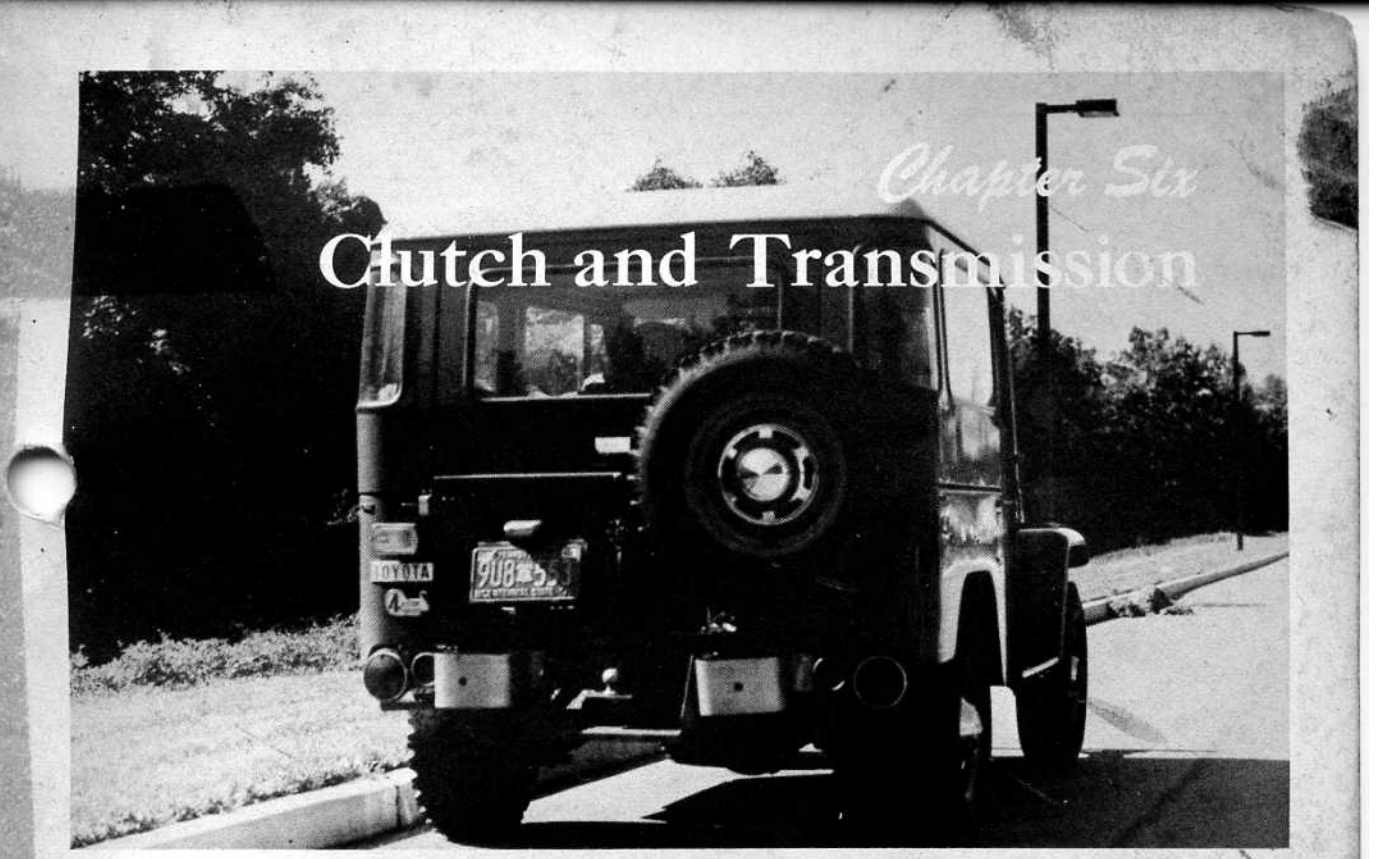


Chapter Six

Clutch and Transmission

Manual Transmission

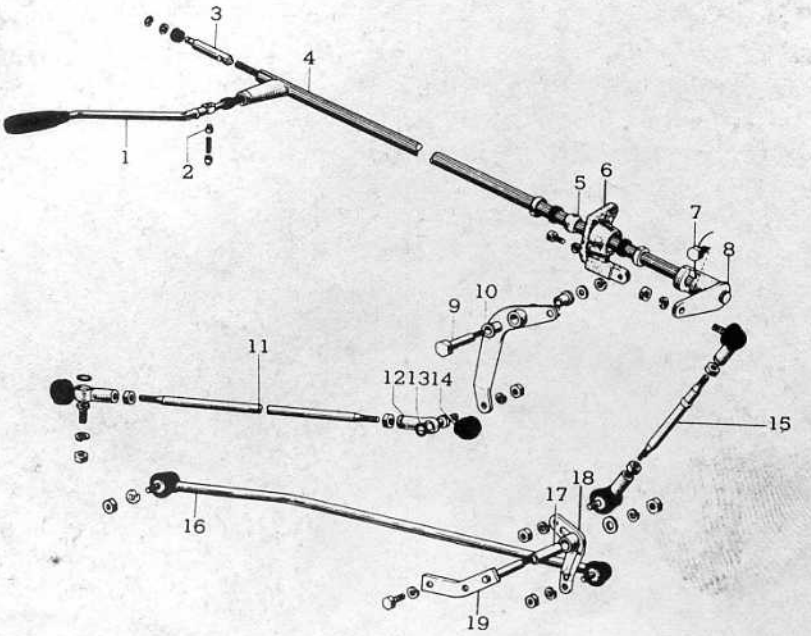
Linkage Adjustment

COLUMN SHIFT

1. Disconnect the two adjustable length shift rods at their adjustable ends.
2. Place the transmission shift levers in the Neutral position together with the column mounted shifter.
3. Adjust the length of the adjustable shift rods so that they can be connected without moving the column-mounted shifter or the transmission shift levers.
4. Road-test the vehicle to make sure that the linkage operates smoothly.

