TOYOTA
REPAIR MANUAL

MODEL FJ

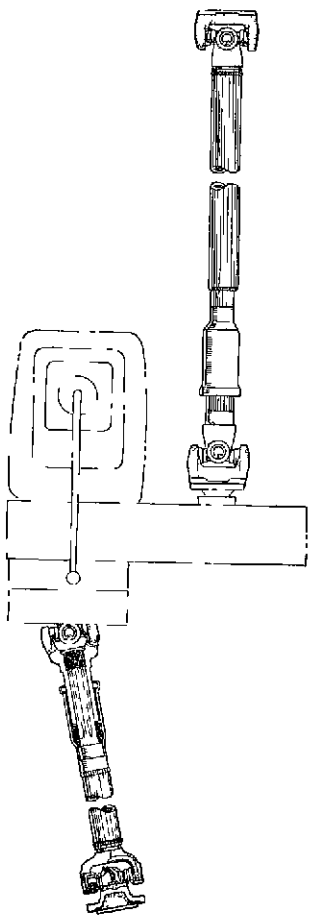
PROPELLER SHAFT AND UNIVERSAL JOINT
REAR AXLE
DIFFERENTIAL

PROPELLER SHAFT AND UNIVERSAL JOINT

After the engine torque passes through the clutch and transmission, it is necessary that it be transmitted to the front and rear axles to actually drive the vehicle. The shaft propeller is used as an in-between medium to transmit this power Since the Toyota Land Cruiser is equipped with both front and rear axle drives, a transfer is provided behind the transmission. Two propeller shafts are connected to this transfer and through universal joints, are linked on to the front and rear axles.

These universal joints are necessary in transmitting power smoothly to the front and rear axles. This is due to the fact that the relative positions of the transfer case and front and rear axles are constantly changing both in angle and in length because of road and load conditions

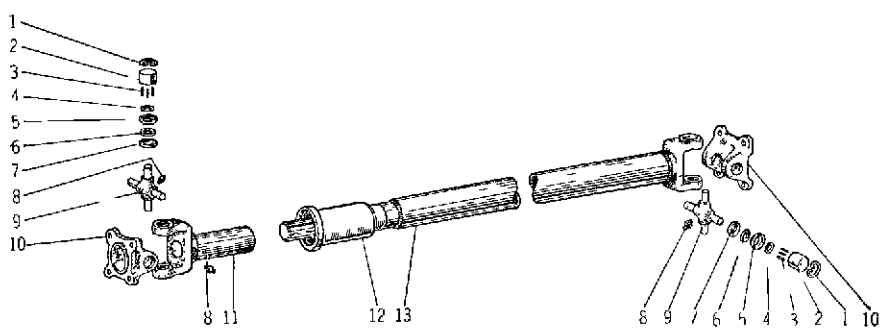
Propeller Shaft and Universal Joint



Specifications

Front Propeller Shaft	
Material	Electric seam welded steel tubing
Length	605 mm
Outside Diameter	48.6 mm
Inside Diameter	42.8 mm
Rear Propeller Shaft	
Material	Electric seam welded steel tubing
Length	505 mm
Outside Diameter	48.6 mm
Inside Diameter	42.8 mm
Universal Joint	
Model	Spider type with needle bearings
Quantity	4
Needle Roller	24 per joint end, total 384

Propeller Shaft and Unversal Joint



① *Snap Ring*
② *Needle Roller Bearing*
③ *Needle Roller*
④ *Needle Roller Seat*
⑤ *Seat Cover*
⑥ *Cork Ring*
⑦ *Cork Ring Seat*
⑧ *Grease Nipple*
⑨ *Spider*
⑩ *Joint Retainer Yoke*
⑪ *Joint Rear Yoke*
⑫ *Joint Oil Cover*
⑬ *Propeller Shaft*

PROPELLER SHAFT

The propeller shaft transmits the powerful engine torque through its long length between both universal joints. Its strength and balancing are important factors since it can cause unplesant vibration throughout the vehicle which may eventually lead to major troubles.

A comparatively long power transmission shaft such as the propeller shaft has what is known as critical speed. If the shaft does not have the specified strength and this speed is exceeded such as when running or when turned with the vehicle jacked up, a severe vibration due to centrifugal force is produced and the shaft will be bent or broken with resultant damage to the frame and body.

This critical speed bears no relationship to the driving power or size of vehicle but is limited by the length between the joints and engine speed. Thus, from structural standpoint, its limit of safety can be calculated. However, just increasing its strength will result in the disadvantage of making the shaft bigger and heavier.

The shaft equipped on the Toyota Land Cruiser has been designed through careful experiments and is of the electrically seam welded tubular type being comparatively light, with good balance and ample strength.

UNIVERSAL JOINT

The universal joint is of the spider type with roller bearings, both front and rear being of identical types. The cross shaped spider fits on to the front and rear yokes through bearing cups with 24 needle rollers, on each end and fastened down with snap rings.

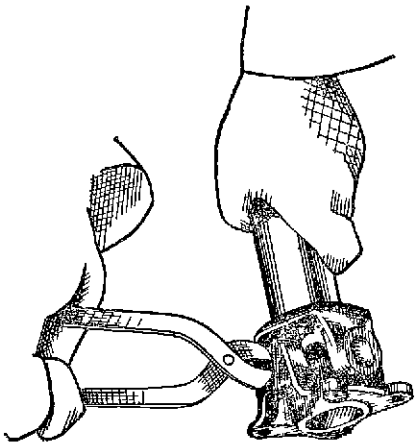
This enables free movement between the yokes both vertically and laterally, does not affect torque transmission, and gives ample wear resistance against shocks. To lubricate the bearing part, grease is forced with grease gun into the nipple provided in the middle of the spider until the grease passes through the oil hole in the spider to roller bearings in each of the four ends of the spider.

