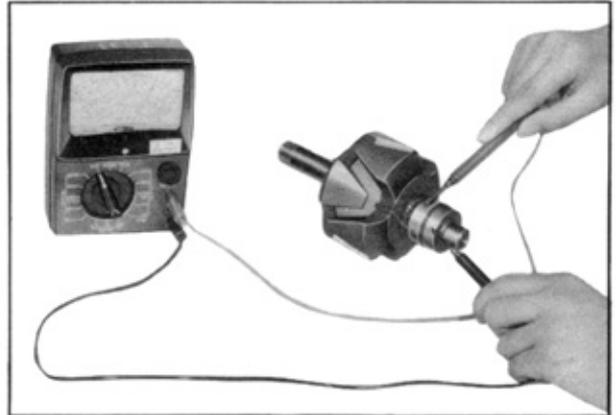
b) Separate Inspection



Check between the lead wire and the diode set common with the other 2 diodes or the rear cover with the lamp and battery. It is all right if one side flares and the other is off. If both sides flare, there is short circuit and both sides are off, there is open.

E. Inspection Field Coil

As shown in Figure, put the tester between the slip ring of rotor and if there are 6 ~ 7 Ω , it is all right. Make sure there is no conduction between the rotor slip ring and the shaft.



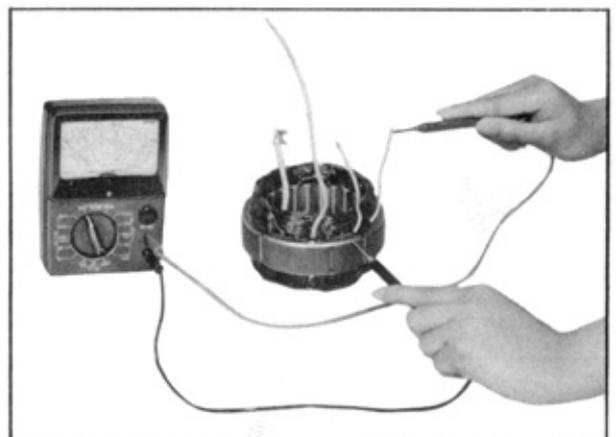
F. Ball Bearing

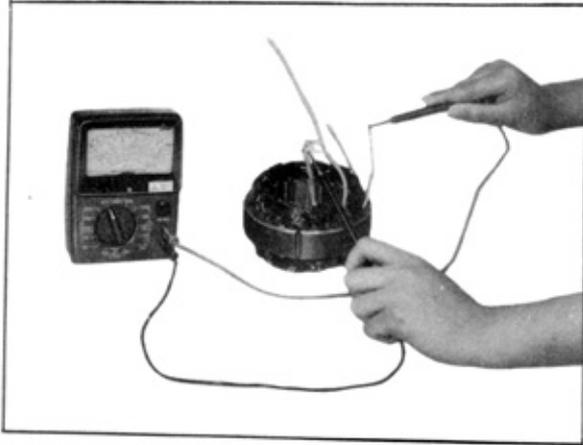
Both sides sealed ball bearing is used, so lubrication is not necessary.

G. Inspection of Stator (Armature)

a) Conduction Test

If the terminal connected to the diode is not conductive with the stator core, that is all right.

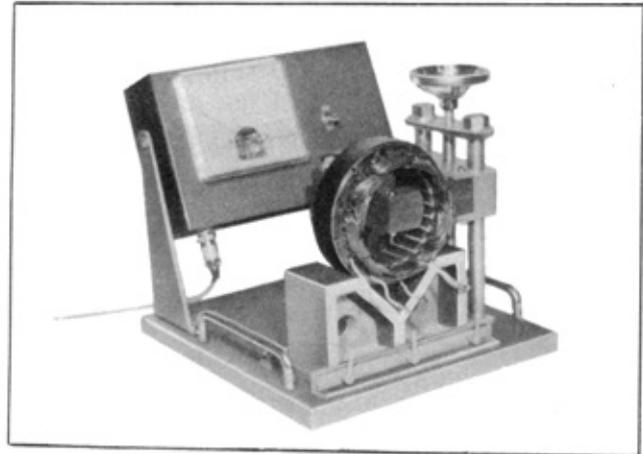




If each terminal of the coil and the terminal connected to N terminal are not conductive, that is all right.

b) Layer Test

Connect the tester cord to 100V wire, put the stator on the test stand and make the tester one turn reading the ammeter. If there is short circuit on the coil, swings of the ammeter abruptly increase and if there is no trouble, there will be no change.



H. Inspection of Brush

Wipe with clean cloth when oil or dust is on the contact surface of the brush and slip ring.

Same as in case of DC generator, replace the brush when wear of it reached to the wear limit.