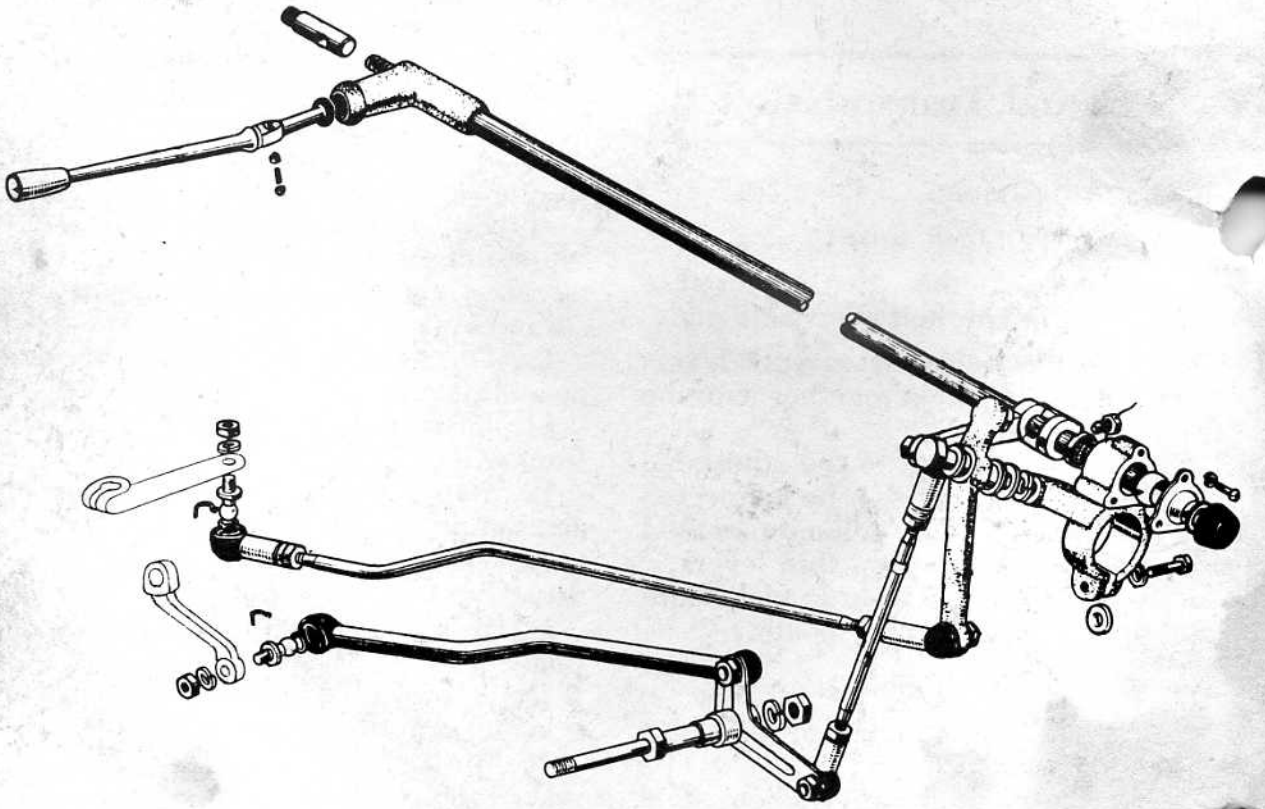
Removal and Installation

1. Jack up the vehicle and support it with jackstands.
2. Remove the transmission skid plate.
3. Drain the transmission and transfer case lubricant.
4. On the FJ 40 models only:
   a. Remove the passenger seat.
   b. Remove the fuel tank.
5. Remove the transmission cover (floor plate).
6. Disconnect the parking brake cable from the end of the parking brake lever.
7. Disconnect the speedometer cable from the transmission.
8. On vacuum-operated transfer cases, disconnect the vacuum hoses from the transfer case.
9. On models equipped with a column shift, remove the rod pins and cotter pins, and disconnect the intermediate rods.
10. Disconnect the High and Low gear shift rods from the transmission.
11. Disconnect the wires from the front wheel drive indicator switch.
12. Raise the transmission slightly and support it with a jack.
13. Disconnect both front and rear driveshafts from the transfer case.
14. Remove the clutch housing skid plate.
15. Remove the bolts which attach the transmission to the clutch housing.
16. Slide the transmission toward the rear of the vehicle so that the input shaft clears the clutch housing.
17. Remove the transmission and transfer case assembly from under the vehicle with the parking brake assembly attached.
18. Install in the reverse order of removal, tightening the transmission mounting bolts to 55 ft lbs. Refill the transmission and transfer case with lubricant and check the operation of the clutch and shift linkage.



1. Shift lever
2. Shift lever pin
3. Control shaft upper shaft
4. Control shaft
5. Control shaft lower bushing
6. Control shaft lower bracket
7. Shift fork lockbolt
8. Control shift lever
9. Control select lever shaft
10. Bushing
11. Gear selecting rod
12. Connecting rod end
13. Hole snap-ring
14. Dust seal
15. Gear shifting rod No. 1
16. Gear shifting rod No. 3
17. Bushing
18. Shifting bellcrank
19. Shift link lever support

Column-mounted shifter linkage for the FJ 55 models



Column-mounted shifter linkage for the FJ 40 and 45 models

Clutch

The clutch installed in the Land Cruiser is a hydraulically-operated, coil pressure-spring, dry disc type.

