

# **SECTION**

# **S**

## **SERVICING THE TWO SPEED TRANSMISSION**

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## INTRODUCTION

This manual covers the service procedure for the "Hydra-Static Drive" transmission used on the Compact Model Tractors.

"Hydra-Static Drive" is a hydraulically powered, two-speed transmission. Hydraulic power is developed by a hydraulic pump, which is driven by the tractor's air-cooled engine. A directional control valve directs oil from this engine - driven pump to the orbital motor. The motor shaft is coupled to the transmission input shaft, thereby transmitting hydraulic power to the transmission. The splined input shaft transmits its power to the integral, spur gear type differential, through a selectively engaged

gear cluster. The differential, in turn, transmits this power to the rear axles through four pinion gears. The specially hardened, broad-faced, heavy duty gears are all housed in the rugged, top-access transmission case. Oil from the drive motor is returned to the transmission case (reservoir).

The transmission oil system is cooled by a constant oil flow between the transmission case (reservoir) and a forward heat exchanger. An engine fan draws cool air through the exchanger.

Section A illustrates (in color) the hydraulic oil flows developed in these tractors.

**NOTE** On models equipped with disc brakes, refer to Supplement No. 1 to this section for brake service instructions.

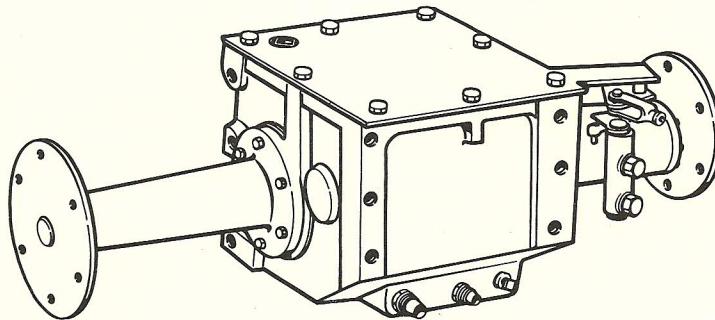


Figure S-1



# TRANSMISSION

## Removal

(Refer to Figure S-2 and S-3)

### Utility Transporter

1. Drain transmission oil.
2. Loosen lug bolts on rear wheels, raise and securely block up the tractor frame and remove the rear wheels.
3. Disconnect implement light wire (16) and brake light wires (1) and tag for reassembly.
4. Remove bolts (9), pull off shift lever knob and bushing (12), and lift off shifter indicator plate (11).
5. Remove cotter pin (10) and unscrew shift linkage (8) from yoke (3) and pull out.  
**NOTE** Shift linkage tension spring (15) will slide off as linkage is removed.
6. Remove cotter pin (19) from brake linkage (7) at brake control valve (4) and disconnect brake tension spring (15).
7. Remove securing bolts from frame, plat-

from, and transmission case and lift off fender and seat assembly.

8. Disconnect the brake control lines (5 and 6) from the brake control valve (4).

**NOTE** Cap all lines and openings to insure against entry of dirt or other foreign matter.

9. Disconnect transmission pump line (13) and heat exchanger line (14) at transmission case.

10. Place suitable supports under the transmission, remove bolts (17) and lift out the transmission.



The transmission assembly is heavy. Avoid injury by securing help when removing or installing the transmission.

### Compact Tractors

1. Drain transmission oil.
2. Loosen lug bolts on rear wheels, raise and securely block up the tractor frame and remove the rear wheels.
3. Remove the transmission cover plate bolts (1) and lift off the fender and seat assembly and cover gasket.
4. Remove cotter pin (6), tension spring (2) and disconnect brake linkage (7) from brake control valve (3).
5. Disconnect upper and lower brake control lines (4 and 5) from the brake control valve (3).

**NOTE** Cap all lines and openings to insure against entry of dirt or other foreign matter.

6. Disconnect transmission pump line (8) and heat exchanger line (9) from transmission.

7. Place suitable supports under the transmission, remove bolts (10), and lift out the transmission assembly.



The transmission assembly is heavy. Avoid injury by securing help when removing or installing the transmission.



