TRACTOMOTIVE

FOREWORD

This Parts and Instruction Book contains all the necessary information for the ordering of repair parts for the TL-20D Tracto-Loader. It also contains the essential operating instructions which will enable the operator to accomplish what the unit has been designed to do and to gain the maximum in trouble-free operation and long life.

The Model TL-20D Tracto-Loader has two distinct features which greatly improve its operation and output. They are:

A. The HYDRAULIC TORQUE CONVERTER between the Engine and Transmission.

B. The FULL POWER SHIFT TRANSMISSION for selecting the speed range and reversing the direction of the unit without shifting gears. One lever controls all speeds – forward and reverse.

1. The Torque Converter provides a very flexible hydraulic connection between the engine and the transmission permitting a smooth, shockless flow of power. It prevents stalling of the engine when the unit is overloaded.
2. The advantages of hydraulic torque multiplication are further extended by the constant mesh planetary gearing in the transmission. This combination makes available an "infinite" number of speed ratios (within the design limits of the converter and transmission) with three forward and three reverse speed ranges.
3. The Torque Converter allows the machine to crowd forward into the pile at the same time the bucket is tipping back and raising, without lugging the engine down. This eliminates slipping the clutch to load the bucket. If the bucket starts to "stall out," slight pressure on the brake pedal will hydraulically release the range clutch which in turn, stops the machine crowding into the pile. When the bucket starts to raise, release the brake pedal.

   Note: A control lever is provided for disengaging this automatic clutch release feature if operating conditions make it undesirable. For positions and location, refer to page 6.

4. The single lever control of the full-power-shift transmission allows the operator to change from any forward speed to any reverse speed at any time by using only one lever.

The practice of going to your Allis-Chalmers Dealer for all repair parts and repair work, other than routine care and adjustments, is encouraged, as the dealers will be kept informed by the factory regarding repair parts and advanced methods of servicing Tractomotive products.

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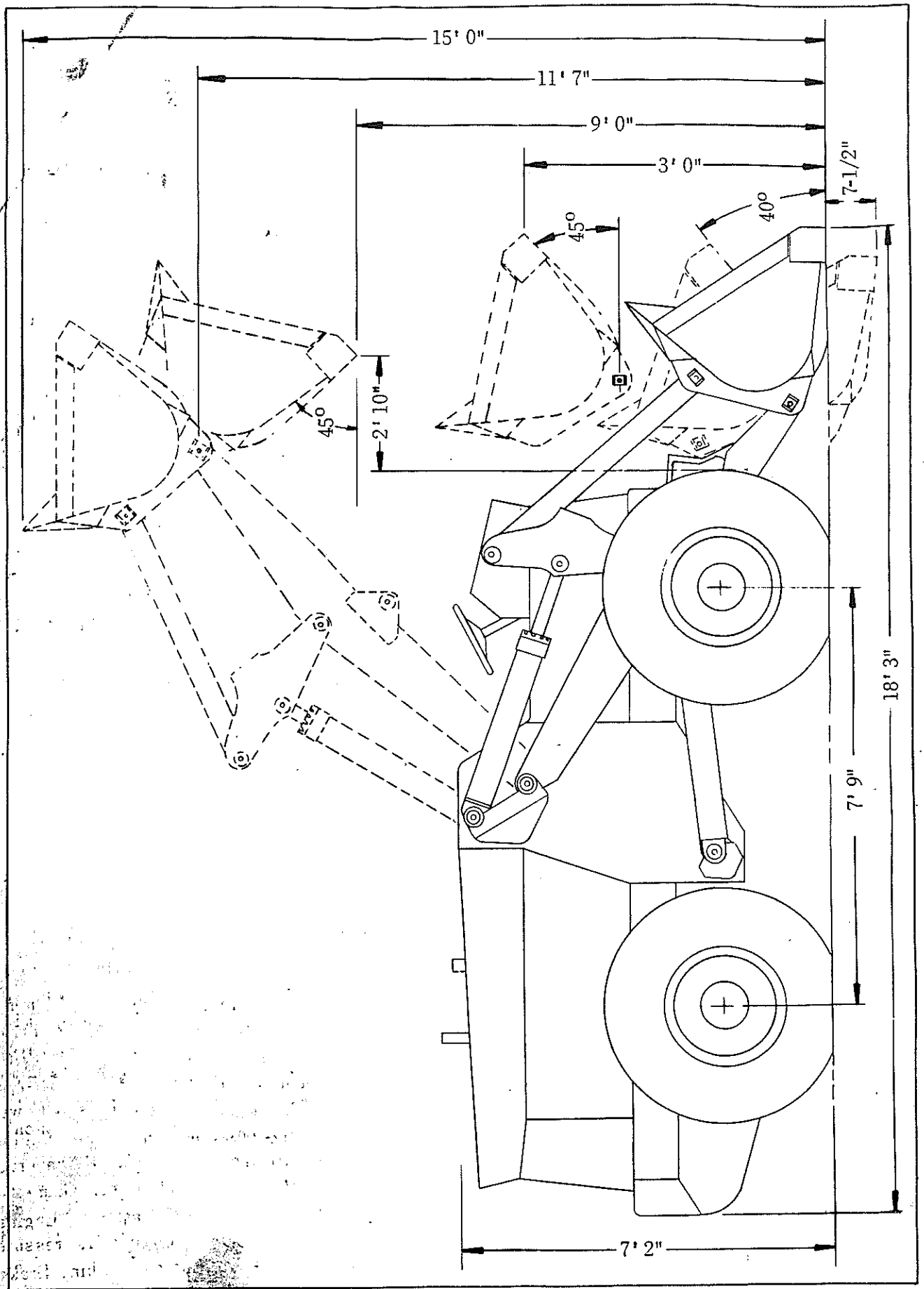


TL-20D DIMENSIONS CHART

TRACTOMOTIVE

SPECIFICATIONS

ENGINE:

Make and Model - Allis-Chalmers	4DI-344
Number of Cylinders	4
Brake Horsepower at governed RPM Without accessories	100
Fuel	Diesel
Bore and Stroke	4-7/16" x 5-9/16"
Firing Order	1–3–4–2
Piston Displacement	344 Cu. In.
Rated RPM (governed at full load)	2000
Air Cleaner	Oil Bath
Lube Oil Filter	Full Flow
Electrical System	24 Volt

WEIGHT:

Front Wheels	10,550
Rear Wheels	11,550
Shipping weight (approx.)	22,100

SPEEDS:

Forward	
1st (Low)	0–3.5
2nd (Intermediate)	0–9.8
3rd (High)	*0–22.6
Reverse	
1st (Low)	0–3.7
2nd (Intermediate)	0–10.1
3rd (High)	*0–23.4

* Road Speeds

BUCKET:

Lifting Capacity - at 3.5 MPH	7,000 lbs.
– at 0.0 MPH	14,000 lbs.
Capacity	2 cu. yd.
Overall Width	7' 4"
Lifting Time	8.5 sec.
Lowering Time	6.0 sec.

DIMENSIONS:

Overall Length - bucket on ground	18' 3"
Overall Length - bucket at 3' carry	18' 0"
Overall Height - top of steering wheel	7' 2"
Overall Width - Drive wheel Hub	7' 8"
Ground Clearance	15-1/2"
*Reach - full raise (max. Dump)	2' 10"
*Reach - at 7' Dumping Clearance	3' 10"
Height - to bucket cutting edge, dumped	9' 0"

DIMENSIONS - Continued

Height - top of bucket (max. raise)	15' 0"
Angle of Bucket dumped (max. raise)	45°
Angle of Cutting Edge at 3' carry	45°

*Reach quoted to tires - For reach to frame add 3".

TURNING RADIUS:

Tip of bucket (at 3' carry)	21' 11"
Outer Steering Wheel (Hub)	23' 4"
Inner Front Wheel (Hub)	12' 9"

TIRE AND TREAD:

Tread - front and rear Wheels	6' 0"
Tires - front and rear (12 ply)	14:00–24

TIRE PRESSURE:

Front and Rear	50 PSI

CAPACITIES:

Cooling System - gallons	8-1/2
Crankcase - quarts	14
Transmission and Converter - gallons	7
Hydraulic System - gallons	33-3/4
Fuel Tank - gallons	26
Differentials - (each) gallons	5
Planetary Hubs - (each) gallons	1
Steering Gear - pounds	1
Hydraulic Brake System - pints	2

STANDARD EQUIPMENT:

Electric Starter – Generator – Muffler – Heavy Duty Drawbar – 24 Volt Electrical System – Horn – Front and Rear Lights – Dash Lights – Stop and Tail Light – Four-Wheel Power Booster Hydraulic Brakes – Oil Bath Air Cleaner – Pre-Cleaner – Hydraulic Oil Micronic Filter (full flow) – Hydraulic Oil Magnetic Filter (full flow) – Rear Axle Disconnect – Four-Way Adjustable Seat – Hood Side Plates – Power Steering – Ether Starting Dispenser – Engine Oil Filter – Fuel Pressure Gauge – Converter Temperature Gauge – Fuel Level Gauge – Transmission Oil Pressure Gauge – Engine Water Temperature Gauge – Engine Oil Pressure Gauge – Ammeter – Mechanical Parking Brake – Hi Traction Differential and Boom Guard

NOTE: The Tractomotive Corporation reserves the right to make changes in the above specifications or to add improvements at any time without notice or obligation.

ALPHABETICAL INDEX

ALPHABETICAL INDEX – CONTINUED

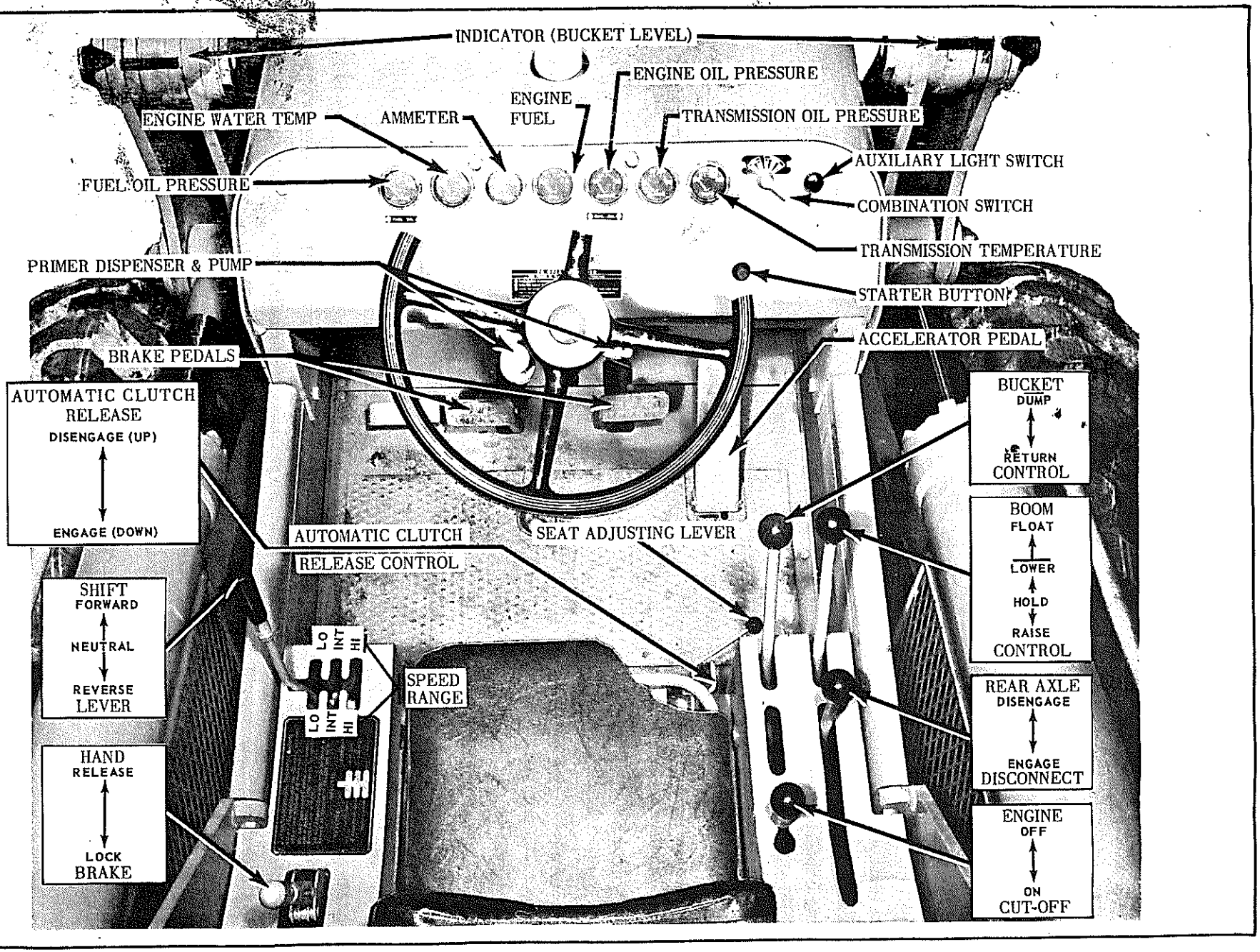


FIG. 20 – OPERATOR'S COMPARTMENT

TRACTOMOTIVE

PREPARATION OF MACHINE FOR USE

Make a complete inspection of machine to make sure no parts have been lost or damaged while in transit.

Inspect oil level in engine crankcase.

Check oil level in transmission.

Check oil level in loader hydraulic system.

Check oil level in differentials.

Check oil level in planetaries.

Fill cooling system with clean soft water.

Fill fuel tank with diesel fuel.

Inspect oil level in air cleaner cup.

Check and lubricate all points where fittings are provided for a pressure grease gun.

Check level of electrolyte solution in the batteries.

Turn fuel line shut-off cock to the open position.

Check tire pressure. (14:00-24 – 50 lbs.)

Check all bolts to be sure they are tight. By tightening the bolts at this time, and again at the end of 10 hours, the possibility of their becoming loose and enlarging the bolt holes will be eliminated.

STARTING AND STOPPING THE ENGINE

A. STARTING ENGINE

Place the power shift lever and bucket control levers in the neutral position. Turn combination switch to "on" position. Depress foot throttle pedal as far down as it will go. Make sure the engine shut-off lever (located to the right of the operator at top of control lever bracket) is fully released. Push on the starter button, located on the instrument panel. As soon as engine starts, release the starter button and reduce accelerator pedal to half speed until water temperature reaches 160° to 190° F. and transmission oil is warm before placing load on engine.

For positions of levers, pedals, gauges, etc. see Figure 20.

IMPORTANT: Converter oil temperature must not exceed 250° F. Check temperature gauge at regular intervals. See page 22 for further instructions.

When engine is started, observe the engine lubricating oil pressure indicated by the gauge. With engine running at full speed and with the engine coolant at normal operating temperature (160° to 190° F.) the oil pressure should be between 30 and 55 psi. If the oil is cold, no pressure may be indicated by the gauge for 15 seconds after the engine starts, but if the pressure does not then rise to normal or above, the engine must be stopped immediately and the cause determined and corrected.

B. STOPPING ENGINE

Release foot throttle pedal and turn ignition switch to "off" position. Pull engine shut-off lever upward and forward to secure it in the locking position, the engine will now have no possible means of starting if starter button is accidentally pushed.

NOTE: Be sure that the combination switch is turned to the "off" position before leaving the operators compartment. Because of the constant flow of electricity to the gauges on the instrument panel, the batteries may be drained if switch is left on.

Cover the exhaust pipe at the end of each days operation to prevent rain from entering while engine is idle.

BEFORE STARTING THE ENGINE, MAKE SURE THERE IS SUFFICIENT OIL IN THE LOADER HYDRAULIC SYSTEM AND TRANSMISSION HYDRAULIC SYSTEM.

It is important that the operator familiarize himself with the various controls and instruments provided for operation of this unit. (See Figure 20) Although many of these controls are similar to other loaders, there are important differences, and it is not wise, regardless of previous experiences, to operate the loader before fully understanding the purpose of each control and instrument.

DRIVING TIP – The transmission is full-power shifting. It is possible to upshift or downshift the transmission at wide-open throttle regardless of load. However, do not downshift from intermediate or high range to low range at speeds in excess of 4 M.P.H. Do not shift down from high to intermediate range at speeds in excess of 10 M.P.H.

The Full Power Shift Transmission is controlled by a single lever which allows the operator to change from any forward speed to any reverse speed at any time. The accelerator pedal is located under the right foot, while the pedals for the four-wheel power brakes are located one on each side of the steering column, either pedal operates the master cylinder. The mechanical parking brake is located to the left of the operator and may be operated manually by pulling back on the lever to lock the brake, which is located at the lower front side of the transmission at drive shaft. This mechanical parking brake operates independently of the service brakes and may be adjusted according to the wearing of the brake lining by turning the mechanical parking brake lever knob.

NOTE: It is a good habit to set the parking brake before leaving the machine, but remember to release the brake before putting the machine back to work.

The rear axle disengagement lever is located to the right of the operator (see Fig. 20). To disengage the power from the rear axle, push forward on lever and to put power back into the axle, pull back on lever.

NOTE: Four wheel drive should always be used when working machine. Rear axle disconnect may be used for road travel and some light materials work.

The one-lever Full Power Shift Transmission is automatically declutched by applying brake pedal pressure, and returns to the same speed range when the brake is released. However, when precise control of the machine is required on grades this automatic clutch release may be undesirable. Accordingly a control lever is provided so the operator can easily disengage the automatic release feature as required. When changing control lever position, the brake pedal should be fully released. For location of control lever, refer to Fig. 20. Also see Maintenance Section, "Clutch Cut-Off Valve."

To operate the loader, place the one lever transmission control in neutral position and start the engine. Move the lever to select the desired direction and speed range. See Fig. 20, page 6, for shifting procedure.

A FEW SUGGESTIONS FOR LOADING THE BUCKET AND MANEUVERING THE MACHINE.

1. A black line and an adjustable pointer, located at the cross link and dump link pin are supplied as an indicator to determine correct dig position for all boom mounted attachments; be sure they are lined up before penetrating the stock pile.
2. Lower the bucket to ground level. Loader is now ready to be driven into stock

pile. If bucket starts to stall out while digging in hard material with the accelerator pedal depressed to full throttle, the penetration will be assisted if the operator touches the power brake pedal lightly for short periods with his left foot and pulls back on the bucket control lever at the same time. After the bucket is fully retracted, pull back on the boom control lever to raise the bucket. Normally, the accelerator pedal should be fully depressed during the entire loading portion of the cycle.

3. The operator will find that, in most material, the first gear forward will be the most satisfactory gear for loading, while any gear in reverse (according to conditions) may be selected with the one lever transmission control to maneuver the machine.

4. Although the power brakes can be operated with either left or right foot, the operator can safely control the machine when approaching a truck by keeping his right foot on the accelerator and his left foot ready for the brake at all times.

5. The purpose of the two brake pedals is to provide the operator a choice of using either foot to operate the brakes.

6. The one-lever control full power shift transmission permits the Tracto-loader to maneuver safely in close quarters because the machine will stop with the range clutches still engaged by removing your foot from the accelerator. Because the clutches are hydraulically controlled, there is automatic compensation for normal wear – no adjustments are necessary.

7. Return the raise control lever to neutral position immediately after the lift cylinders reach the end of the stroke. Otherwise, the hydraulic pump is unnecessarily subjected to excessive load.

The Torque Converter, in conjunction with the full power shift transmission, makes it possible to almost completely eliminate wheel spinning. However, short tire life will result if driving wheels are allowed to spin excessively.

The bucket is lifted by pulling back on the outer control lever. It is lowered by pressure when the control lever is moved forward from the neutral position. When the end of the cylinder stroke is reached, either up or down, the control lever should immediately be returned to its neutral position. The bucket can be "floated" down by moving the lift control lever to its extreme forward position.

NOTE: With the bucket empty and in float position, the bucket will automatically be stopped about three feet above the ground when lowering in the full tip-back position. This added feature is a reminder for the operator to start lining up the two black lines (located at the cross link and dump link pin) to assure the correct dig position by the time the bucket reaches the ground.

The bucket is dumped by pushing forward on the inner control lever. The speed of dumping can be controlled by this lever. If material has a tendency to stick in the bottom of the bucket, it can be jarred by bumping the stops. This is done by moving the control lever back and forth rapidly. This should be done only under extreme sticking conditions.

The bucket, in addition to the automatic tip-back, during the boom raising cycle, can be tipped back at ground level to increase the pay load when handling loose material. This means that the dump cylinder piston rods must be extended to level the cutting edge when penetrating the pile, and can be retracted with breakaway effect during the loading cycle to obtain a full load in the bucket.

By placing the Boom Control Lever in the "Float" position rather than in down pressure,

it is possible to return the bucket to the proper digging position with the Bucket Control Lever at the same time the booms are being lowered. This practice is particularly advantageous on short hauls and stock pile work. A check valve is located in the top front side of the control valve and is connected into the Boom lowering lines so that oil may be transferred from the bottom side to the top side of the lift cylinders as required to keep the cylinders full of oil at all times.

It is possible to create extremely high pressures in the Dump Cylinders by such practices as back-dragging or bulldozing with the bucket and raising the booms with the bucket dumped. Although two safety valves have been provided in the hydraulic system, in addition to the main relief valve, to safe-guard the loader linkage against those high pressures; such practices should be avoided whenever possible.

One safety valve (set at 1350 psi) is located inside the hydraulic tank on right side of manifold plate (as seated in operator's seat) and is connected into the Bucket Dump Line; while the other valve (set at 2000 psi) is located on the left side of manifold plate and connected into the Bucket Return Line.

A third valve (set at 975 ± 25 psi) is located inside and on the bottom of the hydraulic tank. (Note: TL-20D#101 thru #103 used a different type valve which was located on the outside of tank.) It is connected into the power steering lines and serves to protect this circuit against excessive pressures.

All three valves have been correctly adjusted at the factory and require no further adjustment in the field.

When loads are carried for any appreciable distance, the bucket should be carried as close to the ground as practical since the best overall balance is obtained in this position, and with the tip-back feature, the load can be carried low with less spillage.

THE BUCKET SHOULD ALWAYS REST ON THE GROUND WHEN THE UNIT IS NOT IN OPERATION. DO NOT ATTEMPT TO SERVICE OR ADJUST ANY PART OF THE LOADER WHEN THE BUCKET IS IN A RAISED POSITION - - UNLESS IT IS SUITABLY SUPPORTED BY MEANS OTHER THAN THE HYDRAULIC LIFT CYLINDERS.

SPECIFICATIONS OF LUBRICANTS

A. ENGINE CRANKCASE LUBRICANT

USE NON-CORROSIVE "DIESEL" ENGINE LUBRICATING OIL CONTAINING ADDITIVES WHICH WILL PREVENT SLUDGE OR GUM DEPOSITS. UNDER NO CIRCUMSTANCES SHOULD A CORROSIVE ENGINE LUBRICATING OIL EVER BE USED.

Use oils of the following viscosities;

ATMOSPHERIC TEMPERATURE	VISCOSITY
90° F. and above	Use SAE 40
32° F. to 90° F.	Use SAE 30
0° F. to 32° F.	Use SAE 20W
0° F. and below	Use SAE 10W

Manufacturers of lubricants recognize the importance of the qualities required for use in our equipment and they are cooperating fully to assure the use of only those oils which fulfill these requirements. The oil distributor and oil manufacturer are to be held responsible for the results obtained from their products.

The outstanding lubricating requirements for efficient operation of the engine are: The maintaining of piston rings in a clean, free condition; absence of hard carbon and "varnish" deposits on or within engine parts; the prevention of bearing corrosion; and the promotion of general cleanliness within the engine.

Proper operation and maintenance of the engine are necessary to obtain the desired results from the lubricating oil.

B. AIR CLEANER

Use the same viscosity oil in the air cleaner as used in the engine crankcase. CAUTION: *Do not use an oil that foams.*

C. TRANSMISSION AND CONVERTER LUBRICANT

Lubricate these assemblies with a good grade of Transmission Fluid type "C" oil purchased from a reputable oil company.

D. HYDRAULIC SYSTEM

A good grade of rust inhibited hydraulic oil or automotive crankcase oil having a viscosity of 210–225 S.S.U. at 100° F. (SAE 10W) is recommended for use in the hydraulic system. NOTE: *Do not use an oil that foams.*

No specific brand of oil is recommended. Use only products qualified under the above viscosity specification and recommended by reputable oil companies.

E. FRONT AND REAR AXLE LUBRICANT

Both the differentials and Planetary Hubs use Multipurpose (E.P. type) gear oil of the following viscosities:

ATMOSPHERIC TEMPERATURE	VISCOSITY
Above 32° F.	Use SAE 140
32° and below	Use SAE 90

F. PRESSURE GUN LUBRICANT

Use a ball and roller bearing lubricant with a minimum melting point of 300° F. This lubricant should have a viscosity range so as to assure easy handling in the lubricating gun at the prevailing atmospheric temperature, and MUST be waterproof.

SPECIFICATIONS OF FUEL

The "DIESEL" fuel should be a natural distillate petroleum oil and must have certain qualities in order to ignite and burn at the proper rate and temperature. Field experience has shown that the fuel best suited for this engine closely approximates the following specifications:

Gravity API	30 - 35
Viscosity Saybolt Universal at 100°F.	35 - 40
Flash Point	150° F.
Diesel Index	48.5 to 65.5
Cetane Number	46 to 60
Pour Point	0° F.
Volatility 90%	650° F. Max.

SPECIFICATIONS OF FUEL – CONTINUED

End Point 98%
Summer ..... 700° F. Max.
Winter ..... 600° F. Preferable
Sediment and Water ..... Trace
Ash ..... .02 of 1% Max.
Conradson Carbon ..... .03 of 1% Max.
Sulphur ..... ½ of 1% Max.

For satisfactory fuel flow through lines and filters in cold weather, the pour point of the fuel must be at least 10° F. below the prevailing atmospheric temperature.

The API gravity of a fuel varies with its specific gravity. The low API fuels are desirable because they have a high specific gravity and more heat units per gallon. However, the higher the API gravity, the better will be the ignition quality of the fuel.

The ignition quality of a fuel is expressed as a "cetane number." The higher the cetane number, the higher the quality of the fuel. The higher cetane fuel shortens the ignition delay period to facilitate starting and improve combustion. The "DIESEL" index number, which is a close approximation of the cetane number, is a field method to represent ignition quality.

The distillation 90% point and the end point are important. High volatility is required to enable complete vaporization of the fuel, clean combustion, and low residue formation.

The flash point of a fuel has no quality significance, but is important with respect to safety in storage and handling of the fuel.

It is important that the fuel be within the specified limits for ash, carbon, water, and sediment content, etc., to prevent excessive wear and damage to engine parts.

It is also important that the fuel has lubricating properties so that the fuel injection pump and fuel nozzles are adequately lubricated. At times it may be necessary to use fuel with no lubricating properties. If this occasion arises, add one quart of SAE 10 engine oil to every 10 gallons of fuel. NOTE: *Distillates should be used only in emergencies.* When the proper fuel is again available, the fuel system must be drained before the proper fuel is added.

CAUTION: *The sulphur content of "DIESEL" fuel should be as low as possible. The fuel should not contain a sulphur content of more than ½ of 1%.*

Generally speaking, a No. 2 "Diesel" fuel purchased from a reputable oil company will meet the above specifications.

ROUTINE SERVICE
(Quick Reference List)

This quick reference outline is prepared in addition to the more detailed discussion of Routine Service that appears on the following pages. For added convenience, listed below are the inspections, service items, lubrication points and adjustments to be made at the time designated. The accompanying "Maintenance Chart" is to show the general location of the points to be serviced.

Note: The intervals given below are based on normal operation; perform these services, inspections, etc., more often (as necessary) for operation under abnormal and severe conditions.

TEN (10) HOUR SERVICE

INSPECT:

Engine Crankcase - Oil level
Hydraulic Tank - Oil level
Transmission - Oil level
Radiator - Coolant level
Air Cleaner Oil Cup - Oil level
Air Pre-Cleaner - Dust level
Batteries (2) - Electrolyte level

SERVICE:

Front and Rear Axle Breathers
a. Planetary Hubs (4) - Check
b. Differentials (2) - Check
c. Front Axle Shaft Compartments (2) - Check
Fuel Filters (2) - Drain sediment
Fuel Tank - Drain sediment
Hydraulic Tank Breather - Clean
Hydraulic Suction Line Screen and Magnet - Clean daily first week. (See 100 Hr. Service.

LUBRICATE:

Power Steering Linkage
a. Cylinder Pivot Pin - (1) lube fitting
b. 2 Drag Link - (4) lube fittings
c. Tie Rod - (2) lube fittings

Loader Linkage
a. Boom
b. Dump Cylinders
c. Cross Links
d. Lift Cylinders
e. Bucket

ONE HUNDRED (100) HOUR SERVICE

INSPECT:

Engine Radiator - Core for plugging
Front and Rear Axles
a. Differentials (2) - Oil level
b. Planetary Hubs (4) - Oil level
Master Brake Cylinder - Fluid level
Loader Hydraulic System
a. Connections for leaks
b. Adjustments of Cylinder Piston Rod Packing

SERVICE:

Engine Crankcase - Drain and refill
Engine Oil Filter - Replace element
Batteries - Test with Hydrometer
Hydraulic System Oil Filter - Replace element
Hydraulic Tank Air Filter - Replace element
Hydraulic Tank Breather - Replace element
Hydraulic Suction Line Screen and Magnet - (Also see 10 Hour Service)

LUBRICATE:

3 Drive Shaft "U" Joints - (8) fittings
Generator
Starting Motor
Fan Idler Bearings
Fan Bearings
Water Pump
Axle Disconnect Linkage - (4) Oil
Transmission Control Linkage
a. Lube fittings (2) Grease
b. Ball Socket Joints - (4) Oil
Control Valve Linkage - (4) Oil
Accelerator Linkage - (6) Oil

NOTE: Telescoping rods have cadmium plated plungers and require no lubrication. DO NOT OIL OR GREASE.

FIVE HUNDRED (500) HOUR SERVICE

INSPECT:

Steering Gear - Check oil level

LUBRICATE:

Trunnion Socket Assembly (Steering axle)

ONE THOUSAND (1000) HOUR SERVICE

SERVICE:

Hydraulic System - Drain, flush and refill
Front and Rear Axles
a. Differentials (2) - Drain and refill
b. Planetary Hubs (4) - Drain and refill
Transmission - Drain and refill
Transmission Oil Filter - Replace element
Transmission Sump Screen - Clean

PERIODIC SERVICE AND ADJUSTMENTS

Hydraulic System - (Refer to "Hydraulic System" in Maintenance section.)
a. Packing Glands of Cylinders - tighten if necessary
b. Hoses, Pipes and Fittings - tighten if necessary
Fuel Tank - Drain and flush
Fuel Filters (1st and 2nd stage) - Install a new element in each filter when fuel pressure drops below normal range (5 to 15 psi) due to filters clogging. Do not attempt to clean clogged elements. (Refer to "Fuel System" in Maintenance section.)
Fuel Nozzles - Check and adjust
Cooling System - Drain and refill
Fan Belt - Check and adjust
Generator Belt - Check and adjust
Power Steering Pump Belt - Check and adjust
Brakes - Check and adjust
Vacuum Hydraulic Unit - Check oil level
Wheel Nuts - Check and adjust
Tires - Check pressure
Check entire unit to see that all bolts, nuts and pins are tight.

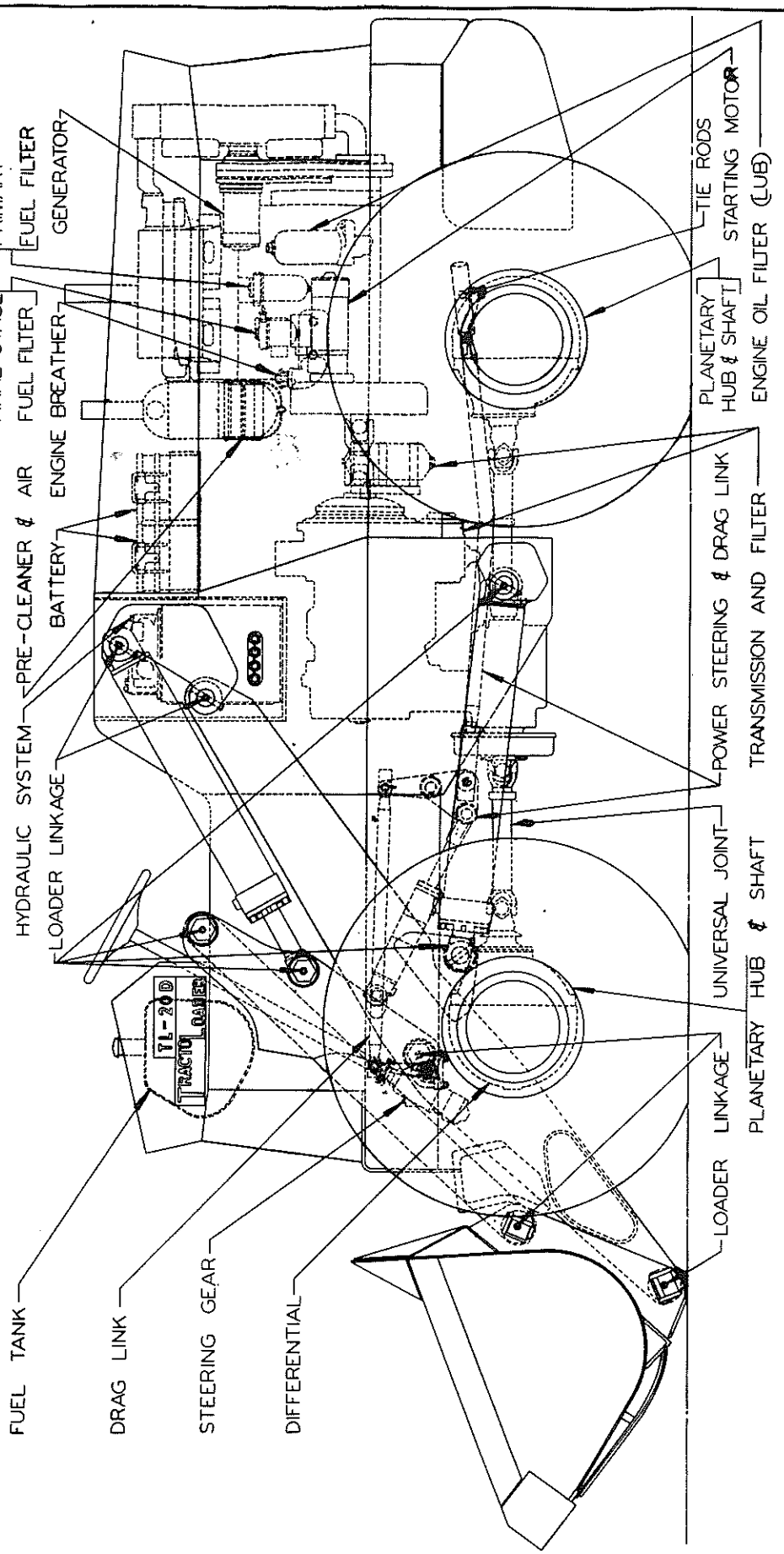


PLATE 715 – MAINTENANCE CHART

The operating life of a machine can be materially increased and fewer shut-downs experienced if the unit is properly serviced at regular intervals. Periodic lubrication and inspection of certain parts of the unit will often eliminate costly shut-downs and major repairs.