14 ITEMS ON HANDLING

| PROHIBITION | REASON |
|---|---|
| <p>(1) When mounting on vehicle, polish the contact points on both sides removing point, rust or oil.</p> <p>(2) Make sure the engine side pitch and dynamo side pitch of the front cover are well fitted together.</p> <p>(3) Be attentive to the belt tension.</p> <p>(4) Regulator is sealed with lead. If the seal is removed during the claim period, the claim will be invalid.</p> <p>(5) If the earth is not correctly set, the adjust value will change.</p> <p>(6) Connect the dynamo and battery with full attention.</p> <p>(7) Make sure the whole circuit is completely composed.</p> <p>(8) Change wiring with full attention.</p> | <p>When the battery poles are connected in reverse, large current flows from battery to dynamo, resulting in damages of diode or lead wire.</p> <p>When after the engine started the dynamo is magnetized from the ignition switch, so that incorrect wiring will result in hampering magnetization and then generation.</p> |
| <div style="border: 1px solid black; padding: 2px;"> <p>(9) Do not use the high voltage tester such as megger.</p> </div> <p>(10) Engine room must be kept in the condition of standard usage.</p> <p>(11) Do not separate the battery terminal (dynamo terminal) during driving vehicle.</p> <p>(12) When cleaning with steam cleaner, do not expose dynamo to steam directly. When washing with water, dynamo must be free from reckless pour of water.</p> | <p>As diode is built in, the diode will be damaged with high voltage.</p> <p>Because there is diode which will deteriorate or be damaged with temperature higher than the normal.</p> <p>Separation of the terminal causes surge voltage within battery and damages diode.</p> <p>If the diode is moistened, the performance will be lowered.</p> |
| <div style="border: 1px solid black; padding: 2px;"> <p>(13) When the battery is quickly charged with the quick charger, the lead wire or regulator A terminal (dynamo A terminal) should be disconnected.</p> </div> <p>(14) Put the key switch off when the engine is a stop except when particularly needed.</p> | <p>Surge voltage of the quick charger will also damage diode.</p> <p>When the key switch is on, magnetic current always flows on the field coil and might damage the dynamo and often causes over discharge of battery.</p> |

TROUBLE SHOOTING LIST

| TROUBLE & CAUSE | REMEDY |
|---|---|
| <p><i>1 Over-discharge of battery</i></p> <ol style="list-style-type: none"> 1. Slackness of fan belt 2. Earth or breakage of stator coil 3. Breakage of rotor coil 4. Mal-contact of brush and slip ring 5. Mal-function of diode 6. Adjust voltage of constant voltage relay is low. 7. Mal-contact of low speed side contact point of constant voltage relay. 8. Adherence of high speed side contact point. 9. Shortage or unfitness of electrolyte. 10. Mal-function of battery pole. (short circuit) 11. Mal-contact of battery terminal. 12. Mal-contact or breakage between ignition switch and relay IG terminal. 13. Mal-contact or breakage between regulator F terminal and dynamo F terminal. 14. Excessive electric load. <p><i>2 Over-charge of battery</i></p> <ol style="list-style-type: none"> 1. Constant voltage relay adjust voltage is too high. 2. Constant voltage relay coil breakage or rare short. 3. Constant voltage relay coil straight resistance breakage. 4. Constant voltage relay low speed side contact point adherence. 5. Constant voltage relay high speed side contact point mal-contact. 6. Breakage or rare short of pilot lamp relay. 7. Mal-contact of pilot lamp relay contact point. 8. Mal-function of regulator earth. 9. Mal-contact or breakage between regulator N terminal and dynamo N terminal. <p><i>3 Noises of dynamo</i></p> <ol style="list-style-type: none"> 1. Mal-function of bearing. 2. Mal-function of diode. 3. Earth or rare short of stator coil. | <p>Adjust Repair or replace Replace Replace brush, clean holder Replace as a set Readjust</p> <p>Polish contact point Replace Add distilled water, check S.G. Replace or repair Clean, retighten terminal</p> <p>Repair</p> <p>Repair Check power consumed</p> <p>Readjust</p> <p>Replace</p> <p>Replace</p> <p>Replace</p> <p>Polish contact point Replace Polish contact point Adjust</p> <p>Repair</p> <p>Replace Replace diode as a set Replace</p> |

STARTER MOTOR



Type S114-87 Starting Motor (Hitachi)

| | | |
|--------------------------|---------|-------------|
| Type | | S114-87 |
| Rated output | V-Kw | 12 - 1.0 |
| Meshing device | | Magnetic |
| No load current | V-A | Under 12-60 |
| No load rev. | rpm | Above 7,000 |
| Brush normal height | mm | 16 |
| Brush wear limit | mm | 9.5 |
| Brush spring tension | gram | 800 ± 15 % |
| Commutator | Dia. mm | 33 |
| Commutator wear limit | dia. mm | Under -2 |
| Pinion operating voltage | V | Under 8 |

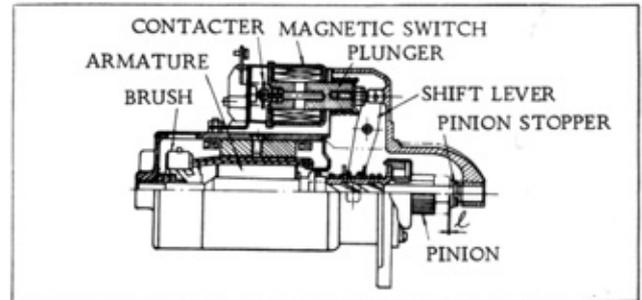
Construction and Operation

The starter motor is a 1.0 horsepower sliding inertia type electric motor for use in starting. The motor when mounted on the engine is on the front right side of the transmission with its pinion gear directly to the ring gear. The construction of the starter motor is similar to that of the generator but differs only in that its armature shaft extends out backwards with a pinion gear installed on the end as shown in Figure.