# Utility Transporter

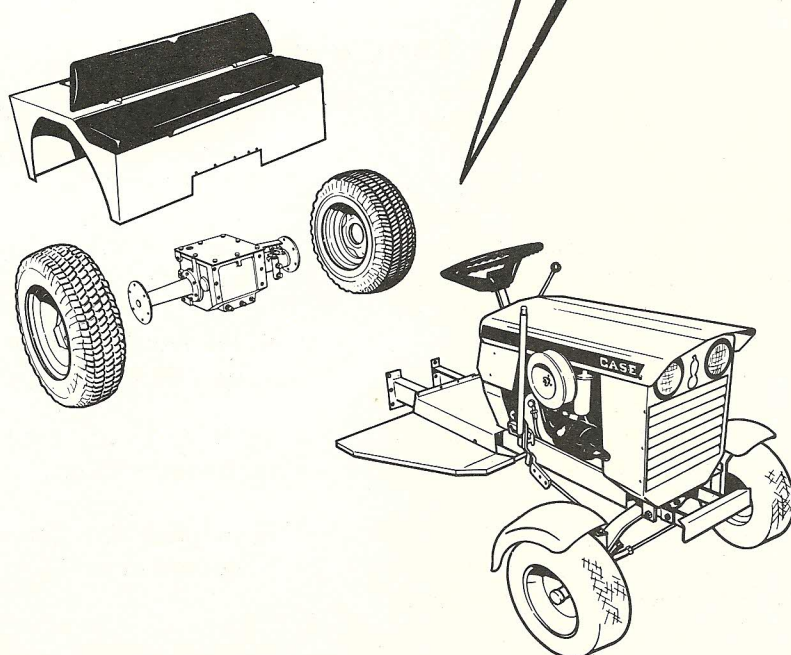
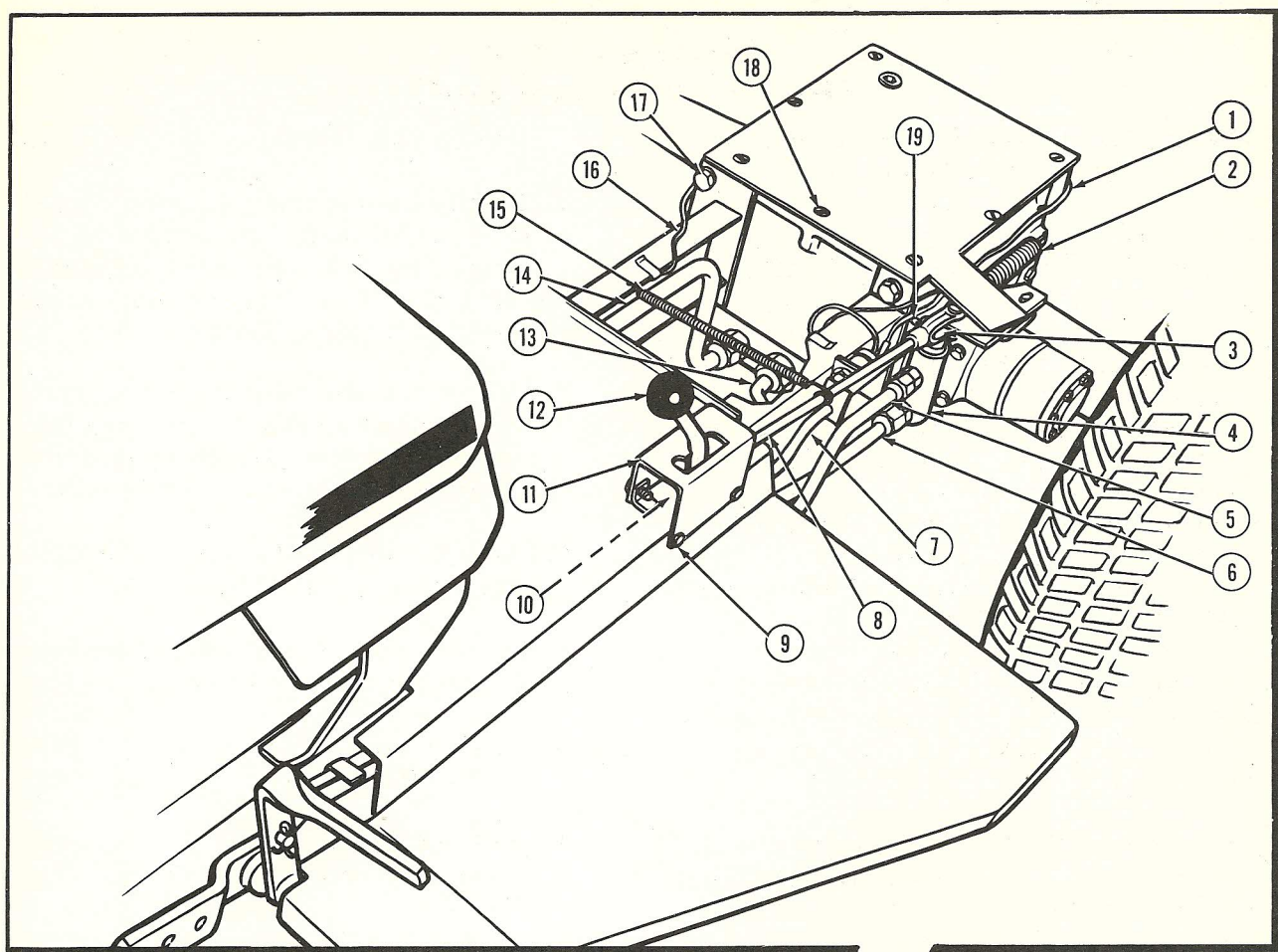