The same type of joints are equipped on the front and rear ends of the front propeller shaft, and connects on to the universal joint front yoke retainer on the transfer case and second and third universal joint retainer.

The connections to the rear axle and front axle are made by the differential joint yoke retainer.

DISASSEMBLING UNIVERSAL JOINT

When noise is produced by the universal joint while running, it is caused by wear in spider and needle bearings or wear in yoke and front joint spline so that the joint assembly should be replaced or disassembled in following manner and defective parts replaced.



Removing Joint Snap Ring

1 Pull out 4 snap rings
2. Push out alternately both arm parts of joint yokes or knock out bearings
3. Turn joint yoke upside down and in same manner knock out bearings on opposite side.

NOTE:

Take care not to damage the bearing cup during the above operation.

4. By removing bearings on both sides, the joint yoke together with the spider can be disassembled.
5 To remove joint yoke from spider, hold joint yoke in vise and disassemble by knocking spider at arm part.

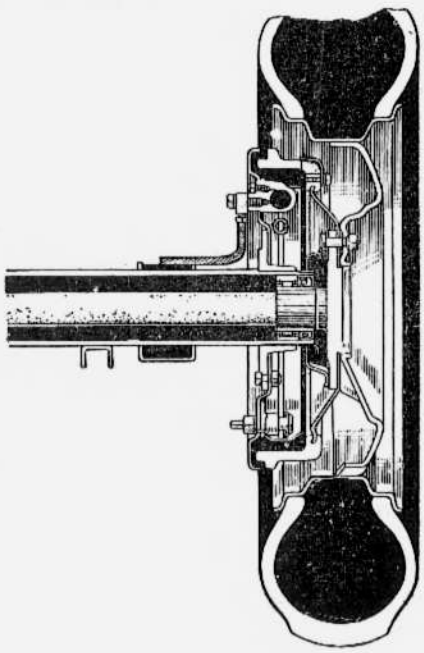
REAR AXLE

CONSTRUCTION OF REAR AXLE

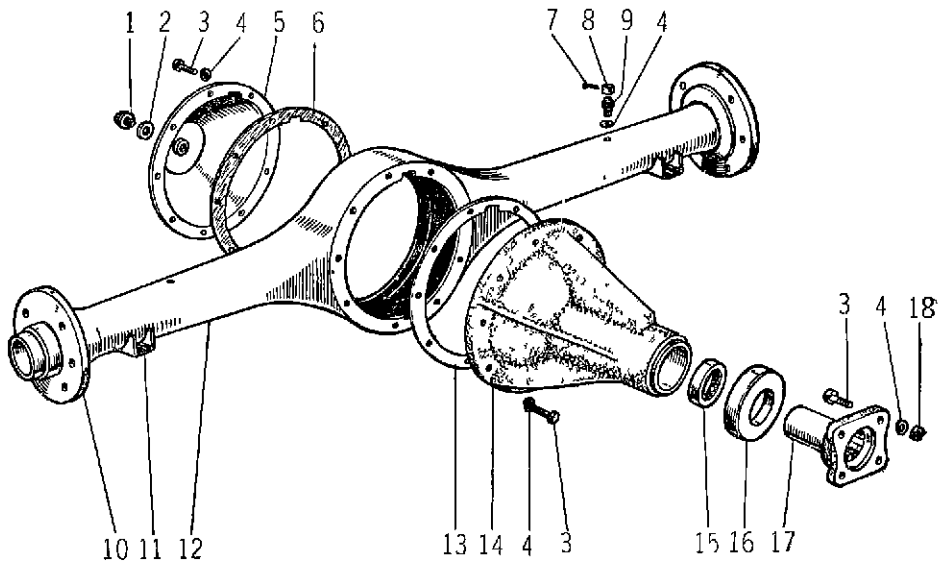
The rear axle equipped on the Toyota Land Cruiser is of the semi floating type and the drive used is of the Hotchkiss type in which the drive is effected through the chassis springs. The rear axle consists of the right and left parts with the differential gears in the middle. The inner end of each axle connects on to the differential side gear with splines and locked with rear axle shaft lock ("C" washer) to prevent the axle from pulling out. The outer end is supported on the axle housing through wheel bearing and the flanged part on the extreme outer end is provided with 6 holes for hub bolts, 2 holes for brake drum mounting screws and 1 hole for oil drain. The brake drum is installed on this shaft flange with 6 hub bolts and 2 screws. The wheel is mounted from the outer side with these 6 hub bolts so that the rotation of axle is directly connected to the wheels.