The connection diagram for the starter is shown in Figure.

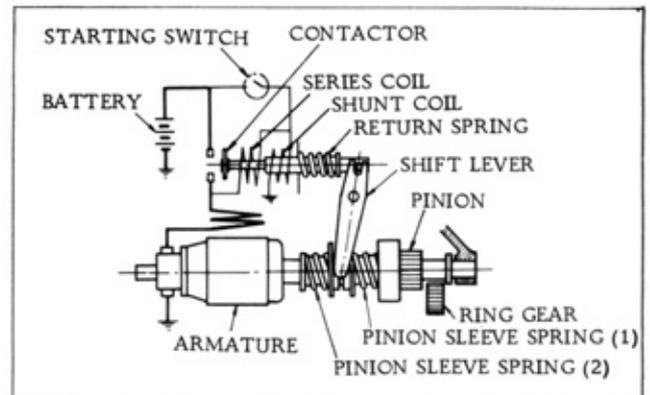
The starter switch is a key type combined with the ignition switch. By turning switch to the right direction, the relay on the magnetic

switch move to permit current to flow to the starter and cause the armature to start turning suddenly.



Magnetic Shift Type

After advancing about 14 mm, the pinion completes the meshing into the ring gear and drives it with a powerful torque. The direction in which the pinion moves is from the end of the shaft towards the starter bracket, thus reducing the bending torque. After the engine starts and its speed becomes greater than the no-load speed of the starter, the pinion is kicked back to unmesh and return to its former position.