A list of points to be serviced regularly at each inspection period is outlined below:

10 HOUR SERVICE

ENGINE CRANKCASE OIL LEVEL – Check level on oil level gauge rod. Add oil if necessary to bring level up to "full" mark on gauge rod. For oil specifications, refer to 100 Hour Service, "Engine Crankcase."

HYDRAULIC TANK OIL LEVEL – Check oil level and keep filled to ring groove on dipstick. Dipstick and filler plug are located on the front left hand top of the oil reservoir. For oil specifications, refer to "Hydraulic System" in Maintenance section.

TRANSMISSION – Check oil level at level plugs, located on the left side of transfer gear housing. Oil should be level with the top plug. For oil specifications, refer to Maintenance Section - "Transmission."

RADIATOR – Check level of coolant. Keep radiator filled.

AIR CLEANER OIL CUP – Inspect condition and quantity of oil in oil cup. Keep oil level to top of cone in center of baffle. DO NOT OVERFILL. Oil must be changed if discolored or if there is a layer of dirt in cup or on baffle. Use same viscosity oil as used in engine crankcase for prevailing air temperature. DO NOT USE AN OIL THAT FOAMS.

AIR PRE-CLEANER – Empty the dirt from the pre-cleaner shell when dirt level reaches halfway up on the inspection glass. Remove the cap, lift the shell from the body and clean the shell thoroughly. Reinstall and tighten the wing nut. Be sure gasket is in good condition and properly installed.

BATTERIES (2) – Check electrolyte level. If it is low, add clear distilled water.

FRONT AND REAR AXLE BREATHERS

a. PLANETARY HUBS (4) – One in center of each hub plate. Pull out on pin until oil flows to make certain breather is free to function.

b. DIFFERENTIALS (2) – Located on differential carrier housings. Press caps several times to make certain the breathers are free to function.

c. FRONT AXLE SHAFT COMPARTMENTS (2) – One in each end of housing near brake drum. Press caps several times to make certain the breathers are free to function.

FUEL FILTERS (1st and 2nd stage) – Open the drain cock in bottom of each filter shell daily (or as often as conditions warrant) and allow any water or sediment to drain; close drain cocks when clean fuel runs out. Perform this service before the start of the day's operation in warm weather or shortly after the end of the day's operation in freezing weather. (See "Periodic Service and Adjustments" also "Fuel System" in Maintenance section.)

FUEL TANK – Open the drain cock before the engine is started in warm weather or shortly after the end of the day's operation in freezing weather, and allow water and sediment to drain.

HYDRAULIC TANK BREATHER – Located at left rear top of hydraulic tank. Remove and wash in a clean solvent or "Diesel" fuel, dry with air (from inside out). Dip in clean oil. Shake off excess oil before replacing.

POWER STEERING LINKAGE

a. CYLINDER PIVOT PIN – One grease fitting located at front of cylinder through hole in left hand frame. Lubricate with pressure gun lubricant.

10 HOUR SERVICE – Continued

b. TWO DRAG LINKS – One grease fitting in each end. Lubricate with pressure gun lubricant.

c. TIE ROD – One grease fitting in each end. Lubricate with pressure gun lubricant.

LOADER LINKAGE – Eighteen grease fittings. Lubricate with pressure gun lubricant. Fittings are located as follows:

a. 2 at rear of booms
b. 2 at rear end of dump cylinders
c. 2 at lower end of cross links
d. 2 at center of cross links
e. 2 at top of cross links
f. 2 at rear end of lift cylinders
g. 2 at front end of lift cylinders
h. 2 at front end of booms
i. 2 at front end of dump links

100 HOUR SERVICE

ENGINE RADIATOR – Check core for plugging. Clean out with water or air if necessary.

FRONT AND REAR AXLES

a. DIFFERENTIALS (2) – Check oil level and keep filled to level of filler plug. For oil specifications, refer to 1000 Hour Service, "Differentials."

b. PLANETARY HUBS (4) – Check oil level and keep filled to oil level plug.

Before checking, rotate each wheel so "level mark" on Hub Cover Plate is horizontal. Add oil through filler plug located in Planetary Hub. For oil specifications, refer to 1000 Hour Service, "Planetary Hubs."

MASTER BRAKE CYLINDER – Check fluid level. Add fluid if necessary to level of filler plug.

LOADER HYDRAULIC SYSTEM – Check the following points:

a. Check all hoses, pipes, and fittings for leaks. See instructions in Maintenance Section - "Hydraulic System."

b. Check packing adjustments of lift and dump cylinder piston rods. See instructions in Maintenance Section - "General Care of Hydraulic System."

ENGINE CRANKCASE – Capacity 14 quarts. Drain oil from crankcase and refill with new oil. Drain plug located at lower front side of crankcase. Fill to "full" mark on oil level gauge rod. For temperatures above 90° F. use SAE 40. For lowest expected temperature of 32° F. use SAE 30. For lowest expected temperature of 0° F. use SAE 20W. For temperatures below 0° F. use SAE 10W.
CAUTION: Under no circumstances should a corrosive engine lubricating oil be used.

ENGINE OIL FILTER – Located on the left side of the engine. Remove the old element; clean the filter shell and install a new element. Refer to Maintenance Section - "Engine Lubrication System."

BATTERIES – Test with Hydrometer for specific gravity of each cell. Maintain electrolyte level as indicated on cap by adding clean distilled water.

HYDRAULIC SYSTEM OIL FILTER – Located at the left front side, inside hydraulic tank. Replace element (from element kit) at 100 hours or more often if conditions warrant.

HYDRAULIC TANK AIR FILTER – Located at the left rear side, inside hydraulic tank. Replace element (from element kit) at 100 hours or more often if conditions warrant.

HYDRAULIC TANK BREATHER – Located on left top side of hydraulic tank. Replace element (from element kit) at 100 hours or more often if conditions warrant.

HYDRAULIC SUCTION LINE SCREEN AND MAGNET – It is important that these parts be cleaned daily during the first week of operation or until the amount of foreign material col-

lected daily has practically disappeared. Thereafter, cleaning these parts may be extended to 100 hour periods.

DRIVE SHAFTS - UNIVERSAL JOINT – One grease fitting in each universal joint. Lubricate with a regular "Universal Joint Grease." Industry's general specification for universal joint grease, according to the National Lubrication and Grease Institute is listed as follows: N.L.G.I. #2 soda soap, fiber base grease.

GENERATOR – Lubricate with 4 drops of SAE 20W motor oil in each of the two oil cups.

STARTING MOTOR – Located on left side of engine. Lubricate with 5 drops of SAE 20W motor oil.

FAN IDLER BEARINGS AND FAN BEARINGS – One fitting each. Lubricate with chassis lubricant.

WATER PUMP – One grease fitting. Lubricate with pressure gun lubricant.

500 HOUR SERVICE

STEERING GEAR – Check grease level and keep filled to the level of the filler plug. Use GMC-4567-M steering gear lubricant both summer and winter. This lubricant is available at United Motors Service Stations.

STEERING AXLE – Each trunnion socket should be lubricated every 500 hours or more often under extremely severe conditions with Marfax No. 2 Heavy Duty Grease or equal. Remove pipe plug from top of steering trunnion bearing cap and install lubricating fitting. With a power grease gun or pressure gun, add three shots or approximately one ounce of grease. Remove lube fitting and replace with pipe plug. *DO NOT OVER GREASE.*

1000 HOUR SERVICE

HYDRAULIC SYSTEM – Capacity 33¾ gallons. Drain, flush, and refill with new oil: This service should be performed more often if the oil shows signs of discoloration. Use SAE 10W. Do not use an oil that foams. For extreme cold weather, dilute the oil with the best grade of kerosene. To drain system, see instructions under "General Maintenance."

FRONT AND REAR AXLES

a. DIFFERENTIALS (2) – Capacity - 5 gallons each. Drain and refill. For temperatures above 32° F. use SAE 140 Multipurpose (E.P. type) gear oil; for temperatures below 32° F. use SAE 90. Drain plug is located in the bottom of the differential housing.

b. PLANETARY HUBS (4) – Capacity - 1 gallon each. Drain and refill. Drain plug located on the outer rim of the hub housing. Turn wheel until the plug is at the bottom of the hub. This plug is used for draining and filling. For temperatures above 32° F. use SAE 140 Multipurpose (E.P. type) gear oil; for temperatures below 32° F. use SAE 90.

TRANSMISSION – Capacity 7 gallons. Drain and refill. Drain plug is located at the front lower left side of transfer gear housing. Use transmission fluid Type "C." For draining and refilling procedure, see instructions in Maintenance Section - "Transmission."

TRANSMISSION OIL FILTER AND SUMP SCREEN – Replace oil filter element located between transmission and seat frame. Remove the screen from opening in sump of the transfer case. Clean thoroughly and re-install. Refer to Maintenance Section - "Transmission."

TRANSMISSION OIL FILTER – Replace filter element located between transmission and engine.

TRANSMISSION SUMP SCREEN – Remove screen from opening in sump of transfer case. Clean thoroughly and re-install. Refer to Maintenance Section - "Transmission."

LOADER HYDRAULIC SYSTEM

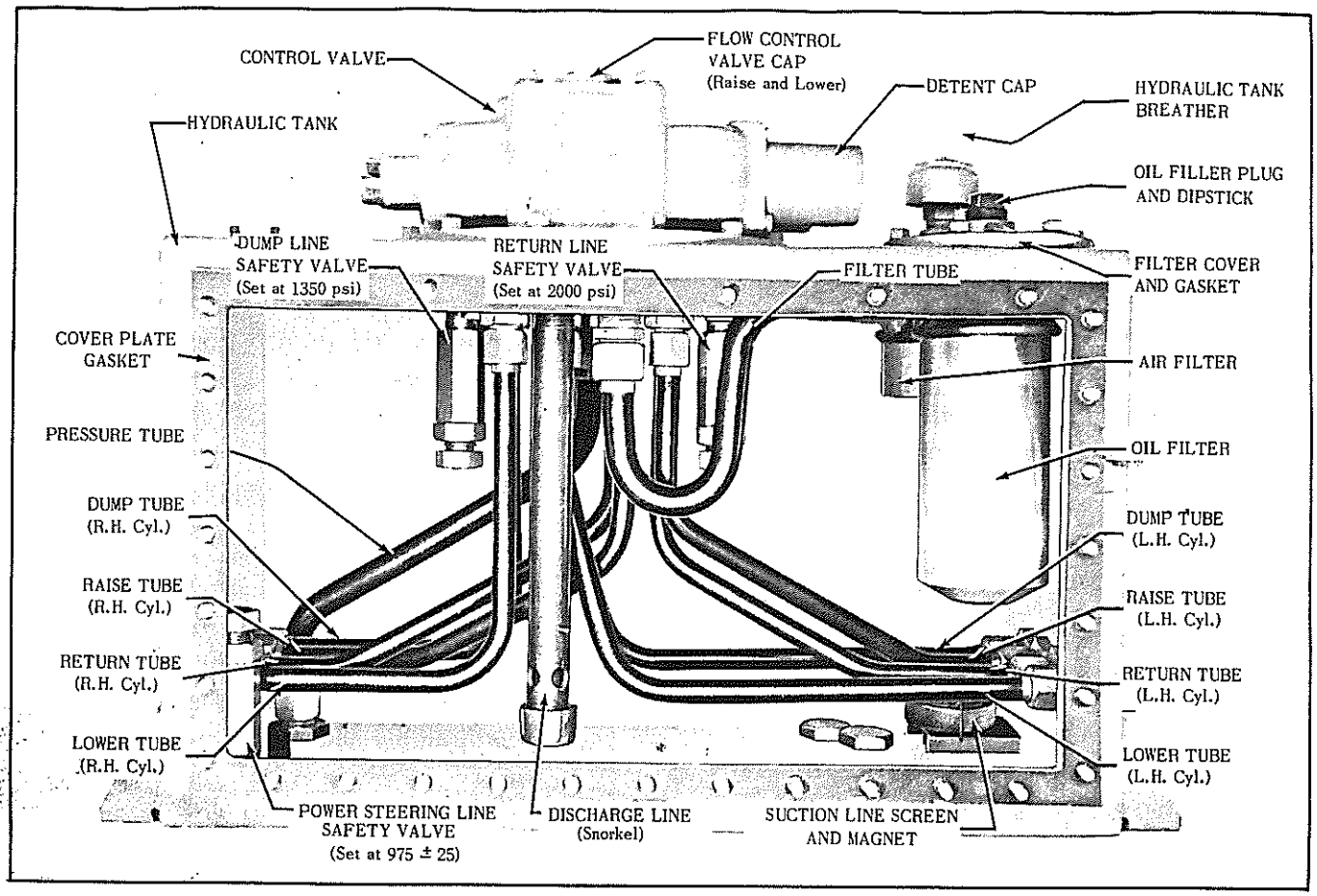


FIG. 21 – HYDRAULIC TANK

A. GENERAL

The hydraulic system consists of the gear type hydraulic pump, hydraulic tank assembly, control valve, double-acting hydraulic cylinders for the loader booms and the bucket, and the necessary tubes and lines to complete the system.

The hydraulic pump supplies hydraulic power to operate the loader. The pump is externally mounted on the torque converter housing, and is directly connected to the engine crankshaft through a gear train. A small drain hole for the pump seal compartment is located on the bottom side of the adapter end cover. Slight drainage from this hole is normal; excessive drainage may indicate a worn pump seal.

The loader is controlled by the double spool valve bolted to the top of the hydraulic tank, which is located behind the operator's seat. The hydraulic tank is designed so that with little periodic service, top performance can be maintained indefinitely. Service of the filters, breathers, suction line screen, etc. of the tank assembly is dependent upon operating conditions.

The dump line safety valve and the return line safety valve, located inside of the hydraulic tank as shown in Fig. 21, are properly adjusted at the factory and require no further adjustment in the field.

B. OIL RECOMMENDED FOR HYDRAULIC SYSTEM

A good grade of rust inhibited hydraulic oil or automotive crankcase oil having a viscosity of 210 – 225 S.S.U. at 100° F. (SAE 10W) is rec-

ommended for use in the hydraulic system. NOTE: *Do not use an oil that foams.*

No specific brand of oil is recommended for use in the hydraulic system. Use only products qualified under the above specification and recommended by reputable oil companies.

C. HYDRAULIC OIL FILTER

The oil filter, located inside of the hydraulic tank as shown in Fig. 21, has a micronic element which should be replaced after every 100 hours of operation, or more often if conditions warrant. When the oil is at operating temperature, all oil is 100% filtered. Refer to Fig. 21 and replace the oil filter element as follows:

1. Remove cover plate from top of stabilizer for access to hydraulic tank assembly. Thoroughly clean the filter cover and surrounding area.
2. Remove the filter cover (with oil dipstick) from the top of the hydraulic tank.
3. Pull the filter element from the oil filter case and discard the element. Thoroughly clean the inside of the filter case.
4. Make certain that the spring and metal washer are in position on the pipe in the bottom of the filter case. Insert the new filter element into position in the filter case, making certain that the lower end of the element seats squarely on the metal washer.
5. Place a new cover gasket in position on the tank and install the filter cover (with oil dipstick). Tighten the hex-nuts evenly.

CAUTION: *If the filter case is removed, make certain that when reinstalling it that none of its holes will be aligned with the oil stream coming from the filter tube.*

D. HYDRAULIC TANK BREATHER

The tank breather (Fig. 21) should be serviced after every 10 hours of operation, or more often if conditions warrant. The breather element should be replaced after every 100 hours of operation. Clean the breather element as follows:

1. Loosen and remove the machine screw and lockwasher attaching the breather cup to the base. Remove the breather cup and the breather element.
2. Wash the element in clean solvent or "DIESEL" fuel, dry with compressed air (from inside out), and dip the element in clean oil. Shake off the excess oil and reinstall the element, breather cup, and the machine screw (with lockwasher).

E. HYDRAULIC TANK AIR FILTER

The element of the air filter, located inside the hydraulic tank as shown in Fig. 21, should be replaced after every 100 hours of operation, or more often when operating in extremely dusty conditions. Replace the filter element as follows:

1. Thoroughly clean the filter cover and the surrounding area.
2. Remove the filter cover (with tank breather) from the top of the hydraulic tank.
3. Pull the filter element from the filter case and discard the element. Thoroughly clean the inside of the filter case.
4. Insert the new filter element (*with open end upward)* into position in the filter case and center the element within the case.
5. Place a new cover gasket in position on the tank and install the filter cover (with tank breather). Tighten the hex-nuts evenly.

F. HYDRAULIC SUCTION LINE SCREEN AND MAGNET

It is important that the suction line screen and magnet (Fig. 21) be cleaned daily during the first week of operation or until the amount of foreign material collected daily has practically disappeared. Thereafter, the screen and magnet should be cleaned after every 100 hours

of operation. These parts are accessible for cleaning by the removal of the air filter cover, filter element, and the air filter case and reaching down into the tank.

IMPORTANT: *PLUGGING OF THE SUCTION SCREEN WITH FOREIGN MATERIAL (PARTICULARLY, FIBRES WORN FROM PACKING RINGS) WILL STARVE THE HYDRAULIC PUMP, WHICH ALMOST ALWAYS RESULTS IN SERIOUS DAMAGE TO THE INTERNAL PARTS OF THE PUMP. THEREFORE, IT IS IMPERATIVE THAT THE SUCTION SCREEN BE KEPT CLEAN.*

Clean the suction screen and magnet as follows:

1. Remove the air filter element following the procedure in the preceding paragraph, steps 1 thru 3. Pull the air filter case from the hydraulic tank.
2. Reaching down into the hydraulic tank, push down on the bail to loosen the suction line screen baffle cup (Fig. 21) and remove the baffle cup and the suction screen. Remove the magnet (ring) from the suction line.
3. Wash the suction screen in clean solvent or "DIESEL" fuel and dry with compressed air. Clean the magnet.
4. Place the magnet in position on the suction line and insert the suction screen into the line. Install the suction line screen baffle cup and secure with the bail.
5. Make certain that the air filter case seal ring (located in the bore of the tank) is in good condition and insert the air filter case into position in the tank. Install the filter element following the procedure in the preceding paragraph, steps 4 and 5.

G. PRESSURE RELIEF VALVE

The spring loaded pressure relief valve assembly, located in the loader control valve housing, is provided for regulating the pressure within the hydraulic system. The relief valve is properly adjusted at the factory for an opening pressure of 1200 to 1250 P.S.I. When the valve opens, oil is by-passed from the hydraulic pump directly to the hydraulic tank. Since the pressure relief valve is properly adjusted at the factory, no further adjustment should be necessary in the field.

1. Testing of Hydraulic System for Proper Operation

The following test can be made to determine if the hydraulic system is functioning properly: The time required to raise an empty bucket from ground level to the full raised position, with the engine running at full throttle, should be approximately 9 seconds. NOTE: *The hydraulic system should be at normal operating temperature when making this test.*

If it is found that the bucket raises slowly when testing as above, check the following:

a. Make certain that the oil in the hydraulic tank is at the proper level.

b. Make certain that the suction line screen, located in the hydraulic tank, is clean.

c. The hydraulic pump should be removed, disassembled, and inspected after one year of operation even though no noticeable decrease in operating efficiency has become apparent. Without actually inspecting the internal parts of the pump, it is difficult to determine from the operating test, exactly when an overhaul should be made to the gear type pump. A gear type pump may maintain its maximum operating efficiency to a point where the bearings start to fail.

2. Testing of Pressure Relief Valve

The pressure relief valve is properly adjusted when it opens at a pressure of 1200 to 1250 P.S.I. As this valve was properly adjusted at the factory, no further adjustment should be necessary in the field. However, if repairs to

the loader control valve assembly have been made, or if a new control valve assembly has been installed, the pressure relief valve should be tested and adjusted for the proper opening pressure. Testing and adjusting of the relief valve is also necessary when a new or a rebuilt hydraulic pump has been installed.

CAUTION: *Never adjust the pressure relief valve (to increase the pressure) without first making certain that the suction line screen in the hydraulic tank is clean. Also, make certain that the oil in the hydraulic system is at normal operating temperature.*

Test and adjust the pressure relief valve as follows:

a. Thoroughly clean the top of the loader control valve.

b. Remove the rearmost pipe plug (in line with the relief valve assembly) from the top of the loader control valve and install an accurate pressure gauge having a minimum capacity of 1500 P.S.I. NOTE: *A master gauge kit is listed under Special Tools in the back of this book and is available through your "Allis-Chalmers" Construction Machinery Dealer.*

c. Start the engine and operate it at full throttle. Raise the bucket to its maximum height.

d. Pull the boom control lever to its full "RAISE" position and observe the pressure indicated by the gauge. The pressure should be 1200 to 1250 P.S.I. Return the boom control lever to its neutral position.

CAUTION: *When performing this test, do not hold the boom control lever in the "RAISE" position for long periods of time; just long enough to obtain an accurate gauge reading.*

e. If the pressure indicated by the gauge is above or below the recommended pressure setting (1200 to 1250 P.S.I.), adjustment of the pressure relief valve is necessary.

f. To adjust the pressure relief valve, remove the pressure relief valve acorn nut and loosen the jam nut on the adjusting screw. Carefully turn the adjusting screw IN to increase or OUT to decrease the pressure as necessary. When the correct adjustment is obtained, lock the adjusting screw securely with the jam nut and install the acorn nut. NOTE: *Pressure in excess of 1250 P.S.I. has no effect on speed or efficiency of operation, but definitely causes unnecessary wear on component parts – particularly the pump assembly.*

g. Slow the engine to idling speed and lower the bucket to the ground. Push the boom control lever to the "FLOAT" position and stop the engine.

h. Remove the pressure gauge. Install the pipe plug and tighten securely.

H. CHECKING OIL LEVEL OF HYDRAULIC SYSTEM

An oil level dipstick, attached to the oil filler plug (Fig. 21), is provided in the left front corner on top of the hydraulic tank. The oil level should be checked after every 10 hours of operation by removing the dipstick and oil filler plug. NOTE: *Make certain the tractor is level before checking oil level. With the engine running at full throttle, raise the boom to radiator height. Actuate the bucket through its full travel several times to make certain the dump cylinders are full of oil, then fully retract the dump cylinders. Move the boom control lever to the "LOWER" position and lower the bucket to ground level, then return the control lever to its "NEUTRAL (HOLD)" position. Be sure the engine is running at full throttle when performing these operations. Stop the engine and check the oil level as follows:*

1. Thoroughly clean the top of the hydraulic tank (at oil filler plug location) before removing the filler plug.

2. Remove the dipstick and oil filler plug and dry the dipstick with a clean cloth.
3. Insert the dipstick back into the hydraulic tank, resting the oil filler plug on the top of the oil filter cover. Withdraw the dipstick and note the oil level; the oil level should be even with the ring groove in the dipstick.
4. Add oil to the hydraulic tank as necessary to raise the level even with the ring groove in the dipstick. Install the dipstick and oil level plug and tighten securely.

IMPORTANT: *The oil level should never be allowed to drop more than 1 inch below the ring groove in the dipstick. When the oil level in the hydraulic tank is too low, the action of the lifting and dumping cylinders will be sluggish because the hydraulic pump is not receiving enough oil and is, to some extent, pumping air. The upward movement of the bucket during the lifting operation might be slowed to half its normal speed, or it may stop entirely, due to an insufficient supply of oil in the system. The same applies to the dumping cylinders. Considerable damage can be done to the hydraulic pump when the oil level is allowed to get so low that the suction line is not full.*

I. DRAINING, FLUSHING, AND FILLING OF HYDRAULIC SYSTEM

The hydraulic system should be drained, flushed, and refilled with new oil after every 1000 hours of operation, or more often if oil is found discolored. NOTE: *The oil should be at normal operating temperature when draining from the system.*

Drain, flush, and refill the system as follows:

1. Remove the bucket from the machine.
2. Start the engine and carefully retract the dump cylinders all the way. Use care to see that the front end of the dump links are moving freely.
3. Raise the booms to full height. When the oil reaches operating temperature, stop the engine. CAUTION: *SUITABLY SUPPORT THE BOOM TO PREVENT ACCIDENTAL DROPPING DURING THE NEXT OPERATION.*
4. Drain the hydraulic tank completely as follows:
   a. Disconnect the return hose from the power steering valve port marked "RT." Since the intake fitting for this hose is flush with the bottom of the tank, it will drain all the oil including any possible sludge or sediment.
   b. Remove the suction elbow fitting from the loader hydraulic pump to accelerate the draining operation. The baffle cup, placed upside down over the suction line opening inside the tank, serves as a temporary cover to prevent oil flow while removing the elbow.
5. Move the bucket (dump) control lever back and forth several times to relieve pressure. Disconnect both dump cylinder hoses on each side of the machine where they pass through the loader frame. Place a container under the hoses (and close to the tank bulkhead fittings), to catch the drained oil – about 3 gallons each side.
6. Remove the boom support. Place the boom control lever in the "LOWER" position allowing the booms to drop until all the oil is expelled from the lift cylinders into the tank and out through the drain. Do not use "FLOAT" position. NOTE: *Some oil will discharge through the dump cylinder hoses while the booms are being lowered.*
7. Use an external power source to completely extend the dump cylinder rods thereby expelling all the oil.
8. The oil remaining in the loader control valve may be drained by disconnecting the lift cylinder hoses at the cylinders and the pressure line at the pump.

9. Drain the power steering cylinder and valve by turning the steering wheel from one extreme to the other to expell oil through the valve port marked "RT." The rear of the machine must either be jacked up or the drag link disconnected from the steering axle to facilitate turning the steering wheel. Disconnect the pressure and suction line from the power steering pump for draining.

10. Install new oil filter, air filter, and tank breather elements (refer to Paragraphs C, D, and E). Clean the suction line screen and magnet (refer to Paragraph F).

11. Reconnect all lines which were disconnected during draining as follows:
    a. Pressure and suction lines - pump to tank.
    b. Lift and dump cylinder hoses - cylinders to tank.
    c. Return hose - power steering valve to tank.
    d. Pressure and suction lines - power steering pump

12. COMPLETELY fill the hydraulic tank with the best grade of kerosene. Start the engine and circulate the kerosene through the system by operating both loader control levers four or five times so that the lift and dump cylinders fill and empty several times. Turn the steering wheel from one extreme to the other several times.

13. Drain the hydraulic system by following the procedure in steps 2 through 9. Reconnect all lines which were disconnected during draining as listed in step 11.

14. Remove the dipstick and oil filler plug from the hydraulic tank. Fill the hydraulic tank to a level even with the ring groove in the dipstick with the specified oil. Install the dipstick and oil filler plug.

15. Start the engine. Operate the loader control levers so that both the power steering cylinder and the lift and dump cylinders fill with oil. Add oil to the hydraulic tank as necessary to keep the suction line filled.

16. Reinstall the bucket and connect the steering drag link to the rear steering axle, or remove jack from rear of machine (step 8).

17. Fully retract the dump cylinders and lower the bucket to ground level.

18. Remove the dipstick and dry with a clean cloth. Insert the dipstick back into the tank, resting the oil filler plug on the top of the oil filter cover. Withdraw the dipstick and note the oil level; the level should be even with the ring groove in the dipstick.

19. Add oil to the hydraulic tank as necessary to raise the level even with the ring groove in the dipstick. On the final check, allow a few minutes for the oil to settle before checking the level. Install the dipstick and oil filler plug and tighten securely. The hydraulic system now is full and ready to operate.

J. GENERAL CARE OF HYDRAULIC SYSTEM

1. Keep all tube fittings and hose connections tight to prevent oil leaks. *Do not overtighten or use sealing compound.*

2. Use such compounds as "Permatex" #2 on pipe threads when replacing fittings. Make certain that all parts are thoroughly cleaned before installation.

3. When installing a hose assembly, be sure that it is not twisted when the connections are tightened.

4. Keep all hose clamps tightened to avoid hose chafing.

5. Keep the packing glands for the hydraulic lift and dump cylinders properly adjusted to avoid oil leakage. The packing gland end plates should be adjusted so that

there is a light film of oil on the piston rods when the unit is in operation.

The packing glands of each cylinder are adjusted by removing the lockwire from the capscrews in the packing gland end plate. Tighten the four capscrews evenly using a slight pressure on a short wrench. Lock the capscrews with lockwire. NOTE: *Excessive tightening of the packing glands results in rapid wear on the packing rings and severe wiping of the piston rod. If the packing gland leaks oil after being adjusted properly, it is an indication that the packing rings are worn and should be replaced.*

K. TO REPLACE WORN PACKING RINGS

1. Lower the bucket to its normal position (dig position) on the ground. Remove the lockwire and the four capscrews attaching the packing gland end plate.
2. Slide the packing gland end plate and packing gland bearing forward on the piston rod.
3. Remove the four (4) packing rings and wipe out the packing ring space. Do not remove the bottom adapter ring.
4. Insert four (4) new packing rings into position in the recess of the cylinder head, making certain that the open end of the "V's" are toward the rear of the cylinder. CAUTION: *When installing the packing rings, stagger the gaps so that no two gaps are adjacent and make certain that the edges are not doubled back.*
5. Slide the packing gland bearing and the end plate back on the piston rod and install the attaching capscrews. Tighten the capscrews evenly using slight pressure on a short wrench; *DO NOT OVERTIGHTEN.* Lock the capscrews with lockwire.

L. HYDRAULIC CYLINDER PISTON ROD WIPER SEALS

The wiper seal installed in the packing gland end plate of each cylinder, serves to wipe off dirt from the piston rod surface. The wiper seal should be replaced when there are indications that the seal is not wiping the rod surface properly. To replace the wiper seal, it is necessary to remove the cylinder head, pull the piston assembly from the cylinder, and remove the piston from the rod in order that the packing gland end plate can be slipped off the piston rod. When installing a new wiper seal, make certain that the lip of the seal is towards the outside.

— FUEL SYSTEM —

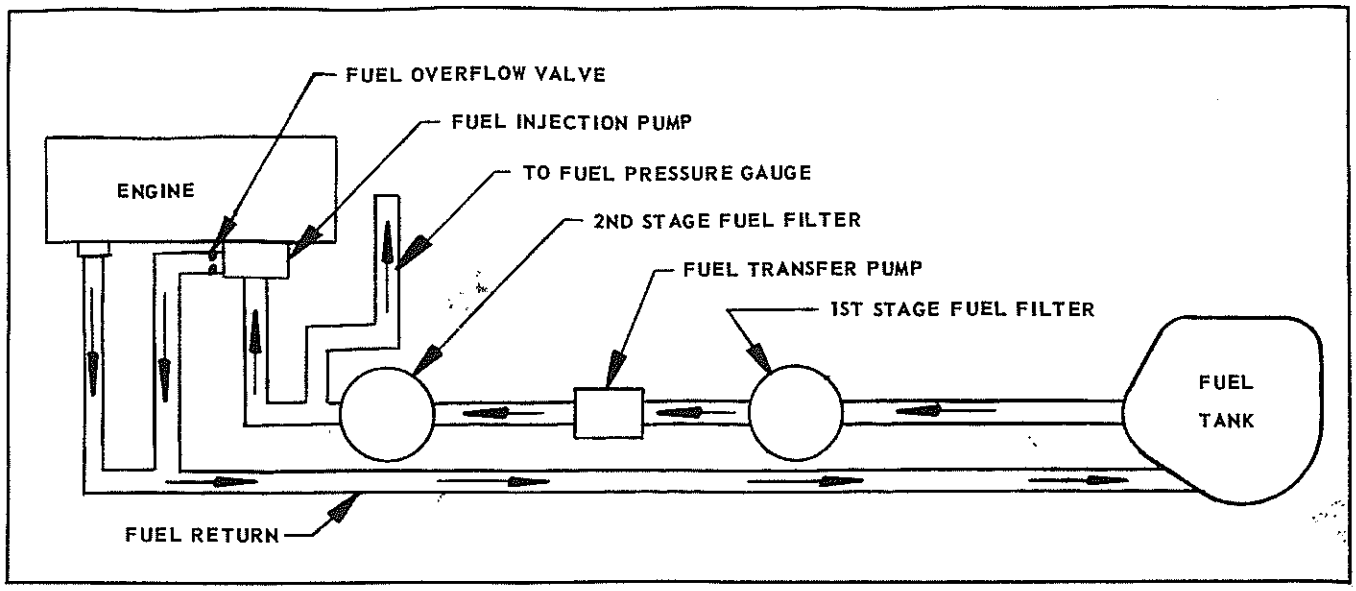
A. DESCRIPTION OF SYSTEM

The engine fuel system consists of a fuel tank, first stage fuel filter, fuel transfer pump, second stage fuel filter, fuel injection pump, fuel nozzles, and the fuel lines. There are two fuel pressure systems; the low pressure system and the high pressure system.

The low pressure system consists of the fuel tank, first stage fuel filter, fuel transfer pump, second stage fuel filter, fuel return manifolds and the fuel return line leading from the fuel sump of the fuel injection pump to the fuel tank.

The high pressure system consists of the fuel injection pump, fuel nozzles, and all high pressure fuel lines connecting the fuel injection pump to the fuel nozzles. The high pressure fuel lines are seamless steel tubing and each line is the same length. These lines being the same length assures the proper timing and the proper amount of fuel to each fuel nozzle. These lines are not interchangeable; when ordering lines for replacement, specify for which cylinder the line is ordered.

The fuel is drawn from the fuel tank, through the first stage fuel filter, by the fuel



FUEL FLOW CHART

transfer pump. The fuel is then forced by the transfer pump, through the second stage fuel filter and to the fuel injection pump. The amount of fuel required for combustion is forced under high pressure by the fuel injection pump, through the high pressure fuel lines to the fuel nozzles, from which the fuel enters the engine combustion chambers in the form of a fine cone-shaped spray.