Rear Axle Specifications

Type	Semi floating type
Drive	Hotchkiss type
Rear Axle Shaft Material	Chrome-molybdenum steel
Rear Axle Shaft Bearing	Roller bearing

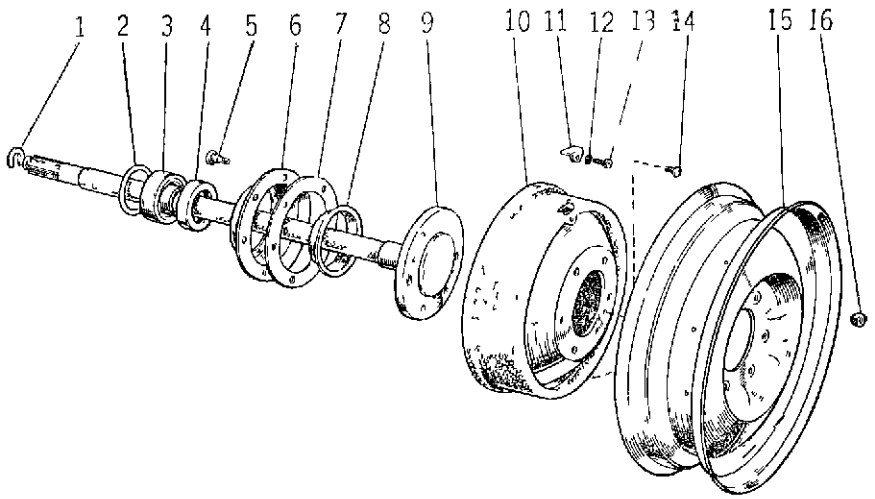


Rear Axle Housing



① *Filler Plug*
② *Plug Packing*
③ *Bolt*
④ *Spring Washer*
⑤ *Housing Cover*
⑥ *Cover Packing*
⑦ *Cotter Pin*
⑧ *Breather Plug Cap*
⑨ *Breather Plug*
⑩ *Brake Flange*
⑪ *Spring Seat*
⑫ *Rear Axle Housing*
⑬ *Carrier Packing*
⑭ *Differential Carrier*
⑮ *Oil Retainer*
⑯ *Dust Cover*
⑰ *Joint Yoke Retainer*
⑱ *Nut*

Rear Axle Shaft and Wheel



① *Shaft Lock*
② *Bearing Collar*
③ *Bearing*
④ *Oil Retainer*
⑤ *Hub Bolt*
⑥ *Brake Drum Strap*
⑦ *Strap Packing*
⑧ *Housing Side Collar*
⑨ *Rear Axle Shaft*
⑩ *Brake Drum*
⑪ *Drum Inspection Hole Strap*
⑫ *Spring Washer*
⑬ *Bolt*
⑭ *Drum Set Screw*
⑮ *Wheel*
⑯ *Axle Nut*

DISMANTLING REAR AXLE ASSEMBLY

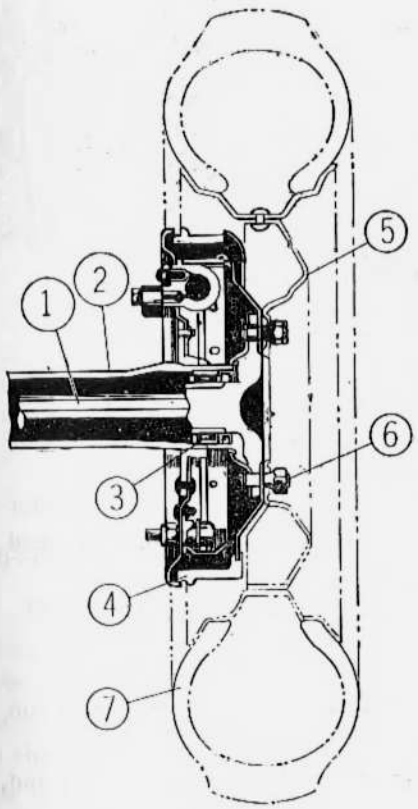
Repairs on the rear axle can be classified into two methods, major overhaul and minor overhaul. In major overhaul, the rear axle assembly is removed from the frame and the rear axle, differential gear mechanism and assembly in whole is reconditioned. In minor overhaul, the repairs are only sectional such as replacing axle shaft or wheel bearings, replacing differential gear and its bearing with adjustments. Thus, the cause of the trouble should be carefully inspected to determine which type of repairs to perform.

The rear axle assembly is dismantled from the frame by the following method.

1. Jack-up the rear axle, place horses under the frame and lower jack.
2. Remove left and right wheels.
3. Disconnect brake lines at the flexible tube part.
4. Disconnect propeller shaft rear joint at the yoke part.
5. Disconnect lower eye connection on shock absorber.
6. The Model FJ28 is equipped with a stabilizer so that on this model vehicle, disconnect the stabilizer link from the bracket welded on to the rear axle housing.
7. Then by removing the U-bolts on left and right springs and making the springs free, the rear axle can be dismantled from the frame as an assembly.

To install, proceed in the reverse order.

Rear Axle



① *Rear Axle Shaft*
② *Rear Axle Housing*
③ *Rear Wheel Bearing*
④ *Rear Brake Drum*
⑤ *Disc Wheel*
⑥ *Rear Axle Hub Bolt*
⑦ *Tire*

DISASSEMBLING REAR AXLE SHAFT

Both the left and right rear axles are removed in the following manner.

1. Jack-up the rear axle.

—*NOTE*—

It is important in this case to place the jack so as not to obstruct removal of differential case cover.