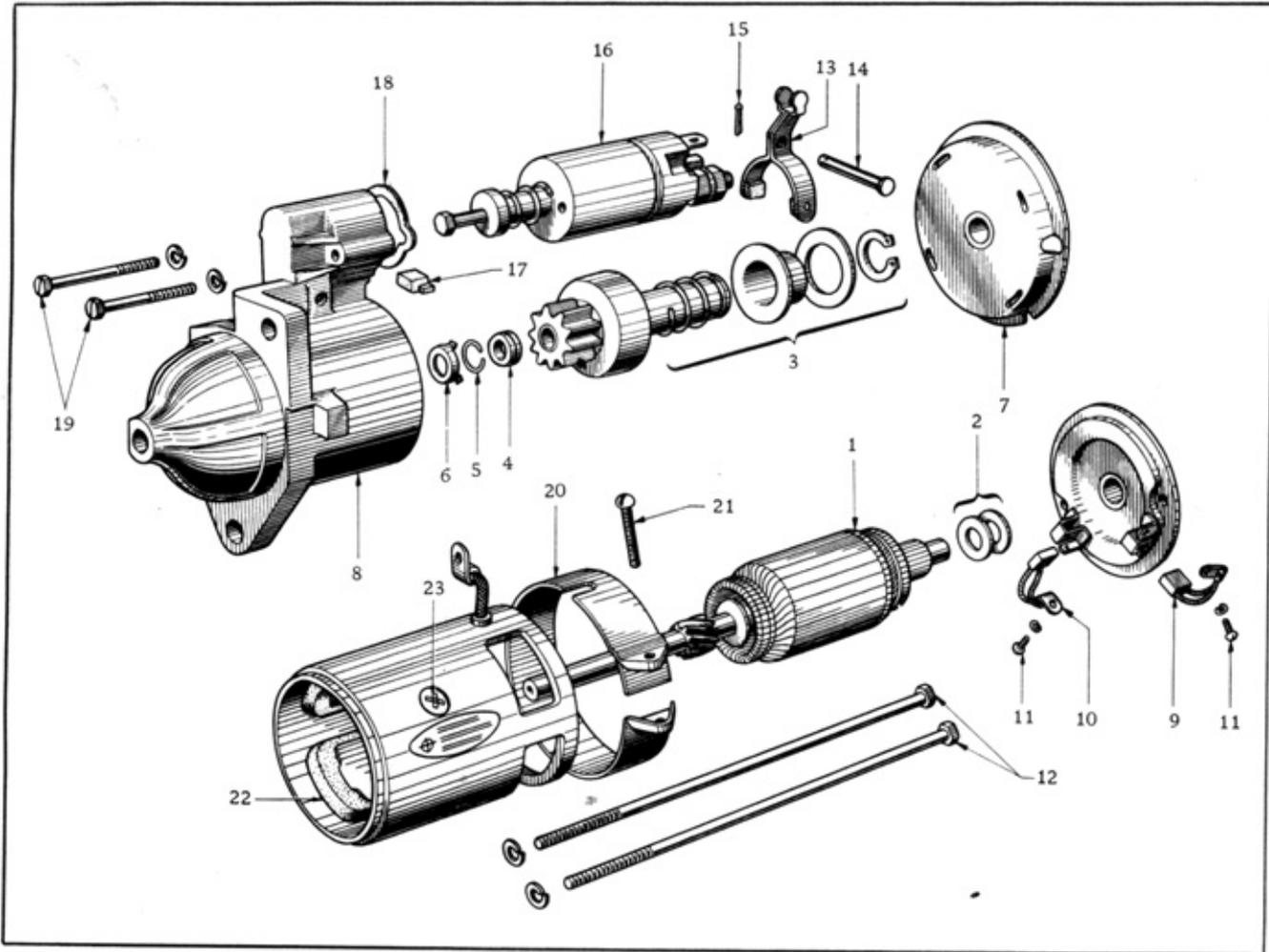
A View of Starter System

Operational Precautions

The instructions to be observed when starting the engine are as follows:

- (1) The starter should be securely mounted on the engine and should not show any looseness.
- (2) The starter switch should be operated properly and should be released immediately when the engine starts.

Expecting in extremely cold weather, the engine should normally start within 10 seconds.



Starter Motor (Hitachi)

| | | | |
|----|-------------------|----|------------------------|
| 1 | Ass'y-armature | 13 | Lever-shift |
| 2 | Washer-thrust | 14 | Pin-lever |
| 3 | Ass'y-pinion | 15 | Pin-cotter |
| 4 | Stopper-pinion | 16 | Ass'y-switch, magnetic |
| 5 | Clip-stopper | 17 | Cover-dust |
| 6 | Washer-stopper | 18 | Packing |
| 7 | Bearing-center | 19 | Bolt |
| 8 | Ass'y-cover, rear | 20 | Ass'y-cover, brush |
| 9 | Brush (+) | 21 | Screw |
| 10 | Brush (-) | 22 | Ass'y-coil, field |
| 11 | Screw 3φ | 23 | Screw |
| 12 | Bolt-through | | |

- (3) The starter switch should not be operated when the engine is running. If the engine fails to start, allow time for the pinion to come to rest before turning the starter switch again.
- (4) When the engine fails to start after turning the starter key for over 10 seconds, do not continue turning the key time after time but try to save the battery. In this case, check for the cause of the trouble and correct so that the engine will start.
- (2) The two stay bolts on the starter rear cover (front end when mounted on the engine) are removed.
- (3) After removing the band cover, the brushes and lead wires are removed.
- (4) By properly protecting and holding the starter body, the armature shaft is pulled out.
- (5) The armature and the front cover are taken out together.
- (6) To remove the pinion group from the armature shaft, the cotter pin on the end of the shaft is pulled out and by removing the pinion nut, the pinion group is removed.

Checking while in Operation

- (1) With a fully charged battery and with the lamps lighted, the starter switch is used. If the lamps become dim, especially when the engine does not start, the current is flowing through the starter motor coil but for some reason the armature is not turning. Careful check should be made since the starter pinion may be locked in the flywheel ring gear and unable to return, a trouble usually caused by turning on the starter while the engine is still running.
- (2) When the starter switch is turned up and the starter motor fails to turn although the lights remain bright, the switch should first be checked. If the switch is in satisfactory condition, then the condition of all the terminal and ground connections of the battery, starter switch and starter are checked. If the starter motor runs but its movement is sluggish, it indicates either a high resistance due to loose connection in the starter circuit or a badly discharged battery.
- (3) If after the above troubles are corrected and the starter fails to operate occasionally and shows defective performance, it is due to internal defects so that in this case, it should be dismantled and checked.

Dismantling and Disassembling

- (1) The starter can be dismantled easily by removing the two stud nuts mounting the starter on the engine.

Inspection and Repairing Parts

The same procedure as that for the generator parts is followed, the parts being cleaned and inspected after which determinations are made as to whether they can be reused or if repairs or replacements are necessary.

- (1) The pinion is inspected for defects and if the tooth face is worn or the tooth edge is damaged, the pinion should be replaced. Worn or broken teeth will not only make the gear mesh poorly but will hasten the wear on the opposing gear and also, poorly meshing gears will cause bending in the armature shaft. For this last reason, care should be taken, when inspecting, to also check the flywheel and take remedial measures if the ring gear is found worn or damaged. When the pinion is found defective, replaced the entire pinion group.
- (2) When inspecting the armature, check the armature to core gap, shaft to bushing clearance, bending in shaft, etc., in the same manner as that for the generator and are corrected to the specified limits, or the armature is replaced. Special attention should be given to the clearance between the armature and the core to see that they are not contacting, and corrosion found on the outside surface of the armature or the inner surface of the core should be removed by polishing, and the surfaces painted with rust preventive oil.

DATSUN 1000

- (3) The armature is inspected and repaired in accordance with the procedures outlined for the generator. Especially to improve or correct the brush contacting condition, the brushes are reseated. At the same time, the brush spring are checked and are corrected or replaced.
- (4) The insulation on the wires are carefully inspected and wires found with weak or damaged insulation should be replaced.
- (5) An armature found with one part especially damaged by burning should be strictly tested by the insulation test.