Figure S-2

Compact Tractor

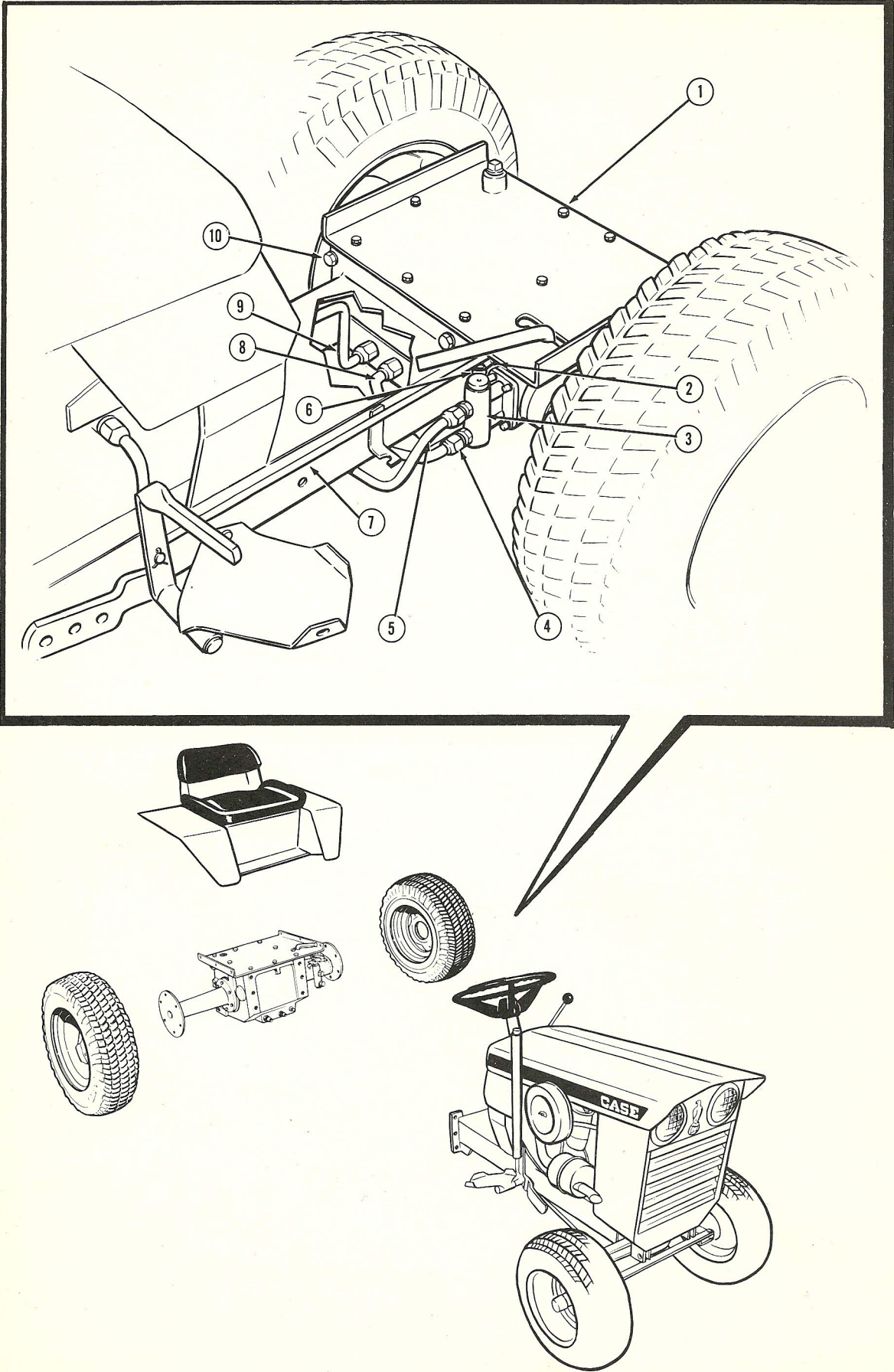


Figure S-3



# TRANSMISSION

## Disassembly (Refer to Figure S-4)

**NOTE** The following disassembly procedures apply to both the Utility Transporter and the Compact Tractor. Disassembly steps begin with the removal of the transmission cover plate although it is generally removed with the seat and fender assembly when the transmission is removed from the vehicle. The transmission cover plate used on the utility transporter differs slightly from that used on the compact tractors as stated in step one. The transmission may be equipped with a six tooth or twenty tooth input shaft. Differences are called out in steps 2, 5 and 6. Thoroughly clean the transmission before disassembly.

1. Remove transmission cover plate screws (2), shifter bracket securing nut (utility transporter only), cover plate and gasket (3).
2. Remove roll pins (5), shifting rod (4) and shifter fork (9). Press out nylon bushing (8) (20 tooth input shaft only).
3. Remove orbital motor attaching bolts, orbital motor, gasket and input shaft coupling (18).
4. Remove snap ring (17) and coupling re-

taining ring (16).