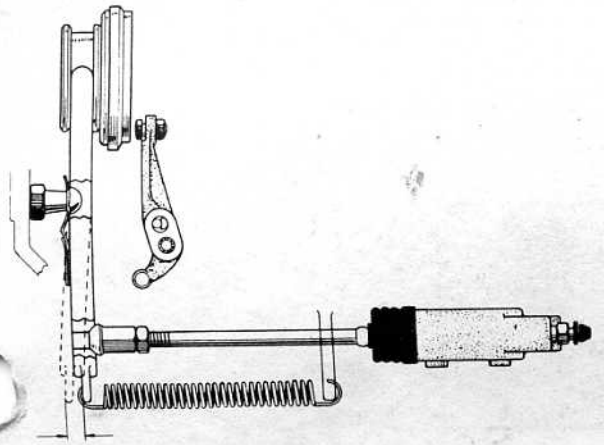
The clutch is operated by a pedal which is mechanically connected to a clutch master cylinder. When the pedal is depressed, the piston in the master cylinder is moved in the master cylinder bore. This movement compresses the fluid in the master cylinder creating hydraulic pressure which is transferred through a tube to the slave cylinder. The

slave cylinder is mounted to the clutch housing with its piston connected to the clutch release lever. The hydraulic pressure in the slave cylinder forces the slave cylinder piston to travel out of the cylinder bore and move the clutch release lever, disengaging the clutch.

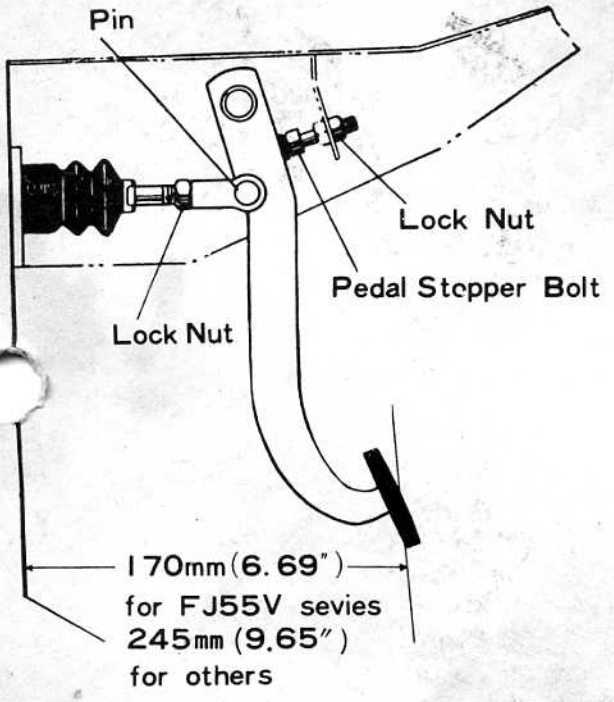
Pedal Height and Free-Play Adjustment

The clutch pedal height adjustment should be made whenever the clutch does not engage or disengage properly or the clutch has been replaced.

1. Make sure that there is about 0.12 in. (0.21 in. on FJ 55) of play at the end of the clutch release fork between the slave cylinder piston and the fork. An adjusting nut and locknut on the end of the slave cylinder pushrod are provided for making the adjustment.



Clearance adjustment between the slave cylinder pushrod and the clutch fork



Clutch pedal height adjustment

2. Adjust the pedal stopper bolt so that the pedal-to-toe board clearance is 9.6 in. (6.7 in. on FJ 55). Make this adjustment with the pushrod pin removed and the return spring installed.

3. Adjust the master cylinder piston rod length by turning the adjusting nut. Adjust the length so that, with the master cylinder piston rod in the fully released position, the pushrod pin can be inserted through the piston rod clevis easily and without moving the pushrod.

Removal and Installation

1. Remove the transmission and transfer case.

2. Loosen the clutch fork spring and remove the hole cover set plate and the hole cover.

3. Remove the clutch release fork.

4. Remove the clutch release bearing assembly.

5. Punch two matchmarks on the flywheel, clutch cover, and pressure plate and remove the six bolts attaching the clutch pressure plate assembly to the flywheel. Loosen the bolts alternately, a few turns at a time, to avoid distorting the cover and pressure plate assembly.

6. Remove the pressure plate assembly and the disc from the flywheel. Be careful that the disc doesn't fall out from behind the pressure plate unexpectedly, causing injury.