2. Unscrew 6 hub nuts and remove wheel.
3. Drain out oil from differential case, remove rear axle housing cover and knock out

differential pinion gear shaft Care should be taken to unloosen pin locking the shaft before knocking it out

4. By removing the above shaft, the pinion spacer can be taken out. The axle shaft lock can then be removed and allow the axle shaft to be pulled out together with the brake drum

5. The brake drum can be removed from the axle flanged part by unscrewing 2 set screws attaching brake drum

6. At the base of the flanged part on the axle shaft, the bearing inner race supporting the wheel bearing is installed

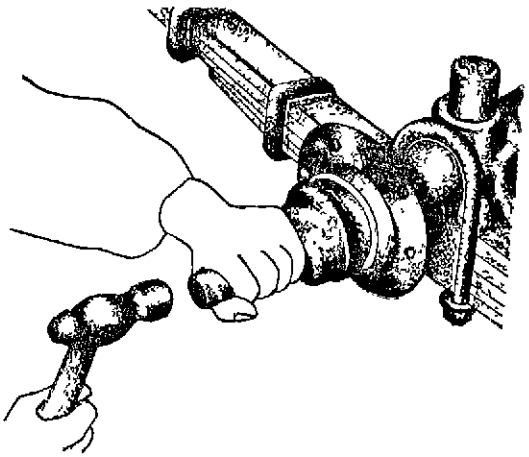
7. The axle shaft is installed by following the above procedure in reverse order.

REMOVING REAR WHEEL BEARING

1 Remove axle shaft by following the above procedure.

2 Remove wheel bearing together with leather oil retainer using Rear Axle Bearing Puller (SST—2044)

3 To install, use Rear Axle Bearing Replacer (SST—2045) and drive-in in following order: bearing collar, bearing, oil retainer.



Using Rear Bearing Replacer

REAR AXLE HOUSING

The construction of the rear axle housing consists of two parts welded together with brake flanges welded on to both ends. The spring seats are of rolled steel plates and these also are welded on to the housing.

REAR AXLE MAINTENANCE INSTRUCTIONS

1. Hub bolts should always be tightened by tightening alternately nuts on opposite sides and tightening uniformally.

2 In the operation of the vehicle, care should be taken not to overload and not to make sudden stops unless absolutely necessary.

3. After every 5,000 kms, the wheel bearings should be disassembled and checked, and packed with new grease.

DIFFERENTIAL

The differential system is the means of providing any desireable difference in rotation between the left and right wheels without affecting the drive purposes of the rear axles. This is necessary due to the fact that when the vehicle is being turned, there is required a difference of rotation between the inner and outer wheels. On the other hand, it is necessary that the drive axles deliver the power from the engine uniformally to both wheels. To satisfy the above two conditions and provide smooth running of the vehicle, there is equipped at the connecting part between the propeller shaft and the rear axles, and also front axles the differential system, the construction of which is described below

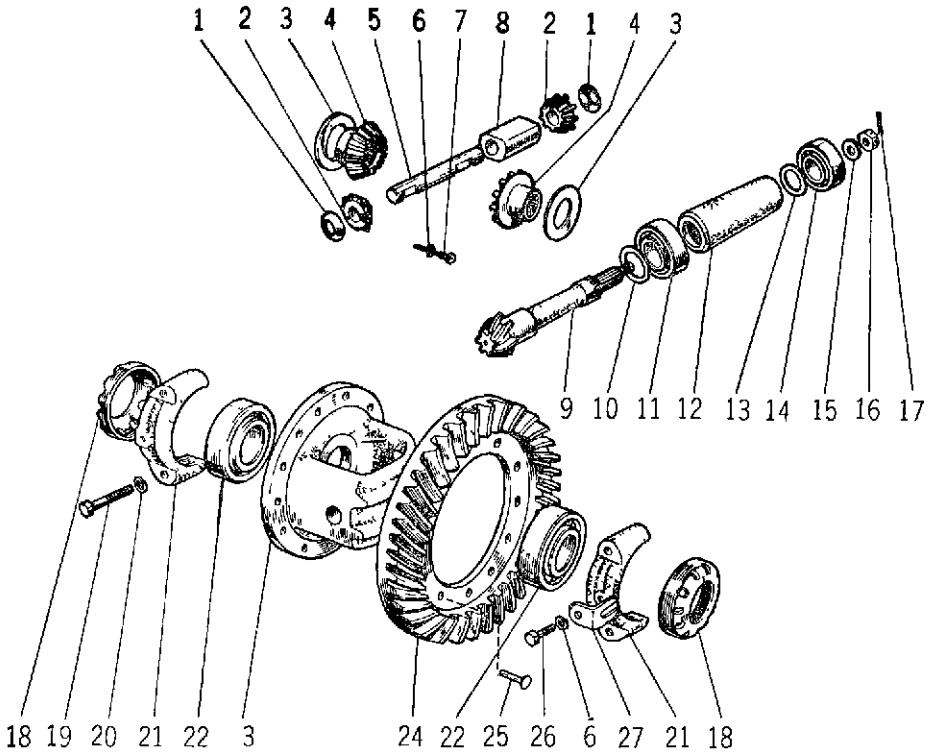
Differential Specifications

Gear Type	Helical bevel gear
Gear Reduction	4.11 : 1
No. of Teeth: Drive Pinion Gear	9
Ring Gear	37
Differential	Bevel gear
No. of Teeth. Side Gear	16
Pinion Gear	10
Differential Housing	Banjo type
Differential Case Oil Capacity.	1.8 liters (for rear axle)
	2.2 liters (for front axle)

DIFFERENTIAL CONSTRUCTION AND OPERATION

The construction consists of two differential side gears placed opposite to each other inside the differential case into which the splined part of the left and right axle shafts fits in Both of these gears mesh with two differential pinion gears placed at right angles and facing each other. These pinion gears are free to rotate on the differential pinion shaft rigidly attached to the case, and together with the side gears form a gear system