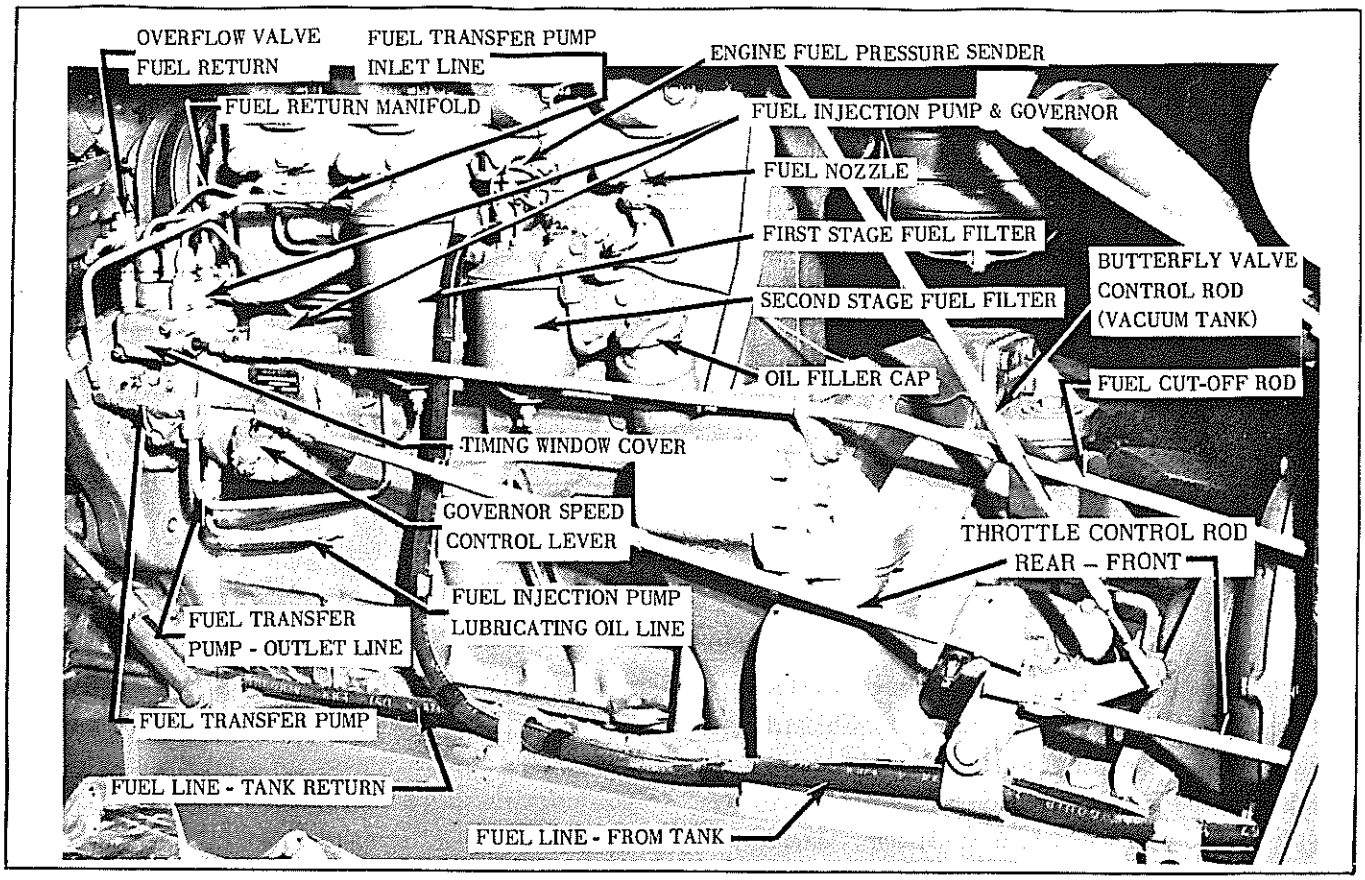
There is a certain amount of fuel seepage between the lapped surfaces of each fuel nozzle valve and its body, which is necessary for lubrication. This leakage of fuel accumulates around the spindle and in the spring compartment of each fuel nozzle, and is returned through the return manifold to the fuel return line, extending to the fuel tank. The excess fuel delivered to the fuel injection pump by the fuel transfer pump is also returned to the fuel tank through the fuel return line. A pressure of 5 to 15 P.S.I. is maintained within the low pressure fuel system by a fuel pressure relief valve installed in the fuel return outlet of the fuel injection pump.

The heavy-duty fuel injection pump is of the constant-stroke, distributing-plunger, sleeve control type, the plunger being actuated by a cam and tappet arrangement which also carries the gearing for the distribution function. Its purpose is to meter the fuel accurately and deliver it precisely at a definite moment in the engine cycle and under high pressure to the fuel nozzles. The fuel injection pump plunger is 10 M.M. in diameter and the pump is controlled by a mechanical-centrifugal type (type "C") governor.

The function of the fuel nozzles is to direct the metered quantity of fuel, received from the fuel injection pump, into the engine combustion chambers in a definite spray pattern and in such a manner as to produce the most efficient engine performance. The valve of each fuel nozzle is operated hydraulically by the pressure of the fuel delivered by the fuel injection pump.

B. FUEL TANK AND DRAIN

The TL-20D fuel tank should be filled at the end of each operating period rather than at the start. This will reduce the water content, as a full tank is less subject to condensation. A drain cock, located in the bottom left end of the fuel tank, is provided to drain the water and sediment before the engine is started at the beginning of the day's operation in warm weather, or shortly after the end of the day's operation in freezing weather. If a large accumulation of rust or sediment is found, the fuel tank should be drained and flushed.



FUEL SYSTEM (RIGHT SIDE)

C. FIRST AND SECOND STAGE FUEL FILTERS

1. Description

The first stage and second stage fuel filters, located on right side of engine, contain replaceable type elements. Dirt and sediment is collected by the first stage fuel filter and prevented from entering the fuel transfer pump. Any dirt or sediment passing through the first stage fuel filter and the fuel transfer pump is collected by the second stage fuel filter and prevented from entering the fuel injection pump. A drain cock in the bottom of the filter case allows drainage of the sediment collected.

2. Service

Before starting the engine at the beginning of the day's operation in warm weather or shortly after stopping the engine at the end of a day's operation in cold weather, open the drain cocks and allow the water and sediment to drain; close drain cocks when clean fuel runs out. Remove and replace filter element after every 300 to 500 hours of operation (more often if conditions warrant) or when fuel pressure drops below 5 P.S.I., which is an indication that the filters may be clogged. Clogged filter elements are usually indicated by irregular engine performance.

3. To Replace First Stage Fuel Filter Element

a. Close fuel tank shut-off valve. Thoroughly clean outside of filter and surrounding area.

b. Open drain cock in bottom of filter, allowing water and sediment to drain while removing screw to discard cover gasket and element. Thoroughly clean inside of filter case before installing new element and cover gasket (from element replacement kit).

c. Close drain cock in bottom of filter case.

Open shut-off valve at tank and allow the filter to fill with fuel by gravity. Tighten the filter vent plug when fuel (free of bubbles) flows from around the vent plug.

4. To Replace Second Stage Fuel Filter Element

a. Follow same steps (a. and b) as described above.

b. Fill the filter shell with clean fuel before securing it in position.

c. Crank the engine with the starter until a full stream of fuel (free of bubbles) flows from around the loosened vent plug; tighten the vent plug while the oil is flowing.

d. Start engine and observe for fuel leaks.

D. CHECKING LOW PRESSURE FUEL SYSTEM

"Missing" or uneven running of the engine, excessive vibration, stalling when idling, and loss of power are indications of insufficient fuel supply to the engine. Before performing any of the following checks, make certain there is an ample supply of fuel in the fuel tank.

1. Check for Admission of Air Into System

Loosen the vent plug located in the top of the second stage fuel filter. Crank the engine with the starter. If fuel containing bubbles flows from around the vent plug, this indicates that air is being drawn into the system. Correct this condition by tightening any loose low pressure fuel line connections, filter connections, and filter shell retaining nuts.

2. Check for Clogged Fuel Filters and Clogged or Collapsed Fuel Line

Loosen the vent plug in the top of the second stage fuel filter and crank the engine with the starter. If a full flow of fuel is not obtained from around the vent plug, this indicates a clogged or collapsed fuel line or a clogged first stage fuel filter element. If this condition exists, remove and replace the first stage fuel filter element or clean or replace the necessary fuel line.

If a full flow of fuel was obtained from around the loosened vent plug in the second stage filter, tighten the vent plug. Loosen the pressure sender located in top of the filter head of the second stage fuel filter. Crank the engine with the starter and check for full flow of fuel. If a full flow is not obtained, this indicates a clogged second stage fuel filter element and the element must be replaced. Tighten the pressure sender.

3. Check for Inoperative Fuel Overflow Valve or Transfer Pump.

The fuel transfer pump should deliver more fuel to the fuel sump of the fuel injection pump than is required for engine operation. The overflow valve, connected into the fuel return passage of the fuel injection pump, controls the maximum fuel pressure within the fuel sump of the injection pump. When the fuel pressure within the fuel sump of the injection pump exceeds 15 P.S.I., the overflow valve opens and allows the excess fuel to return to the fuel tank. The fuel leak-off from the fuel nozzles is also returned to the fuel tank through this valve. Check for an inoperative overflow valve or an inoperative fuel transfer pump as follows:

a. Start the engine and operate at approximately one-half throttle. The gauge should indicate a pressure of 5 to 15 P.S.I. If the gauge indicates a pressure below 5 P.S.I., stop the engine and disconnect the fuel return line from the overflow valve.

b. Start the engine and operate at approximately one-half throttle. If the gauge indicates a pressure below 5 P.S.I. and a full flow of fuel is observed from the overflow valve, this indicates that the valve is stuck in the open position and must be replaced as a unit. However, if the gauge indicates a pressure below 5 P.S.I. and little or no fuel is observed from the overflow valve, this indicates an inoperative fuel transfer pump and the pump must be removed and repaired or replaced.

c. If a pressure above 15 P.S.I. is indicated

by the gauge, the overflow valve is inoperative (stuck closed) and must be replaced as a unit.

d. Stop the engine and re-connect the fuel return line to the overflow valve.

E. CHECKING HIGH PRESSURE FUEL SYSTEM

1. Fuel Nozzles

The fuel nozzles should be removed after the first 50 to 75 hours of operation, tested, and adjusted if necessary. The nozzles should be removed periodically thereafter (approximately every 2000 hours), tested, and adjusted as required. "Missing" or uneven running of the engine and loss of power are an indication of an inoperative nozzle or nozzles.

a. Locating Faulty Nozzle

Run the engine at low idle speed and "cut-out" each fuel nozzle in turn by loosening the fuel line connector nut attaching the high pressure fuel line to its corresponding fuel nozzle. NOTE: *KEEP HANDS AWAY FROM THE LOOSENED NUT WHILE PERFORMING THIS TEST.* A decrease in engine speed with the connector nut loosened indicates that the fuel nozzle for that cylinder is functioning properly. If the engine speed does not decrease, the fuel nozzle is inoperative and should be removed and tested.

b. Removal of Fuel Nozzle from Engine

1. Thoroughly clean the fuel nozzle and the surrounding area before removing the nozzle.
2. Disconnect the fuel return manifold and the high pressure fuel line from the fuel nozzle. CAUTION: *Do not bend the lines when disconnecting. Cover the ends of the disconnected fuel lines to prevent the entrance of dirt.*
3. Remove the two nuts and lockwashers securing the fuel nozzle to the cylinder head.
4. Using a prying tool, pull the nozzle from the cylinder head. Use care when removing to prevent striking tip of nozzle against a hard object, which could result in damage to the nozzle tip.

c. Testing and Adjusting Fuel Nozzles

Since special test equipment is required to repair, test and adjust the fuel nozzles, they should be taken to your nearest "Allis-Chalmers" Construction Machinery Dealer.

d. Installation of Fuel Nozzle in Engine

1. Thoroughly clean the fuel nozzle recess in the cylinder head before inserting the fuel nozzle. Make certain that no small particles of carbon are present which would cause fuel nozzle to be cocked, thereby, permitting "blow-by" from the cylinder. Hard or sharp tools should not be used for cleaning; a round piece of wood or brass properly shaped is very effective.
2. NOTE. *Always use a new fuel nozzle gasket when installing a fuel nozzle in position in the cylinder head. Place gasket on nozzle and carefully insert into position in the cylinder head.*
3. Install two lockwashers and hex nuts to secure fuel nozzle; tighten the nuts evenly to torque of 12 to 15 lbs. ft.
4. Connect the high pressure fuel line and the fuel return mainfold to the nozzle and make certain that the connections are tightened securely.

2. Check for Inoperative Fuel Injection Pump

If all the above causes for insufficient fuel supply have been eliminated, and the engine still runs uneven and normal engine performance is not obtained, the fuel injection pump will be considered at fault and should be removed and tested. The "faulty" fuel injection pump should be taken to your nearest "Allis-Chalmers" Construction Machinery Dealer for repairs and testing. IMPORTANT: *Do not replace the fuel injection pump before making certain that all other possible causes for improper engine operation have been eliminated.*

AIR PRE–CLEANER AND AIR CLEANER

A. DESCRIPTION AND PURPOSE

The purpose of the air pre-cleaner and air cleaner is to remove dust and other foreign matter from the air used by the engine. The life of the engine depends largely upon the efficiency of the air pre-cleaner and air cleaner. Fast wear on cylinder liners, pistons, and rings will result if the air cleaner is not kept in good condition and properly serviced.

Air for the engine enters through the air pre-cleaner mounted on top of the air cleaner pipe. The pre-cleaner is designed to impart a rotary motion to the air; this causes the heavy particles of dust to be thrown to the outside of the pre-cleaner shell and deposited therein. A large percentage of the dust in the air drawn through the pre-cleaner is thus removed.

After passing through the air pre-cleaner, the air enters the air cleaner through the pipe that extends down through the center of the air cleaner body. An oil cup filled to a specified level with engine oil is suspended on the lower end of the air cleaner body. As the air is drawn up onto the screen mats in the main body of the cleaner. Dust still remaining in the air is collected by these oily mats as the air passes through them. The oil dripping back into the oil cup carries this dust with it and deposits it in the cup. Thus, only clean air enters the engine air intake for delivery to the cylinders.

A damaged hose, loose hose clamps, damaged seal on butterfly shaft (for power brakes), damaged gasket or leak of any kind that allows air to enter the cylinders without first passing through the air cleaner will defeat the purpose of the cleaner; therefore, extreme care should be taken to prevent leaks. Periodic inspection of the above parts and of the air cleaner body for dents, cracks, loosened solder connections, etc., should be made frequently. If any of the above mentioned conditions are found, they must be corrected immediately.

B. AIR PRE–CLEANER SERVICE

Empty the air pre-cleaner whenever the dust level reaches half-way up on the inspection glass. Remove and clean as follows:

1. Unscrew the wing nut and remove the cap from the shell. Lift the shell from the pre-cleaner body.
2. Empty the dust from the shell and wipe the inside of the shell with a dry cloth. Make sure the fins in the pre-cleaner body are not bent, damaged, or clogged.
3. Wipe the dust off the cap and reassemble the pre-cleaner. Replace the gasket if it is not in good condition. Tighten the wing nut with the fingers; *DO NOT USE A WRENCH.*

C. AIR CLEANER SERVICE

The filtering oil in the air cleaner oil cup must be checked daily, or more often when operating under extremely dusty conditions. Keep the oil cup filled with clean engine oil to a level even with the top of the cone in the center of the air baffle. Empty and wash the cup and the air baffle whenever the oil becomes discolored, indicating a quantity of dirt has collected, then refill the cup with clean engine oil. Use same viscosity oil as is used in the engine.

NOTE: *SOME "DIESEL" ENGINE LUBRICATING OILS MAY FOAM WHEN USED IN THE AIR CLEANER. DO NOT USE AN OIL THAT FOAMS AS IT REDUCES AIR CLEANER EFFICIENCY AND IN SOME CASES ALLOWS THE OIL TO BE PULLED OVER INTO THE ENGINE, CAUSING SERIOUS DAMAGE.*

Service the air cleaner as follows:

1. Remove the oil cup from the bottom of the air cleaner body. Remove the air baffle retaining ring and the air baffle from the oil cup, then empty the oil from the cup.

2. Thoroughly wash the oil cup and the air baffle with clean solvent or fuel. Remove the air pre-cleaner assembly from the top of the air cleaner and swab out the inside of the air cleaner pipe that extends from the pre-cleaner to the oil cup. Install the air pre-cleaner assembly.
3. Install the air baffle and retaining ring in the oil cup and fill the cup to the proper level with clean engine oil.
4. Be sure that the oil cup gasket is in good condition, then install the oil cup in position on the bottom of the air cleaner body. Check the hose clamps on the air cleaner hose and make certain that the clamps are tight and that the hose is not crimped, allowing air to enter without passing through the air cleaner.

— GOVERNOR —

A. GENERAL

The governor was adjusted at the factory to provide for the proper horsepower and a full governed engine speed (under load) of 2000 R.P.M. The governor should not require adjustment during the warranty period. Should an adjustment become apparent while the tractor is in the warranty period, contact your nearest authorized "Allis-Chalmers" Dealer.

B. CHECKING ENGINE SPEED

The governor very seldom gets out of working order. If the engine speed is irregular, check the fuel system and all other engine adjustments before changing the governor setting.

Operate the engine until normal operating temperature (160° to 190° F.) is indicated by the engine temperature gauge. Check the speed as follows:

1. Remove radiator grill.
2. Move transmission control lever to neutral and start engine.
3. Hold tachometer against engine crankshaft. With accelerator pedal fully depressed, engine speed should be 2140 to 2200 R.P.M. With accelerator pedal released, engine speed should be 600 R.P.M. NOTE: *On early machines it may be necessary to cut a small notch in the bottom plate of the fan shroud in order to get the Tachometer on the engine crankshaft.*

C. LOW IDLE AND HIGH IDLE ENGINE SPEED ADJUSTMENTS

Before changing the high and low idle speed settings, with the accelerator pedal fully depressed and fully released, make certain that the throttle control linkage moves the governor speed control lever through its full travel. To adjust the engine speed proceed as follows:

1. Remove the speed adjusting screw access cover from the governor.
2. Disconnect the throttle control rear rod from the governor speed control lever, so that the lever may be moved by hand.
3. With the engine running, loosen the jam nut on the low idle adjusting screw. Hold the governor speed control lever toward the front so that the control lever shaft stop plate contacts the low idle adjusting screw. Turn the low idle adjusting screw "in" as necessary to increase and "out"

as necessary to decrease the low idle speed. When a speed of 600 R.P.M. is obtained at the crankshaft, hold the low idle adjusting screw and tighten the jam nut.

4. With the engine running, loosen the jam nut on the high idle adjusting screw. Hold the governor speed control lever toward the rear so that the control lever shaft stop plate contacts the high idle adjusting screw. When a speed of 2140 to 2200 R.P.M. is obtained at the engine crankshaft, hold the high idle adjusting screw and tighten the jam nut.
5. Install the speed adjusting screw access cover in position on the governor.
6. Connect the throttle control rear rod to the governor speed control lever.
7. Install the radiator grill.

VALVE ADJUSTMENT AND CYLINDER HEAD

A. VALVES

1. General

The correct clearance (lash) between the ends of the intake and exhaust valve stems and the rocker arms is very important in a "Diesel" engine due to the high compression developed within the cylinders. Insufficient valve clearance will cause loss of compression, misfiring, and will eventually cause burning of the valves and valve seats. Excessive valve clearance will result in faulty engine operation, valve tappet noise and cause rapid wear of the valve operating mechanism.

With the engine at normal operating temperature (160° to 190° F.), the proper lash for the intake valves is .016" and is .020" for the exhaust valves. After any mechanical work has been done which would disturb the valve lash, the intake valves may be set "cold" at .018" and the exhaust valves at .022" clearance so that the engine may be run and allowed to warm up to normal operating temperature. After the engine has been "warmed up" to normal operating temperature, the valve lash should be checked for proper clearance. NOTE: The firing order of the engine is 1–3–4–2.

2. Valve Adjustment

Check the valve clearance periodically and adjust when necessary to obtain the specified lash of .016" for the intake valve and .020" for the exhaust valves.

a. Operate the engine until it reaches normal operating temperature (160° to 190° F.) then stop engine.
b. Remove the engine hood and the rocker arm cover.
c. Crank the engine with the starter until both valves for the No. 1 cylinder (cylinder nearest the fan) are closed and the push rods are at their lowest position.
d. Check the clearance between the valve stems and the rocker arms. Use a .016" thickness gauge when checking the lash of the intake valve and a .020" thickness gauge when checking the lash of the exhaust valve. The thickness gauge should pass between the rocker arm and the corresponding valve stem with a slight drag when the valve lash is properly adjusted.

e. Adjust each valve by loosening the lock nut on the adjusting screw and turning the screw clockwise as necessary to decrease the clearance or counter-clockwise as necessary to increase the clearance. When the proper clearance is obtained, tighten the lock nut. Recheck to be sure the clearance did not change when the lock nut was tightened.

f. Repeat the above operations on the valves for the other cylinders. Install the rocker arm cover and the engine hood.

C. CYLINDER HEAD

1. Tightening of Cylinder Head Stud Nuts

The tightness of the cylinder head stud nuts MUST be checked at least two (2) times after a new or rebuilt engine has been placed in operation. The checks must be made after the first 10 and 100 hours of operation. If the cylinder head stud nuts are not maintained at the correct torque (95 to 105 lbs. ft. on the 1/2" and 190 to 200 lbs. ft. on the 5/8" cylinder head stud nuts), it is possible that cylinder head gasket trouble will be encountered. After the cylinder head stud nuts have been checked for proper torque, it is also necessary to check the valve tappets for proper clearance.

2. Energy Cells

The energy cells, located in the left side of the cylinder head, constitute part of the combustion chambers. The energy cells are subject to intense heat and may become burnt and coated with carbon. The energy cells should be removed periodically for inspection. In order to remove #1 and #4 cells it will be necessary to move the generator and the hose from the torque converter heat exchanger to the engine oil cooler. Special tools are available through your Allis-Chalmers dealer for removing the energy cells as follows:

Remove the energy cells as follows:

a. Remove the two nuts and lockwashers securing each energy cell clamp to the cylinder head.

b. Using special tools, pull the energy cell plugs from the energy cells.

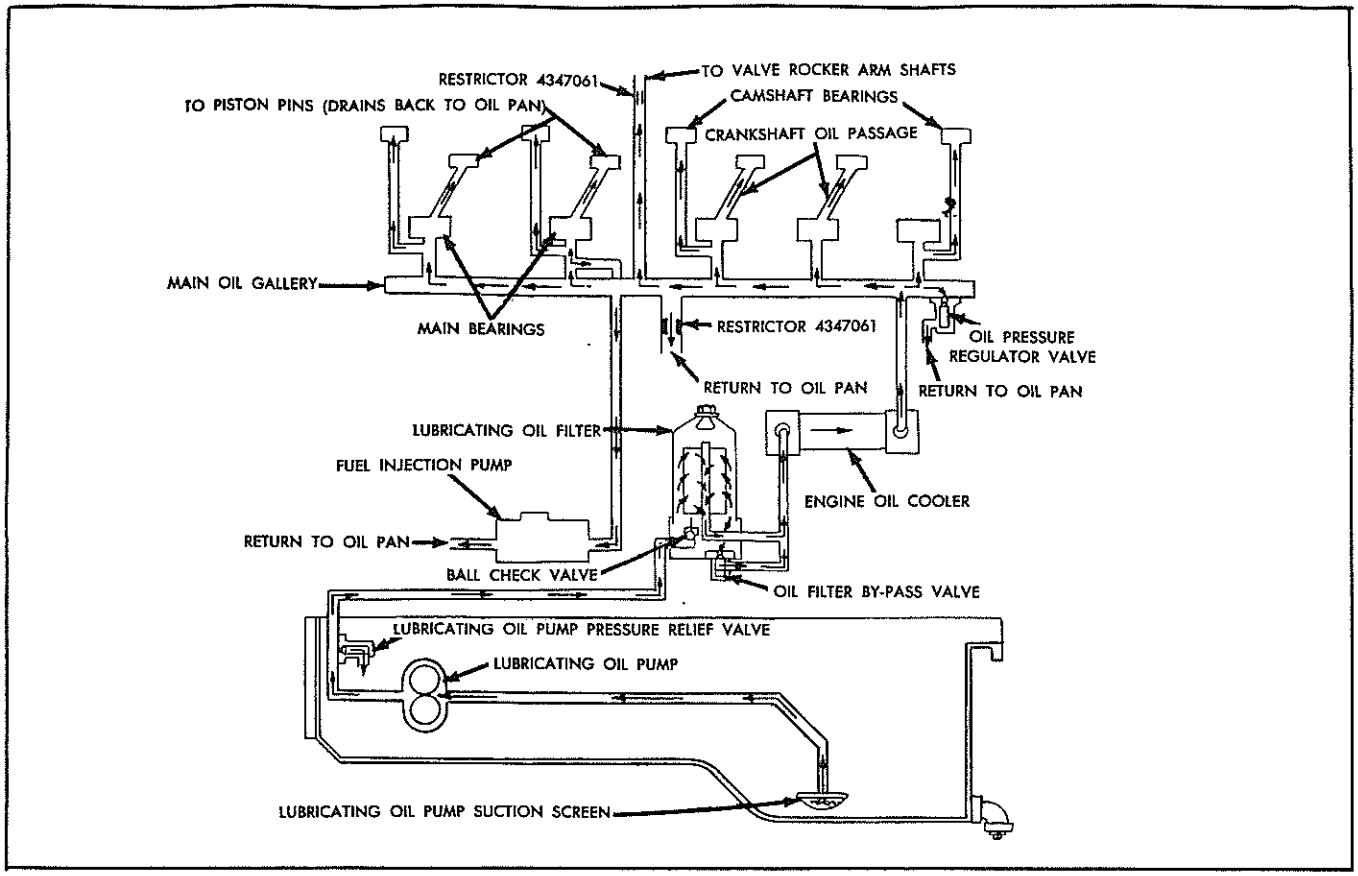
c. Using special tools, pull the energy cells from the cylinder head.

Note the condition of each energy cell. If a heavy coating of carbon is present on a cell, this is an indication of a faulty fuel nozzle and the corresponding fuel nozzle should be removed and checked. If an energy cell is badly burnt or has burnt spots, the cell must be replaced. Using a piece of hardwood and solvent, or fuel, clean the energy cells. Do not use emery cloth or a metal object to remove carbon.

CAUTION: DO NOT CHANGE THE CONTOUR OF AN ENERGY CELL IN ANY MANNER.

Make certain that the energy cells and the cell openings in the cylinder head are clean. Using fine grain valve lapping compound, lap the seats of each energy cell with its corresponding seats in the cylinder head. After lapping, remove the energy cell and clean the lapping compound from the cell and the cylinder head. Install each energy cell in position in the cylinder head. Install the energy cell plugs and secure with the energy cell clamps. Reset generator and adjust belt. Connect hose from torque converter heat exchanger to engine oil cooler.

ENGINE LUBRICATION SYSTEM



LUBRICATING OIL FLOW CHART

A. DESCRIPTION OF SYSTEM

The engine is pressure lubricated throughout by a gear type lubricating oil pump, driven by the oil pump driving gear in mesh with the crankshaft gear.

The lubricating oil pump draws the oil from the crankcase through the oil pump suction screen which is submerged in the lubricating oil. The pump then circulates the oil under pressure through the oil filter, engine oil cooler, and then to the main oil gallery of the engine which extends lengthwise through the cylinder block and parallel to the camshaft. Oil passages direct the oil from the main oil gallery to the camshaft and main bearings and through the rifle drilled connecting rods to the piston pins.

Stabilized oil pressure is maintained within the engine by an oil pressure regulator valve, located in the main oil gallery at the right rear corner of the cylinder block. Excess oil bypassed through this valve returns to the crankcase oil pan.

A horizontal oil passage through the center of the cylinder block extends from the main oil gallery to a cavity in the left side of the cylinder block. From this cavity there are two openings which extend to the rocker arm assemblies.

An external oil line, extending from the main oil gallery of the cylinder block to the fuel injection pump housing, is provided for lubrication of the fuel injection pump and governor. The lubricating oil delivered to the fuel injection pump is returned to the engine crankcase through an oil return hole in the pump mounting flange.

The oil filter base contains two valves, an oil filter by-pass valve and a ball check valve. Oil delivered under pressure by the lubricating

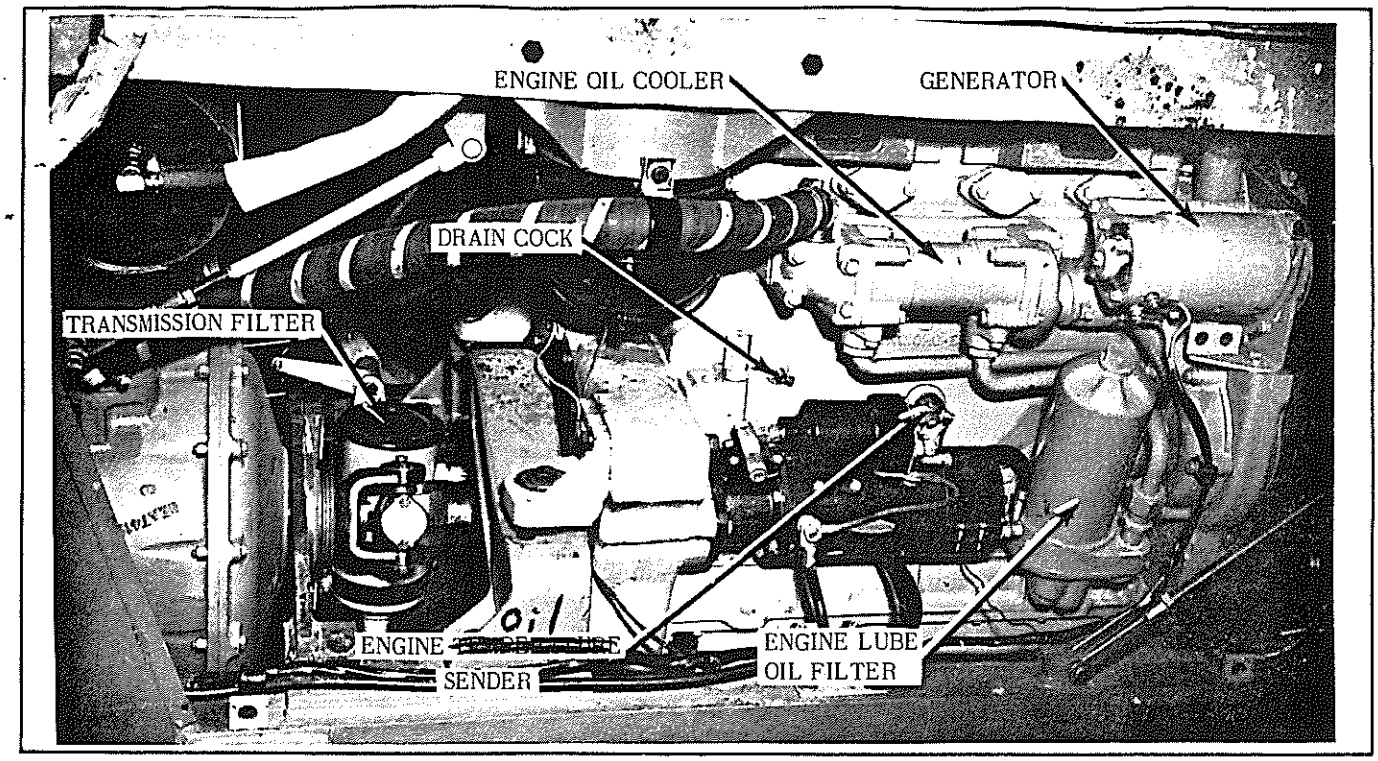


FIG. 22 - TRANSMISSION OIL FILTER AND LUBE OIL FILTER

oil pump holds the ball check valve in the open position, allowing the oil to circulate; whenever the engine is stopped, the ball check valve closes, preventing the oil in the filter from draining back to the crankcase. The oil filter by-pass valve, is provided to by-pass oil directly from the oil pump to the lubrication system in the engine if the oil filter becomes clogged, or if in cold weather the oil is too thick to circulate freely through the oil filter.

B. LUBRICATING OIL FILTER (See Fig. 22)

The lubricating oil filter, located on the left side of the engine, is of the full-flow type and contains a replaceable type element. A new element must be installed each time the oil in the crankcase is changed, or more often if conditions warrant.

C. TO REPLACE FILTER ELEMENT

1. Thoroughly clean the filter shell and the surrounding area.
2. Loosen the shell center-bolt and remove the center-bolt and filter shell as an assembly. Remove the filter element from the filter base and discard the element.
3. Thoroughly wash and dry the interior of the filter shell.
4. Install a new shell gasket in position in the oil filter base. Install a new element in position in the filter shell.
5. Install the filter shell assembly in position on the oil filter base, making certain the shell gasket is properly installed in the base, then tighten the shell center-bolt to a torque of 80 to 100 lbs. ft.
6. Start the engine and observe for oil leakage between the filter shell and the oil filter base. Stop the engine, check the oil level of the engine crankcase, and add oil as necessary to raise the oil level to the "FULL" mark on the oil level gauge rod.

D. ENGINE OIL COOLER

The engine oil cooler (Fig. 22) located on the left side of the engine, consists of a corrosion resistant cooling core and tank. The water pump circulates coolant through the

cooling core tubes and the engine lubricating oil pump circulates oil through the tank, around the outside of the tubes of the cooling core, thereby controlling the oil temperature.

The cooling core consists of small copper tubes which dissipate heat from the oil to the engine coolant. If proper lubricating oil maintenance procedure is followed, the oil cooler will function efficiently. However, if the oil in the engine is not changed at the recommended intervals, impurities will be deposited in the oil cooler and will restrict the flow of oil around the tubes of the cooling core.

Restriction of the flow of oil around the tubes of the cooling core is usually indicated by a drop in oil pressure. If this occurs, the oil cooler must be cleaned or a new one installed.

IMPORTANT: *IT IS ABSOLUTELY NECESSARY THAT THE OIL COOLER UNIT BE KEPT CLEAN FOR PROPER OIL COOLING.*

E. CLEANING OF ENGINE OIL COOLER

Cleaning the engine oil cooler requires the use of special solvents. The following solvents have been found effective when used according to the manufacturer's direction:

Excello Floor Cleaning Compound
Turco Cleaning Compound
No. 70 Stripper
Mixture of 3 parts Oakite No. 7 and 5 parts fuel oil
Bendix Cleaning Compound

To use the last named solvent, merely submerge the oil cooler into the solution for a sufficient length of time to allow the chemical action of the solvent to dissolve or loosen the sludge or other foreign matter. Flush the oil cooler thoroughly with live steam or spirits after cleaning, regardless of type of cleaner used. NOTE: *If the oil cooler is badly clogged, a new oil cooler must be installed.*

ENGINE COOLING SYSTEM

A. DESCRIPTION OF SYSTEM

The engine cooling system includes the water pump, radiator, engine oil cooler, Thermostat, engine temperature gauge, cooling fan, and the water passages in the cylinder block and cylinder head. The water pump draws the coolant from the bottom of the radiator and circulates it through the engine oil cooler. At the engine oil cooler the coolant is divided, part going through the water passages in the engine and part going to the Transmission oil cooler. The coolant is discharged from the Transmission oil cooler and the cylinder head into the water outlet manifold and passes through the thermostat housing and the radiator inlet elbow to the upper part of the radiator. The coolant is cooled as it passes from the top to the bottom of the radiator core by the suction-type cooling fan.

The thermostat, located in the thermostat housing at the rear of the water outlet manifold of the engine, operates automatically to maintain a normal coolant operating temperature of 160° to 190° F.

A double acting valve is provided in the radiator cap for relieving pressure due to expansion (from heating of coolant), and allows atmospheric pressure to enter when contraction (due to cooling of coolant), occurs. As this is a pressure type cooling system, it is necessary to keep the radiator cap turned on tightly.

CAUTION: *Do not remove the pressure type radiator cap while the coolant is above 212° F., as the coolant will break into a boil and will splash onto the person removing the cap.*

B. GENERAL MAINTENANCE

In warm weather, keep the cooling system filled with clean soft water or rain water whenever possible. If soft water is not available and hard water must be used, the hard water should first be treated with a water softener. A commercially reliable rust inhibitor should be added to the cooling system for warm weather operation. A rust inhibitor (soluble oil), available in half pint or quart containers, can be obtained from "Allis-Chalmers" Dealers and should be added to the cooling system in proportions of 1 pint of soluble oil to every 15 quarts of water.

CAUTION: *NEVER ADD AN ANTI-FREEZE SOLUTION TO A COOLING SYSTEM THAT CONTAINS A RUST INHIBITOR.* Drain, flush and refill the cooling system with clean water before adding an anti-freeze solution for cold weather operation.