7. Install the clutch in the reverse order of removal, taking note of the following:

8. Be sure to align the matchmarks on the clutch cover, pressure plate and the flywheel, installing the clutch assembly in the exact position from which it was removed.

9. Center the clutch disc by using a clutch pilot tool or a discarded transmission input shaft. Position the tool into the end of the input shaft front bearing and bolt the clutch to the flywheel.

NOTE: *Bolt the clutch assembly to the flywheel by tightening the attaching bolts two or three turns at a time in an alternating pattern to*

avoid bending or distorting the cover or pressure plate. Tighten the attaching bolts to 11–16 ft lbs.

10. Apply a light coating of multipurpose grease to the release bearing hub and release fork contact points. Also, pack the groove inside the clutch hub with grease.

NOTE: *Never clean the bearing in any type of solvent. Clean by wiping the outside of the bearing with a cloth.*

11. Adjust the clutch pedal height and the release for free-play.

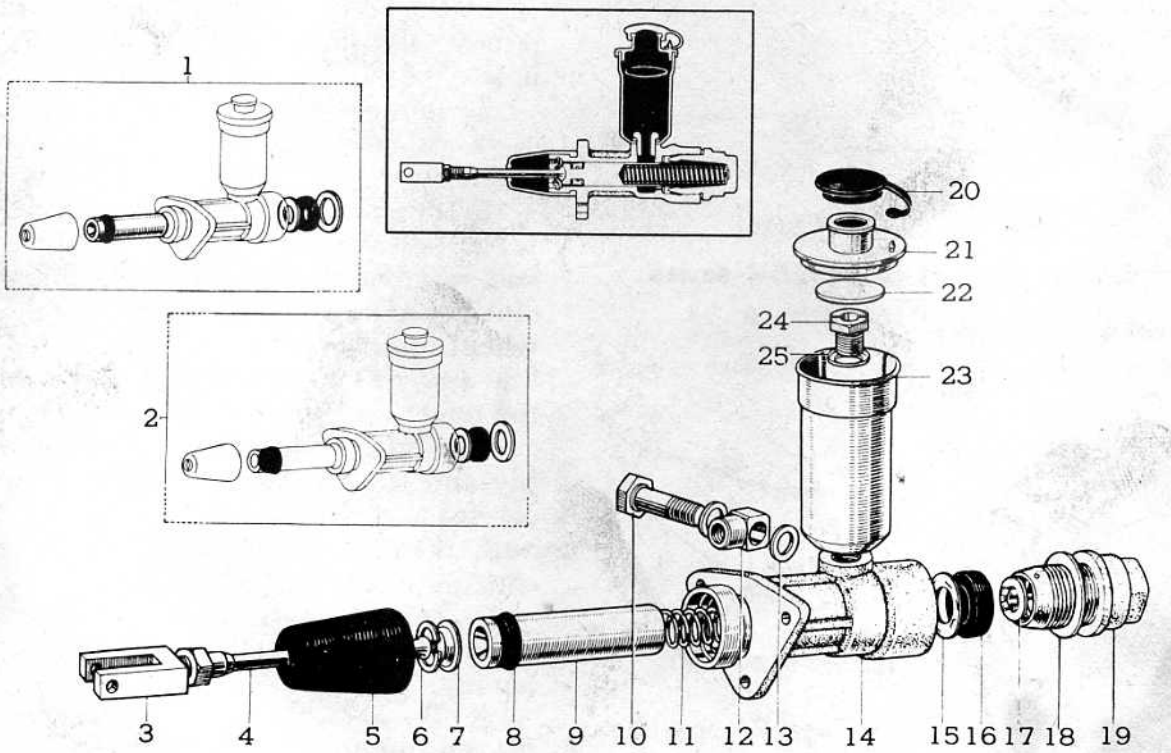
CLUTCH MASTER CYLINDER

Removal and Installation

1. Plug the air vent of the master cylinder reservoir.
2. Disconnect the fluid line from the master cylinder.
3. Remove the clutch pedal return spring.
4. Remove the master cylinder pushrod pin from the clevis attaching the pushrod to the clutch pedal.
5. Remove the three attaching bolts securing the master cylinder to the dashboard and remove the master cylinder assembly from the vehicle.
6. Install the master cylinder in the reverse order of removal and bleed the hydraulic system.