5. Lightly tap the inner bearing race (31) off of the input shaft (14); remove the wire retainer ring (13) (six tooth input shaft only). input shaft (14) and gear cluster (10) from the transmission housing.
6. Lightly tap the middle bearing race (11) off the input shaft (14). Remove the wire retainer ring (15) (6 tooth input shaft only). If necessary, remove bearing (12).
7. Remove roll pins (26 and 28) and pull out rear axles (25 and 27).
8. Remove bolts (22 and 33), axle housings (21 and 36) and gaskets (24 and 35).
9. Remove seals (19 and 29) and bushings (20-23-30-34).
10. Lift out the differential housing assembly (38) and remove transmission washers (37).
11. Remove cotter pins (45), roll pins (43), pinion shafts (44), pinion gears (40), spacers (42), and differential gears (41) from the differential housing (38).

## Inspection

1. Thoroughly clean and wipe dry all parts before inspection.
2. Inspect all gears and shafts for burrs, nicks or excessive wear, both to the teeth and to the splines. Light burrs and nicks may be removed with a hone or crocus cloth.
3. Inspect bearings for worn or pitted rollers. There should be no pits or other visible damage. If damaged, replace with new parts.
4. Inspect differential gear housing for cracks, burrs or nicks. Examine gear

teeth for excessive wear. Light burrs and nicks may be removed with a hone or crocus cloth.

5. Inspect axle housings and hubs for cracks and stripped or damaged threads.
6. Inspect bushings for score marks, nicks, or other damage and replace if necessary.
7. Replace oil seals each time the unit is disassembled.
8. Inspect the filter screen and replace if necessary.



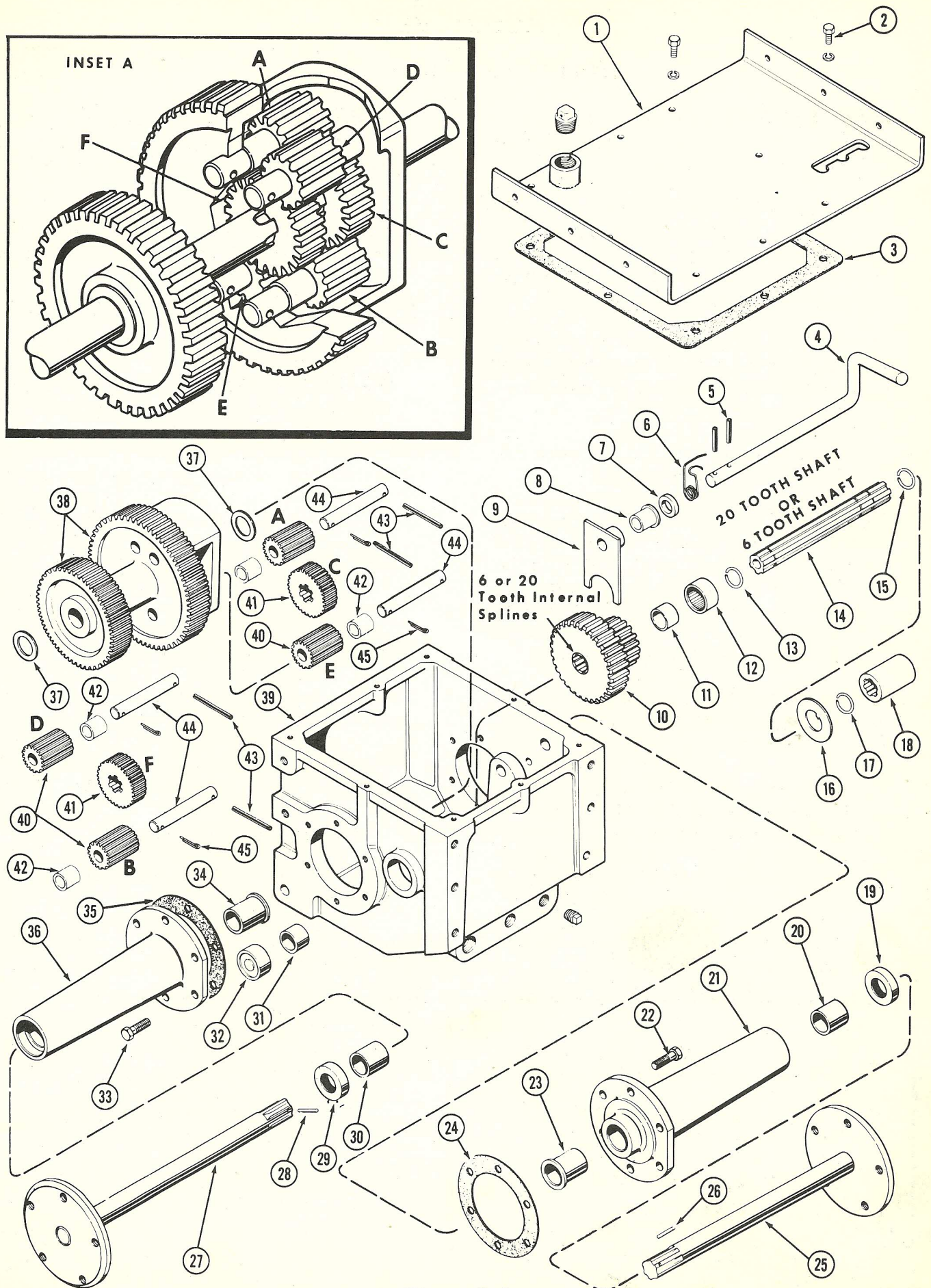


Figure S-4



# TRANSMISSION

## ASSEMBLY

(Refer to Figure S-5)

**IMPORTANT** All bolts should have Permatex applied before installation. Torque all bolts to specifications.

1. Install pinion gears (40), spacers (42), differential gears (41), and pinion shafts (44), into the differential gear housing (38) (See inset A). Secure the pinion shafts (44) with locking pins (43) and cotter pins (45).
2. Position the differential assembly (inset A) with the gear side to the right side of the transmission case and set the transmission washers (37) in place.