In winter weather, use an ethylene glycol anti-freeze solution in the system to protect against damage from freezing. This type of anti-freeze has a much higher boiling point than water. After any addition of water or anti-freeze compound, test the solution after the added quantity has become thoroughly mixed to make sure it will withstand the prevailing or anticipated temperature. A mixture of 60% ethylene glycol and 40% water will provide maximum protection; the use of more than 60% ethylene glycol in the solution will raise the freezing point and provide less protection against freezing.

Keep the radiator air passages free from leaves, trash, and other material which will restrict the flow of air through the radiator.

All leaks in the cooling system must be corrected as soon as they are evident. The fan drive belts and the water pump and generator drive belt must be kept properly adjusted.

The most efficient engine operation is obtained with the coolant operating temperature held within a range of 160° to 190° F. Operating the engine with the coolant temperature below this range will result in incomplete combustion of fuel, higher fuel consumption with less power, and will cause harmful deposits within the engine.

Maintaining the normal coolant operating temperature (160° to 190° F.) depends mostly on proper functioning of the thermostat. If the coolant temperature remains consistently below normal, the thermostat should be removed, checked for proper operation, and replaced if necessary.

C. DRAINING OF COOLING SYSTEM

Remove the radiator filler cap and open the cylinder block drain cock, located on the left front side of the cylinder block. Open the radiator drain cock located in water outlet elbow at lower left corner of radiator. Remove drain plug located on side of transmission oil cooler on top of transmission torque converter housing.
CAUTION: *When draining the cooling system in freezing weather, make certain that the coolant flows freely from the drain cocks and that the system drains completely.*

D. FILLING OF COOLING SYSTEM

Close the radiator and cylinder block drain cocks, and replace plug in transmission cooler. Fill the cooling system through the radiator filler cap opening until the coolant level is within approximately 2 inches of the top of the radiator and install the radiator filler cap.

E. FAN DRIVE BELT ADJUSTMENT

The fan drive belts are correctly adjusted when the straight side of the belts can be pressed inward by hand approximately ½ to ¾ inch at a point half-way between the crankshaft and the fan pulleys. To adjust the drive belts, loosen the jam nut on the adjusting screw and turn the adjusting screw in or out as necessary to obtain the correct tension on the drive belts,

then tighten the adjusting screw jam nut. Tighten the fan idler bracket clamping capscrew.

F. WATER PUMP AND GENERATOR DRIVE BELT ADJUSTMENT

The water pump and generator drive belt is properly adjusted when the belt can be pressed inward by hand approximately ½ inch at a point half-way between the generator and the fan pulleys. To adjust the drive belt, loosen the generator adjusting arm capscrew, move the generator up or down to obtain the correct tension of the drive belt, then tighten the adjusting arm capscrew.

ELECTRICAL SYSTEM

A. DESCRIPTION

The electrical system, which includes the starter, generator, generator regulator, ammeter and gauges, lights, horn, and wiring, is a 24 volt system throughout, except for the red tail light, which is 12 volt. Two 12-volt wet cell storage batteries, located underneath the hood, are used to supply current for the system. Electrical energy drained from the batteries through the operation of the above named units is replaced by the generator. The output of the generator is controlled by the generator regulator to prevent overcharging of the batteries.

B. BATTERIES

Check the level of the electrolyte solution every 10 hours of operation, or more often if conditions warrant. Maintain the solution level as indicated on the battery caps. Keep the battery and cable terminals tight and clean. CAUTION: *To prevent the possibility of bodily injury, always disconnect the battery-to-ground cable (positive terminal) before disconnecting or repairing any of the heavy electrical cables. If corrosion occurs, clean the battery posts and terminals with a strong soda solution and coat the terminals lightly with vaseline before connecting them again. The vaseline will prevent further corrosion.*

When the atmospheric temperature is below the freezing point, special attention should be given to hydrometer readings of the batteries. A specific gravity of 1.270 to 1.215 at 80° F. is considered satisfactory for continued use. Specific gravity readings without correction for temperature are practically meaningless. For each 10 degrees that the temperature of the electrolyte is above 80° F., add 4 points to the hydrometer reading and for each 10 degrees below 80° F., subtract 4 points to get the true specific gravity. For example, if the hydrometer reading is 1.250 and the electrolyte temperature is 20° F. (60 degrees below 80° F.), 1.250 minus 24 points equal 1.226 – the true specific gravity.

If the corrected readings are below 2.215, the batteries are not receiving sufficient charge. This might indicate that the generator or the generator regulator requires attention. If these units prove satisfactory, inspect the system for short circuits and for loose or corroded connections. In zero weather there is danger of batteries freezing if the specific gravity is below 1.100. Batteries with a specific gravity of 1.100 will freeze at 18° F.; batteries with a specific gravity of 1.220 will freeze at 31° below zero F. During freezing weather, any addition of water to the cells should be made after the engine is started at the beginning of an operating period to make certain that the water and electrolyte solution will be thor-

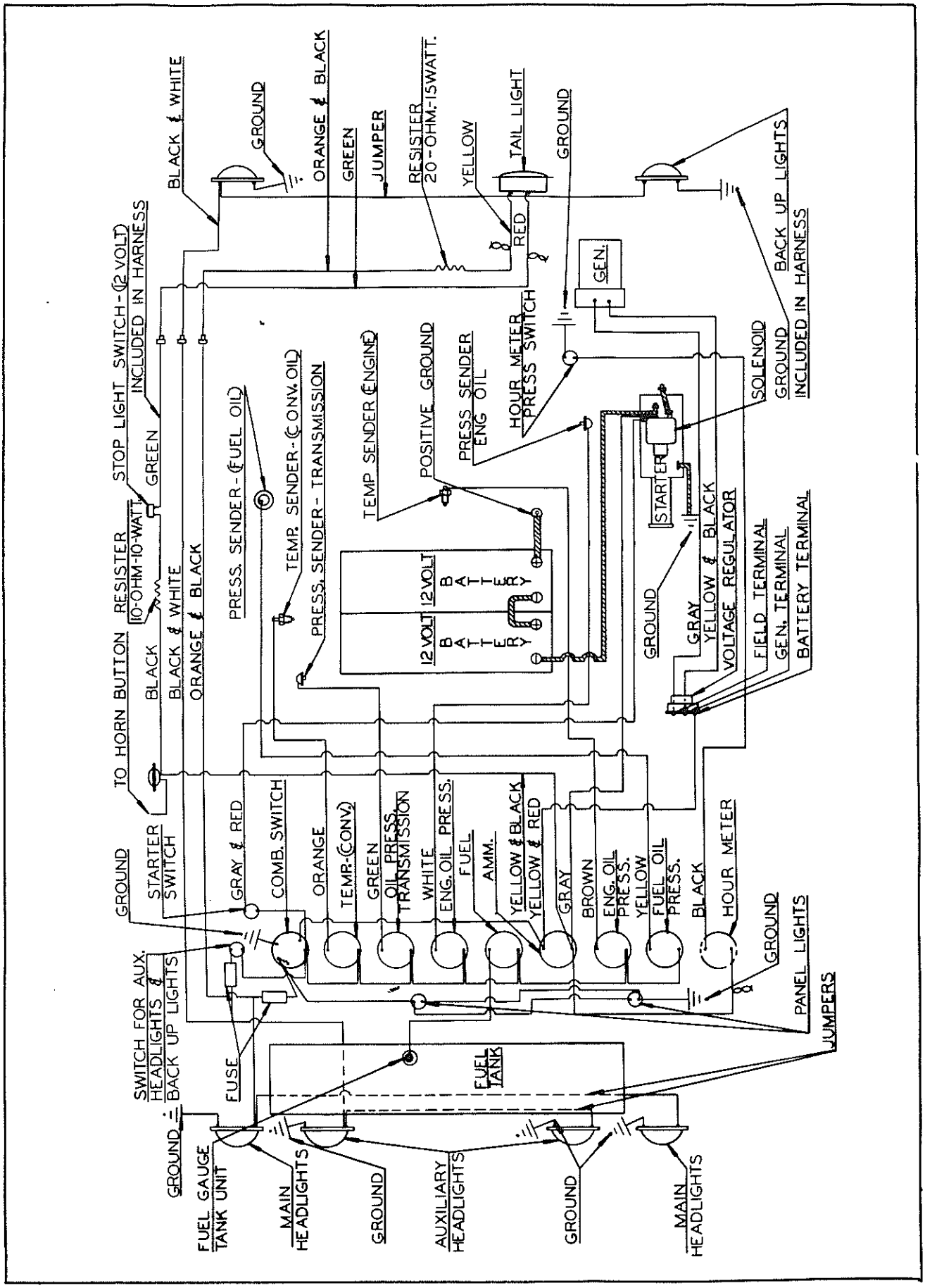


PLATE 708 – WIRING DIAGRAM – SCHEMATIC

oughly mixed; otherwise it may freeze. The filler caps must be kept tight at all times and the tops of the batteries kept clean and dry.

C. STARTER

The 24-volt starter is mounted on the left side of the engine flywheel housing. A "Dyer" type drive is used to mesh the drive pinion of the starter with the flywheel ring gear for cranking the engine and to automatically disengage the drive pinion when the engine has started. The starter is operated with a heavy duty solenoid which is mounted on the starter and controlled by a push button on the instrument panel. When the push button is depressed it actuates the solenoid, closing the circuit between the batteries and the starter, and also shifts the drive pinion of the starter into mesh with the flywheel ring gear. CAUTION: *When using the starter to crank the engine, and the engine does not start within 30 seconds, allow the starter to cool for 2 minutes before using it again.*

Testing and adjustment of the starter and solenoid should not be attempted without dependable testing equipment, therefore, it is recommended that they be taken to a dependable electrical repair shop when service is required.

D. GENERATOR AND GENERATOR REGULATOR

The generator, mounted on a bracket on the right front side of the engine, is belt driven from the fan pulley. The generator and generator regulator are set to keep the batteries fully charged under normal conditions. The ammeter should indicate a good rate of charge for a short time after starting the engine, or until the generator replaces the energy drained from the batteries during cranking; then it will show little or no charge. It is important that the generator and the generator regulator be maintained in good condition so that the batteries will be kept charged.

Testing and adjustment of the generator and generator regulator should not be attempted without dependable testing equipment, therefore, it is recommended that these units be taken to a dependable electrical repair shop when service is required.

E. GAUGES

All the gauges are electrically operated by means of a "sender unit" located at each check point and a wire leading to the corresponding gauge on the instrument panel. Each gauge circuit is energized when the combination switch located on the instrument panel (refer to Page 6) is turned on. It is imperative that this switch be turned *"OFF"* each time the engine is shut off, to avoid discharging the batteries.

F. GENERATOR – WATER PUMP BELT ADJUSTMENT

Loosen the generator adjusting arm capscrew and move the generator up or down to obtain the correct belt tension, then tighten the adjusting arm capscrew. The tension is properly adjusted when the belt can be pressed inward by hand approximately ½ inch at a point halfway between the generator and fan pulleys.

G. ELECTRICAL CABLES

Inspect the electrical cables frequently to detect any loose connections or frayed insulation. Tighten the connections and wrap any frayed spots with friction tape to prevent short circuits. CAUTION: *To prevent the possibility of bodily injury, always disconnect the battery-to-ground cable from the battery box support before cleaning, repairing, disconnecting, or connecting any of the heavy electrical cables.*

TRANSMISSION AND TORQUE CONVERTER

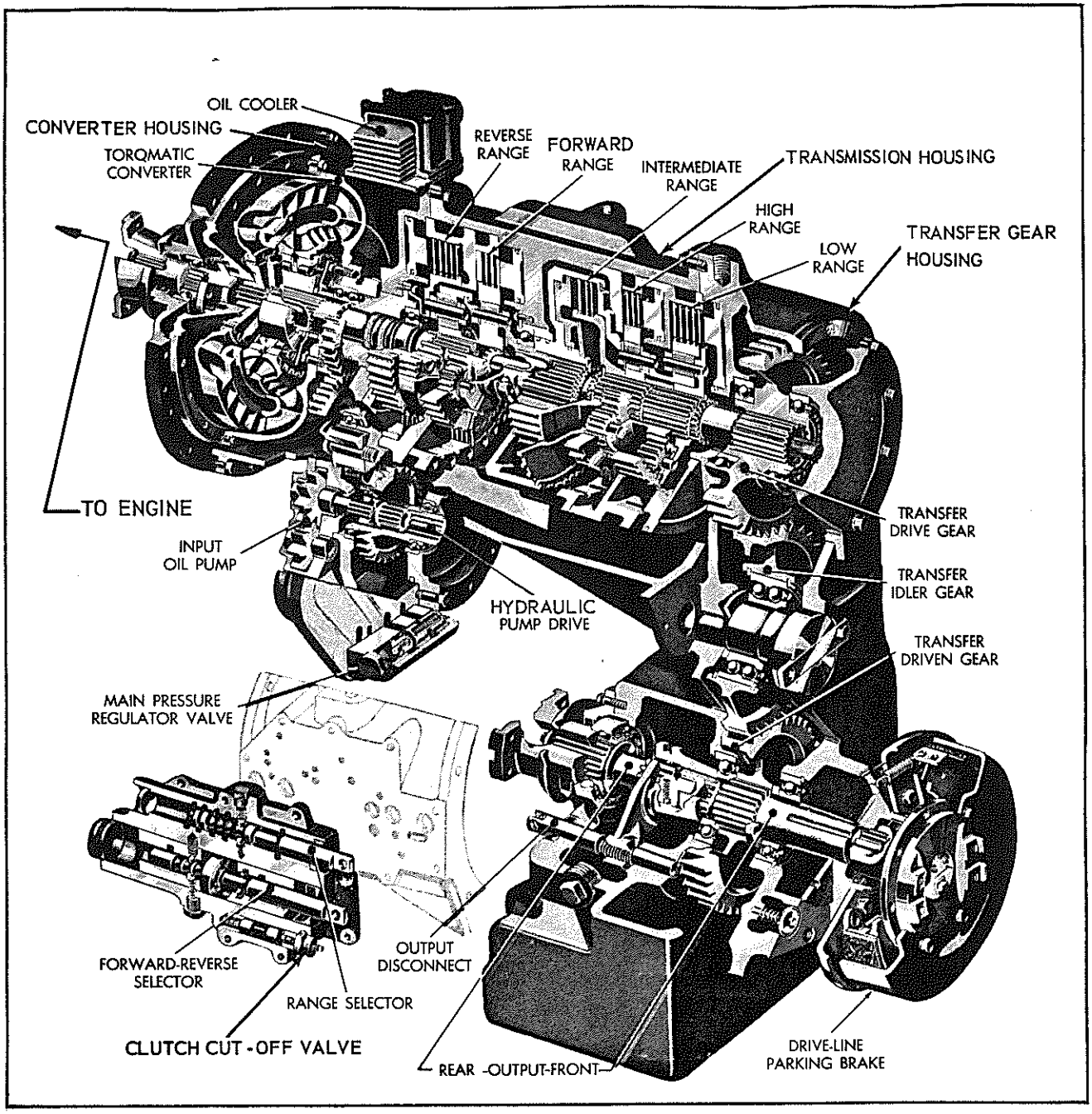


FIG. 23 – TRANSMISSION AND TORQUE CONVERTER

A. GENERAL

The torque converter and transmission is designed as a compact unit. The three major components are contained in separate housings as follows: torque converter, transmission, and transfer gear housings. These housings contain inter-connected oil passages to utilize a common oil supply. Both a screen and replaceable type filter are used to protect the hydraulic system.

1. Torque Converter Housing Assembly

The torque converter housing is bolted to one end of the transmission housing and may be removed as a unit. This housing contains the torque converter assembly and provides a mounting for the transmission-converter oil cooler. A small pump for charging the transmission-

converter hydraulic system and two separate pressure regulating valves for controlling the pressure from the pump are incorporated in the converter housing. In addition the housing provides a mounting for the loader hydraulic pump. Both pumps are driven by the engine crankshaft through a series of gears.

The torque converter assembly is a single stage type with a torque multiplication ratio of 3.5 to 1. It contains four elements which are; pump, turbine, first stator and second stator. The elements are enclosed in a housing consisting of two halves; the pump cover and the pump, which make up the torque converter assembly. The converter assembly is directly connected to the engine crankshaft by means of a universal joint drive shaft.

2. Transmission Housing Assembly

The transmission housing is supported between the torque converter housing and the transfer gear housing. This housing contains the constant-mesh, planetary gear train and the five multiple disc clutches for controlling this gear train. It provides a mounting for the selector valve housing consisting of a range plunger for selecting a speed range; a direction plunger for selecting forward or reverse; and a clutch cut-off valve to provide the automatic clutch release feature.

The compound planetary gear train is arranged to provide three speed ranges (Lo, Int. and Hi) in both the forward and reverse direction. Since the gears are always in constant mesh there is no "clashing of gears" when changing either the speed ranges or the direction of travel.

Two of the five oil cooled, multiple disc clutches are classified as direction clutches, and three are classified as range clutches. All five clutches are applied by hydraulic power and spring released. The friction plates have bronze facings and the reaction plates are steel. Because of the hydraulic control there is automatic compensation for normal clutch wear – no adjustment is necessary. A single lever connected by linkage to the two plungers in the selector valve housing controls both the direction clutches and range clutches – thus full power shift, one lever control of all speeds; forward and reverse.

3. Transfer Gear Housing Assembly

The transfer gear housing is bolted to the end of the transmission housing and may be removed as a unit. It contains the necessary gears to transfer the drive from the planetary gearing in the transmission to the output shaft. In addition it contains the shifting mechanism to provide the rear axle disconnect feature and serves as a mounting for the parking brake. This housing also provides the oil sump for the transmission-converter hydraulic system and contains a suction line screen for the oil.

B. CLUTCH CUT–OFF VALVE

1. Description

The clutch cut-off valve is located in the selector valve housing mounted on the side of the transmission housing. It will pass oil to the control plunger for the range clutches until "actuated" to cut off the oil flow which automatically releases the engaged range clutch. The cut-off valve is actuated by lightly applying the brake, because it is connected into the hydraulic brake system. Therefore, as long as the loader brakes are applied, all the engine power is available to the loader hydraulic pump for more powerful loading action. Upon release of the brakes the cut-off valve again passes oil to the range clutch which automatically engages it.

2. Control of Clutch Cut-Off Valve

When precise control of the machine is required on grades this automatic clutch release feature offered by the clutch cut-off valve may be undesirable. Accordingly, a control lever is provided so the operator can easily disengage the automatic release feature as desired. Control is

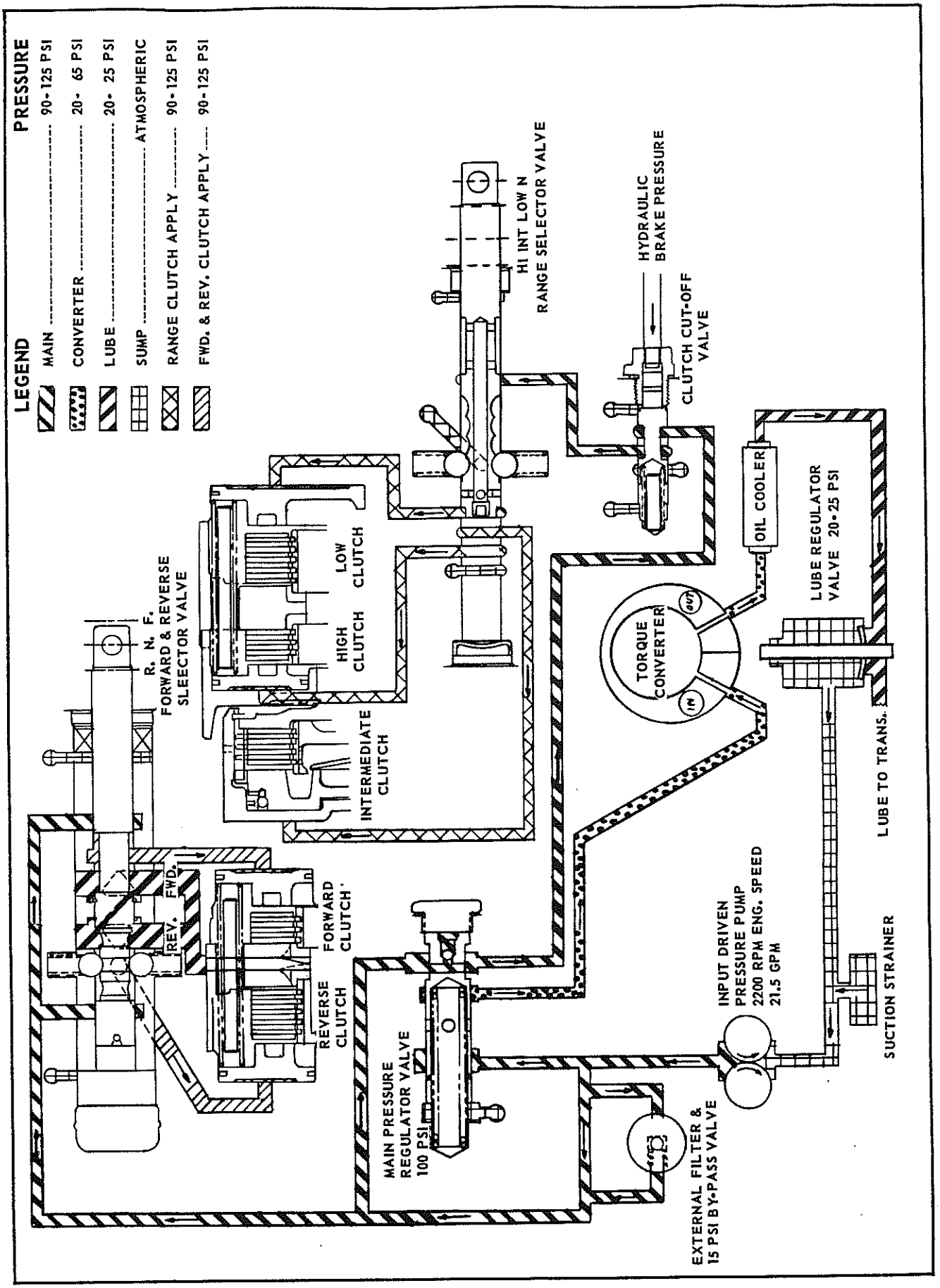


PLATE 740 – TRANSMISSION OIL FLOW & PRESSURE - SCHEMATIC

accomplished by a hand operated check valve in the line between the hydraulic brake circuit and the clutch cut-off valve. When changing the position of the control lever the brake pedal should be fully released. Refer to Page 6 for location of control lever.

C. HYDRAULIC SYSTEM, TRANSMISSION-CONVERTER

1. Oil Recommended for Hydraulic System

A good grade of Type "C" transmission fluid (or equal) is recommended, year around. No specific brand of oil is recommended. Use only products qualified under the above specification and recommended by reputable oil companies.

2. Oil Flow in Hydraulic System

The input charging pump draws oil from the oil sump in the transfer gear housing through the suction line screen which is submerged in oil. From the pump the oil flows through the oil filter, located between the engine and transmission, into the main pressure regulator valve located on the converter housing. The oil then flows under pressure to the selector valve housing where it is directed through oil passages to the forward and reverse selector plunger and through the clutch cut-off valve to the range selector plunger. Movement of either plunger directs oil to the selected clutch and hydraulically engages it. The oil returning from a clutch as it releases is directed back to the oil sump.

Oil is supplied to the torque converter by the excess gallonage from the main pressure regulator valve. The output oil from the torque converter flows through the oil cooler, located on top of the converter, and into the lube pressure regulator valve. The lube oil then flows under pressure into the lubricating circuit and is discharged back into the sump. Normal seepage from the converter seal rings is drained back into the sump.

D. REPLACING FILTER ELEMENT AND SCREEN, TRANSMISSION-CONVERTER

1. The filter, mounted on the transmission support bracket between the engine and transmission, is of the full flow type with a built-in by-pass. It contains a replaceable element. A new element must be installed each time the transmission-converter oil is changed or more often if conditions warrant. To replace the element proceed as follows:
   a. Thoroughly clean the filter cover and surrounding area.
   b. Remove the center bolt with cover and spring. Lift out the old element from the filter case. Discard old element and gasket.
   c. Thoroughly clean the inside of the filter case before installing a new element and new gasket. Be sure element is properly seated inside case.
   d. Reinstall the cover on top of element and draw it down tightly with the center bolt.
2. The screen is located in the oil sump of the transfer gear housing. It is accessible by removing the capscrews in the rear face of the sump. The screen must be removed and cleaned each time the transmission-converter oil is changed or more often if conditions warrant. To clean the screen, proceed as follows:
   a. Remove the drain plug from the oil sump.
   b. Thoroughly clean the screen cover flange and surrounding area.
   c. Remove six capscrews and slide the screen out.
   d. Thoroughly clean the screen in mineral spirits, using a soft bristle brush.
   e. Reinstall screen using a new gasket. Make sure capscrews are securely tightened.

E. CHECKING OIL LEVEL,

Two oil level plugs and the oil filler plug are provided in the left wall of the oil sump (Fig. 24). The oil level must be checked every 10 hours of operation by removing the upper level plug. Make sure the machine is setting level before checking oil level. IMPORTANT: *Engine must never be started when transmission oil is below the lower level plug.* As a safety precaution two oil level checks must be made as follows:

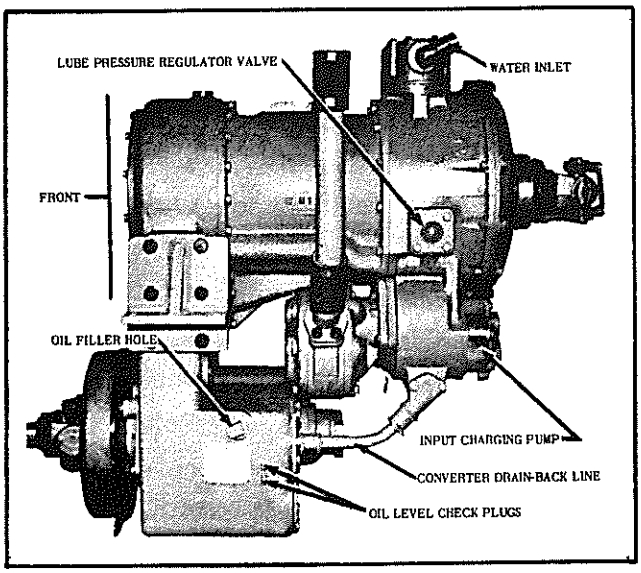


FIG. 24 – TRANSMISSION (LEFT SIDE)

1. Before starting the engine – remove the upper level plug.
   a. If no oil appears, add oil through the filler opening until it appears at upper level plug.
   b. If oil appears or runs out freely, it is safe to start the engine and proceed with Step 2.
2. After starting the engine – wait until the hydraulic oil reaches operating temperature. Then with engine running at ¼ throttle remove the upper level plug.
   a. If no oil appears, add oil through the filler opening until it appears at upper level plug. *DO NOT OVERFILL.*
   b. If oil runs out freely the hydraulic system is overfilled and must be drained down to the level of upper plug to avoid overheating.

Although no harm will be done if the oil level is allowed to drop to the low level plug (engine running at ¼ throttle), it is recommended that the oil level be maintained at the upper level plug.

F. TO CHANGE OIL IN HYDRAULIC SYSTEM, TRANSMISSION-CONVERTER

The capacity of the hydraulic system after complete draining and overhaul is 7 gallons. However, the refill capacity is 5-½ to 6 gallons because the draining operation for an "oil change" leaves some oil inside the torque converter, valves, oil passages and lines. Since the hydraulic system is the "heart" of the transmission-converter combination, it is especially important that emphasis be placed on cleanliness of the oil.

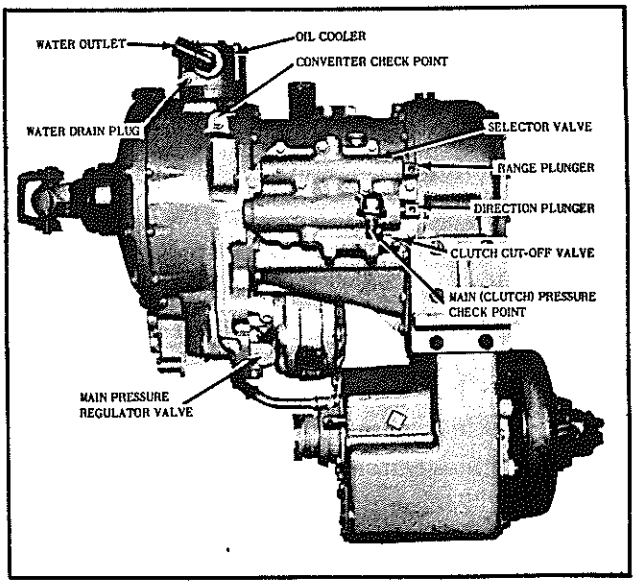


FIG. 25 – TRANSMISSION (RIGHT SIDE)

The hydraulic system should be drained and refilled with new oil after 1000 hours of operation, or more often if the oil shows evidence of discoloration, or has a strong odor resulting

from high operating temperatures. NOTE: *The oil should be at operating temperature. When draining the system allow a few minutes for the oil to drain down into the sump.* Proceed as follows:

1. Remove the drain plug from the lower front face of the oil sump. NOTE: *If the oil is contaminated with metal particles the entire assembly should be disassembled, cleaned and the damaged parts replaced.*
2. Clean and reinstall the strainer, and install a filter element (refer to Paragraph D).
3. Install the drain plug and remove the oil filler plug located in the left hand wall of the oil sump.
4. Pour in approximately 5 gallons of the specified oil (Type C transmission fluid).
5. Start the engine and let it run for 2 minutes at low idle to "charge" the system. Then with the engine running at ¼ throttle, add oil through the oil filler opening until it appears at the upper level plug.
6. Replace the upper level plug and filler plug and tighten securely.

G. OIL PRESSURES AND TEMPERATURES, TRANSMISSION-CONVERTER

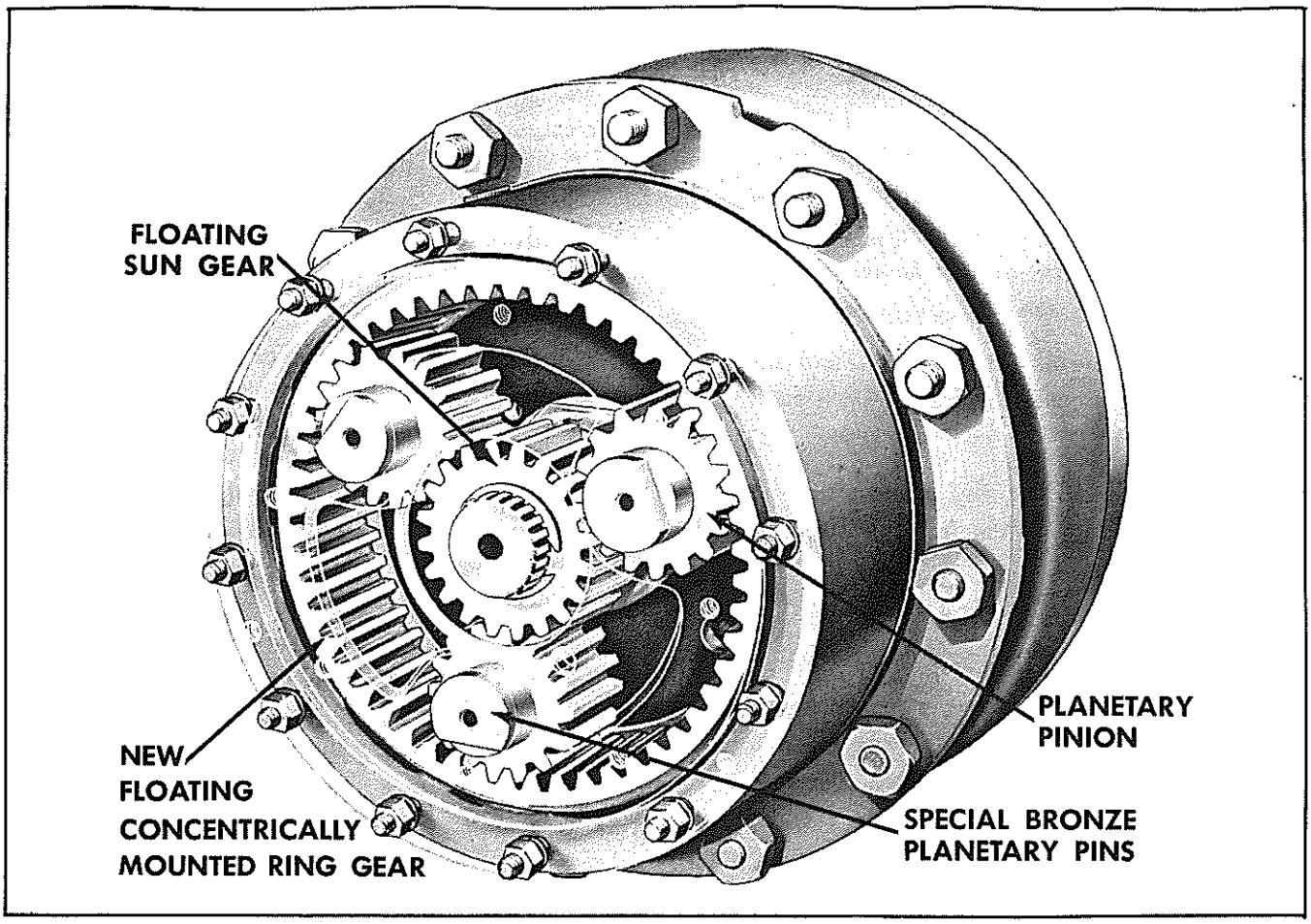
Fewer shut-downs will be experienced if the operator periodically reads the main system pressure gauge and the converter "out" temperature gauge provided on the instrument panel (refer to page 6 for location of gauges).

1. Main system (clutch) pressure should read 90 to 125 P.S.I. any time the engine is running. If the pressure consistently drops below 90 P.S.I., with any one of the five clutches engaged, it may allow the clutch to slip excessively and overheat.
2. Converter "out" oil temperature should never be allowed to go above 250° F. maximum. If it should exceed this maximum, stop the loader, shift the transmission to neutral and run the engine at 1/3 throttle. The temperature should drop rapidly to approximately equal the engine water temperature in two or three minutes. If the temperature does not drop, the engine should be stopped immediately and the cause determined.
3. Ordinarily the converter "out" pressure reading is not required during operation – thus no gauge is provided on the instrument panel. It is specified at 25 P.S.I. minimum at full throttle, converter stall; and 65 P.S.I. maximum at full throttle, no load. The reading, if required, may be obtained by installing a pressure gauge in place of the converter "out" temperature sender, located at the converter check point (refer to Fig. 25) CAUTION: *DO NOT STALL CONVERTER LONGER THAN 30 SECONDS AT A TIME, WHEN OBSERVING THIS PRESSURE.*

Normally, low pressure readings and high temperature readings result from one of the following causes. If checking these possibilities does not locate the cause, contact your nearest Allis-Chalmers Construction Machinery Dealer.

a. Incorrect oil level, either low or high.
b. Clogged filter element or sump screen.
c. Worn input oil pump assembly.
d. Worn or maladjusted main pressure regulator valve assembly.
e. Low water level in engine cooling system.
f. Clogged or dirty oil cooler.