Differential



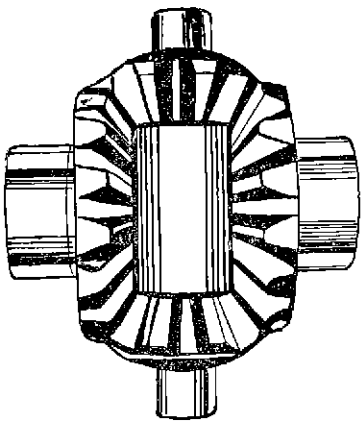
① *Pinion Thrust Washer*
② *Pinion*
③ *Side Gear Thrust Washer*
④ *Side Gear*
⑤ *Pinion Shaft*
⑥ *Spring Washer*
⑦ *Pinion Shaft Pin*
⑧ *Pinion Spacer*
⑨ *Drive Pinion*
⑩ *Adjusting Shim*
⑪ *Drive Pinion Rear Bearing*
⑫ *Drive Pinion Spacer*
⑬ *Adjusting Shim*
⑭ *Drive Pinion Front Bearing*
⑮ *Drive Pinion Washer*
⑯ *Nut*
⑰ *Cotter Pin*
⑱ *Adjusting Nut*
⑲ *Bolt*
⑳ *Spring Washer*
㉑ *Carrier Cap*
㉒ *Side Bearing*
㉓ *Differential Case*
㉔ *Drive Ring Gear*
㉕ *Ring Gear Rivet*
㉖ *Bolt*
㉗ *Adjusting Nut Lock*

The differential case which supports this four-gear system is riveted on with 12 rivets to the ring gear which is driven by the drive pinion and forms the differential assembly This assembly is supported by the strongly ribbed differential carrier through the two left and right side bearings The drive pinion is supported at front and rear with tapered bearings inside the differential carrier and meshes with the ring gear. Between the front and rear tapered roller bearings are drive pinion

spacer and adjusting shims which determine the tightening position of these bearings. The differential yoke retainer and splines are attached to the other end of this drive pinion, and links on to the propeller shaft through the rear universal joint.

Through the above system, the engine power passes from the propeller shaft, through the drive pinion to the ring gear. The differential case riveted on to this ring gear turns inside the side bearings. In the four gear system inside the case, the two differential pinions are attached to the pinion shaft fixed to the case as previously described The two side gears mesh at right angles to the differential pinion and rotate on the same center line as the case As long as the turning resistance of these two side gears are the same, the four bevel gears do not rotate individually but turns in mutually meshed condition around the side gear axles as the axis In other words, the differential case turns the side gears itself with the same revolution.

Consequently, the propeller shaft torque is only reduced in speed (increased force) between the drive pinion and ring gear, and is transmitted from the side gear, through the rear axle shafts to the rear wheels and propel the vehicle.



When running straight ahead on level roads, the above action takes place without any changes. But when travelling on rough roads or when making a turn, it is required that there be a difference of rotation between the left and right wheels, and it is at this time when the object of the differential comes into play.

In this case, the driving action is not hindered and is continued, there being no change in the driving power itself. When the road resistance received by the left and right wheels become different, this is transmitted from the axle shafts to the differential side gear. The four mutually meshed gear system adjusts this automatically, this resistance being made uniform by the rotation of the side gears itself being different at the left and right side Consequently the left and right wheels without losing driving power, is provided with difference in rotation to conform to requirements so that the vehicle can travel over any road conditions without trouble

DIAGNOSING DIFFERENTIAL NOISES AND ITS TESTING PROCEDURES

There are four different varieties of differential noises and each can be differentiated. But to judge these noises accurately is exceedingly difficult Frequently, a combination of noises produced from several causes is heard so that from the following tests, the cause must be traced down to see if it is in the differential it-

self If so, the differential assembly should be overhauled and necessary repairs and adjustments made.

Types of Noises

1. Drive Noise.

This is clearly distinguished when accelerated at constant rate between speeds of 20 to 60 kms/hr.

2. Coast Noise.

This is clearly defined when the vehicle is driven at high speed and then allowed to coast down to low speed by disengaging the clutch.

3. Float Noise.

This is clearly defined when driven at constant speeds at 5 kms/hr intervals between speeds of 20 to 60 kms/hr.

4. Bad Bearing Noise.

When the bearings become worn, the gear contact becomes bad, or loose, they become causes for the above drive, coast, and float noises. When bearings become bad, an irregular, groaning sound is produced.

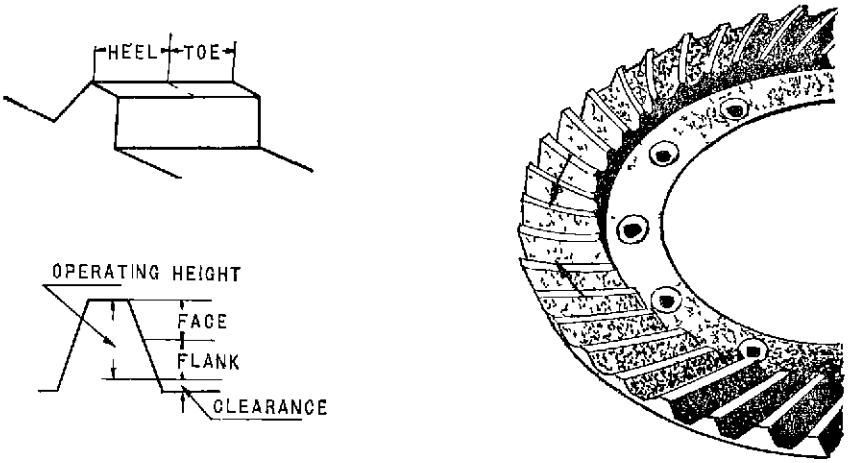
PROCEDURE FOR TESTING DIFFERENTIAL NOISES

The following procedure is used to test differential noises.