Overhaul

1. With the master cylinder removed from the vehicle, remove the reservoir cap and pour out any remaining fluid.
2. Loosen the reservoir set bolt and remove the reservoir.



Exploded view of the clutch master cylinder

1. Clutch master cylinder kit
2. Clutch master cylinder piston cup kit
3. Pushrod clevis
4. Pushrod
5. Master cylinder boot
6. Hole snap-ring
7. Piston stop plate
8. Cylinder cup
9. Master cylinder piston
10. Union bolt
11. Piston return spring
12. Union
13. Gasket
14. Master cylinder body
15. Piston cup spacer
16. Cylinder cup
17. Spring seat
18. Gasket
19. Master cylinder cap
20. Reservoir filler cap
21. Reservoir cap
22. Float
23. Master cylinder reservoir
24. Reservoir set bolt
25. Set-bolt washer

3. Remove the master cylinder boot from the cylinder and remove the piston rod.

4. Remove the piston stop ring and piston stop and remove the piston from the cylinder bore.

5. Remove the master cylinder plug and gasket from the opposite end of the cylinder bore.

6. Remove the return spring and piston cup.

7. Remove the piston packing.

8. Clean all of the parts in alcohol and inspect for damage and/or wear.

9. Check the master cylinder bore for scored or worn areas and replace as necessary. The cylinder bore can be cleaned up with crocus cloth bathed in brake fluid. This will remove minor scratches and glaze from the cylinder bore.

10. Check the piston-to-bore clearance. The clearance should be between 0.0016–0.0050 in. Replace the piston if the clearance exceeds 0.0059 in.

11. Discard all rubber parts.

12. Assemble all of the new rubber parts to their respective components.

13. Soak all of the parts in clean brake fluid before reassembling.

14. Insert the piston secondary cup into the piston.

15. Install the piston primary cup, return spring seat and return spring into the cylinder. Then, install the master cylinder packing and plug.

16. Install the master cylinder piston rod and attach the boot to the cylinder.

17. Install the reservoir to the master cylinder.

18. Install the master cylinder to the vehicle and bleed the hydraulic system.

CLUTCH SLAVE CYLINDER

Removal and Installation

1. Plug the air vent of the master cylinder filler cap.

2. Raise the front of the vehicle and support it securely with jackstands.

3. Disconnect the fluid hose from the slave cylinder.

4. Disconnect the clutch release fork return spring.

5. Remove the slave cylinder by removing the attaching bolts from the clutch housing.

6. Install the slave cylinder in the reverse order of removal and adjust the clutch release fork free-play. Bleed the hydraulic system.