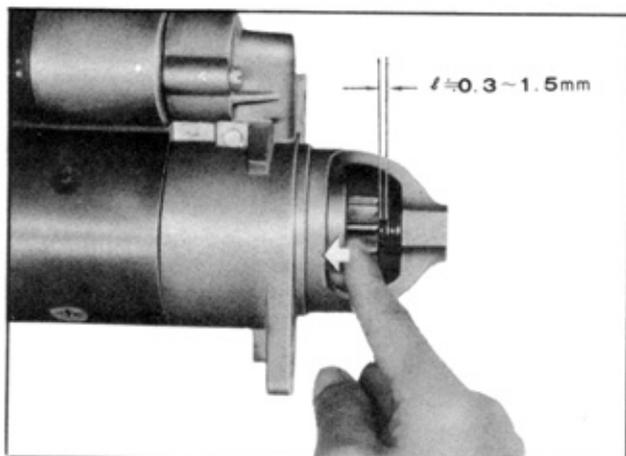
ADJUSTMENT

a. Meshed Pinion Position by Magnetic Switch

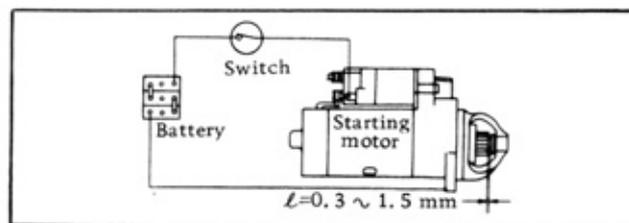
The correct clearance between the pinion stopper and pushed out pinion which is shown by L dimension in Figure must be following.

$$L = 0.3 - 1.5 \text{ mm}$$

In case that the L dimension is incorrect, adjust plunger gap of the magnetic switch by following paragraph b. Pay attention that the L dimension must be measured when the pinion is at mostly pushed out by the shift lever of the plunger and the back lash of the pinion is eliminated by pushing gear inward with finger as Figure shows. If the L dimension is incorrect, it will be the possible cause of large meshing noises or early wear and damage of the pinion and ring gear.



Checking Dimension



Cable Connection of Dimension Adjust

b. Adjustment of Plunger Gap of Magnetic Switch

The L dimension when the plunger gap is compressed to 0, must be following in Figure. $L = 31.7 - 32.3 \text{ mm}$

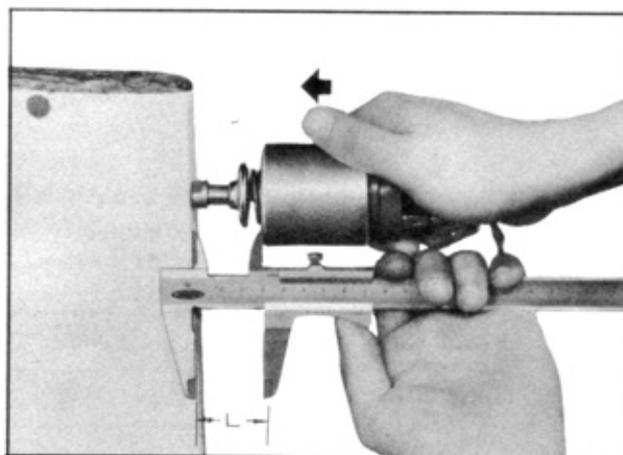
This adjustment is carried out at the adjuster and the adjusting nut.

Disassembling and Assembly Operation

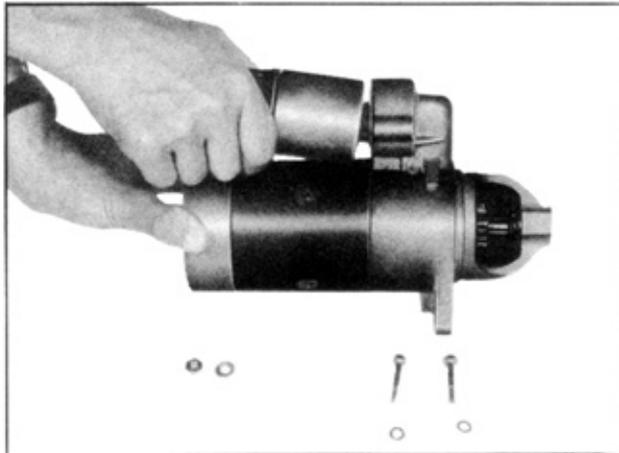
Disassembling the Armature, Gear Case and Pinion

Disassembling order is shown by Figure.

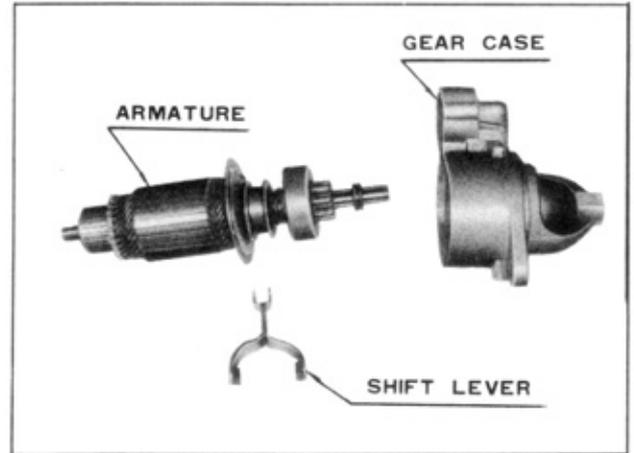
Disassembly is operated by removing magnetic switch fixing bolts, through bolts and the armature shaft clip. Before disassembling main body, remove brushes by unscrewing brush fixing screws as Figure.