PLANETARY AXLES, FRONT AND REAR



PLANETARY SHAFT AND HUB

A. GENERAL

The front and rear axles each consist of a central differential carrier section, two power actuated hydraulic brake assemblies and two planetary wheel hubs. The rear axle has in addition two steering knuckle assemblies located between the central section and the wheel hubs to provide a steering type drive axle. "Toe-in" is not required since the steering wheels are also driving wheels.

The front and rear central differential carrier sections are identical in construction. Each consists of a differential assembly with hypoid type ring gear and pinion. The housing for the central section also serves as a reservoir for the lubricating gear oil for these parts.

All four planetary hubs are identical and each consists of a floating ring gear, a floating sun gear and three planetary pinions which rotate on forged bronze planet pins. These parts are lubricated by the oil carried in each planetary hub.

As the wheel hub and planetary spider rotate, they pick up oil contained in the hub and channel it to the wheel bearings and gears. The oil, therefore, is constantly flowing around these parts and through the channels in the planet pins to lubricate the pinions. This assures full flow lubrication under all operating conditions.

CAUTION: *For safety, use blocks in addition to a jack if removing wheels, tires, axles, etc.*

B. ADJUSTMENT OF WHEEL BEARINGS

Since the wheel bearings are constantly lubricated by the oil inside the planetary hub, no

additional lubrication or "packing" is required. When adjustment becomes necessary on either front or rear axle, proceed as follows:

1. Drain the wheel hub and remove the planetary end cover from the spider.
2. Insert 7/16" - 14NC x 2" capscrews in each of the three holes of the spider. Turn capscrews in evenly until the spider (including the planetary pins and pinions) pulls free of the wheel hubs.
3. Remove snap ring, sun gear, thrust washer, and nut lock (for adjusting nut) from axle shaft.
4. Tighten adjusting nut until bearings bind slightly, while turning the wheel. Then back off the nut to the nearest slot so that nut lock can be secured. Wheels should rotate freely after securing nut lock.
5. Reinstall thrust washer, sun gear, snap ring, spider assembly and end cover. Refill with oil (refer to 1000 Hour Routine Service - "Planetary Hubs").

C. STEERING KNUCKLES – REAR AXLE

The steering knuckles or ball joints each consist of a constant velocity universal joint and a trunnion socket. The universal joint, contained in the trunnion socket, is designed to transmit power while the machine is being steered - thus a drive type steering axle. The trunnion socket is a "ball-shaped" housing with integral king pins on which are mounted two tapered roller bearings. These trunnion bearings support the wheel hub and allow it to pivot during steering.

The universal joint and trunnion bearings are pre-packed with grease during assembly so that very little lubrication is required in the field. Add two or three shots of grease (Marfak No. 2 heavy duty or equal) every 500 hours of operation. (Refer to Routine Service, "Steering Axle.") *DO NOT OVERGREASE.*

The trunnion bearings are adjusted by shims located under their bearing caps. The quantity of shims used under the upper cap should approximately equal those used under the lower cap to center the universal joint in the trunnion socket housing. When adjustment becomes necessary, proceed as follows:

1. Remove the wheel and tire assembly.
2. Add or remove shims under upper and lower trunnion bearing caps in approximately equal amounts, until there is no perceptible "play" when the wheel hub is manually moved up and down. The wheel hub should pivot freely right or left, as when steering.
3. Reduce the shim pack by .005" under each cap, and replace cap. The wheel hub should now pivot with a slight drag when turning right or left.
4. Replace wheel and tire assembly.

D. POWER BRAKES

1. Description

The TL-20D is equipped with hydraulic power brakes on the front and rear wheels. A vacuum-hydraulic unit composed of three major parts; hydraulic cylinder, vacuum power cylinder and a hydraulically actuated control valve is located under the floor plates. Power for braking is provided by this unit when the brake pedal is depressed. Vacuum is supplied to the unit by a hose from the vacuum reserve tank, located behind the seat frame just under the battery box. Vacuum for the reserve tank is provided by a line from the butterfly valve located in the casting just ahead of the engine intake manifold. This butterfly valve is connected to the accelerator linkage and provides maximum vacuum when the engine is at low idle, therefore, each time the engine is decelerated, additional vacuum is built up in the vacuum reserve tank. When the accelerator is fully depressed, the butterfly valve is wide open and gives full flow of air to the engine.

If for any reason the vacuum system should fail, the brakes will operate as a conventional hydraulic brake system whether or not the engine is running.

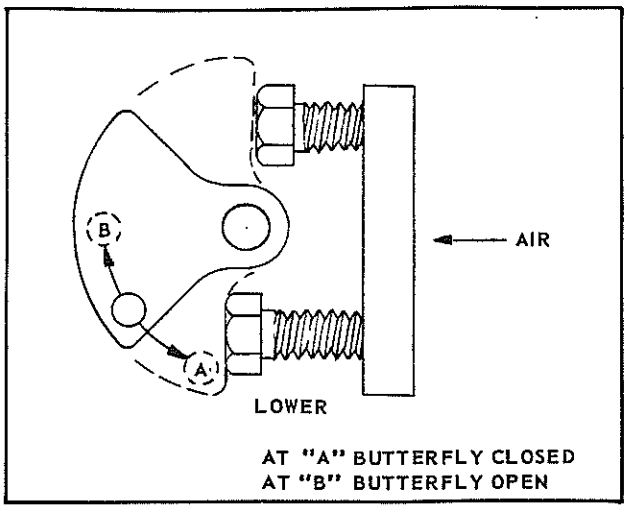


FIG. 26 – BUTTERFLY VALVE LEVER

2. Butterfly Valve Adjustment

In order to check for proper adjustment of the butterfly valve, proceed as follows:

a. Remove the ether primer line elbow from the engine intake manifold and replace with a vacuum gauge.

b. With the engine at low idle, set the lower stops on the butterfly valve lever (refer to Fig. 26) to get maximum vacuum reading on the gauge.

c. Set engine low idle at 600 R.P.M. (Refer to "Governor," Paragraph C.) Gauge should read 6 to 10 inch vacuum.

d. If correct vacuum reading is not obtained, check linkage for binding, and all hoses for possible air leaks.

3. Brake Adjustment

To adjust brakes for normal lining wear, follow the procedure outlined below:

a. Raise front end of machine off the ground with a jack and suitable supports.

b. Place transmission control lever in "neutral" and remove adjusting cover plates located in front brake drum dust covers.

c. Adjust brake shoes individually with a screwdriver until brakes begin to drag while turning wheel by hand. Back off just enough to allow wheel to turn freely.

d. The rear brakes each have two 5/8" capscrews located on the dust shield. Use these capscrews to adjust the rear brakes in the same manner as the front.

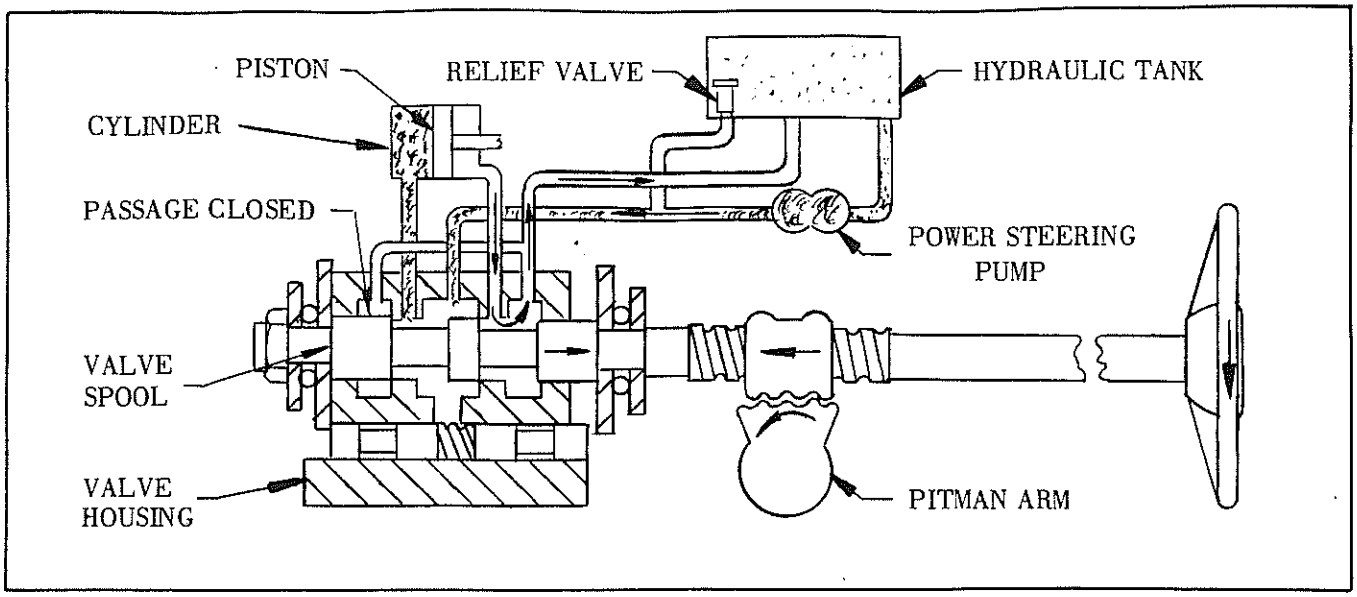
— POWER STEERING SYSTEM —

A. GENERAL

The oil for the power steering system is supplied from the main hydraulic system tank, thus eliminating the need of a special reservoir. The other main components of the power steering system are the pump, safety relief valve, control valve, and a hydraulic cylinder connected to a bell crank (mounted on the left hand frame). One drag link is attached to the steering gear pitman arm and to the bell crank; and another drag link connects the bell crank to a steering arm on the rear axle.

B. PUMP AND DRIVE BELT

The power steering "gear type pump" is located on the right hand side and attached to the timing gear housing of the engine, through an adapter bracket and adjusting plate. It is belt driven by the crankshaft pulley, which means there is power supplied to the steering valve whenever the engine is running. The pump belt is correctly adjusted when the topside of the belt can be pressed downward approximately 3/8" at a point half-way between the crankshaft pulley and the pump pulley. To



POWER STEERING CONTROL VALVE FLOW DIAGRAM

adjust pump belt, loosen lower 1/2" capscrew of adjusting plate and move pump in or out from crankshaft pulley to above belt adjustment, and tighten capscrew.

C. SAFETY RELIEF VALVE

The spring loaded safety valve assembly, located in the bottom of the loader hydraulic tank, is provided to limit the pressure in the power steering system. This safety valve is properly adjusted at the factory for an opening pressure of 975 ± 25 P.S.I. When the valve opens, oil is by-passed from the system directly to the hydraulic tank. Since the safety valve is properly adjusted at the factory, no further adjustment should be necessary in the field.

D. CONTROL VALVE

This hydraulic valve is bolted to the bottom of the steering gear housing. It consists of a spool within a housing which has three grooves accurately located in relation to the spool. The spool and housing are highly machined and ground to a sliding fit to retain high pressure oil. The spool and housing are, therefore, not serviced separately.

The valve spool, being attached to the steering shaft and worm, moves slightly in the valve housing to direct the flow of oil as the steering handwheel is turned. This slight movement is caused by the resistance to turn offered by the steering wheels. Five sets of spring loaded centering plungers are provided to hold the valve spool in "neutral" position except when the steering handwheel is being turned.

In the illustration the handwheel is turned left which actuates the spool thus closing some valve ports and opening others. This, in turn redirects the circulating oil to the rear of the cylinders' piston, which extends the piston rod. The displaced oil from the rear side of the piston is directed to the hydraulic tank. Thus, there is a constant flow of oil to and from the hydraulic tank until the piston has completed its stroke, at which time the safety relief valve opens. Releasing the steering handwheel will allow the centering plungers to return the spool to "neutral" position. A built-in check valve is provided which allows circulation of oil within the valve in the event of a hydraulic power failure or if steering is done with the engine off.

E. STEERING GEAR

1. Description

The steering gear located at the base of the

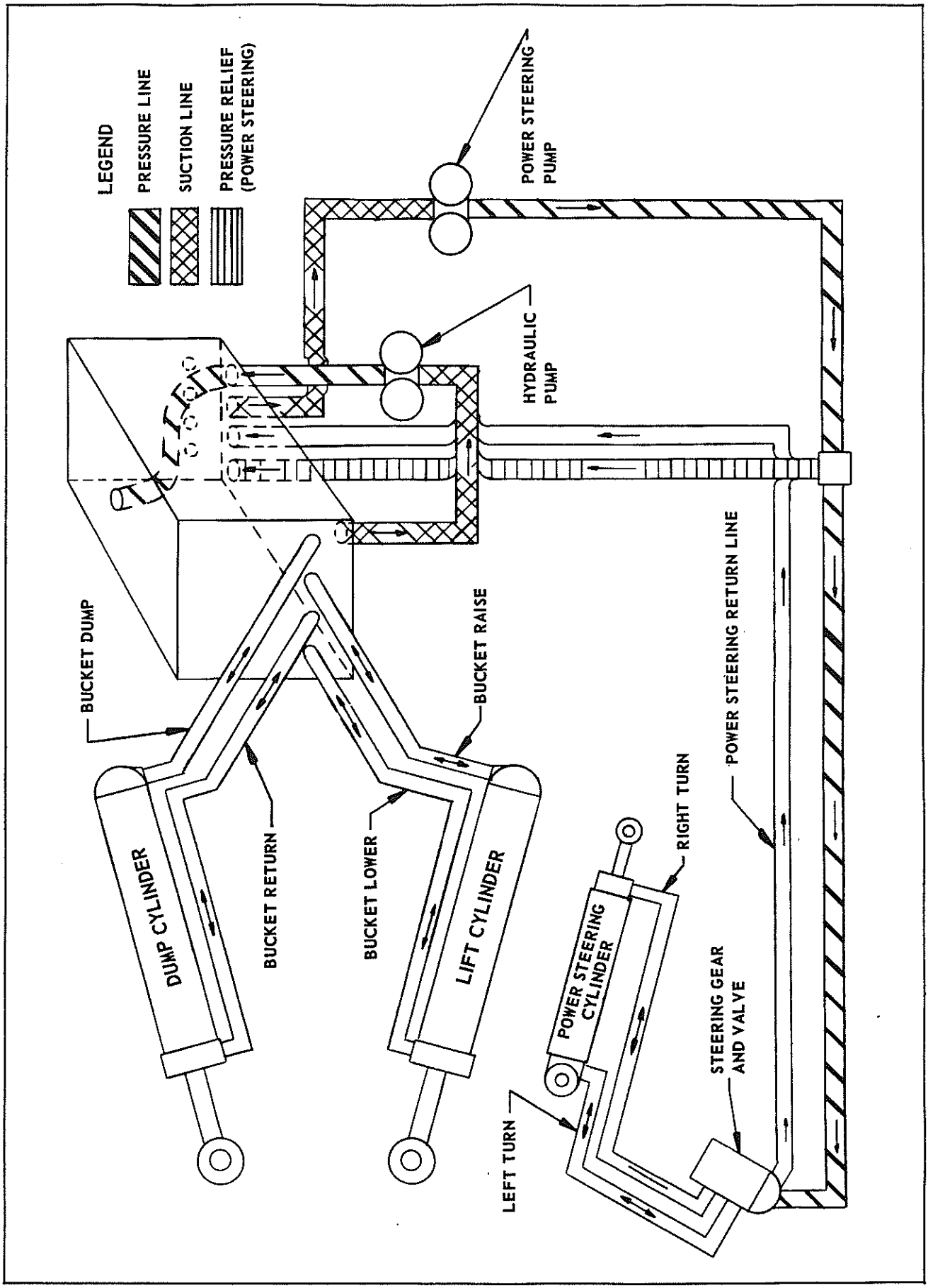


PLATE 726 – HYDRAULIC SYSTEM (INCLUDING POWER STEERING) FLOW CHART

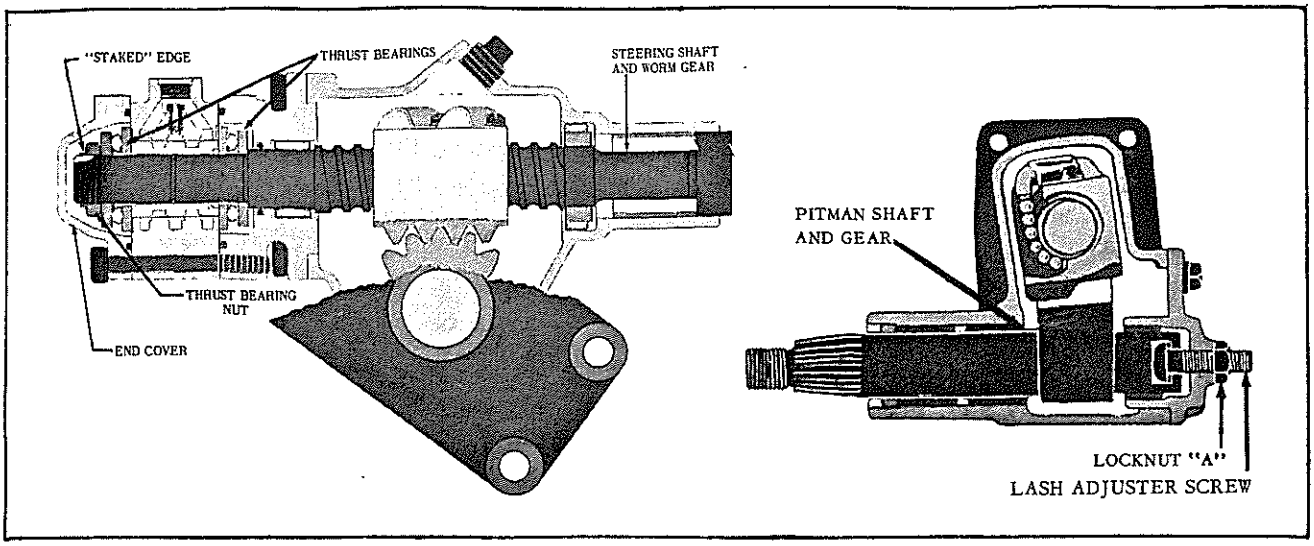


PLATE 445 – STEERING GEAR

steering column is of the recirculating ball type and consists of the steering shaft and worm, ball nut, pitman shaft and gear, and pitman arm. Helical grooves inside the ball nut are filled with steel balls which engage the mating grooves in the worm portion of the steering shaft. Rack teeth are machined on one side of the ball nut which engage the teeth on the pitman shaft and gear. When the steering wheel is turned, the steering shaft and worm rotate, causing the ball nut to move up or down. Movement of the ball nut rotates the output shaft and gear which imparts motion through the pitman arm to the drag link.

2. Adjustment

There are only two major adjustments of the steering gear assembly:

a. Thrust Bearing Adjustment

b. Lash Adjustment

CAUTION: *It is very important that the thrust bearing adjustment be checked and re-adjusted if necessary before the lash adjustment is made. Failure to follow this proper sequence may result in serious damage to the steering gear. If it becomes necessary to remove the steering handwheel, a puller must be used. Damage to the valve components and bearings is certain to result if it is driven off.*

Proceed as follows:

a. Thrust Bearing Adjustment

(1) Disconnect drag link from pitman arm, noting relative position before disconnecting.

(2) Loosen steering column support bracket on instrument panel to insure there is no binding due to anchorage.

(3) Loosen locknut "A" and turn lash adjuster "B" a few turns counterclockwise. (Refer to Plate 445.) This removes from the thrust bearing the load imposed due to the close mesh between the ball nut rack, and pitman shaft and gear.

(4) Remove the cover from bottom of the valve housing and install in its place a spacer tool, #22403. The purpose of the spacer tool is to hold the valve in place and still provide access to the nut.

(5) Drive up the "staked" lock on the thrust bearing nut for removal and replace it with a new nut.

(6) Turn the steering wheel to extreme right turn position which fully compresses the centering plunger springs.

(7) Hold the hand wheel in this position

and tighten the thrust bearing nut firmly against the outer bearing race. Then back off the nut and retighten lightly. This adjustment seats the thrust bearings against all centering plungers and provides proper clearance between bearing races and spool.

(8) Release the handwheel and attach a spring scale to one spoke of the wheel at the rim (9" radius). Measure the pull required to turn the wheel by maintaining the line of pull at 90° to the spoke. It should not exceed ½ to 1 pound.

(9) Stake the thrust bearing nut into the keyway of the shaft, making sure the nut does not turn from its adjusted position.

(10) Remove spacer tool #22403. Reinstall the cover making certain the seal ring is in good condition.

b. Lash Adjustment – After having completed the thrust bearing adjustment proceed with the lash adjustment, which covers a range of approximately one half turn of the handwheel on each side of the "center" position.

(1) Turn the steering handwheel slowly from one extreme to the other, then turn the wheel back to the midway or "center" position.

(2) Attach a spring scale to one spoke of the wheel at the rim (9" radius) so that the pull required to turn the wheel through the "center" position can be observed.

(3) Turn lash adjuster "B" (refer to Plate 445) clockwise until backlash disappears between the teeth on the ball nut and the teeth on the pitman shaft and gear. When adjustment is correct, the pull required to turn the wheel through "center" position, line of pull at 90° should be approximately 2½ pounds.

(4) Carefully secure locknut "A" (refer to Plate 445) making sure that lash adjuster "B" does not move.

After completing both adjustments, reconnect the drag link to the pitman arm and secure the column support bracket to the instrument panel.

3. Service

The steering gear is filled at the factory with a special lubricant (GMC-4567-M) developed for both summer and winter operation. Seasonal change of lubricant and draining of gear case is not necessary. Gear should be kept filled to level of the filler plug with the above lubricant or SAE 90 gear lubricant.

F. STEERING CYLINDER

The double acting power steering cylinder is located under the floor plates. One end of the cylinder is anchored unside the loader frame, and the other end attached to the bell crank. For service and maintenance of this cylinder, see instructions for loader cylinders under "Hydraulic System."

G. CHECKING POWER STEERING SYSTEM

If the power steering system fails to function properly, the following simple checks are easily made.

1. Drive belt for hydraulic pump (loose)
2. Safety relief valve (stuck open)
3. Tire pressures (incorrect)
4. Steering column (misaligned at instrument panel support)
5. Steering linkage (requires lubrication or adjustment)
6. Steering gear (thrust bearings or "lash" require adjustment)
7. Wheel bearings (require adjustment)

PREPARATION OF LOADER FOR STORAGE

If the loader unit is to be stored during the winter or slack season, make a complete inspection of the unit for loose, worn, or damaged parts and make the necessary repairs before it is stored.

Drain the engine crankcase and all other oil compartments and refill them with new oil. To protect the fuel injection system, drain the fuel tank, then pour about 10 gallons of a mixture of 40% mineral oil and 60% "Perfection Kerosene" in the fuel tank and run the engine for 15 minutes to circulate this mixture through the fuel system. This will leave the fuel system filled with the mixture and will prevent corrosion or gumming of the working parts. Major oil companies can supply this storage fuel mixture.

Coat the bottom of the bucket and the cutting edges with heavy grease to prevent rust. Raise and block up axles to remove the weight of the loader from the tires. Lower and retract the bucket to fully retract the piston rods into the cylinders for protection. Place the boom control lever in the "FLOAT" position and coat the extended portion of the valve plungers with light grease to protect the plunger surfaces.

After the loader has been stored, fill the fuel tank with the specified "DIESEL" fuel to minimize condensation in the tank. NOTE: This fuel need not be drained when the tractor is again placed in service.

Remove the batteries, clean, and store them in a cool, dry place (refer to "Electrical System"). Test them once a month and recharge them if the specific gravity of the electrolyte falls below 1.215. Keep the specific gravity of the electrolyte above 1.220 to prevent the batteries from freezing.

Drain the cooling system or fill it with an anti-freeze solution that will withstand the lowest anticipated temperature. Cover the exhaust pipe.

TRACTOMOTIVE

WARRANTY

Tractomotive Corporation warrants that it will repair f.o.b. its factory, or furnish without charge f.o.b. its factory, a similar part to replace any material in its machinery which within six months after the date of sale by the Dealer, is proven to the satisfaction of the Company to have been defective at the time it was sold, provided that all parts claimed defective shall be returned properly identified to the Company's factory, charges prepaid.

This warranty is the only warranty, either express or implied, upon which said machinery is purchased. No other warranty has been made or exists, either expressly or by implication, all statutory and implied warranties being hereby expressly waived and excluded from this transaction, and the Company's liability in connection with this transaction is expressly limited to the repair or replacement of defective parts, all other damages, statutory or otherwise, being hereby expressly waived.

This warranty applies only to new and unused machinery, which, after shipment from the factory of the Company, has not been altered, changed, repaired, or treated in any manner whatsoever. No warranty of any kind, statutory, implied or otherwise, shall apply to trade accessories, attachments, tools, or implements not manufactured by the Company, or to second-hand machinery, or to new and unused machinery, which, after shipment from the factory of the Company, has been altered, changed, repaired, or treated in any manner whatsoever.

No representative of the Company has authority to change this warranty or this contract in any manner whatsoever, and no attempt to repair or promise to repair or improve the machinery covered by this contract by any representative of the Company shall waive any consideration of the contract, or change or extend this warranty in any manner whatsoever.

LIST OF ABBREVIATIONS

ASA	American Standard Association	M.I.	Malleable Iron
Assy.	Assembly	Mach.	Machine
Blk.	Black	Med.	Medium
Brz.	Bronze	NC (Thread)	National Coarse
Cont.	Continued	NF (Thread)	National Fine
Ctsk.	Countersunk	NPT	National Pipe Thread
Cu.	Cubic	O.D.	Outside Diameter
Cyl.	Cylinder	Oz.	Ounce
Dia.	Diameter	psi	pounds per square inch
Eng.	Engine	Rd.	Round
Fil.	Filister	rpm	revolutions per minute
Ft.	Foot or Feet	SAE	Society of Automotive Engineers
Ga.	Gauge		
Gal.	Gallon	Skt.	Socket
Hex.	Hexagonal	Sq.	Square
Hd.	Head	St.	Straight
I.D.	Inside Diameter	Std.	Standard
In.	Inches	Sub-Assy.	Sub-Assembly
Incl.	Included	Thk.	Thick
Int.	Internal	USS	United States Standard
JIC	Joint Industrial Congress	w/	with –
Lb.	Pound	Yd.	Yard

TRACTOMOTIVE

ORDERING OF REPAIR PARTS

IMPORTANT

ALWAYS GIVE THE APPROPRIATE SERIAL NUMBERS WHEN ORDERING REPAIR PARTS:

(a) LOADER NO. – Located on front face of seat frame in operator's compartment.

(b) ENGINE NO. – Stamped on a plate located on the right front side of the engine block.

The terms "Right" and "Left" as they are used throughout this book are applied as viewed looking forward from the driver's seat.

To obtain parts promptly, give part name and part number.

Order parts from the Allis-Chalmers dealer for your territory.

Always state post office address, town, county and state where parts are to be shipped. Also specify whether material is to be shipped by freight, express or parcel post.

Confirm all telephone or telegraph orders in writing.

No credit will be allowed on parts unless they are returned to the dealer from whom they were purchased; from there they will be returned, at the customer's expense to the factory for inspection.

Unless claims for shortages or errors are made immediately upon receipt of goods, they will not be considered.

When broken goods are received, a full description of the damage should be made by the carrier agent on the freight bill. If this description is insisted upon, full damage can always be collected from the transportation company.

No responsibility is assumed for delay or damage to merchandise while in transit. Our responsibility ceases upon delivery of shipment to the transportation company from whom a receipt is received showing that shipment was in good condition when delivered to them; therefore, claims (if any) should be filed with the transportation company and not with the Tractomotive Corporation.

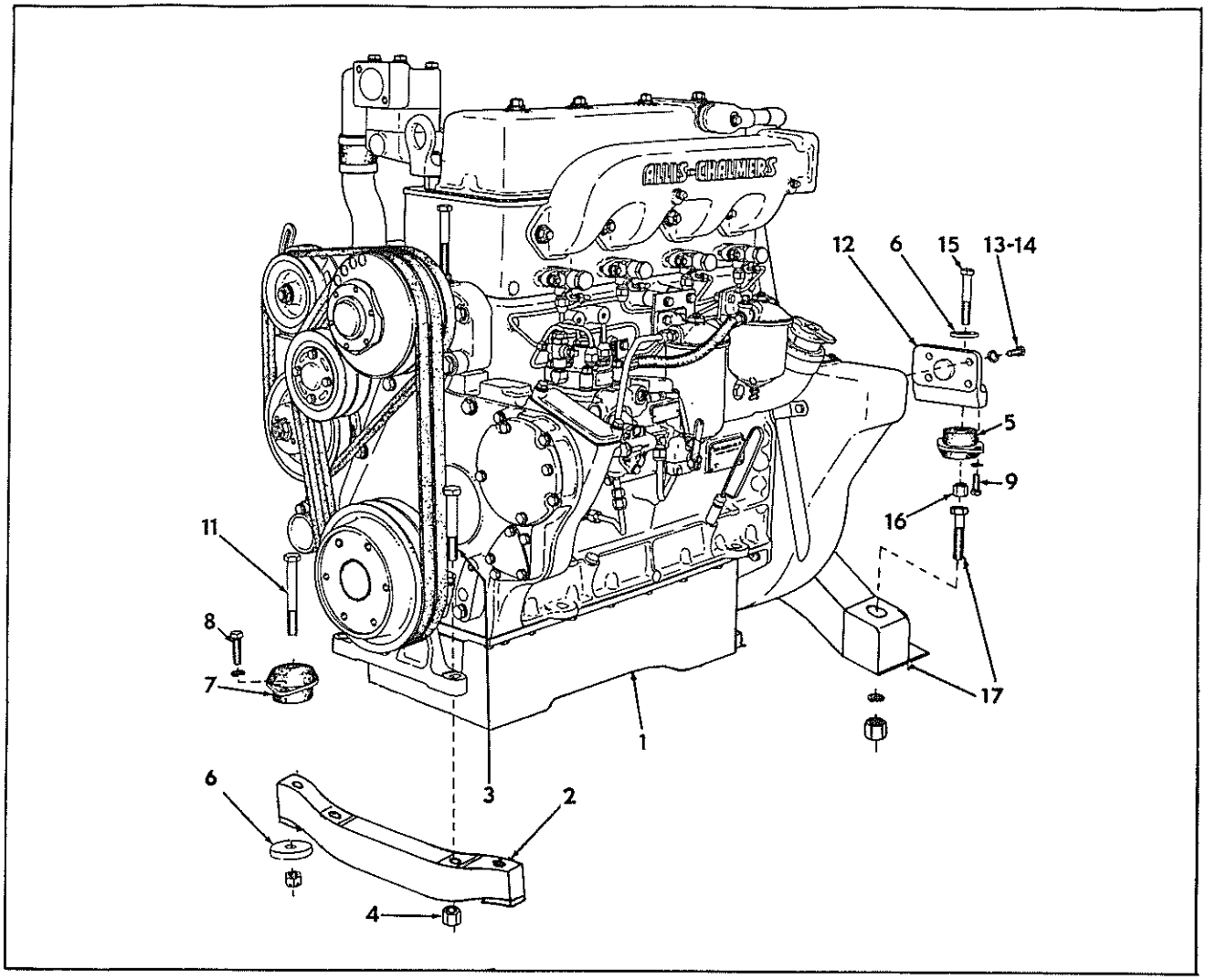
The right is reserved to change the construction or material of any parts where it seems desirable to do so, without incurring the obligation of installing such changes on loaders already delivered.

TELEGRAPHIC CODE

In sending wire orders, it is important that a one-word description of part wanted be specified after each part number. In event the message is received with incorrect part number, it will help us to ascertain the part actually required. Confirm each telegraphic order by mail in order that it may be checked and if not correctly transmitted, the error detected.