1. To eliminate tire frictional noises, the test should be carried out on a level tar or asphalt road

2. Run the vehicle until the rear axle oil is fully warmed up.

3. If any noise is detected while running, the speed at this time should be noted After making sure that this noise is not being resounded from the exhaust or muffler, the speed at which this noise was produced should be accurately determined by



Gear Nomenclature

repeatedly accelerating to the same condition.

4. To test for coast noises, the vehicle is brought up to high speed after which the transmission gear is shifted to neutral and the vehicle allowed to coast down to very low speed, taking care during this time to note any noises produced. In this case, care should be taken not to confuse with tire frictional noises.

DISASSEMBLING DIFFERENTIAL ASSEMBLY

When the differential is to be disassembled because of troubles such as noises, the procedure outline below should be followed

1. Jack-up rear axle high and after placing horses on frame directly in front of rear axle, remove jack.

2 Drain out oil in differential case and remove housing cover.

3 Unloosen the pin locking the pinion gear shaft inside the differential case and knock the shaft out and remove pinion spacer

4. Remove rear axle shaft lock ("C" washer) and pull axle shaft out together with the wheel.

5 Remove bolts attaching universal joint yoke and free the differential assembly from the propeller shaft.

6 Remove bolts attaching differential carrier and take out differential carrier and differential case assembly.

7. Unscrew bolts holding rear joint yoke retainer and remove retainer together with dust cover.

8 Take out oil retainer.

9. Remove bolt on the left and right adjusting nut lock and remove both locks.

10. Remove bolts on left and right differential carrier caps and remove caps and differential adjusting nuts.

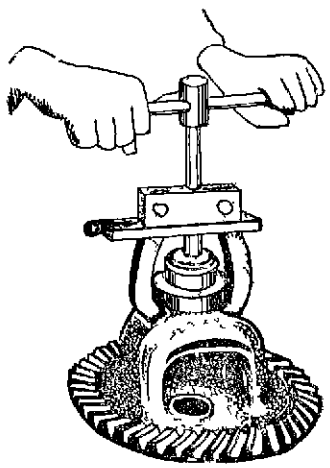
The differential case complete and side bearings can now be removed from the differential carrier

11 Lightly tap the spline end of the differential drive pinion with a wooden mallet and pull out drive pinion together with rear bearing and drive pinion spacer to the inside of the carrier.

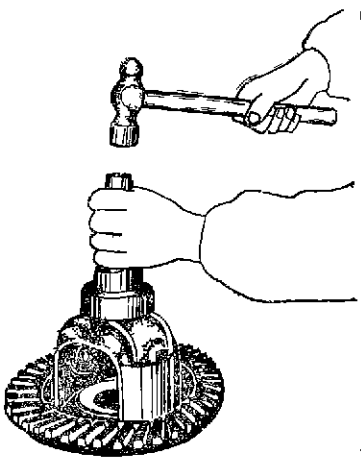
12 The differential drive pinion rear bearing cone can be removed easily by knocking it out from the front side of the carrier with a brass bar

13 Remove differential side bearings with a puller.

This completes the disassembly of the differential assembly During disassembly, care should be taken to carefully check the wear conditions on the various parts,



Differential Side Bearing Puller



Using Differential Side Bearing Replacer

especially the gear contact and bearing action.

To reassemble, the above procedure is followed in the reverse order. However, it should be borne in mind that noises can originate from the smallest defective part so that the reassembly should be made with painstaking care. When assembling differential side bearings, use the Differential Side Bearing Replacer (SST—2029) shown in the figure.

INSPECTING PARTS

1. Check side gears for defects in hub and defects and wear on thrust face. If found defective, replace with new gears.

2. Check splines on inner part of side gears for wear. Fit on the axle shaft and if the play in the direction of rotation is over 0.010 inch, adjust so that play is between 0.002 to 0.005 inch or replace with new gear.

3. Check thrust surface on differential pinions and check its fit with pinion shaft. If this clearance is over 0.010 inch, replace with new pinion or adjust to 0.005 to 0.007 inch.

4. Check differential pinion thrust washer for wear. If badly worn, replace with new part.

5. Check contacting surfaces of differential case side gear and pinion thrust washer.

6. Check differential side bearings for flaws and noises. If found defective, replace with new bearings.

7. Check the part of differential case where the side bearings fit into carefully for presence of cracks. If found faulty, replace with new part.

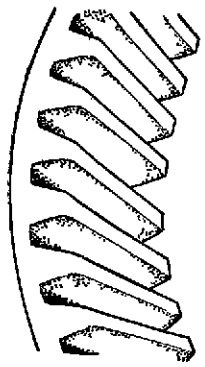
8. If the ring gear shows excessive deflection, the gear is damaged, or the rivets are loose, the surface of the differential case where the ring gear attaches should be measured for out-of-run.

This out-of-run should be less than 0.007 inch. If more than this, corrections should be made by machining on a lathe. When ring gear is riveted back on to the case, the out-of-run on the ring gear at the back surface should be measured again to make sure that it is still within the specified limits.