3. If the axle bushings (23 and 34) were removed, press in new bushings.

**IMPORTANT** Press the flange bushing (23 & 34) in until seated and the straight bushing (20 & 30) in until flush with the housing. Bushings must be reamed after assembly to 1.001" - 1.002" inside diameter. Install oil seals (19 & 29) lip side first. Refer to Insets B and C below.

4. Using new gaskets (24 and 35), position the axle housings (21 and 36) and secure with bolts (22 and 33).
5. Install the axle shafts (25 and 27) thru the axle housings (21 and 36) and into the differential assembly, being sure that transmission washers (37) are in place. Secure the axle shafts with locking pins (26 and 28).
6. Place the input shaft end bearing (32) into the transmission case until it is flush to the surface of the case.

**IMPORTANT** Use caution when installing the axles to insure a good oil seal. The lips on seals (19 and 29) must not be nicked or "rolled" in any way.

7. Press the input shaft middle bearing (12) in until flush with the inner wall.

8. If equipped with 6 tooth input shaft. Install wire retaining ring (15), inner race (11) and place input shaft in the transmission.

**NOTE** If the transmission is equipped with a twenty tooth input shaft, wire retaining rings (13 and 15) will be omitted.

9. Install the cluster gear (10), retaining ring (13) (6 tooth shaft only), inner race (31) and position the input shaft.

10. Install coupling retaining ring (16), snap ring (17) and coupling (18).

11. Position orbital motor and gasket and secure with ferry head capscrews.

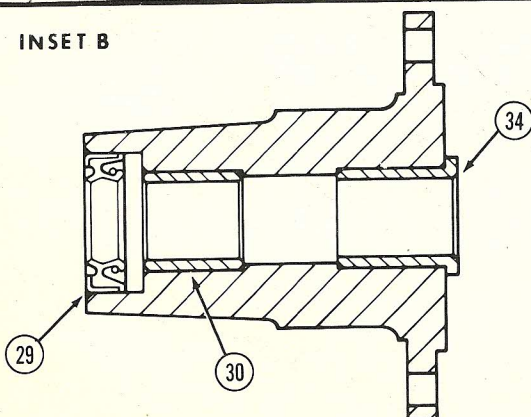
12. Install new shifter shaft oil seal (7) flush with the transmission case.

13. Slide the shifter shaft tension spring (6) onto the shaft, position the shaft in the transmission and install the shifter fork (9) and roll pins (5).

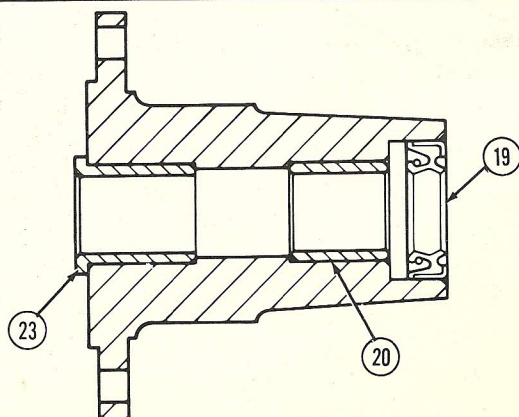
14. Position new cover gasket (3) cover (1) and secure with bolts (2).