Shipping or other instructions in the body of a telegram which normally consists of many words, can be condensed into one by the use of the proper code word as given below:

AIRYX – Ship by Air Express
SONST – Ship to me (us) by Express
SOOTY – Ship by Express
SOYON – Ship to me (us) by Mail
SOBOS – Ship by Mail to
SORAT – Ship to me (us) by Freight
SAPAT – Ship by Freight to
SPLAT – When and how did you ship parts on my (our) order
SPATS – When and how will you ship parts on my (our) order
STAUB – Cancel my (our) order
STUFE – Add to my (our) parts order
SOMOR – Duplicate shipment of my (our) order



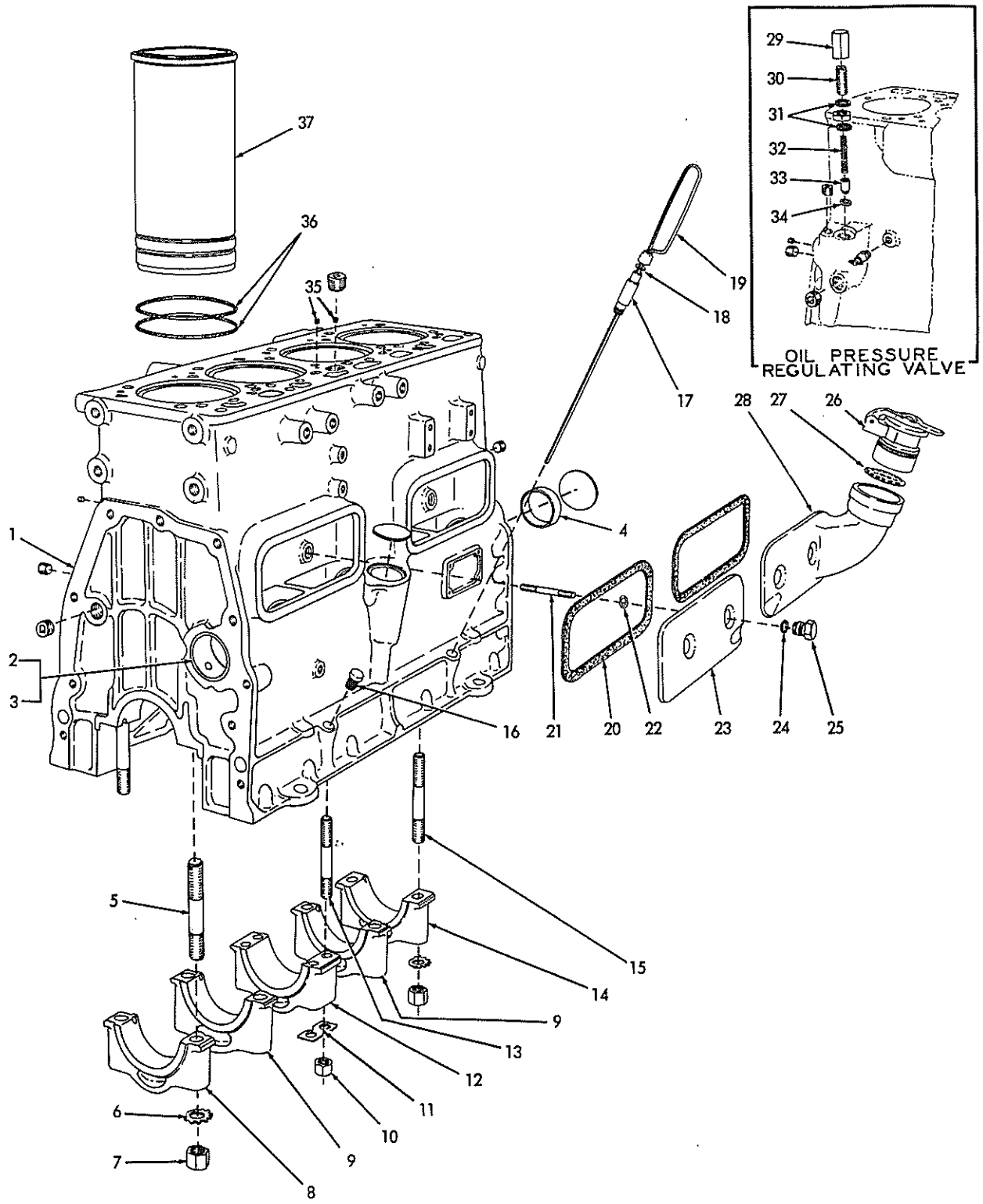
ENGINE AND MOUNTING

ITEM	PART NUMBER	QTY.	PART NAME
1	21386	1	Engine Assy., Complete (Includes parts as listed on pages 59 thru 86, Items #7 & #8 on page 87, Items #26, #33 thru #35 on page 89 & pages 90 thru 97)
2	20512	1	Hanger, engine supporting, rear
3	4862	2	Capscrew, 5/8" – 18 NF x 5"
	904209	2	Lockwasher, 5/8" ASA Med.
4	911044	2	Hex Nut, 5/8" – 18 NF
6	900819	4	Washer, plain, engine mount
7	21397	4	Mount, shock (Interchangeable w/A.C. #090240)
8	1239	4	Capscrew, 1/2" – 20 NF x 1–1/2", Rear mounts
	904208	4	Lockwasher, 1/2" ASA Med.
9	1110	4	Capscrew, 1/2" – 13 NC x 1–1/4", Front mounts
	904208	4	Lockwasher, 1/2" ASA Med.
	911043	4	Hex Nut, 1/2" – 13 NC

(Continued)

ENGINE AND MOUNTING – CONTINUED

ITEM	PART NUMBER	QTY.	PART NAME
11	6199	2	Capscrew, rear mount, 5/8" – 18 NF x 6"
	15904	2	Locknut, 5/8" – 18 NF
12	21396	2	Bracket, front mounting (Interchangeable w/A.C. #091080)
13	1114	8	Capscrew, 1/2" – 13 NC x 1–1/2"
	904208	8	Lockwasher, 1/2" ASA Med.
15	5635	2	Capscrew, front mounting, 5/8" – 18 NF x 4"
16	15904	2	Locknut, 5/8" – 18 NF
17	2977	4	Capscrew, 5/8" – 18 NF x 2–1/4"
	904209	4	Lockwasher, 5/8" ASA Med.
	911044	4	Hex Nut, 5/8" – 18 NF
	20278	1	Support (Engine to Frame)

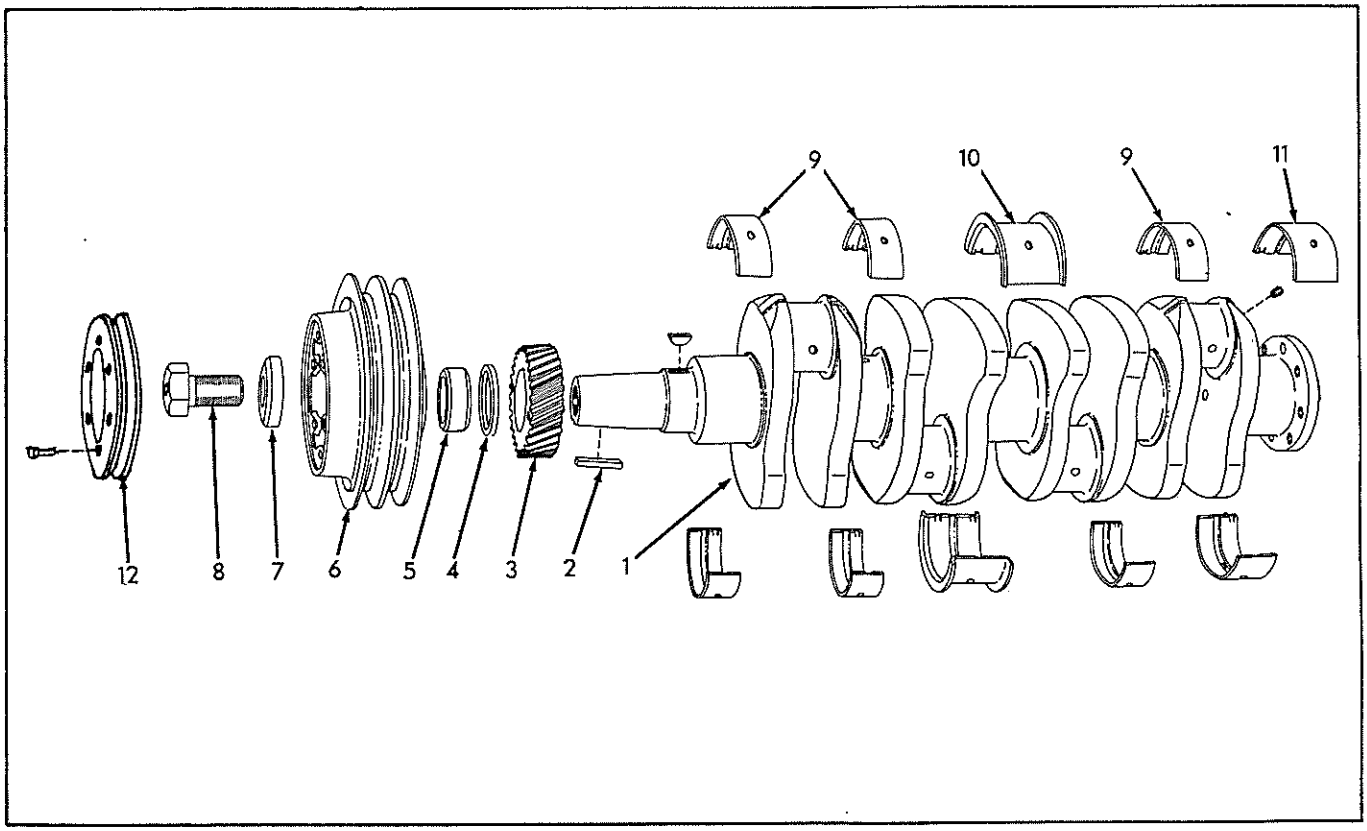


CYLINDER BLOCK

ITEM	PART NUMBER	QTY.	PART NAME	ASSEMBLY OR PACKAGE NO.
	4348656	1	Block Assy., cylinder (Includes parts as listed in Items #1 thru #17, #33 and #34)	
	910015	1	Plug, expansion, 2–1/8" diam.	
	917724	1	Plug, expansion, 2–3/4" diam.	
	910230	2	Pipe Plug, 1/8" slotted	
1	915739	3	Pipe Plug,	
	904223	3	Pipe Plug, 1/2" Steel, Ctsk., 3/8" Sq.	
	904224	1	Pipe Plug, 3/4" NPT	
	912415	1	Cock, drain, 1/4" NPT	
2	4346100	1	Bearing, camshaft, rear	
3	4346099	2	Bearing, camshaft, intermediate	
4	4346108	1	Bearing, camshaft, front	
5	4348046	2	Stud, rear main bearing, 3/4" diam., 5–1/2" long	
6	4346324	8	Lockwasher, main bearing stud nut	
7	4346191	8	Hex Nut, 3/4" NF, main bearing stud	
8	4348056	1	Cap, main bearing, rear	
9	4348244	2	Cap, intermediate, main bearing	
10	4346322	4	Hex Nut, 5/8" NF, center main bearing stud	
11	4346323	2	Plate, locking, center main bearing stud nut	
12	4348245	1	Cap, center main bearing	
13	4346190	4	Stud, center main bearing, 5/8" diam.	
14	4348246	1	Cap, front main bearing	
15	4346189	6	Stud, front and intermediate main bearing, 3/4" diam., 5–7/8" long	
16	4362338	1	Plug, crankcase	
17	4349037	1	Adapter, oil level gauge	
18	4506607	1	Seal, oil level gauge	
19	4348811	1	Gauge Assy., oil level (Includes Item #18)	
20	4348112	2	Gasket, valve lifter cover	4348450
21	4346653	4	Stud, valve lifter cover	
22	4253520	4	Ring, snap, valve lifter cover nut	
23	4348075	1	Cover, valve lifter, rear	
24	4251987	4	Ring, sealing, valve lifter cover nut	4348450
25	4347126	4	Nut, valve lifter cover	(Continued)

CYLINDER BLOCK – CONTINUED

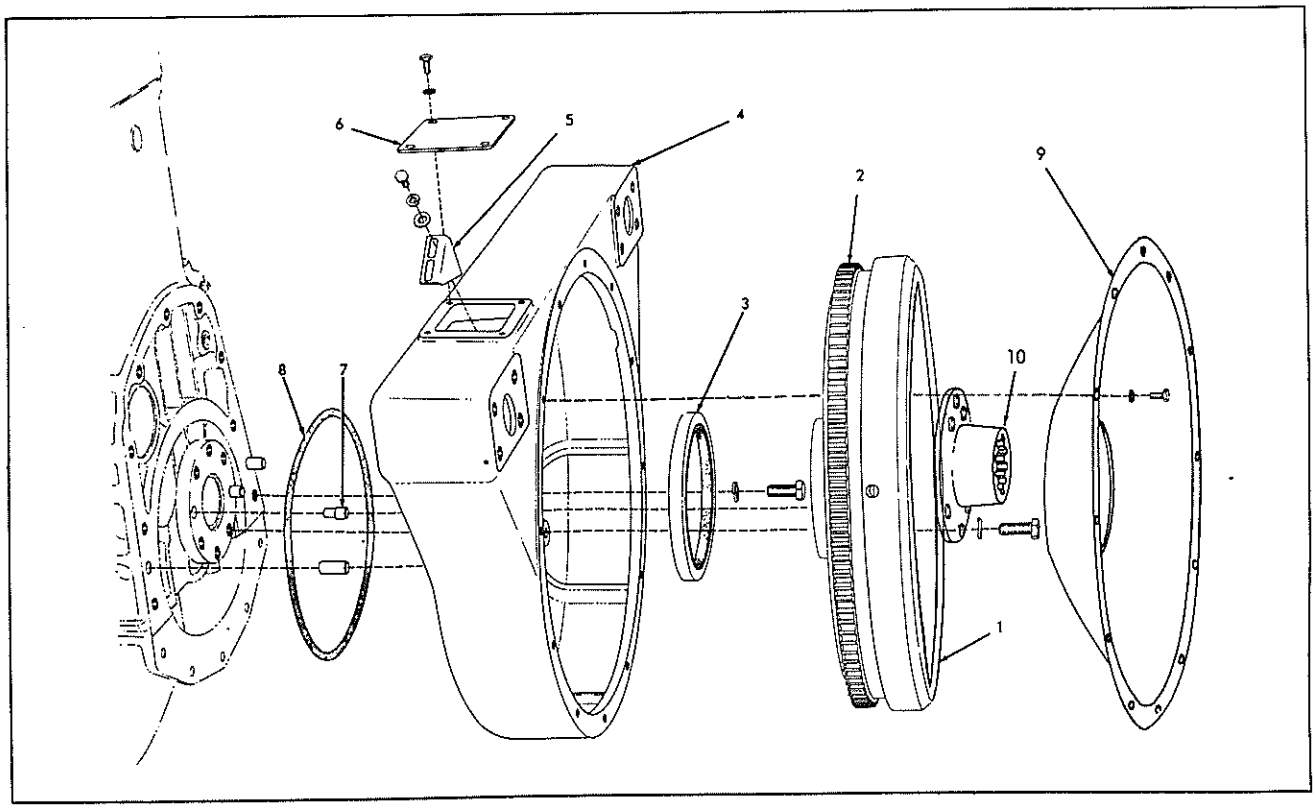
ITEM	PART NUMBER	QTY.	PART NAME	ASSEMBLY OR PACKAGE NO.
26	4366461	1	Cap Assy., oil filler (Serviced only as a unit)	
27	4335022	1	Strainer, oil filler	
28	4348076	1	Cover, valve lifter, front	
29	4660357	1	Nut, cap, oil pressure regulating valve	
30	4660356	1	Screw, oil pressure regulating valve	
	910847	1	Hex Jam Nut, 3/4" NF	
31	4113897	2	Gasket, regulating valve nut	4348450
32	4660358	1	Spring, oil pressure regulating valve	
33	4500230	1	Piston, oil pressure regulating valve	
34	4347465	1	Insert, oil pressure regulating valve seat	
35	4347061	1	Restrictor, oil passage	
36	4346184	8	Ring, packing, cylinder sleeve	4348638
37	4348072	4	Sleeve, cylinder	4348638



CRANKSHAFT

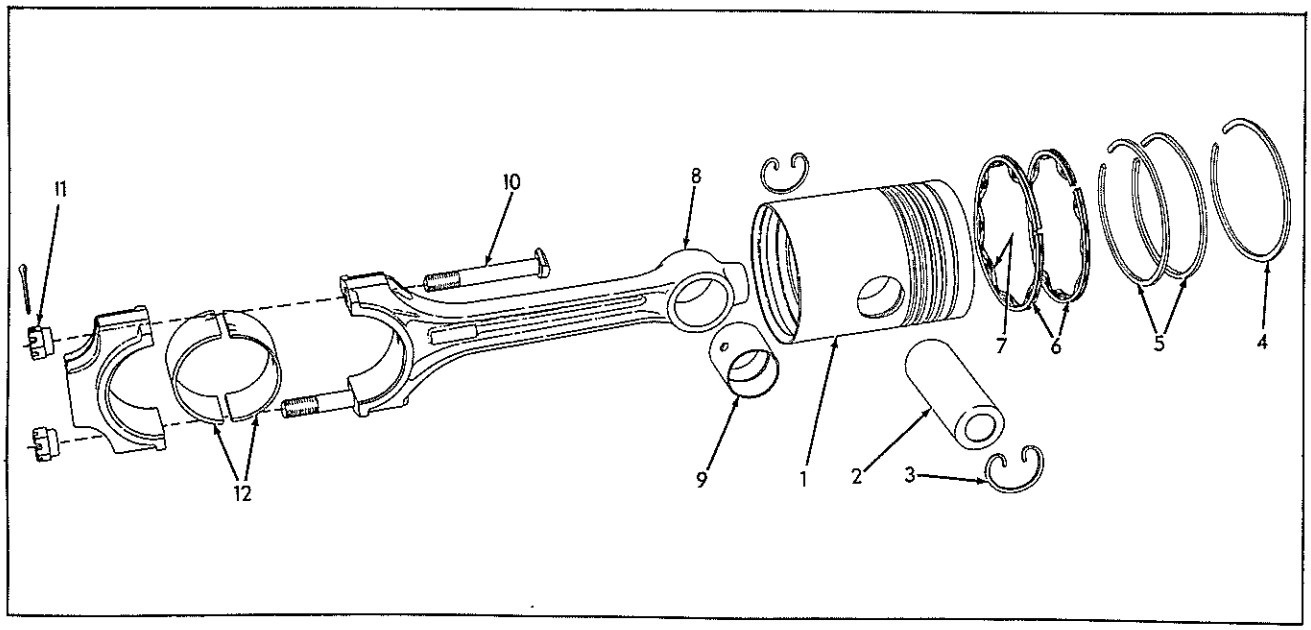
CRANKSHAFT

ITEM	PART NUMBER	QTY.	PART NAME
	4348424	1	Crankshaft Assy. (Includes 4--910231 and 1--907859)
1	910231	4	Pipe Plug, 1/8" Ctsk., 3/16" Hex
	907859	1	Pipe Plug, 1/4" Hex-socket (For shipping only)
2	4003490	1	Key, crankshaft pulley
3	4348353	1	Gear, crankshaft
	905127	1	Key, "B" woodruff, 5/16" x 1"
4	4374391	1	Spacer, front oil seal sleeve
5	4374390	1	Sleeve, front oil seal
6	4348437	1	Pulley
7	4371503	1	Washer, crankshaft pulley bolt
8	4347897	1	Capscrew, crankshaft pulley
	4348067	6	Bearing, half, rear and intermediate main (standard size)
	4335194	6	Bearing, half, rear and intermediate main (.010" undersize)
9	4348295	6	Bearing, half, rear and intermediate main (.020" undersize)
	4348296	6	Bearing, half, rear and intermediate main (.030" undersize)
	4348297	6	Bearing, half, rear and intermediate main (.040" undersize)
	4335198	2	Bearing, half, center main (Standard size)
	4335214	2	Bearing, half, center main (.010" undersize)
10	4335215	2	Bearing, half, center main (.020" undersize)
	4335216	2	Bearing, half, center main (.030" undersize)
	4335217	2	Bearing, half, center main (.040" undersize)
	4348068	2	Bearing, half, front main (Standard size)
	4335204	2	Bearing, half, front main (.010" undersize)
11	4348287	2	Bearing, half, front main (.020" undersize)
	4348288	2	Bearing, half, front main (.030" undersize)
	4335207	2	Bearing, half, front main (.040" undersize)
	21646	1	Pulley (Power steering pump)
12	1082	6	Capscrew, 1/2" – 13 NC x 1–1/2"
	1085	3	Lockwire, #16 W and M Ga. x 17" Long



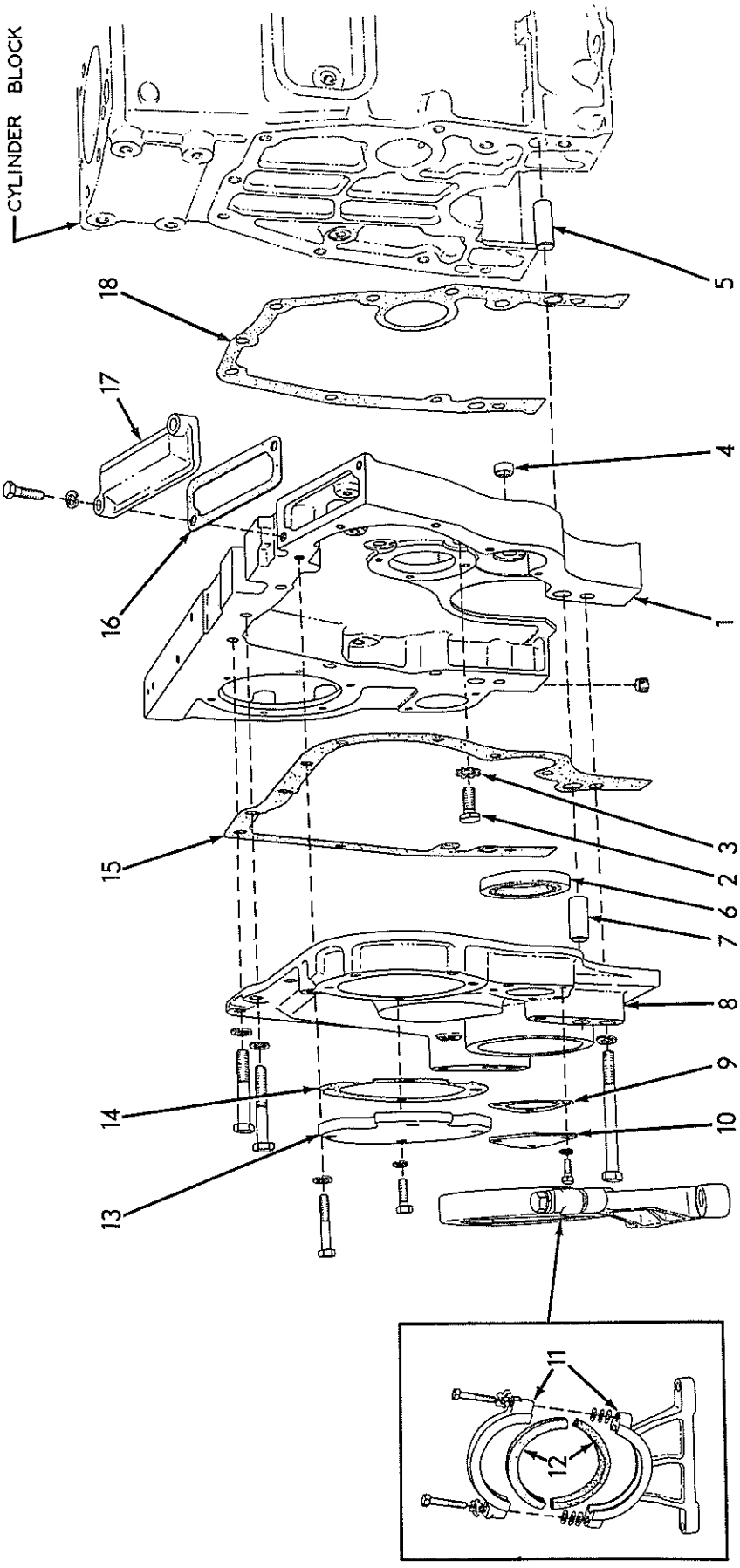
FLYWHEEL AND HOUSING

ITEM	PART NUMBER	QTY.	PART NAME	ASSEMBLY OR PACKAGE NO.
	4348625	1	Flywheel Assy. (Includes Item #2)	
1	913249	6	Capscrew, 1/2" NF x 1–1/4", heat-treated	
	904208	6	Lockwasher, 1/2" ASA Med.	
2	4341292	1	Gear, ring	
3	4335255	1	Seal, oil, crankshaft front	
	4348460	1	Housing, flywheel	
	903638	9	Capscrew, 1/2" NC x 1–1/4"	
4	904208	9	Lockwasher, 1/2" ASA Med.	
	917021	2	Pin, dowel, 1/2" x 1"	
	901652	2	Pipe Plug, 1/4" Steel, Ctsk., 3/8" Sq.	
	4348410	1	Pointer, timing	
5	905655	2	Capscrew, 1/2" NC x 1/2"	
	904204	2	Lockwasher, 1/4" ASA Med.	
	4348253	1	Cover, flywheel housing timing hole	
6	905655	4	Capscrew, 1/4" NC x 1/2"	
	904204	4	Lockwasher, 1/4" ASA Med.	
7	4500300	2	Dowel, flywheel to crankshaft	
8	4253801	1	Ring, sealing, flywheel housing to crankcase	4348450
	20296	1	Cover (Flywheel)	
9	3440	12	Capscrew, 3/8" – 16 NC x 1/2"	
	904206	12	Lockwasher, 3/8" ASA Med.	
10	20568	1	Adapter	



PISTON AND CONNECTING ROD

ITEM	PART NUMBER	QTY.	PART NAME	ASSEMBLY OR PACKAGE NO
1	4348447	4	Piston Assy. (Includes Items #2 and #3)	4348638
2	4347281	4	Pin, piston	
3	4304699	8	Retainer, piston pin	
4	4347458	4	Ring, compression (top groove)	4348637 4348638
5	4347235	8	Ring, compression (2nd and 3rd grooves)	4348637 4348638
6	4347439	8	Ring, oil control (4th and 5th grooves)	4348637 4348638
7	4347438	8	Spring, oil control ring	4348637 4348638
8	4348451	4	Rod Assy., connecting (Includes Items #9 thru #11)	
9	4340081	4	Bushing, connecting rod	
10	4348003	8	Bolt, connecting rod	
11	4346117	8	But, connecting rod bolt	
	900806	8	Pin, cotter, 1/8" x 1"	
12	4335208	8	Bearing, half, connecting rod (standard size)	
	4335209	8	Bearing, half, connecting rod (.010" undersize)	
	4335190	8	Bearing, half, connecting rod (.020" undersize)	
	4335191	8	Bearing, half, connecting rod (.030" undersize)	
	4335192	8	Bearing, half, connecting rod (.040" undersize)	

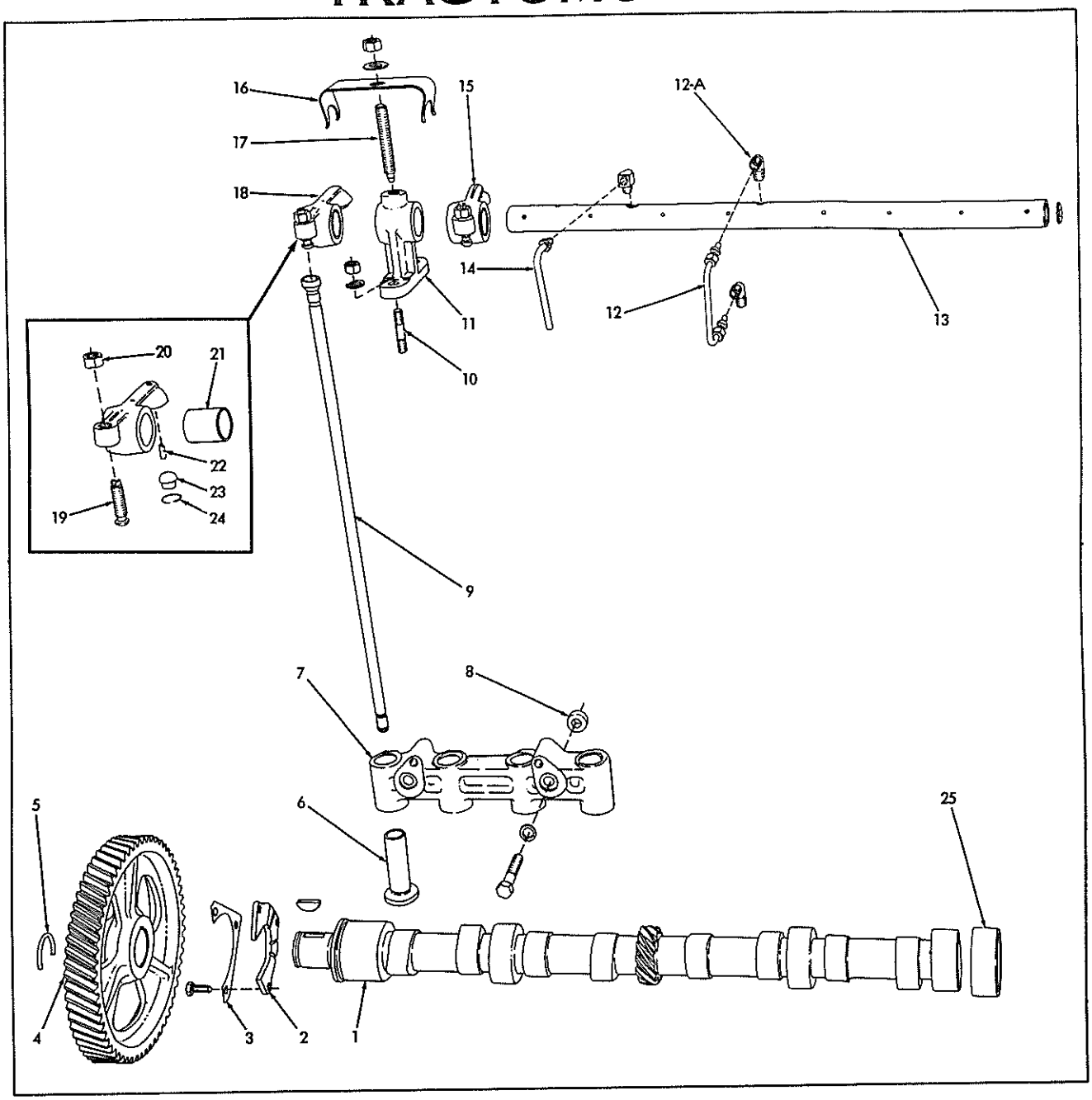


TIMING GEAR HOUSING

TRACTOMOTIVE

TIMING GEAR HOUSING

ITEM	PART NUMBER	QTY.	PART NAME	ASSEMBLY OR PACKAGE NO
1	4348768	1	Housing Assy., timing gear (Includes Item #4)	
	907856	1	Pipe Plug, 3/8" Steel, Ctsk., 5/16" Hex	
2	4004054	3	Capscrew, 1/2" NC x 1–1/16"	
3	4253490	3	Lockwasher, 1/2" ASA Med.	
4	4253924	1	Plug, cup, 3/4" O.D.	
5	4346246	2	Pin, dowel, timing gear housing	
6	4347933	1	Seal, oil, crankshaft	
7	4348107	2	Pin, dowel, timing gear cover	
8	4348433	1	Cover Assy., timing gear housing (Includes Item #7)	
	904283	4	Capscrew, 1/2" NC x 3"	
	903782	1	Capscrew, 1/2" NC x 3–1/2"	
	910257	2	Capscrew, 1/2" NC x 4–3/4"	
	915635	5	Capscrew, 3/8" NC x 1–7/8"	
	908191	1	Plain Washer (Copper)	
	904208	6	Lockwasher, 1/2" ASA Med.	
	904206	5	Lockwasher, 3/8" ASA Med.	
9	4348111	1	Gasket, cover plate	4348450
10	4348285	1	Plate, cover, timing gear	
	905661	3	Capscrew, 5/16" NC x 5/8"	
	904205	3	Lockwasher, 5/16" ASA Med.	
11	4349326	1	Bracket, engine mounting (Includes Cap)	
	916009	10	Washer, shimming, 1/32" thick	
	903642	2	Capscrew, 1/2" NC x 2–1/2"	
	4252682	2	Lockwasher	
12	4364864	2	Liner, engine mounting bracket	
13	4348310	1	Plate, cover, injection pump driving gear	
	903775	4	Capscrew, 3/8" NC x 7/8"	
	904206	4	Lockwasher, 3/8" ASA Med.	
14	4349011	1	Gasket, cover plate	4348450
15	4348126	1	Gasket, timing gear housing cover	4348450
16	4347120	1	Gasket, timing hole cover	
17	4347119	1	Cover, fuel pump timing hole	
	910245	2	Capscrew, 3/8" NC x 1–3/8"	
	904206	2	Lockwasher, 3/8" ASA Med.	
18	4348136	1	Gasket, timing gear housing	4348450



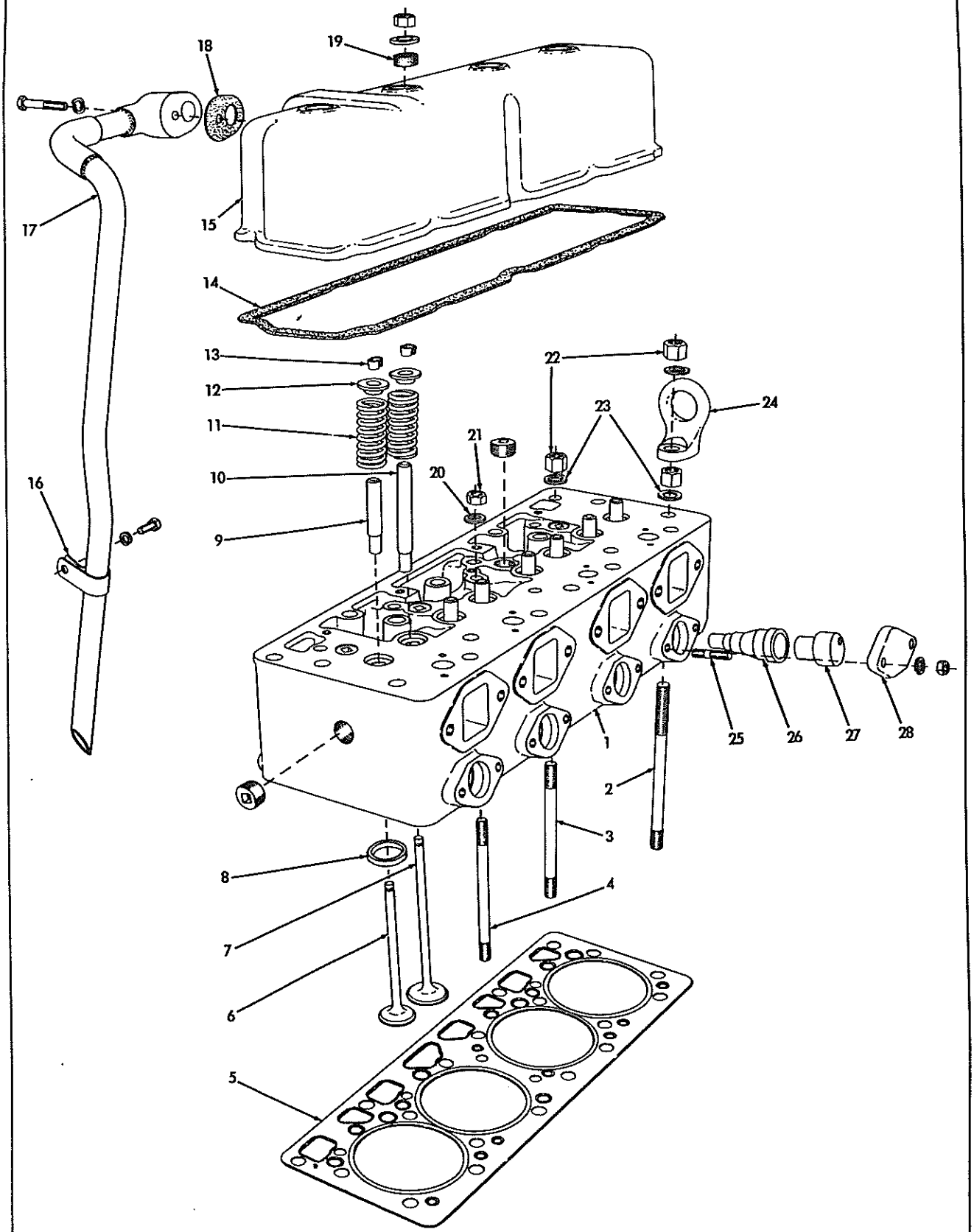
VALVE MECHANISM AND CAMSHAFT

ITEM	PART NUMBER	QTY.	PART NAME
1	4348049	1	Camshaft
	905126	1	Key, #5 woodruff, 1/4" x 1"
2	4349257	1	Collar, camshaft thrust
	903626	3	Capscrew, 5/16" NC x 3/4"
3	4348416	1	Plate, capscrew locking
4	4346206	1	Gear, camshaft
5	4346307	1	Ring, snap, gear retaining
6	4344869	8	Lifter, valve

(Continued)

VALVE MECHANISM AND CAMSHAFT – CONTINUED

ITEM	PART NUMBER	QTY.	PART NAME
	4348074	2	Bracket, valve lifter
7	915635	4	Capscrew, 3/8" NC x 1–7/8"
	904206	4	Lockwasher, 3/8" ASA Med.
8	4347832	4	Dowel, hollow, valve lifter bracket
9	4346209	8	Rod, push
	4506946	8	Stud, rocker shaft bracket, 3/8" NC x 3/8" NF x 1–9/16"
10	910123	8	Hex Nut, 3/8" NF
	904206	8	Lockwasher, 3/8" ASA Med.
11	4335857	4	Bracket, rocker shaft
	4348452	1	Tube, oil, rocker shaft
12	911437	2	Nut, compression fitting, 1/4" tube
	911435	2	Sleeve, compression fitting, 1/4" tube
	911017	1	Elbow, compression, 1/4" tube, 1/8" NPT male
12A	4349297	1	Elbow, rocker shaft oil tube (restricted)
13	4348492	1	Shaft Assy., rocker arm (Includes 2--910002)
	910002	2	Plug, expansion, 3/4" diam.
14	4349157	1	Tube Assy., rocker shaft drain (Includes Nut)
	913040	1	Elbow, inverted flare, 90°, 1/4" tube, 1/4" NPT
15	4346018	4	Arm Assy., rocker, exhaust valve (Each includes one Items #19 thru #24)
16	4344624	4	Clip, spring, rocker arm retaining
	4348130	1	Screw, rocker shaft retaining, 3" long, dog-pt.
17	4348129	3	Stud, rocker arm retaining clip, 2–5/8" long
	910986	4	Hex Nut, 7/16" NF
	912298	4	Plain Washer, 7/16" SAE
18	4346017	4	Arm Assy., rocker, intake valve (Each includes one Item #19 thru #24)
19	4304051	8	Screw, valve lash adjustment
20	4348440	8	Nut, valve lash adjustment screw
21	4660369	8	Bushing, rocker arm
22	4364422	8	Wick, oiling, rocker ball
23	4661329	8	Ball, rocker arm
24	4661328	8	Retainer, rocker arm ball
25	----	–	Bearing, camshaft (See Cylinder Block)