9. When the differential drive pinion rear bearing is found defective, it should be removed with the Universal Puller.

ADJUSTING DIFFERENTIAL

The differential adjustments consist mainly of adjusting gear mesh between drive pinion and ring gear, and adjusting play in differential side bearings and drive



pinion bearings. That is, it is the process of checking the contacting conditions of both gears and operating conditions of the bearings to see if they are correct or not and making necessary correction. The operating condition of the bearings are satisfactory if the rotating part fitted into the bearing turns lightly without resistance or noise and no play is felt in the axial directions. The gears are contacting correctly when at no load, about 3/4 of the tooth surface from the tooth end of the drive pinion are contacting. Under actual running conditions, the total surface from the tooth end will be contacting.

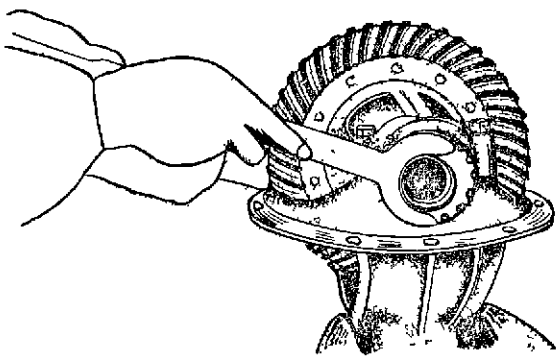
By adjusting the bearings and correcting gear clearance to give correct tooth contact, not only will the noise be prevented but the life of the bearings and gears will be considerably prolonged.

1. Adjusting Differential Side Bearings

The operating condition of the side bearings are adjusted by varying the tightness of the differential adjusting nut on the outer sides of the bearings. To adjust, the differential carrier cap and the adjusting lock nut on the cap are first loosened. Then by using Differential Adjusting Nut Wrench shown in the figure, the nut on the right side (as seen from the rear of the vehicle) is loosened, and the nut on the left side is tightened until there is no clearance between the ring gear and the drive pinion. This nut is then unloosened 1/2 to 1 turn. (This is to provide allowance for adjusting gear contact and back lash)

The adjusting nut on the right side which was previously unloosened is then tightened fully and then unloosened about 1/3 turn. (this is to provide turning clearance for the side bearings)

This should make the operating condition of the side bearings satisfactory but to make sure, the ring gear should be turned by hand and carefully checked to see that it turns satisfactory.



Using Differential Adjusting Nut Wrench

—NOTE—

The differential carrier cap and adjusting nut lock which were unloosened to make the above adjustment should not be tightened since the gear contact and backlash are to be checked next.

2. Adjusting Drive Pinion in Axial Direction

Adjusting shims are provided behind the drive pinion rear bearing To adjust drive pinion in axial direction, the number of shims are varied. The following sizes of shims are available

Shim Size	Thickness (mm)	Part No.
No 1	0.228	BJ 41212 A
No 2	0 271	BJ 41213 A
No 3	0 350	BJ 41214 A
No 4	0.450	BJ 41215

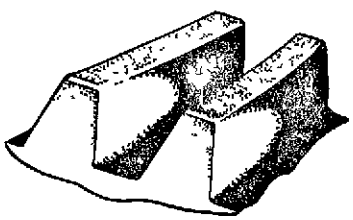
When the shims are decreased, the drive pinion moves forward (toward ring gear side) to lessen the clearance. When the shims are increased, the pinion moves backwards to increase the clearance so that by this method, the clearance between the gear mesh is adjusted approximately to the specified 0 010 inch (0.25mm) taking into consideration the gear contact adjustment outlined in following Article 3, and the ring gear axial adjustment outlined in following Article 4.

3. Adjusting Gear Contact

To check the tooth contact on the gears, the whole surface of the gear part on drive pinion is uniformally coated with a thick mixture of red lead. The gear is then installed and carefully turned back and forth several times Upon removing the gear, the red lead adhering to the ring gear will show the condition of contact. The following 5 cases are possible in this tooth contact. As previously described, the correct tooth contact is when at no load, about 3/4 of the tooth surface on the drive pinion from the tooth end is contacting which under actual running conditions will allow the whole surface from the tooth end to be contacting.

a. Heel Contact

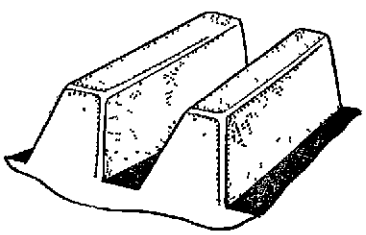
Under this condition, a heavy drive noise will eventually be caused. This contact as shown in the figure is when the contact on the tooth surface of the ring gear is small, that is, only the heel part of contacting (from the drive pinion side, the contact is too deep). This adjustment, as described in Article 4, is made by moving the ring gear towards the drive pinion to increase the contact length and then decreasing the number of shims on the drive pinion side to adjust the backlash between the gears.