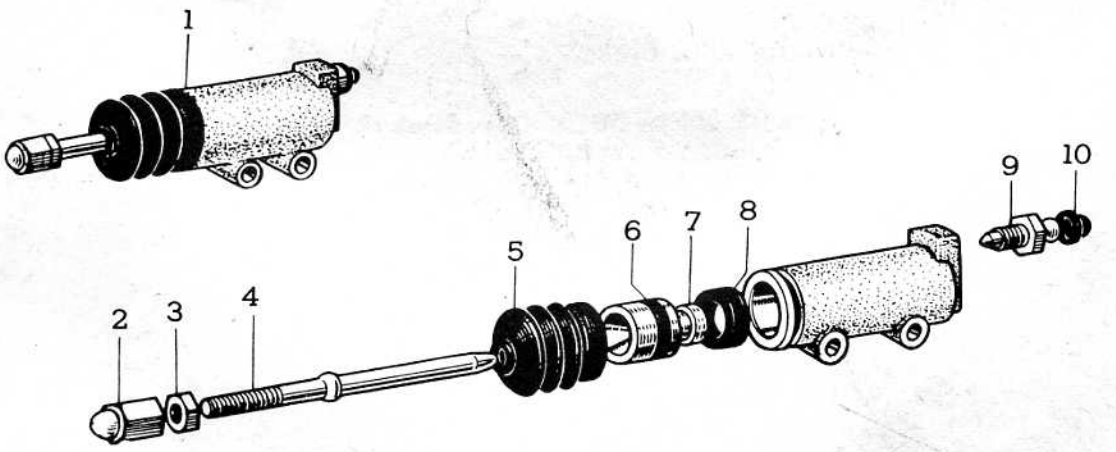
Overhaul

1. Remove the clutch slave cylinder from the clutch housing.

2. Remove the boot.

3. Remove the piston rod.

4. Remove the piston and the piston cup.



Exploded view of the clutch slave cylinder

1. Clutch release cylinder assembly
2. Pushrod No. 2
3. Locknut
4. Pushrod No. 1
5. Boot
6. Cylinder cup
7. Piston
8. Cylinder cup
9. Bleeder plug
10. Plug cap

5. Clean all the parts in alcohol or brake fluid.

6. Check the inside of the cylinder bore for wear or damage. Light scratches or glaze can be removed with crocus cloth bathed in brake fluid. If the cylinder bore is deeply scored or badly worn, replace the slave cylinder.

7. Measure the outer diameter of the piston and replace it with a new one if the diameter is less than 0.87 in.

8. Soak all of the parts in brake fluid and assemble and install the slave cylinder in the reverse order of removal.

9. Bleed the hydraulic system.

Bleeding the Clutch Hydraulic System

1. Fill the master cylinder reservoir with brake fluid.

2. Fit a length of rubber tubing over the bleeder plug on the slave cylinder and place the other end into a clean jar half filled with brake fluid.

3. Have an assistant depress the clutch pedal, loosen the bleeder plug slightly, and allow the fluid to flow into the jar.

4. Tighten the bleeder plug and then release the clutch pedal.

5. Repeat Steps 3 and 4 until no air bubbles are expelled into the jar of brake fluid.

6. When the bubbles cease to appear, tighten the bleeder plug while keeping the clutch pedal fully depressed. Replace the bleeder plug cap.

7. Fill the master cylinder with brake fluid.

8. Operate the clutch and check for leaks.

Transfer Case

Shifter Adjustment

The transfer case shift linkage is adjusted by adjusting the length of the High/Low range intermediate rod and the bellcrank-to-transfer case shift rod.

1. Disconnect the shift rods at the High/Low range shift link lever and bellcrank.

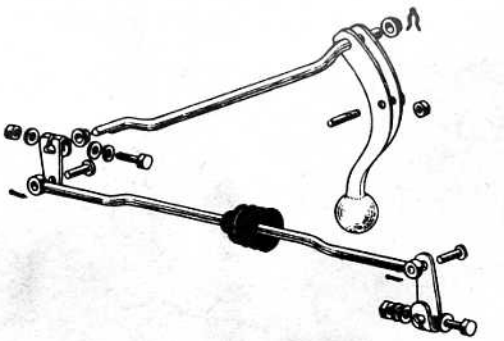
2. Push the High/Low range shift lever under the dash into the High (H) position. Set the outer shift lever on the transfer case in the High (H) position also.

3. Adjust the length of the High/Low range intermediate rod and bellcrank-to-transfer case shift rod by turning the rod ends until they connect easily and without moving the shift levers.