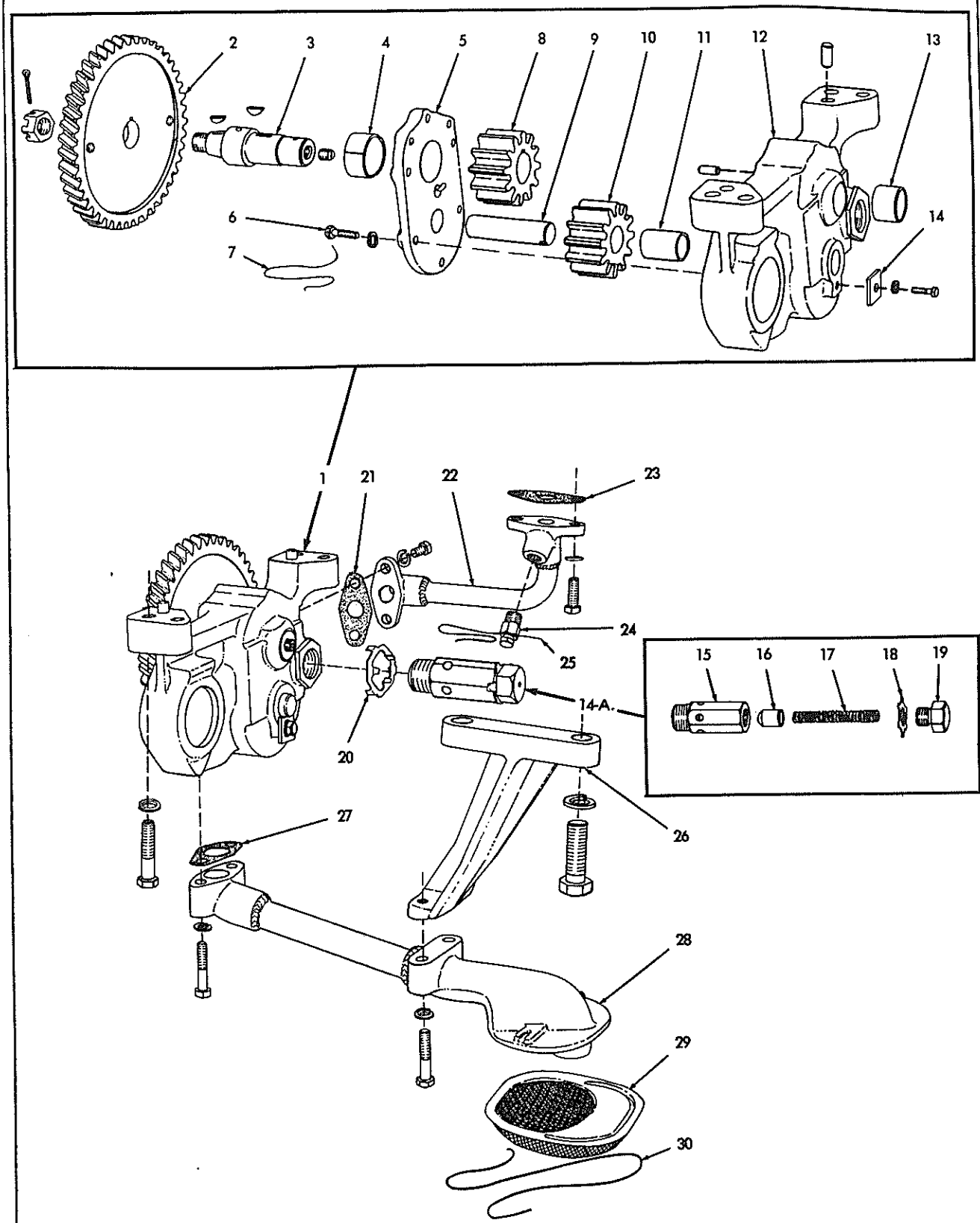


CYLINDER HEAD AND VALVES

TRACTOMOTIVE

CYLINDER HEAD AND VALVES

ITEM	PART NUMBER	QTY.	PART NAME	ASSEMBLY OR PACKAGE NO.
1	4348446	1	Head Assy., cylinder (Includes 6--904224 and Items #8 thru #10)	
	904224	6	Pipe Plug, 3/4" NPT, Ctsk. Hd.	
2	4372733	2	Stud, cylinder head, 5/8" x 9–7/16"	
3	4347435	17	Stud, cylinder head, 5/8" x 8"	
4	4372724	5	Stud, cylinder head, 1/2" x 7–5/8"	
5	4348405	1	Gasket, cylinder head	4348450
6	4348090	4	Valve, exhaust	
7	4348079	4	Valve, intake	
8	4346146	4	Insert, exhaust valve seat	
9	4346093	4	Guide, exhaust valve	
10	4346092	4	Guide, intake valve	
11	4345412	8	Spring, valve	
12	4343799	8	Retainer, valve spring	
13	4347270	16	Lock, valve spring retainer (half only)	
14	4348772	1	Gasket, rocker cover	4348450
15	4348021	1	Cover, rocker	
	910986	4	Hex Nut, 7/16" NF	
	906985	4	Plain Washer, 7/16" U.S. Std.	
16	4253771	1	Clip, breather tube, supporting	
	903629	1	Capscrew, 3/8" NC x 3/4"	
	904206	1	Lockwasher, 3/8" ASA Med.	
17	4348657	1	Tube, breather	
	903633	1	Capscrew, 3/8" NC x 1–3/4"	
	904206	1	Lockwasher, 3/8" ASA Med.	
18	4348133	1	Gasket, breather tube	4348450
19	4364131	4	Washer, sealing, rocker cover nut	
20	4372864	5	Washer, cylinder head nut (for 1/2" stud)	
21	4366781	5	Nut, cylinder head stud (1/2" NF)	
22	4366780	21	Nut, cylinder head stud (5/8" NF)	
23	4372863	19	Washer, cylinder head nut (for 5/8" stud)	
24	4348243	2	Eye, engine lifting	
	904209	2	Lockwasher, 5/8" ASA Med.	
25	4346416	8	Stud, energy cell clamp, 3/8" NC x 3/8" NF x 2–3/8"	
	4348440	8	Hex Nut, 3/8" NF	
	904206	8	Lockwasher, 3/8" ASA Med.	
26	4345658	4	Cell Assy., energy (Includes one Orifice and Pin) (Serviced only as unit)	
27	4341123	4	Plug, energy cell	
28	4346543	4	Retainer, energy cell	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OIL PUMP

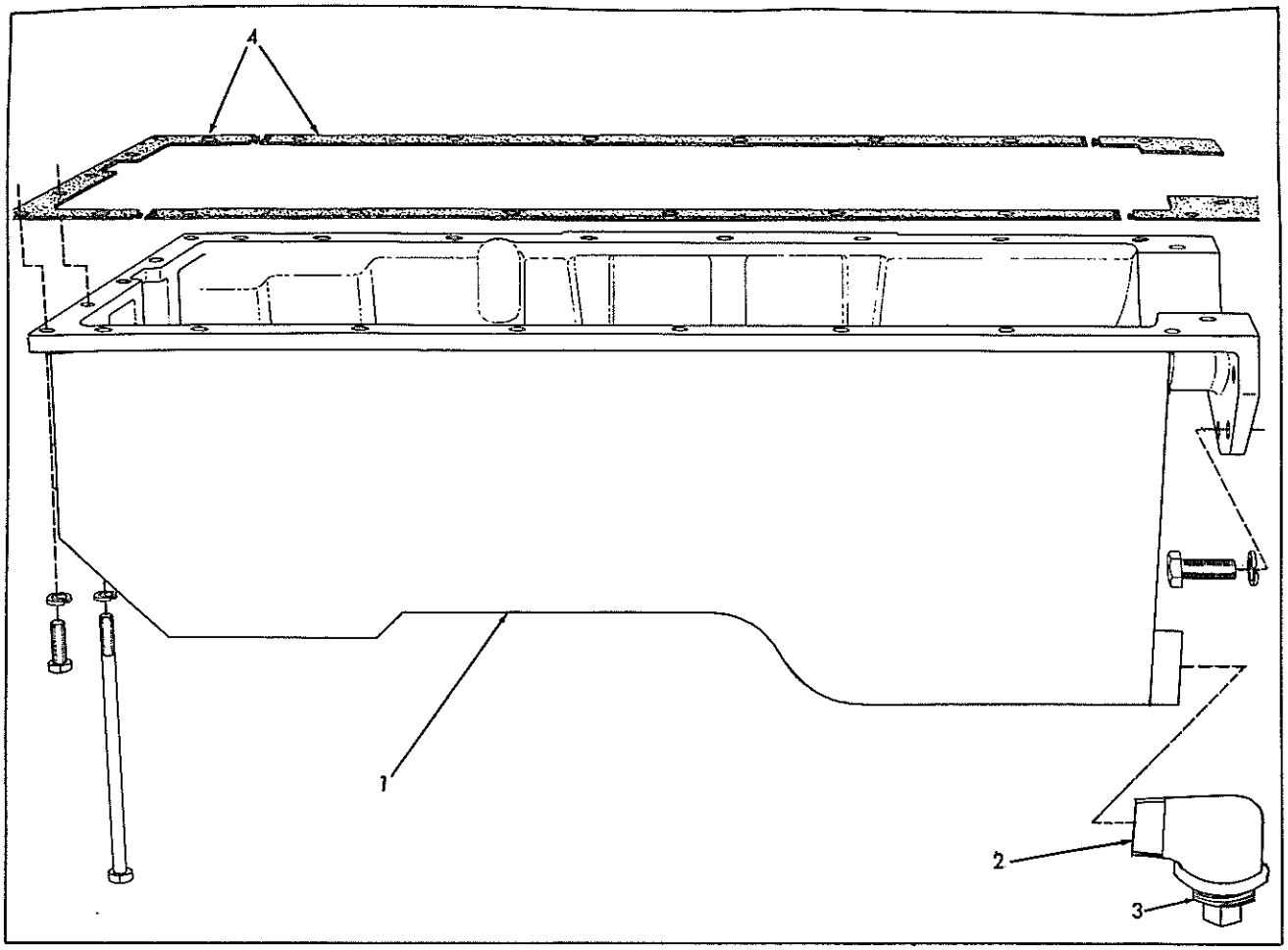
OIL PUMP

ITEM	PART NUMBER	QTY.	PART NAME
	4348886	1	Pump Assy., pressure (Consists of Items #2 thru #14)
1	4348692	4	Capscrew, 3/8" NC x 1–3/4"
	904206	4	Lockwasher, 3/8" ASA Med.
2	4348883	1	Gear, driving
	4348894	1	Shaft, upper
	910224	2	Key, #6 woodruff, 5/32" x 5/8"
3	912840	1	Hex Nut, slotted, 5/8" NF
	900807	1	Cotter Pin, 1/8" x 1–1/4"
	910231	1	Pipe Plug, 1/8", Ctsk., 3/16" Hex
4	4347659	1	Bushing, pump cover
5	4348044	1	Cover Assy. (Includes Item #4)
6	4875601	6	Capscrew, 1/4" NC x 7/8", Dr. Hd.
	904204	6	Lockwasher, 1/4" ASA Med.
7	4348428	3	Wire, locking
8	4348042	1	Gear, upper
9	4348038	1	Shaft, lower
10	4348891	1	Gear Assy., lower (Includes Item #11)
11	4348083	1	Bushing, lower gear
	4348885	1	Housing Assy. (Includes parts as listed in Item #12 and #13)
12	917554	1	Pin, dowel, 1/4" x 1/2"
	917546	2	Pin, dowel, 3/8" x 5/8"
13	4348303	1	Bushing, pump housing
	4348020	1	Retainer, lower shaft
14	4349378	1	Capscrew, 1/4" NC x 1/2"
	904204	1	Lockwasher, 1/4" ASA Med.
14A	4373111	1	Valve Assy., oil pressure relief (Consists of Items #15 thru #19)
15	- - - -	1	Body, pressure relief valve (Not serviced separately)
16	- - - -	1	Piston, pressure relief valve (Not serviced separately)
17	4347239	1	Spring, pressure relief valve
18	4347227	1	Washer, locking, relief valve cap
19	4347228	1	Cap, pressure relief valve
20	4347938	1	Lock, pressure relief valve body

(Continued)

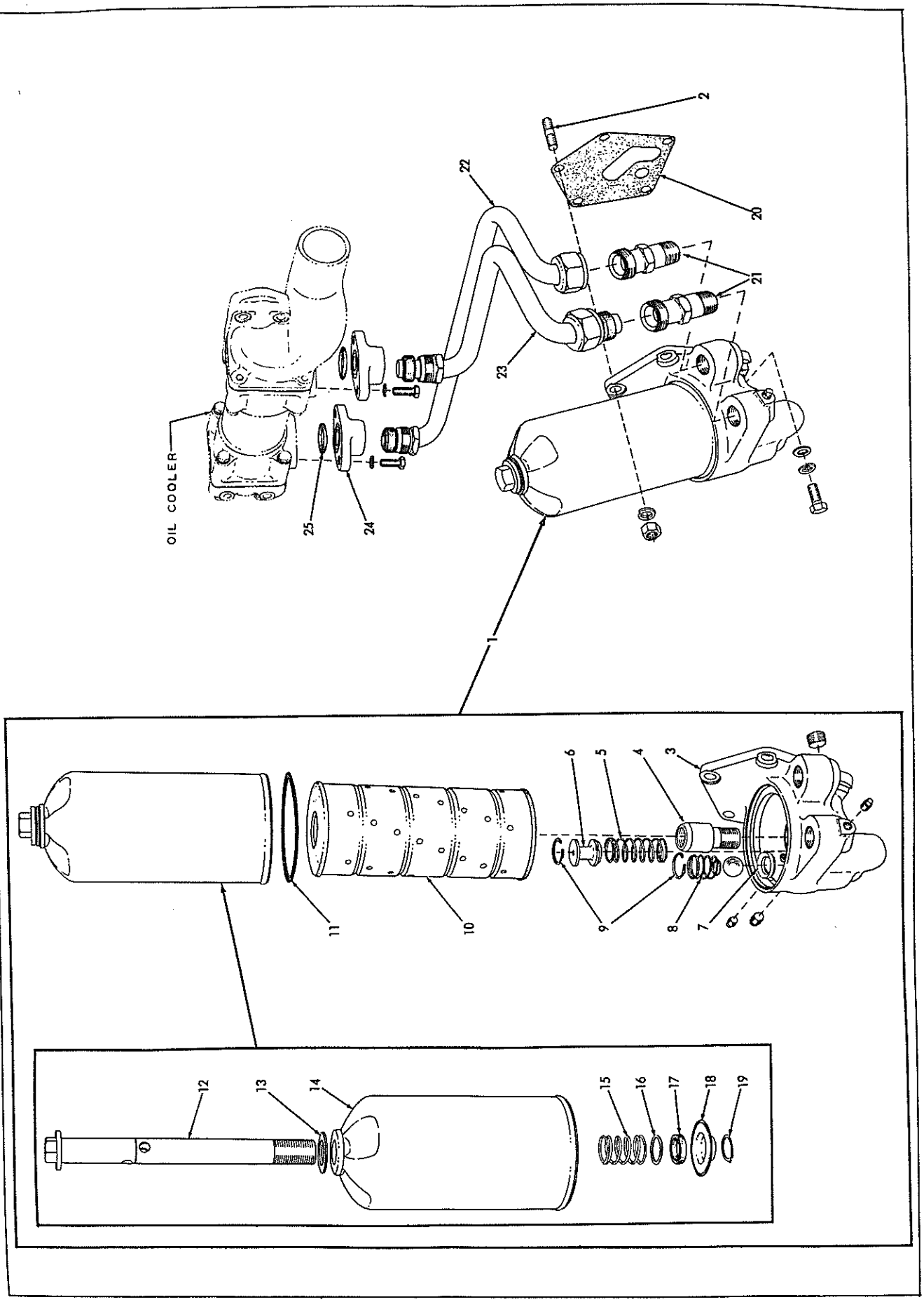
OIL PUMP – CONTINUED

ITEM	PART NUMBER	QTY.	PART NAME	ASSEMBLY OR PACKAGE NO.
21	4348215	1	Gasket, discharge pipe to pump	4348450
	4348214	1	Pipe, discharge	
	903771	2	Capscrew, 5/16" NC x 7/8"	
22	904205	2	Lockwasher, 5/16" ASA Med.	
	4346483	2	Capscrew, 3/8" NC x 1"	
	904206	2	Lockwasher, 3/8" ASA Med.	
23	4346169	1	Gasket, discharge pipe to crankcase	4348450
24	4348485	1	Plug Assy., discharge pipe	
25	4348691	1	Wire, locking, discharge pipe plug	
	4348682	1	Bracket, suction pipe supporting	
26	4311869	2	Capscrew, 1/2" NC x 1–5/8"	
	904208	2	Lockwasher, 1/2" ASA Med.	
27	4348218	1	Gasket, suction pipe to pressure pump	4348450
	4348640	1	Pipe Assy., suction (Includes Items #29 and #30)	
28	4349375	4	Capscrew, 5/16" NC x 1–5/8"	
	904205	4	Lockwasher, 5/16" ASA Med.	
29	4348683	1	Screen, oil	
30	4348682	1	Wire, oil screen retaining, 1/16" x 18"	



OIL PAN

ITEM	PART NUMBER	QTY.	PART NAME	ASSEMBLY OR PACKAGE NO.
1	4348787	1	Pan, oil	
	910211	23	Capscrew, 3/8" NC x 1–1/8"	
	903772	2	Capscrew, 5/16" NC x 1"	
	918587	3	Capscrew, 5/16" NC x 6–3/4"	
	904206	23	Lockwasher, 3/8" ASA Med.	
	904205	5	Lockwasher, 5/16" ASA Med.	
2	4629	1	90° Elbow, Street	
3	912768	1	Plug, oil drain	
4	4348142	1	Gasket Set, oil pan (5 pieces)	4348450


OIL COOLER
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OIL FILTER

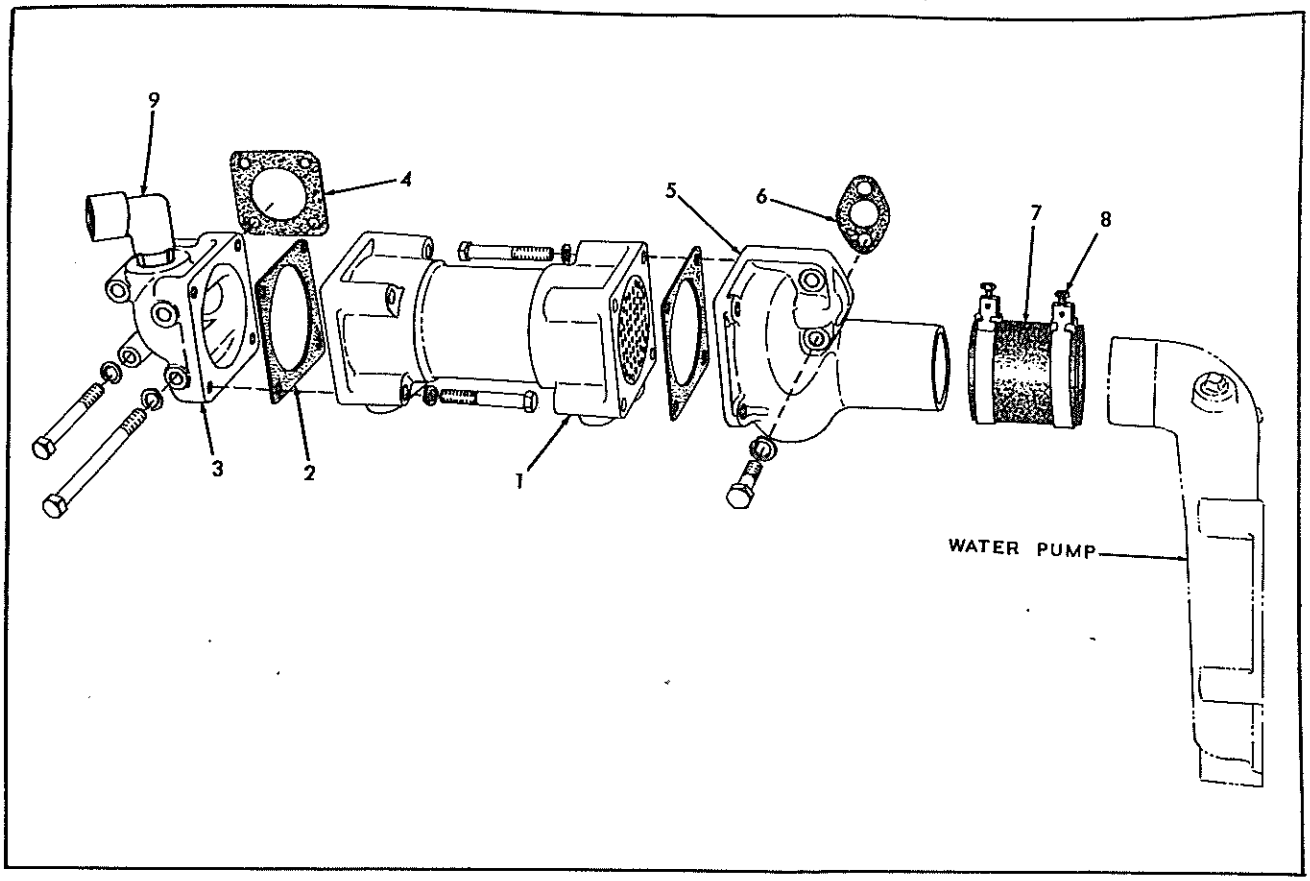
OIL FILTER

ITEM	PART NUMBER	QTY.	PART NAME	ASSEMBLY OR PACKAGE NO.
1	4348756	1	Filter Assy., lubricating oil (Consists of Items #3 thru #19)	
	903638	3	Capscrew, 1/2" NC x 1–1/4"	
	912007	2	Plain Washer, 1/2" I.D. x 7/8" O.D.	
2	4348314	2	Stud, 1/2" NC x 1/2" NF x 1–7/8"	
	910195	2	Hex Nut, 1/2" NF	
	904208	5	Lockwasher, 1/2" ASA Med.	
	4348754	1	Base Assy. (Includes parts as listed in Item #3 and #4 thru #9)	
	901651	2	Pipe Plug, 1/8" Steel, 9/32" Sq. Hd.	
3	901652	1	Pipe Plug, 1/4" Steel, Ctsk., 3/8" Sq.	
	904223	1	Pipe Plug, 1/2" Steel, Ctsk., 3/8" Sq.	
	917015	1	Ball, steel, 7/8" diam.	
4	4348636	1	Adapter, center bolt	
5	4348087	1	Spring, pressure relief valve	
6	4348086	1	Valve, pressure relief	
7	4348580	1	Insert, check valve seat	
8	4347190	1	Spring, check valve	
9	4253766	2	Ring, snap, valve retaining	
10	4348261	1	Element Kit, oil filter (Includes Item #11)	
11	4506161	1	Gasket, oil filter body	
12	4369990	1	Bolt, center	
13	4348266	1	Gasket, filter center bolt	
14	4348272	1	Body, oil filter	
15	4348267	1	Spring, filter element	
16	4348268	1	Washer, filter element seal	
17	4348270	1	Seal, filter element	
18	4348269	1	Adapter, filter element	
19	4348271	1	Ring, snap, filter center bolt	
20	4348151	1	Gasket, filter to crankcase	4348450
21	4348311	2	Connector, oil filter lines	
	4348465	1	Line, filter to cooler	
22	918327	2	Ring, sealastic, 7/8" tube (Includes Ferrule)	
	917741	1	Nut, Sealastic, male, 7/8" tube	

(Continued)

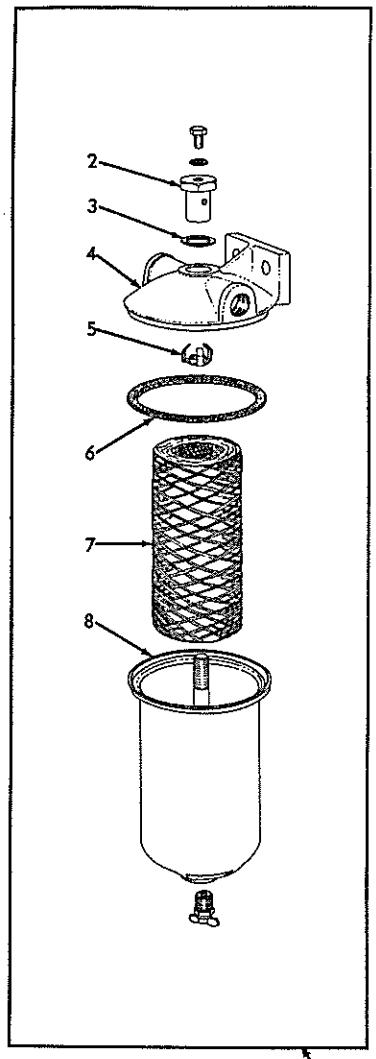
OIL FILTER – CONTINUED

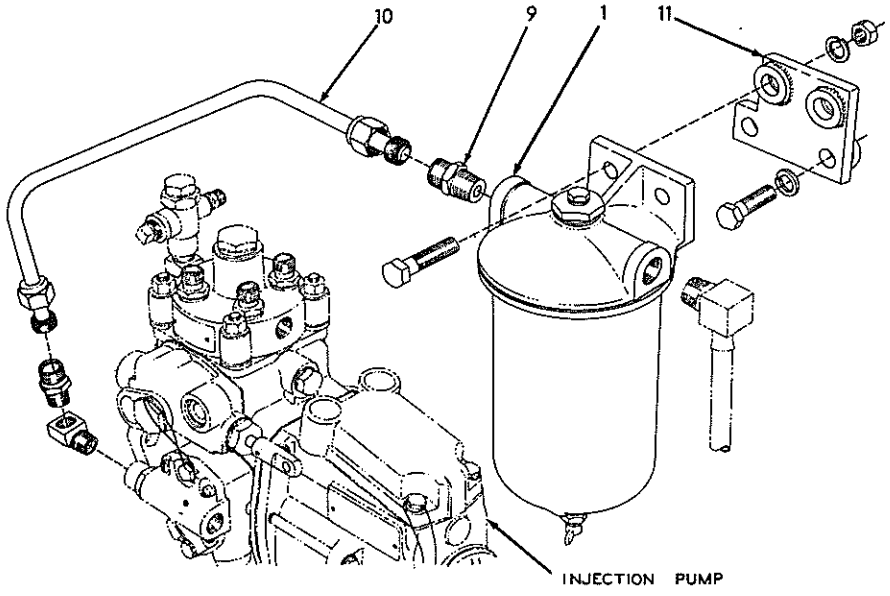
ITEM	PART NUMBER	QTY.	PART NAME	ASSEMBLY OR PACKAGE NO.
22	918326	1	Nut, Sealastic, female, 7/8" tube	
23	4348464	1	Line, cooler to filter	
	918327	2	Ring, Sealastic, 7/8" tube (Includes Ferrule)	
	917741	1	Nut, Sealastic, male, 7/8" tube	
	918326	1	Nut, Sealastic, female, 7/8" tube	
24	4348279	2	Flange, oil cooler	
	910211	4	Capscrew, 3/8" NC x 1–1/8"	
	904206	4	Lockwasher, 3/8" ASA Med.	
25	4253106	2	Ring, sealing, oil cooler flange	4348450



OIL COOLER

ITEM	PART NUMBER	QTY.	PART NAME	ASSEMBLY OR PACKAGE NO.
	4348284	1	Cooler, lubricating oil	
1	903635	4	Capscrew, 3/8" NC x 2–1/2"	
	904206	8	Lockwasher, 3/8" ASA Med.	
2	4348629	2	Gasket, oil cooler	4348450
	4348822	1	Connection, water outlet	
	906695	2	Capscrew, 3/8" NC x 3–1/4"	
3	906698	2	Capscrew, 3/8" NC x 4–3/4"	
	904206	4	Lockwasher, 3/8" ASA Med.	
4	4348184	1	Gasket, water outlet	4348450
	4348100	1	Connector, water inlet	
5	903633	2	Capscrew, 3/8" NC x 1–3/4"	
	904206	2	Lockwasher, 3/8" ASA Med.	
6	4348185	1	Gasket, water inlet	4348450
7	4506737	1	Hose, water pump to cooler	
8	4253922	2	Hose Clamp	
9	16775	1	Elbow (Oil Cooler)	



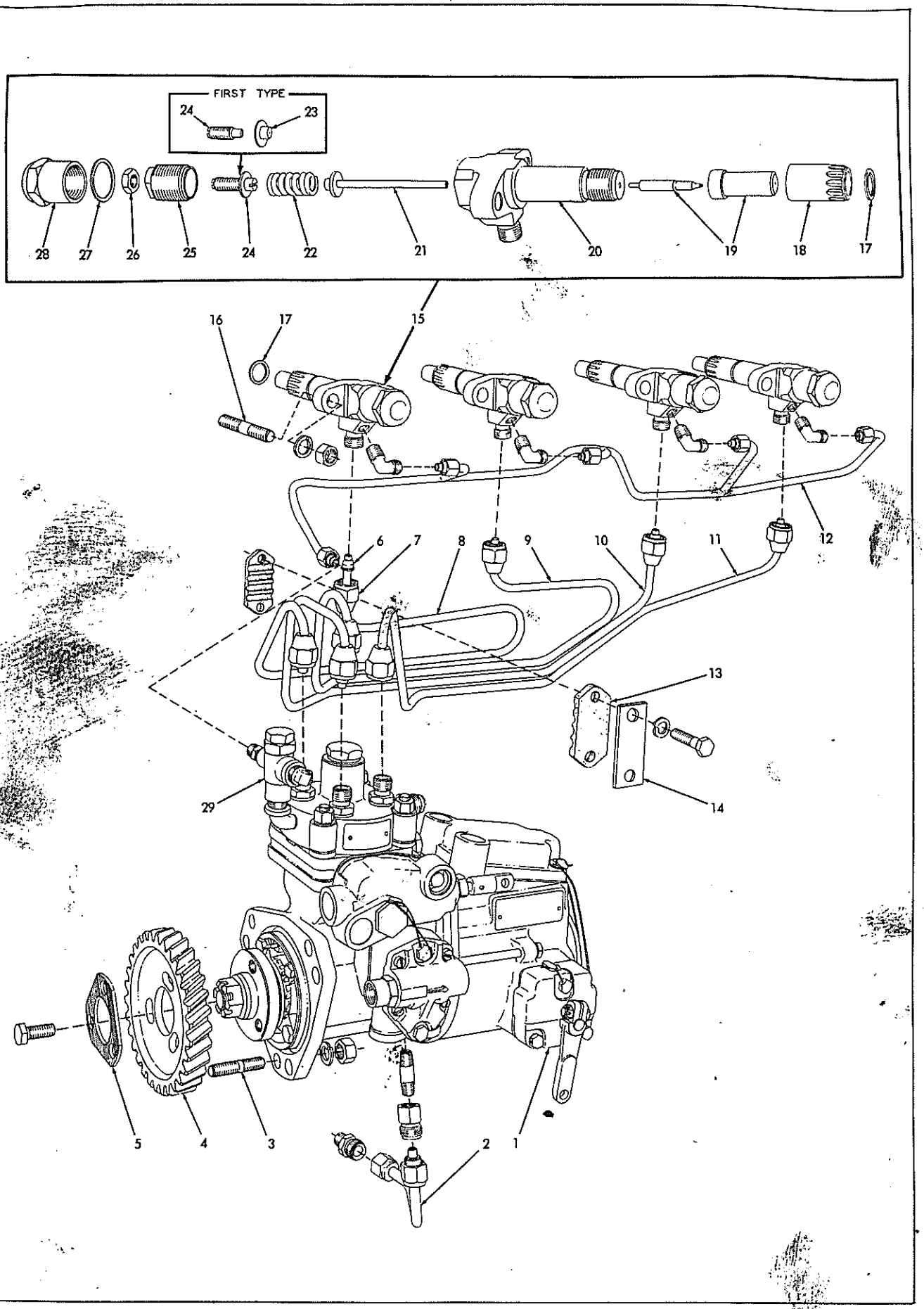


FIRST STAGE FUEL FILTER

TRACTOMOTIVE

FIRST STAGE FUEL FILTER

ITEM	PART NUMBER	QTY.	PART NAME
	4347786	1	Filter Assy., fuel (Consists of Items #2 thru #8)
1	903632	2	Capscrew, 3/8" NC x 1–1/2"
	904206	2	Lockwasher, 3/8" ASA Med.
	910324	2	Nut, 3/8" NC
	065578	1	Nut, shell retaining
2	906692	1	Capscrew, 1/4" NC x 3/8"
	914686	1	Plain Washer, copper, 1/4" I.D.
3	065579	1	Gasket, shell retaining nut
4	4347790	1	Head, filter
5	065581	1	Guide, element centering
6	043130	1	Gasket, filter shell
7	4347787	1	Element Kit, filter (Includes Item #6)
8	4347791	1	Shell, filter
	915443	1	Drain cock, 1/4" NPT
9	4254097	1	Connector, fuel line (Sealastic) 3/8" tube, 3/8" NPT Male
	4348510	1	Line, filter to injection pump
	918325	2	Nut, Sealastic, 3/8" tube (Includes Swivel Collar)
10	915367	2	Ring Assy., Sealastic, 3/8" tube (Includes Ferrule)
	915368	1	Connector, Sealastic, 3/8" tube, 1/4" NPT Male
	914588	1	Elbow, st., brass, 90°, 1/4" NPT
	4348506	1	Bracket, mounting
11	910245	2	Capscrew, 3/8" NC x 1–3/8"
	904206	2	Lockwasher, 3/8" ASA Med.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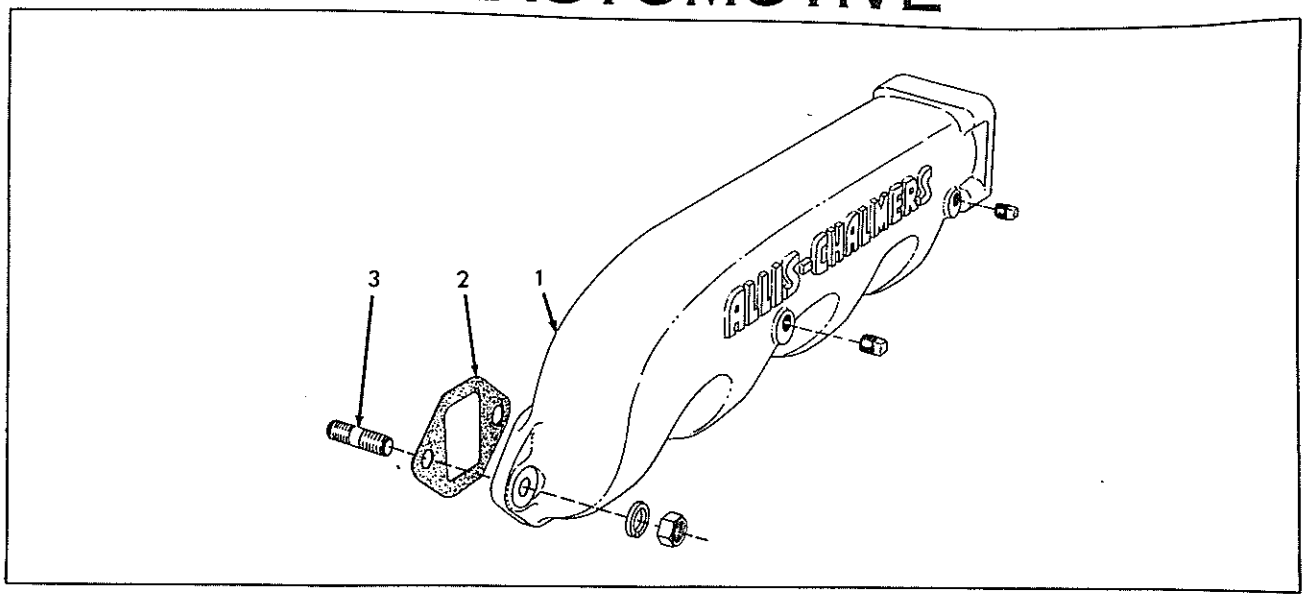
INJECTION PUMP AND NOZZLES