15. Install shifter bracket securing nuts (utility transporter only).

INSET B



INSET C





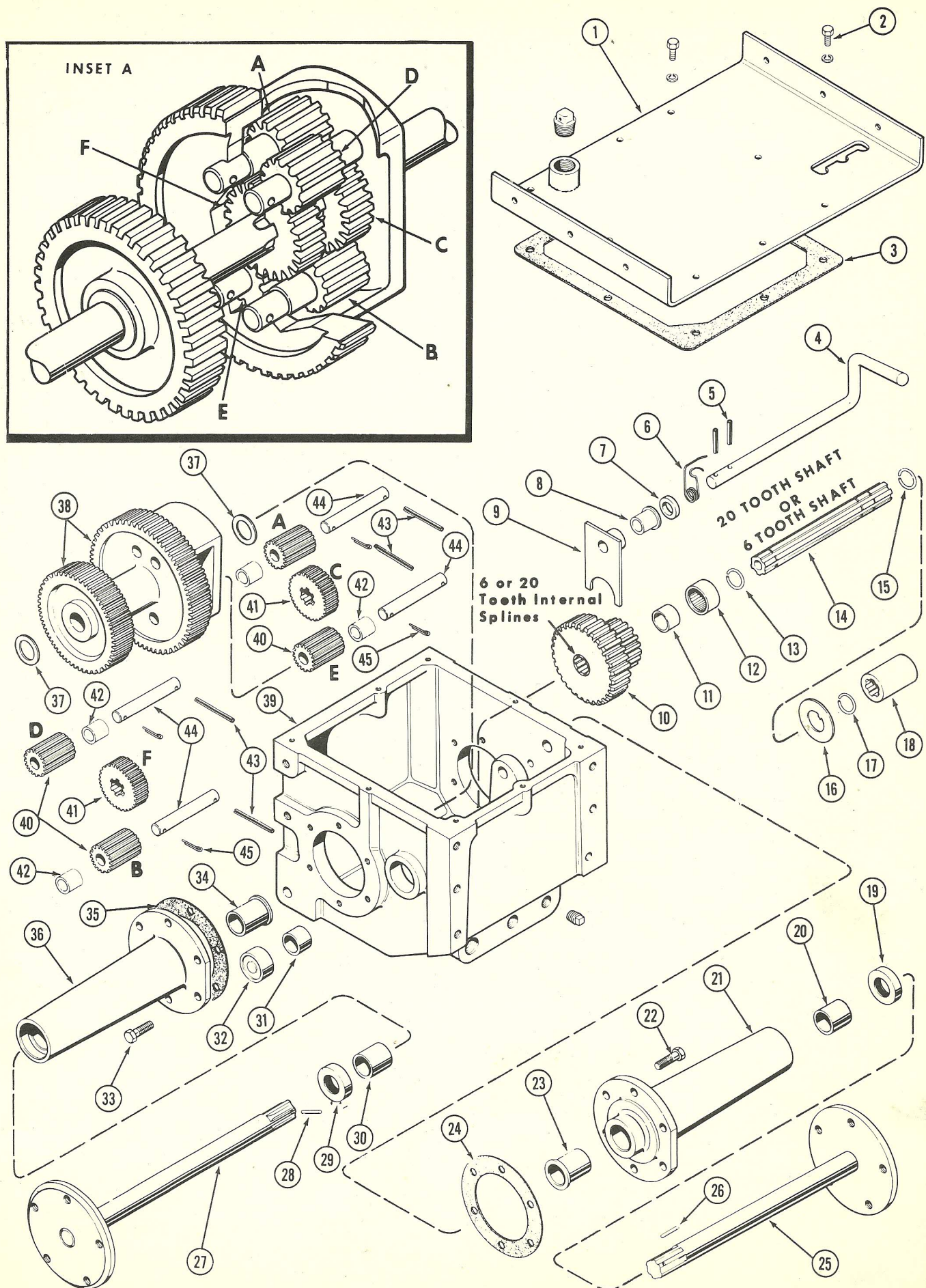


Figure S-5  
S-9



# **TRANSMISSION**

## **Installation**

**(Refer to Figure S-6 and S-7)**

### **Utility Transporter**

1. Position transmission to frame and install securing bolts and lockwashers (17).
2. Connect transmission pump line (14) and heat exchanger line (13) to transmission.
3. Connect lower brake control line (6) to brake control valve (4).
4. Position seat, fender assembly, cover plate and gasket and secure with attaching bolts.
5. Connect brake light wires (1) and implement light wire (16).
6. Slide shift lever linkage tension spring (15) onto linkage (8) and screw linkage into yoke (3). Install new cotter pin (10).
7. Position shift indicator plate (11), secure with bolts (9), and push on shift lever knob and bushing (12).
8. Position brake pedal linkage (7), attach brake tension spring (2) and install new cotter pin (19).
9. Connect upper brake control line (5) to brake control valve (4).
10. Install rear wheels and remove supports.
11. Fill transmission to one inch below cover, using SAE 5W20 Motor Oil for winter operation (below 32°F.) or SAE 20W40 Motor Oil for summer operation. Use only MS or DS Service Classification Oil that has passed AMA Test Sequences I, II, and III.

### **Compact Tractors**

1. Position transmission to frame and install bolts and lockwashers (10).
2. Connect transmission pump line (9) and heat exchanger line (8) to transmission.
3. Connect upper and lower brake control lines (5 and 4) to the brake control valve (3).
4. Position brake linkage (7) in brake control valve retainer eye, attach brake tension spring (2) and install new cotter pin (6).
5. Position new transmission cover plate gasket and install transmission cover plate and fender and seat assembly with bolts (1).
6. Install rear wheels and remove supports.
7. Fill transmission to one inch below cover plate using SAE 5W20 Motor Oil for winter operation (Below 32°F.) or SAE 20W40 Motor Oil for summer operation. Use only MS or DM Service Classification Oil that has passed AMA Test Sequences I, II and III.