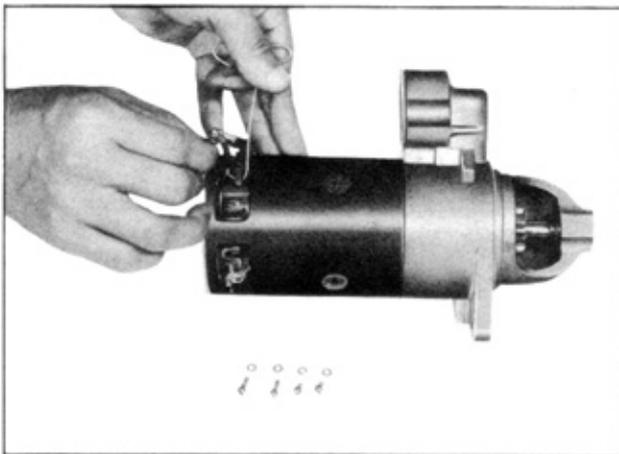
Measurement of Plunger Gap



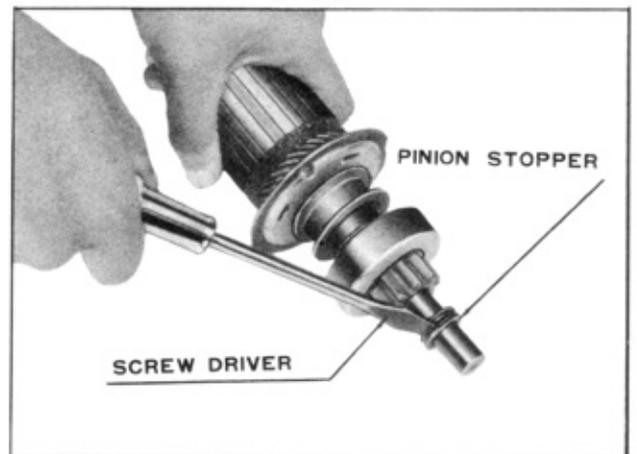
Removing Magnetic Switch



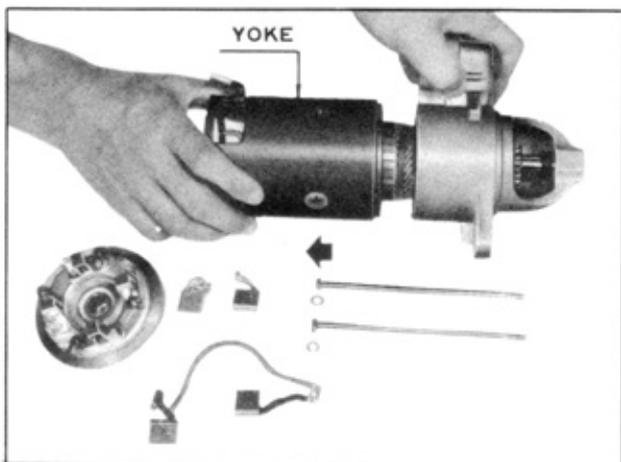
Disassembling Armature and Gear Case



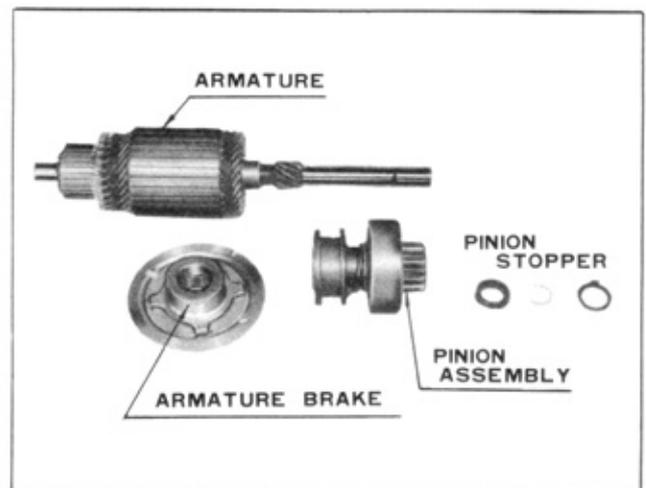
*Drawing out Brushes
(After removing fixing screw)*