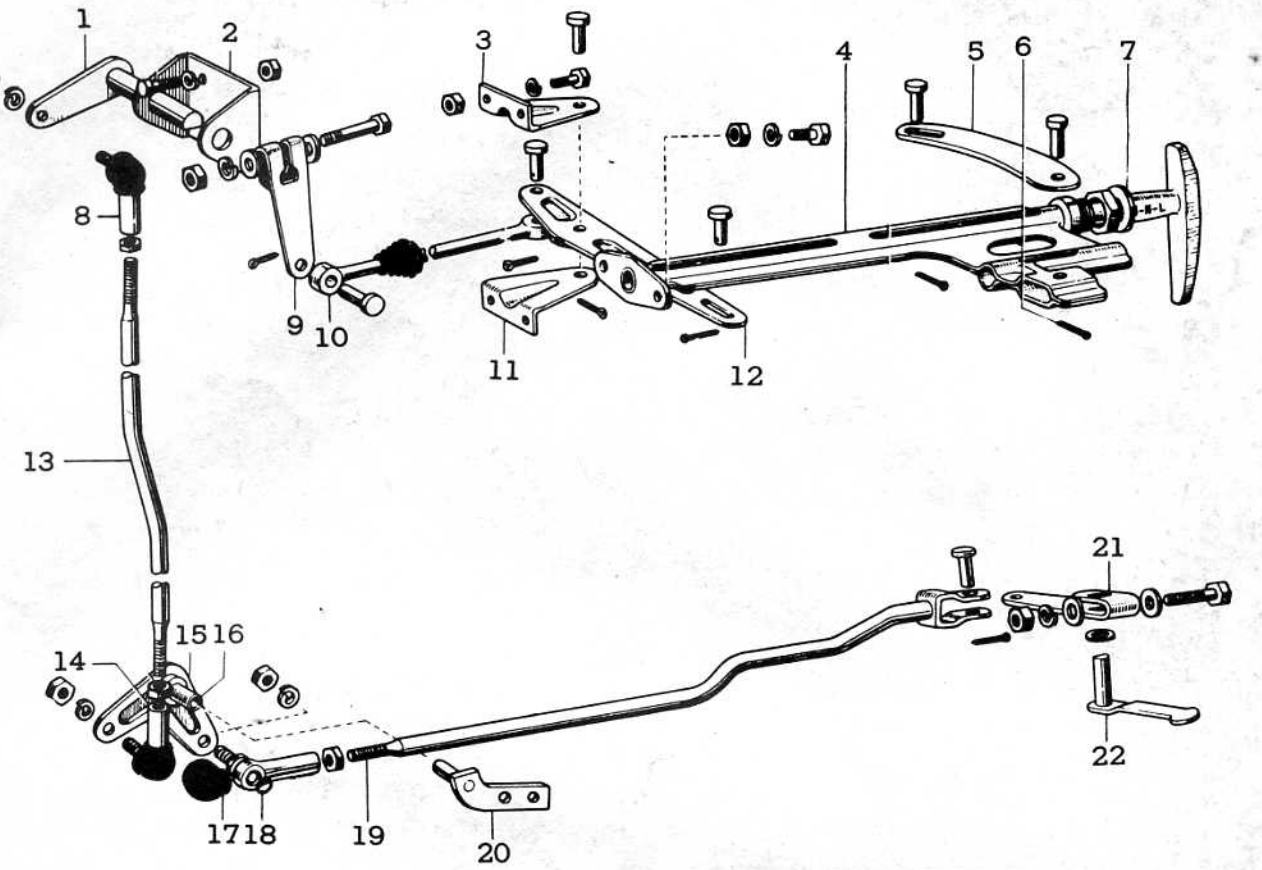
4. After connecting the rods, move the transfer case shift linkage through the ranges to make sure of proper operation.

Removal and Installation.

See "Transmission Removal and Installation"



The transfer case shift linkage for FJ 40 and 45 models



The transfer case shift linkage for the FJ 55 models

1. High and low shift link lever
2. Shift link bracket
3. Shift link bracket No. 1
4. Shift lever guide
5. Front drive guide lever No. 1
6. Cotter pin
7. Transfer high and low shift lever
8. Connecting rod end No. 1
9. Shift link lever No. 1
10. High and low shift rod No. 1
11. Shift link bracket No. 1
12. Front drive guide lever No. 2
13. High and low shift rod No. 2
14. Connecting rod end No. 2
15. Shifting bellcrank
16. Bellcrank bushing
17. Dust seal
18. Hole snap-ring
19. High and low shift rod No. 3
20. Link lever support
21. Transfer high and low shift lever
22. Shift inner lever