# Utility Transporter

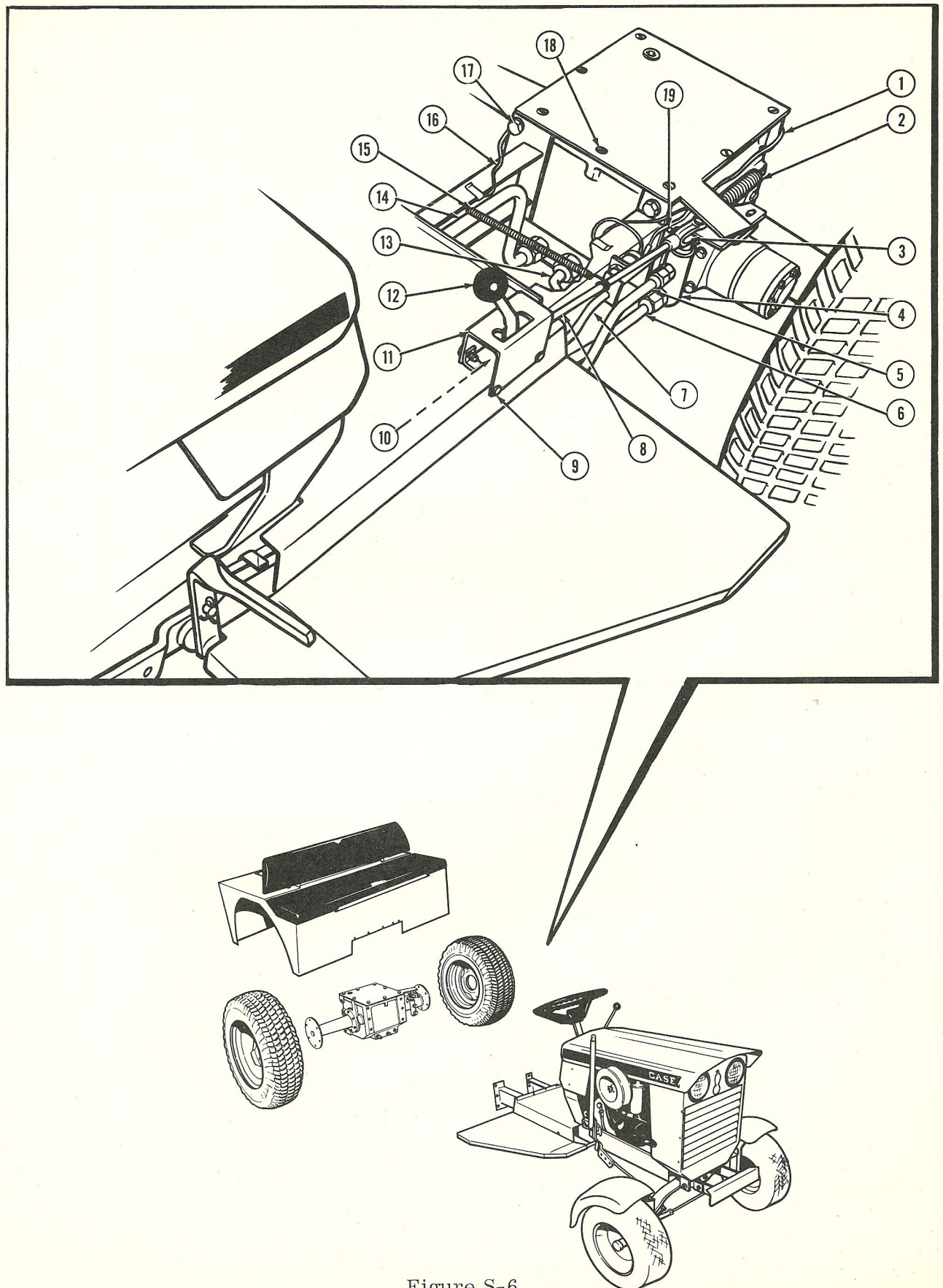


Figure S-6



## Compact Tractor

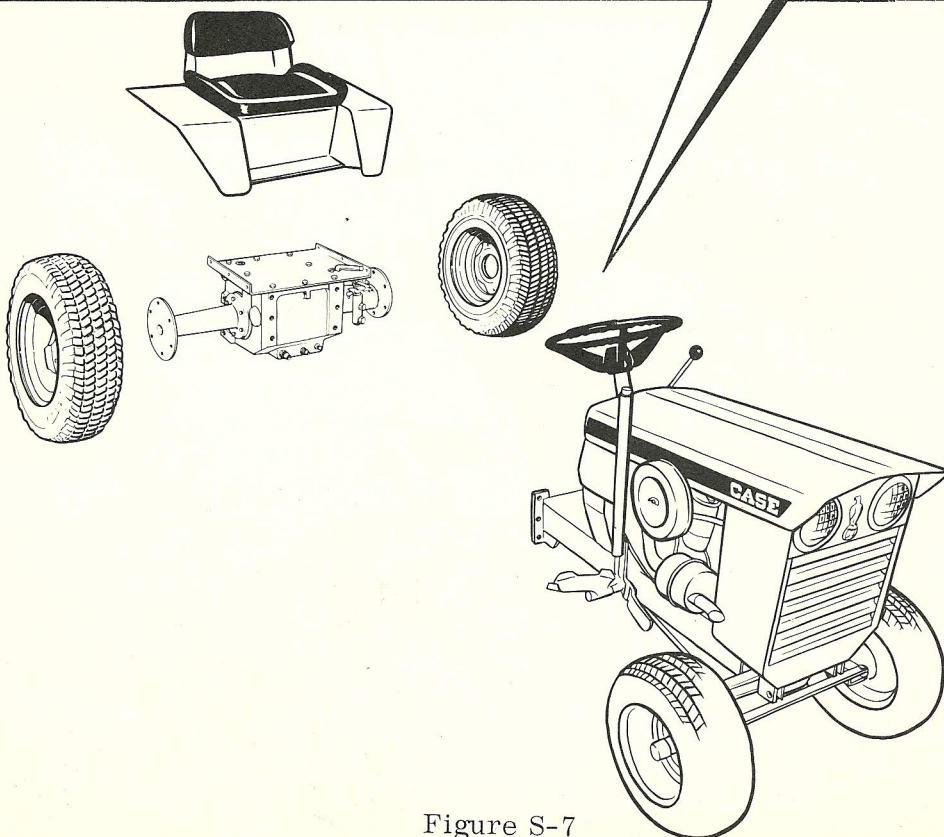
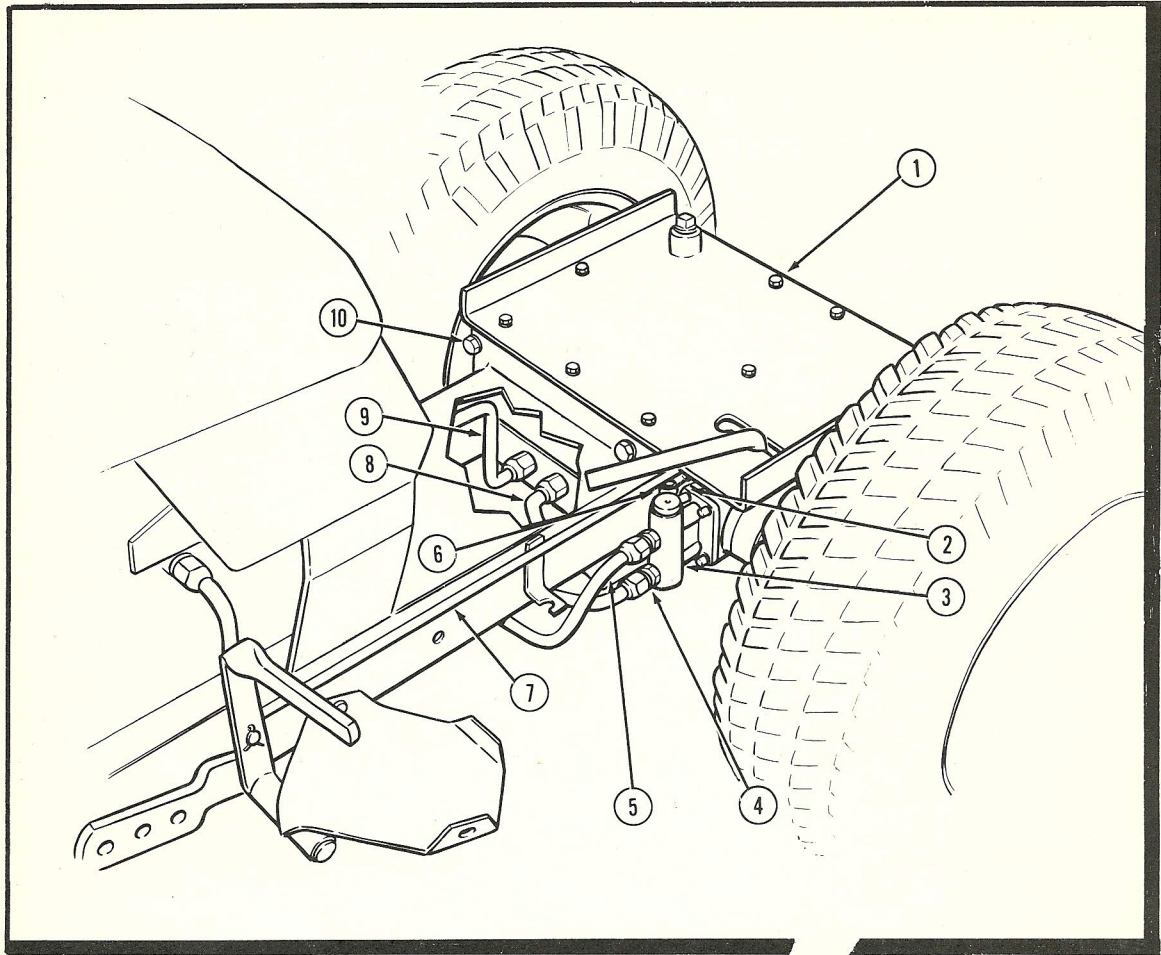


Figure S-7

**NOTE** The J. I. Case Company reserves the right to make improvements in design or changes in specifications at any time without incurring any obligation to install them on units previously sold.