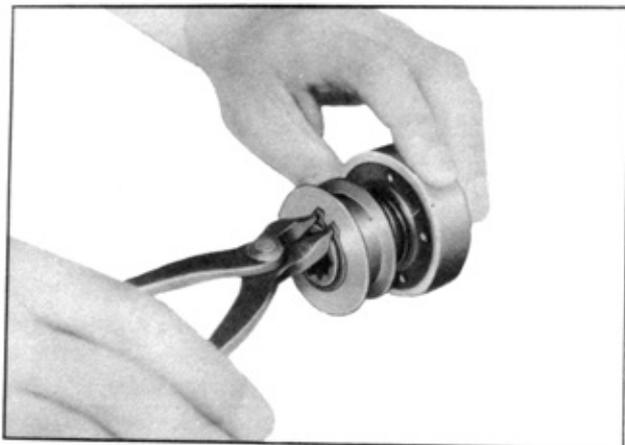
Removing Pinion Stopper



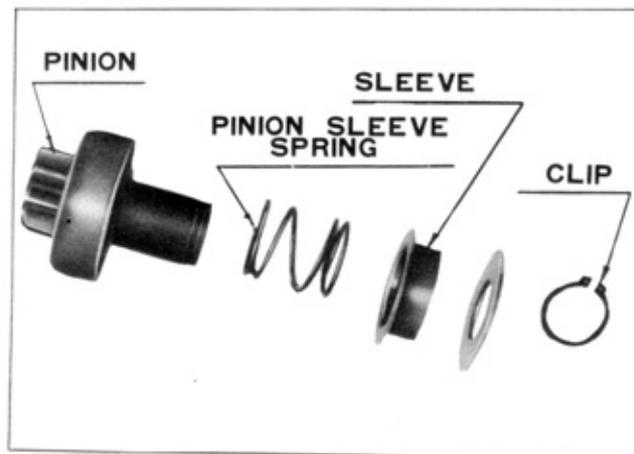
Drawing out Yoke



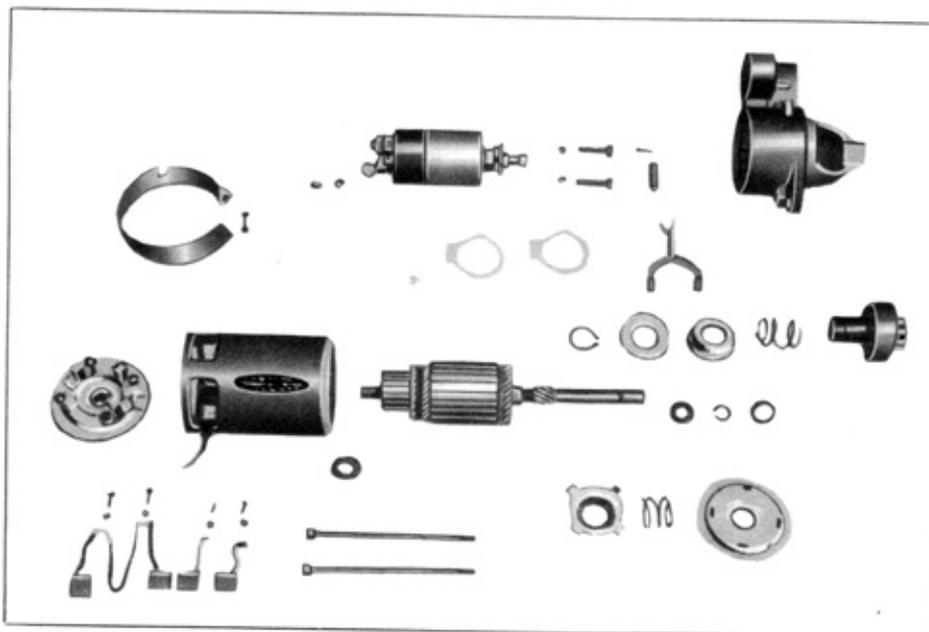
Disassembling Armature



Removing Pinion Clip



Disassembling Pinion Subassembly



Display of all Component

Disassembling Pinion

Disassembling is carried out by removing pinion clip as Figure.

Assembling and Testing Starter

Reassembling is performed by following the reverse procedure for disassembling. All frictional parts are lubricated with mobile oil (SAE 30) while the bearings are coated with a small amount of grease circuit in the magnetic switch and causes the main circuit S_2 in the magnetic circuit to close. Releasing the

starter switch opens the magnetic circuit which also opens S_2 .

- (1) Causes for magnetic switch failing to operate can be divided into electrical and mechanical sources.

Causes for electrical troubles.

- (A) Current failure in magnetic circuit.

When the starter switch in pressed and the current falls to pass through the magnetic circuit, most of the trouble is due to broken soldered connection

between the magnetic coil wire and the magnetic switch (+) terminal, and defective ground connection from the coil wire to the magnetic switch body.

(B) Defective contact in main circuit S_2 .

When the magnetic circuit is satisfactory and S_2 is closing but only a small current flowing due to high contact resistance, and the opposite case of switch S_1 opening but S_2 remains closed. In either case, the trouble lies in the faulty moving of the core or roughness of the contacting point surface. Therefore polished the surface well, then the operation will become satisfactory.

Causes for mechanical troubles.

Failure to operate is caused in many cases by the guide shaft on the moving core of the magnetic switch main circuit S_2 sticking against the cover hole.

Correction can be made in this case by loosening the cover screws (4 pieces) and retightening them so that the shaft moves freely.