Heel Contact

b. Toe Contact

The condition will eventually cause float noises to be produced This contact as shown in the figure is when the contact on the ring gear tooth surface is small, that is, only the heel part is contacting (from

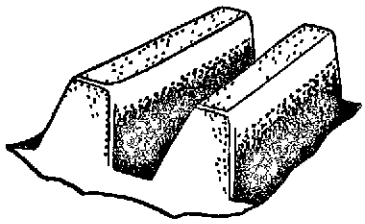


Toe Contact

the drive pinion side, the contact is too shallow). This adjustment, as described in Article 4, is made by moving the drive gear slightly away from the drive pinion to increase the contact length, and then increasing the number of shims on the drive pinion side to adjust the backlash between the gears.

c. Face Contact

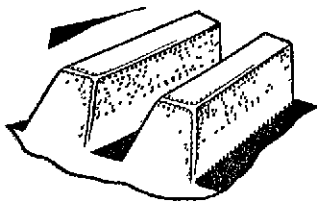
This contact as shown in the figure is when the contact on the ring gear tooth surface is too shallow, that is, only the face part is contacting, and in this case the backlash will be large. To adjust, the shims on the drive pinion side are increased to push the pinion so that the tooth contact will be down to the flank part. The ring gear is then moved away to adjust for backlash.



Face Contact

d. Flank Contact

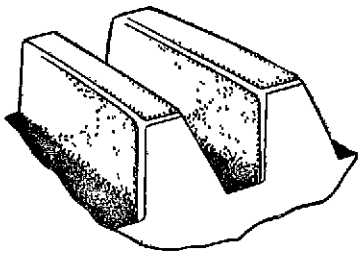
This contact as shown in the figure is when the contact on the ring gear tooth surface is too deep, that is, only the flank part is contacting and indicates the condition when both gears are meshing too close. This is adjusted by reducing the number of shims on the pinion side to lower the pinion and make the effective depth extend on the whole surface. The ring gear is then brought closer to adjust the backlash.



Flank Contact

e. Coast Contact

This contact as shown in the figure differs from the above 4 types of drive side contact in that it occurs on the coast side and the contact is mostly on the toe part. This condition usually causes coast noises. The adjustment in this case is made in similar manner to that described in Paragraph b.



Coast Contact

—NOTE—

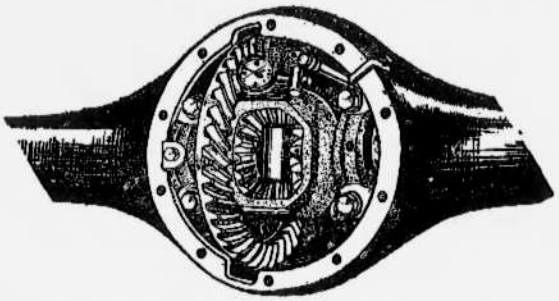
The above adjustment procedures (a) to (d) describes only one method of adjustment. Since the positions of both gears are relative to each other, the adjustment can be made in the reverse order or by moving just one gear in some cases. This latter method should be avoided whenever possible and the adjustment made by dividing the amount of adjustment into two parts and moving both gears. If even the procedure is slightly reversed, it is important that the correct clearance be taken and the tooth contact be made proper.

4. Adjusting Ring Gear in Axial Direction

When moving the ring gear toward or away from the drive pinion for adjusting the mesh between the gears and adjusting backlash, this shifting is made

through the left and right differential adjusting nuts on the outer side of the side bearings in the same manner described in Article 1.

To adjust, first unloosen the differential carrier cap and the adjusting nut lock on this cap holding the side bearing and using Differential Adjusting Nut Wrench (SST—2033), move nuts on both sides in axial direction. To shift drive gear to drive pinion side, unloosen nut on the right side, as seen from the rear of the vehicle, by a small amount and tighten the nut on the left side by a corresponding amount. Check gear contact and backlash and if the ring gear is found not shifted enough, repeat the operation. If shifted too much or if it is necessary to move the ring gear away from the drive pinion because of tight gear mesh, the above operation is reversed, that is, the left side nut is loosened and the right side nut tightened by the same amount. When the adjustment has been properly completed, the carrier cap if first tightened, the nut lock fastened on and lock bolt secured to prevent the adjusting nut from loosening.



Measuring Backlash with Dial Gauge

The amount of loosening and tightening of the left and right nuts should always be by the same amount. Special care should be taken on this point since it will throw out the adjustment made on the side bearings in Article 1. The amount which the nuts are loosened or tightened can be determined by the distance which the 16 adjusting holes provided on the circumference of the nut is moved.

5. Adjusting Drive Pinion Bearing

To adjust, tighten drive pinion nut fully with drive pinion wrench and unloosen about 3/4 turn. Then check by turning with hand and make final adjustments. When completed, be sure to lock the nut with cotter pin.

The tightness of these bearings are adjusted through the drive pinion spacer adjusting shims between the drive pinion spacer and the drive pinion front bearing.

These adjusting shims are available in the following sizes.

Size	Thickness	Part No.
No. 1	0.03 mm	BJ 41217
No. 2	0.10 mm	BJ 41218
No. 3	0.228 mm	BJ 41219
No. 4	0.450 mm	BJ 41223

Adjustment Dimensions of Differential

Adjustment part	Inch	mm
Backlash between Ring Gear and Pinion	0.010	0.250

	in	mm.
Clearance between Rear Axle and Spacer	0.004	0.102
Runout in Ring Gear and Diff. Case	0.004	0.102
Amount Shifted per One Hole Movement of Adjusting Nut.....	0.005	0.127

MAINTENANCE INSTRUCTIONS

1. The oil capacity of the differential case is 2.2 liters for front axle, and 1.8 liters for rear axle this being the amount of oil when it is up to the filler plug with the vehicle in level position. The oil should be checked every 5,000 kms and replenished if found low.

2. After every 15,000 kms, replace with new gear oil (SAE No. 140).

3. When operating the vehicle, absolutely avoid overloading and except for emergencies, never make sudden stops or sudden starting.

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