(2) Precaution

In removing nuts from the magnetic switch main circuit terminals when installing or removing cables, the lower nut of the double nuts should be kept in a tightened state while unscrewing. If the lower nut is loose, the terminal bolt may turn together and ground the terminal to the cover and cause damage.

Starter Troubles, Their Causes and Remedies

The following is a list of troubles which can be determined from the state the starter is installed on the engine.

(1) Starter fails to turn.

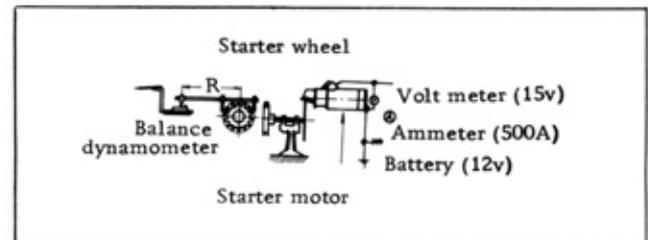
The engine is checked to see if it can be cranked by hand.

If it cannot be cranked, the engine is at fault and should be checked. If it can be cranked easily, the starter including the wiring should be checked and correction made accordingly.

Is the battery run down? Check the specific gravity of the battery fluid to see if it is over 1.240 and recharge or replace the battery as found necessary.

All loose battery and ground cables should be cleaned and properly tightened.

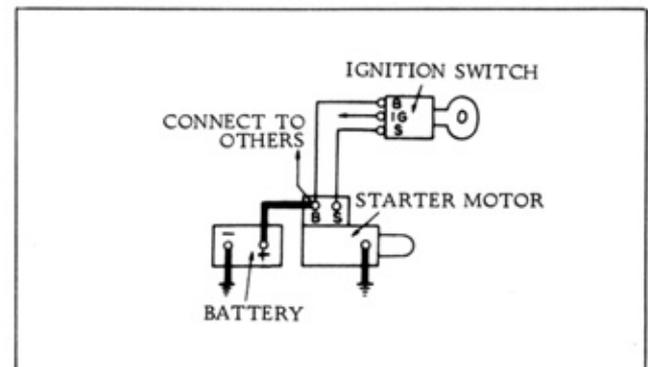
(Magneto grease or Gargoyle (BRB No.1)). All cord connections are carefully tightened and special attention given to the condition of insulation. The assembly check is made by testing the starter as a single unit using a fully charged battery. Tests are made with a starter motor tester or with the apparatus shown in Figure by which braking torque is measured. In this case, the normal value should be 0.9 m-kg.



Torque Testing Apparatus

Construction of Magnetic and Switch Instructions

The magnetic switch is an apparatus when the engine is being started by shift lever, serves to close the circuit between the battery and the starter motor, and permits a large current to flow and actuate the starter motor. After starting or when the engine is stopped, the switch serves to keep the circuit open. The principles of operation can be seen from Fig. 8. Closing the starter switch S_1 allows the current to flow through the magnetic.



Magnetic Starter Circuit

DATSUN 1000

If there is trouble in the magnetic circuit, it should be corrected.

For improperly contacting starter brushed, the brushes together with the armature should be checked, and corrections or replacement made as found necessary.

If all of the above checks with their corresponding repairs have been made and the starter still fails to operate, the trouble can be assumed to be in the starter itself so that it should be removed from the engine and checked.

This is exceedingly rare but care should be taken to see that the starter pinion is not locked into the flywheel ring gear. Cases like this are usually caused by badly worn gears meshing improperly and if the defect is not too severe, it can be remedied by placing the gear shift lever into fourth speed and rocking the car back and forth to free the gears. If this trouble is frequently repeated, the starter should be dismantled from the engine for checking and repairs.

- (1) Starter turns but its turning power is weak and fails to start the engine.

If the trouble is due to a run down battery, loose terminals, troubles in magnetic shift switch, worn and sticking brushes, dirty and damaged commutator, etc., the checking and repairs are made in the same manner as described in the preceding chapters.

If the outer surface of the armature is rubbing against the core, the starter should be dismantled, disassembled and repaired.

Besides the above, there is the case of the pinion meshing improperly. If the trouble is due to the gear teeth being badly worn, the gears should be replaced but if it is due to the screw guide on the pinion shaft being dirty and not allowing the pinion to advance smoothly and causing improper meshing, the shaft should be cleaned and oiled.

- (2) Starter exceeding noisy when operation. The flywheel ring gear is checked and if the teeth are deformed, they should be repaired or the gear replaced.

Rattling noise caused by loose starter mounting bolts are corrected by retightening the bolts.

Noise caused by brushes improperly contacting the armature required correcting as this condition not only produces noise but will hasten wear on both parts.

Noises made by the armature rubbing against the core while in operation is caused by too large a clearance between the armature shaft and the bushing so the worn parts should be replaced. Wear between the shaft and bushing is due to lack of oil so that attention should be given to proper lubrication.

Lubricate once every half year using good grade of machine or mobile oil and lubricate the parts through the oil nipples. The amount of oil required is about 0.5 cc. for each bracket.