ITEM	PART NUMBER	QTY.	PART NAME
1	4348747	1	Pump Assy., fuel injection (new)
	4348895	1	Pump Assy., fuel injection (rebuilt)
2	4348474	1	Line, oil, crankcase to injection pump
	918235	2	Nut, Sealastic, 5/16" tube
	915852	2	Ring Assy., Sealastic, 5/16" tube (Includes Ferrule)
	915854	1	Connector, Sealastic, 5/16" tube, 1/8" NPT male
	917980	1	Connector, Sealastic, 5/16" tube, 1/8" NPT female
	910205	1	Nipple, pipe, 1/8" NPT x 1–1/4"
3	4346347	3	Stud, injection pump attaching
	910123	3	Hex Nut, 3/8" NF
	904206	3	Lockwasher, 3/8" ASA Med.
4	4348438	1	Gear, injection pump drive
	912180	3	Capscrew, 3/8" NF x 7/8"
	904206	3	Lockwasher, 3/8" ASA Med.
5	4347836	1	Plate, serrated, injection pump drive gear
6	4501149	8	Sleeve, fuel injection line
7	4504409	8	Nut, fuel injection line
8	4348175	1	Line, fuel injection (#1 cylinder)
9	4348176	1	Line, fuel injection (#2 cylinder)
10	4348177	1	Line, fuel injection (#3 cylinder)
11	4348178	1	Line, fuel injection (#4 cylinder)
12	4348168	1	Manifold Assy., fuel return (Includes 5--911437 and 5--911435)
	911437	5	Hex Nut, compression fitting, 1/4" tube
	911435	5	Sleeve, compression fitting, 1/4" tube
	4349376	4	Elbow, compression type, 1/4" tube, 1/8" NPT male
	914626	1	Connector, compression type, 1/4" tube, 1/8" NPT male
13	4347650	2	Clamp, fuel injection lines (half only)
14	4348188	1	Plate, fuel injection line clamp
	903773	2	Capscrew, 5/16" NC x 1–1/4"
	904205	2	Lockwasher, 5/16" ASA Med.
15	4346227	4	Holder Assy., injection nozzle (Includes Items #17 thru #28)
16	4346445	8	Stud, injection nozzle holder

(Continued)

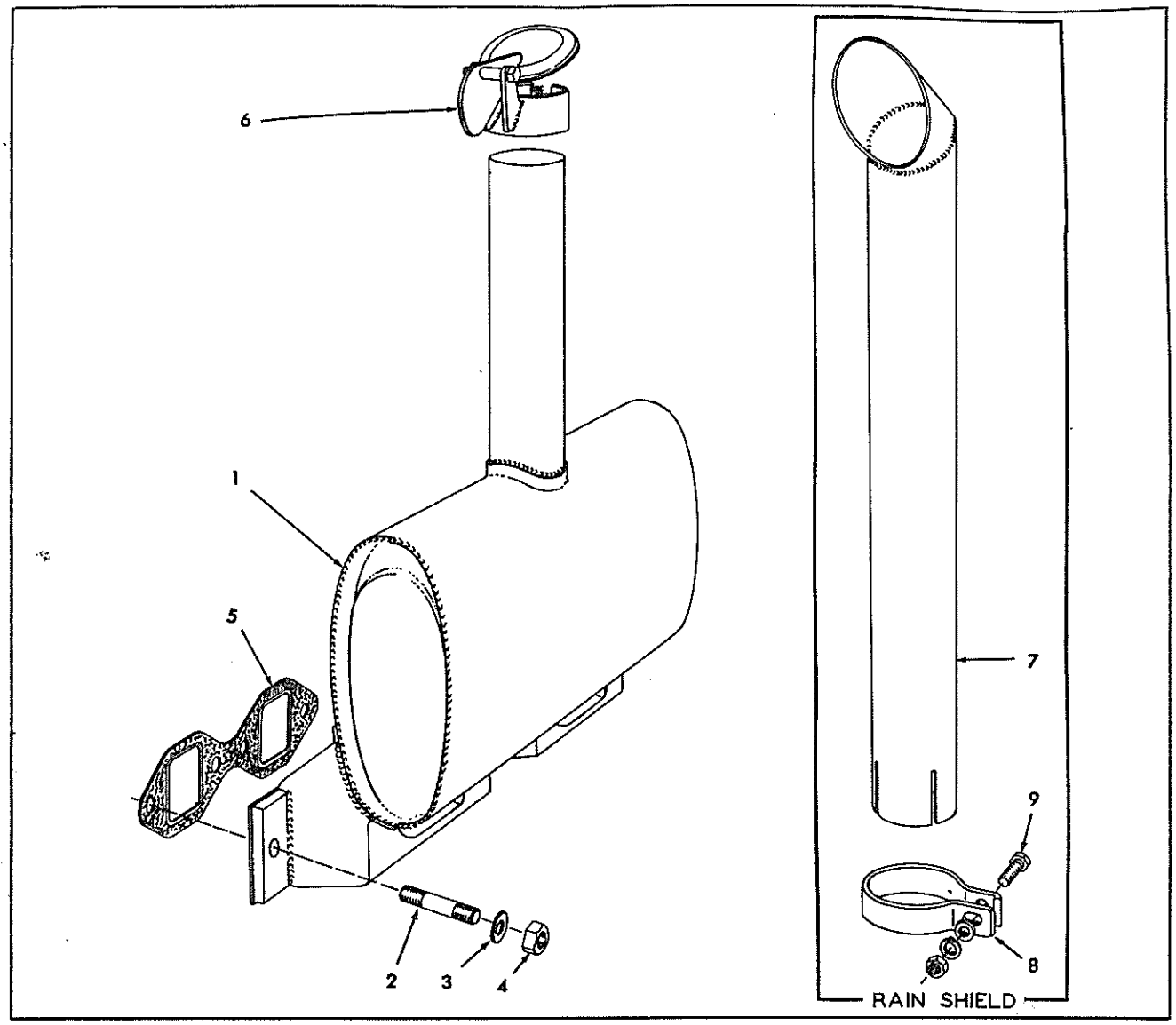
INJECTION PUMP AND NOZZLES – CONTINUED

ITEM	PART NUMBER	QTY.	PART NAME
16	910123	8	Hex Nut, 3/8" NF
	904206	8	Lockwasher, 3/8" ASA Med.
17	4340484	4	Gasket, injection nozzle holder
18	4040100	4	Nut, injection nozzle
19	4331648	4	Nozzle Assy., injection (Includes one Body and one Valve) (Serviced as assy. only)
20	4040553	4	Body, nozzle holder
21	4040552	4	Spindle, nozzle holder
22	4371121	4	Spring, nozzle holder
24	4047538	4	Screw, nozzle holder spring (Second type)
25	4040096	4	Nut, nozzle holder spring
26	4040098	4	Nut, nozzle holder screw
27	4372113	4	Gasket, nozzle holder cap
28	4040099	4	Cap, nozzle holder
29	4040718	1	Valve Assy., pressure relief
	901722	1	90° Elbow, St., 1/4" NPT



INTAKE MANIFOLD

ITEM	PART NUMBER	QTY.	PART NAME	ASSEMBLY OR PACKAGE NO.
1	4348002	1	Manifold, intake	
	901652	2	Pipe Plug, 1/4" Steel, Ctsk., 3/8" Sq.	
2	4346138	4	Gasket, intake manifold	4348450
3	4346208	8	Stud, exhaust manifold	
	910325	8	Hex Nut, 1/2" NC	
	904208	8	Lockwasher, 1/2" ASA Med.	



MUFFLER

ITEM	PART NUMBER	QTY.	PART NAME
1	21388	1	Muffler, exhaust (Interchangeable w/A.C. #086767)
2	4346208	8	Stud
3	904208	8	Lockwasher, 1/2" ASA Med.
4	910325	8	Hex Nut, 1/2" – 13 NC
5	21389	2	Gasket, muffler to cylinder head (Interchangeable w/A.C. #086768)
6	068963	1	Raincap, exhaust pipe
7	077250	1	Shield, rain, exhaust pipe
8	077247	1	Clamp, exhaust pipe rain shield
9	U-3188	1	Capscrew, 3/8" NF x 1–1/2"
	900817	1	Plain Washer, 3/8" U.S. Std.
	904206	1	Lockwasher, 3/8" ASA Med.
	911041	1	Hex Nut, 3/8" NF

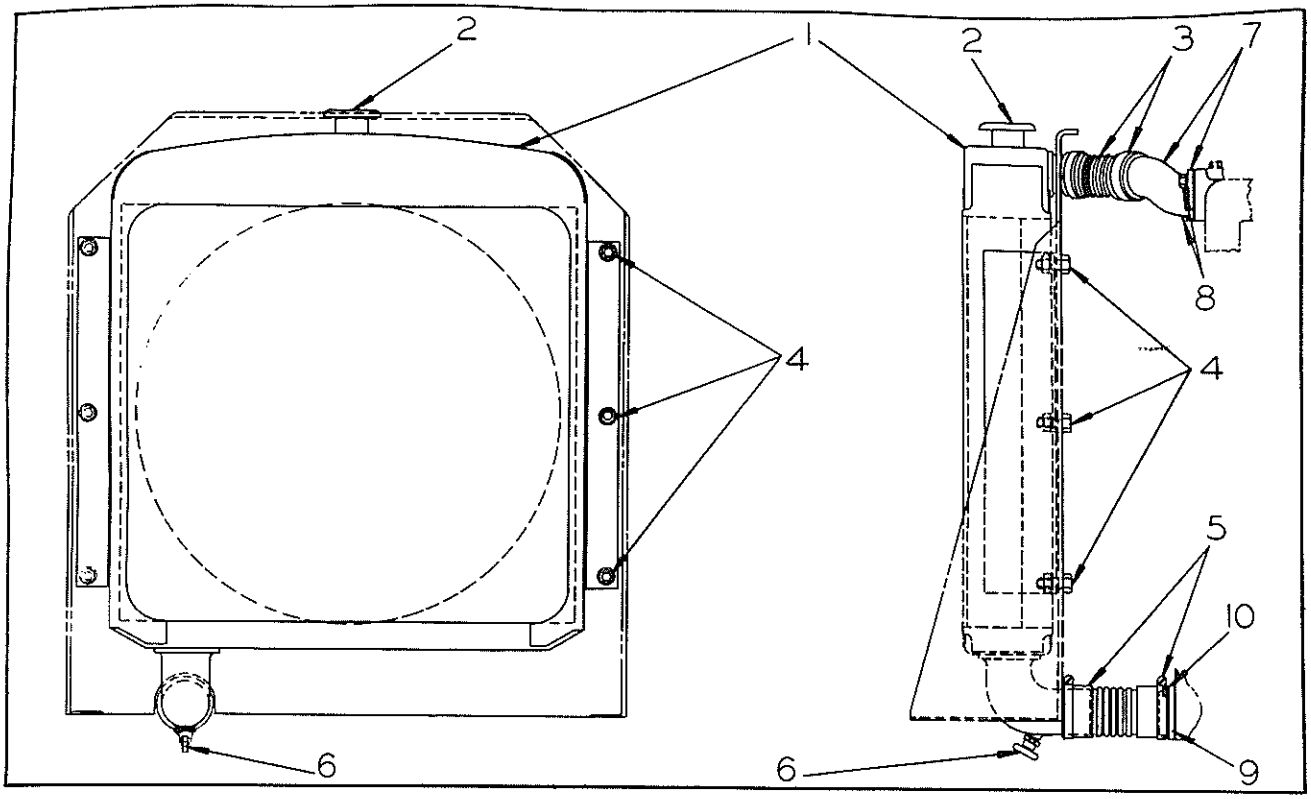


PLATE 707 – RADIATOR GROUP

ITEM	PART NUMBER	QTY.	PART NAME
1	20953	1	Radiator Assy. (Includes Item #2)
2	7198	1	Cap, Radiator
3	20962	1	Hose, 2–1/4" I.D. x 4–1/2" Long
	17654	2	Hose Clamp
4	1239	6	Capscrew, 1/2" – 20 NF x 1–1/2"
	20841	12	Rubber Washer
	910244	6	Plain Washer, 1/2" SAE
	19771	6	Locknut, 1/2" – 20 NF
5	20963	1	Hose
	17654	2	Hose Clamp
6	6810	1	Drain Cock
7	21390	1	Elbow, Engine Water Outlet (Interchangeable w/A.C. #088242)
	21391	1	Gasket (Interchangeable w/A.C. #088196)
8	6572	2	Capscrew, 7/16" – 14 NC x 1–1/8"
	904207	2	Lockwasher, 7/16" ASA Med.
9	4347003	1	Flanged Adapter
	4346456	1	Gasket
10	903630	2	Capscrew, 3/8" – NC x 1"
	904206	2	Lockwasher, 3/8" ASA Med.

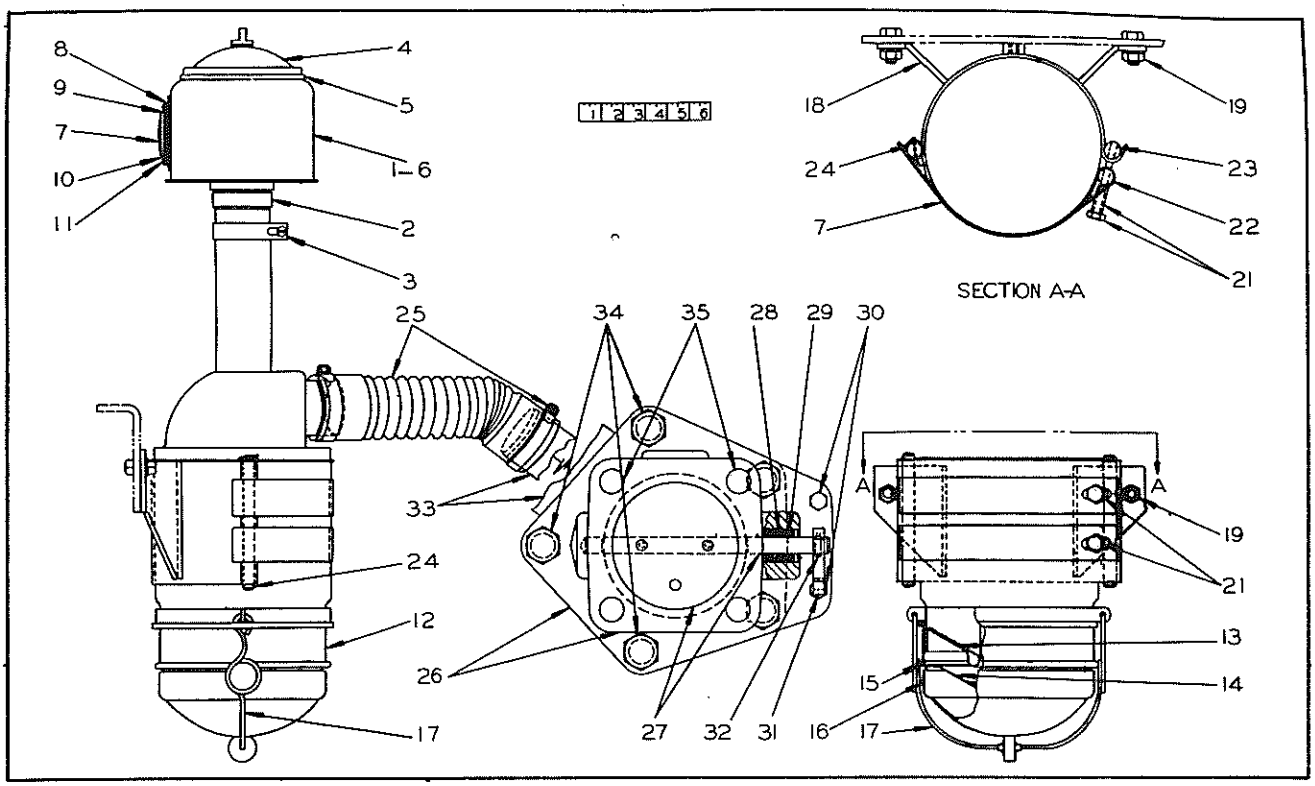


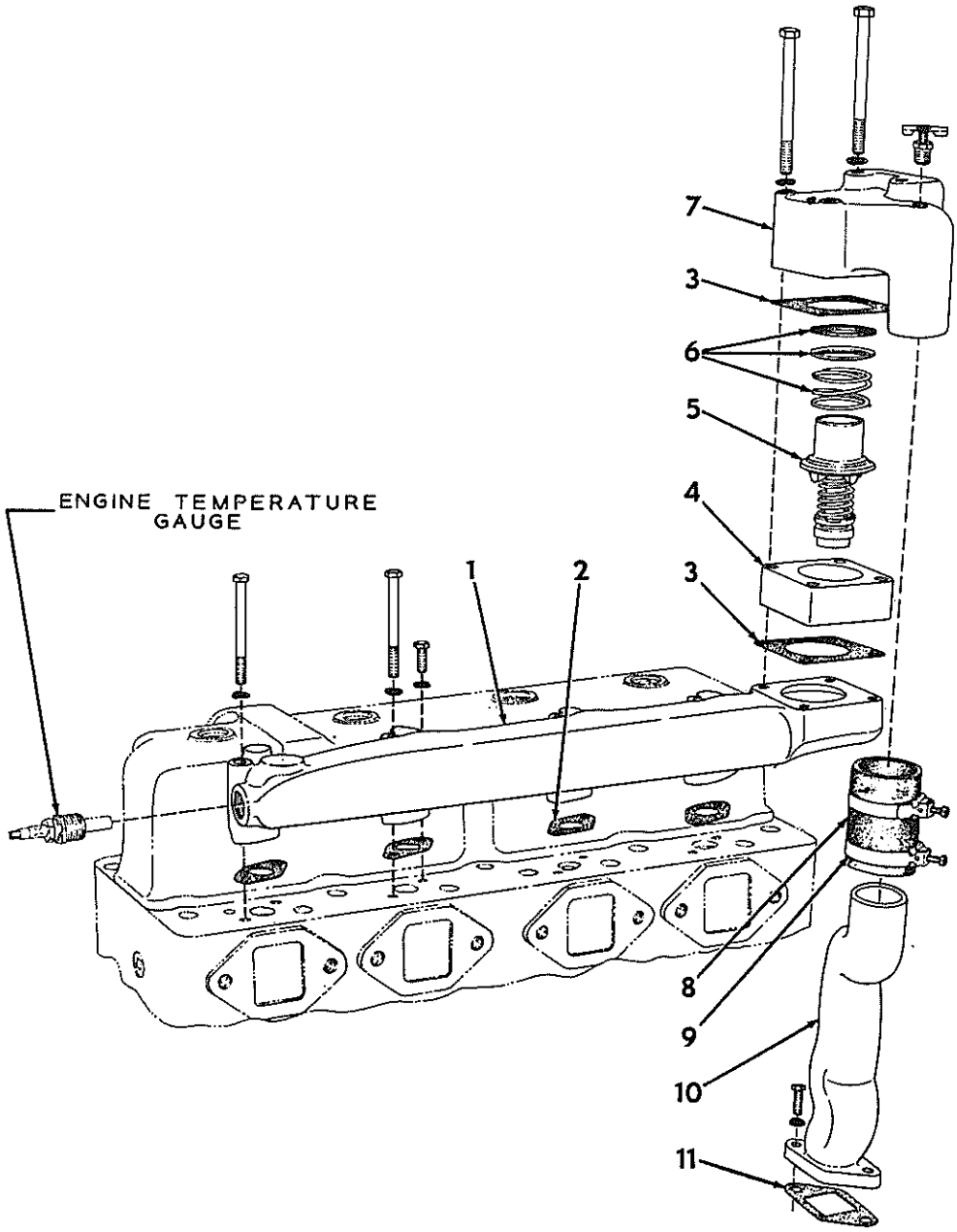
PLATE 702 – PRE-CLEANER AND AIR CLEANER

ITEM	PART NUMBER	QTY.	PART NAME		
1	17656	1	Pre-Cleaner Assy. (Includes Items #2 thru #6)	Interchangeable with A.C. #044961	
2	22168	1	Sleeve and Body Assy.	A.C. #044252	
3	22169	1	Clamp Assy. (Includes Screw & Nut)	A.C. #065412	
4	22170	1	Cap Assy. (Includes Wing Nut)	A.C. #044255	
5	22171	1	Gasket	A.C. #044256	
6	22172	1	Shell Assy. (Includes Items #7 thru #11)	A.C. #044918	
7	22173	1	Glass, Shell Window	A.C. #043860	
8	22174	1	Gasket	A.C. #043852	
9	22175	1	Retainer, Shell Glass	A.C. #043853	
10	22176	1	Ring, Glass Retainer	A.C. #043991	
11	22177	3	Screw Assy. (Includes Lockwasher)	A.C. #043856	
12	17657	1	Air Cleaner Assy. (Includes Air Cleaner Body & Items #13 thru #17)	A.C. #085999	
	- - - -	1	Air Cleaner Body (Not serviced, order 17657)		
13	22178	1	Ring, Baffle Retainer	A.C. #041866	
14	22179	1	Baffle, Oil	A.C. #088080	
15	22180	1	Gasket, Oil Cup	A.C. #041869	
16	22181	1	Oil Cup	A.C. #088081	
17	22182	1	Bail Assy., oil cup (Includes Roller)	A.C. #041868	(Continued)

PRE-CLEANER AND AIR CLEANER – CONTINUED

(See Plate 702)

ITEM	PART NUMBER	QTY.	PART NAME
18	17094	1	Bracket
19	1249	2	Capscrew, 1/2" – 20 NF x 1–1/4"
	904208	2	Lockwasher, 1/2" ASA Med.
	911043	2	Hex Nut, 1/2" – 20 NF
20	17598	2	Band
21	11663	2	Capscrew, 3/8" – 16 NC x 3–1/2"
	17601	2	Spacer
22	17658	2	Pin
23	17599	1	Pin
24	17602	1	Pin
	910244	1	Plain Washer, 1/2" SAE
	916939	1	Cotter Pin, 3/16" x 7/8"
25	20856	1	Flexible Hose
	17654	2	Hose Clamp
26	21460	1	Adapter Housing Assy. (Includes Items #27 thru #32)
	20783	1	Gasket
27	20933	1	Shaft
	20934	1	Plate
	21439	2	Rivet, 5/32" x 7/16"
28	21395	1	Seal
29	20873	1	Seal
30	21461	2	Capscrew, 1/4" – 20 NF x 7/8"
	910267	2	Hex Jam Nut, 1/4" – 28 NF
31	20940	1	Lever
32	20995	1	Pin
33	20782	1	Elbow (Special)
	20784	1	Gasket
34	1185	5	Capscrew, 1/2" – 20 NF x 1–3/4"
	904208	5	Lockwasher, 1/2" ASA Med.
	911043	5	Hex Nut, 1/2" – 20 NF
35	1110	4	Capscrew, 1/2" – 13 NC x 1–1/4"
	904208	4	Lockwasher, 1/2" ASA Med.

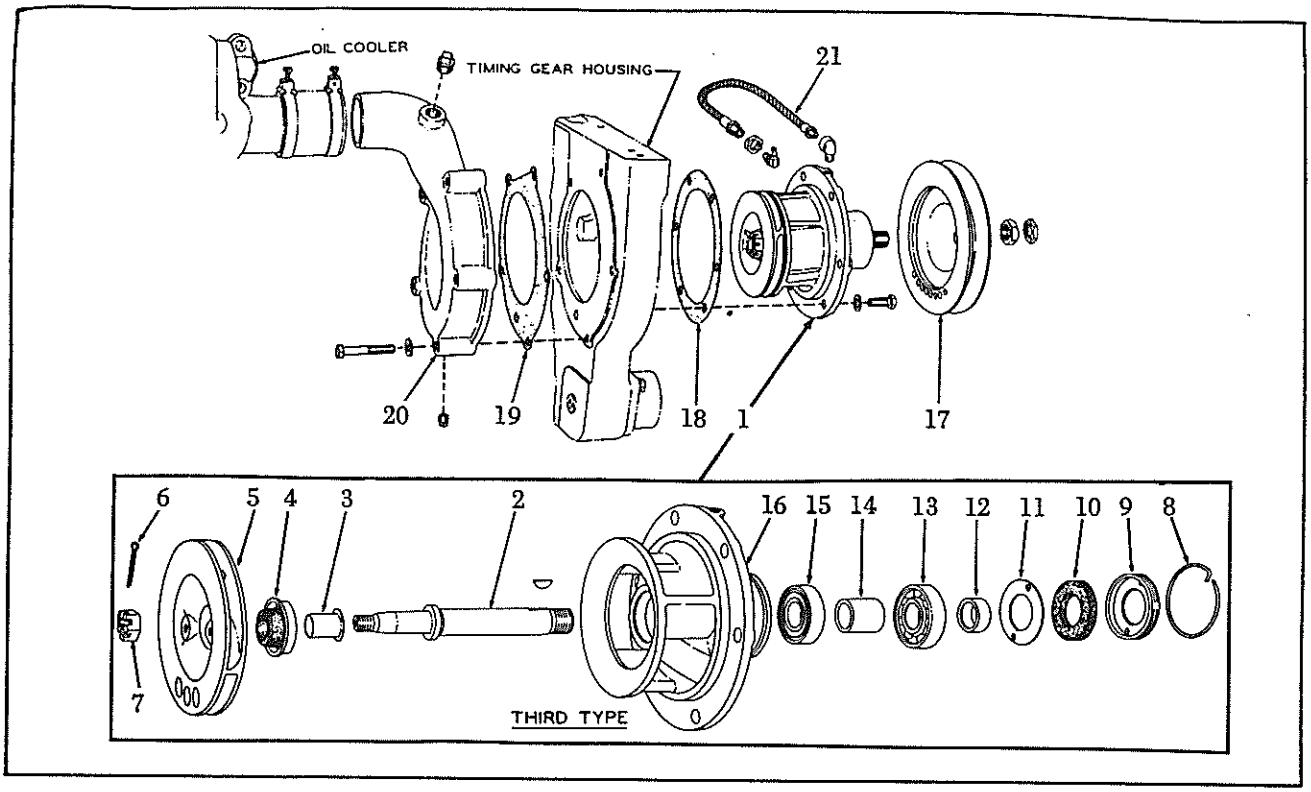


WATER OUTLET MANIFOLD

TRACTOMOTIVE

WATER OUTLET MANIFOLD

ITEM	PART NUMBER	QTY.	PART NAME	ASSEMBLY OR PACKAGE NO.
	4348819	1	Manifold, water outlet	
	903722	4	Capscrew, 5/16" NC x 1"	
1	917300	1	Capscrew, 5/16" NC x 3–1/4"	
	917016	3	Capscrew, 5/16" NC x 3–1/2"	
	904205	8	Lockwasher, 5/16" ASA Med.	
2	4348278	4	Gasket, water manifold	4348450
3	4348189	2	Gasket, thermostat housing	4348450
4	4348478	1	Spacer, thermostat housing	
5	4363280	1	Thermostat	
6	4375678	1	Seal Assy., thermostat (Includes one Seal, one Spring and one Retainer) (Serviced only as a unit)	
	4348740	1	Housing Assy., thermostat (Includes brass insert)	
	912415	1	Cock, T-handle, 1/4" NPT	
7	903778	2	Capscrew, 3/8" NC x 4–1/2"	
	917059	2	Capscrew, 3/8" NC x 5"	
	904206	4	Lockwasher, 3/8" ASA Med.	
8	4254331	1	Hose, water by-pass tube, 3–1/4" long	
9	4253459	2	Hose Clamp	
	4348097	1	Pipe, water by-pass	
10	910245	2	Capscrew, 3/8" NC x 1–3/8"	
	904206	2	Lockwasher, 3/8" ASA Med.	
11	4347031	1	Gasket, water by-pass pipe	4348450
12	21436	1	Tee (Engine Temperature Gauge) Not Shown	



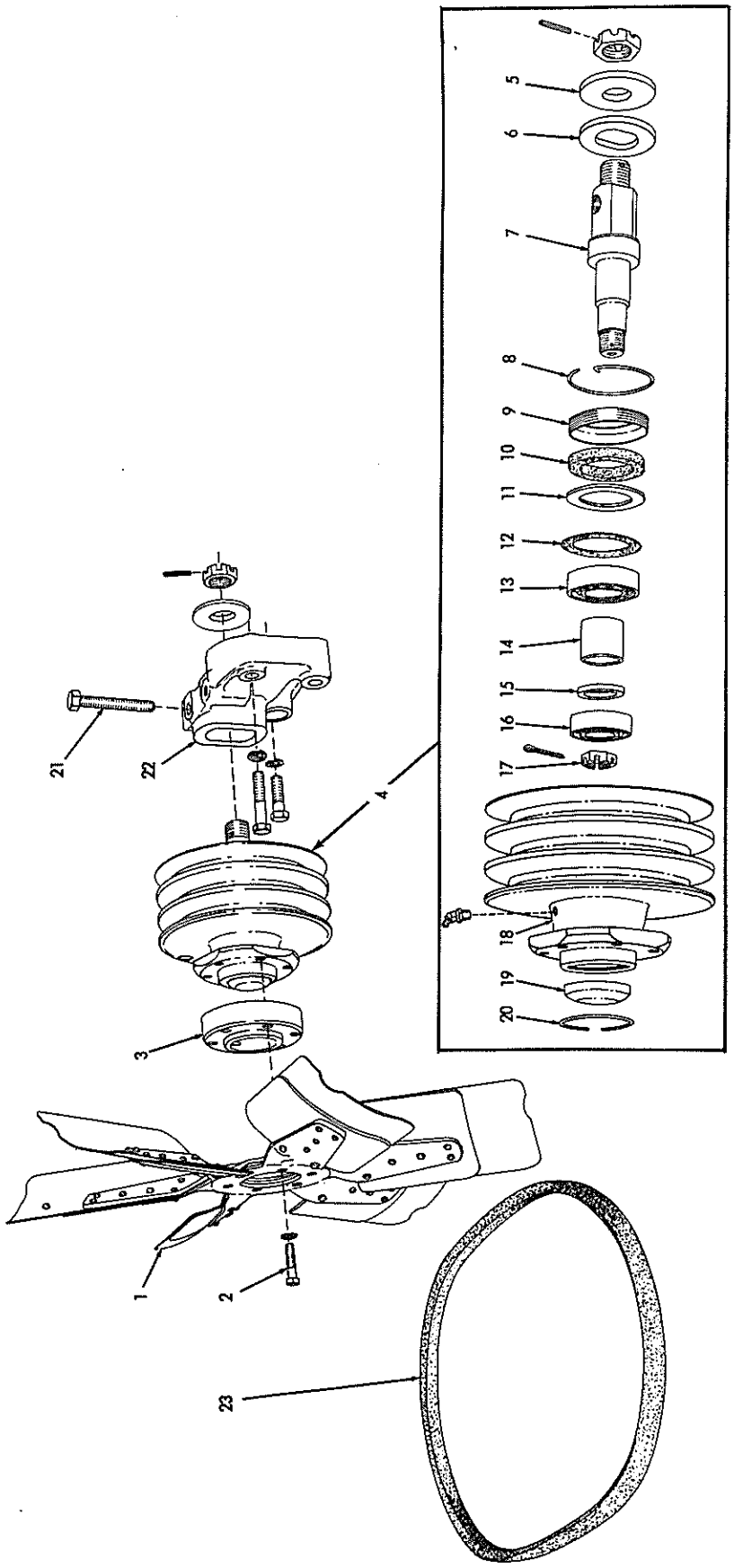
WATER PUMP

ITEM	PART NUMBER	QTY.	PART NAME
	4335284	1	Pump Assy. (Consists of Items #2 thru #16)
1	903630	6	Capscrew, 3/8" NC x 1"
	904206	6	Lockwasher, 3/8" ASA Med.
2	4348757	1	Shaft Assy. (Includes Item #3)
	905121	1	Woodruff Key, #5, 1/8" x 5/8"
3	4507084	1	Flinger, water
4	4507091	1	Seal Assy. (Serviced only as a unit)
5	4047400	1	Impeller Assy. (Includes ceramic insert)
6	4041097	1	Cotter Pin, impeller nut
7	4041096	1	Nut Nut, Slotted, impeller retaining
8	4371707	1	Snap Ring, sealing washer retainer
9	4044206	1	Retainer, sealing washer
10	4044205	1	Washer, sealing
11	4044209	1	Washer, retaining
12	4044207	1	Spacer, driving pulley
13	4044210	1	Ball Bearing, front
14	4044211	1	Spacer, bearing
15	4044212	1	Ball Bearing, rear

(Continued)

WATER PUMP – CONTINUED

ITEM	PART NUMBER	QTY.	PART NAME	ASSEMBLY OR PACKAGE NO.
16	4044213	1	Housing, water pump	
17	4348393	1	Pulley	
	910847	1	Hex Nut, 3/4" NF	
	917680	1	Hex Jam Nut, pal locking, 3/4" NF	
18	4346744	1	Gasket, water pump	4348450
19	4335056	1	Gasket, water pump volute	4348450
20	901651	1	Pipe Plug, 1/8" Steel, 9/32" Sq. Hd.	
	4349322	1	Volute (Has internal drain)	
20	904281	5	Capscrew, 3/8" NC x 2–1/4"	
	911115	5	Plain Washer, 3/8" SAE Std.	
	901653	1	Pipe Plug, 3/8" Steel, 7/16" Sq. Hd.	
21	915276	1	Lubricating Fitting, 90°, 1/8" NPT	
	915339	1	90° Elbow, street, brass, 1/8" NPT	

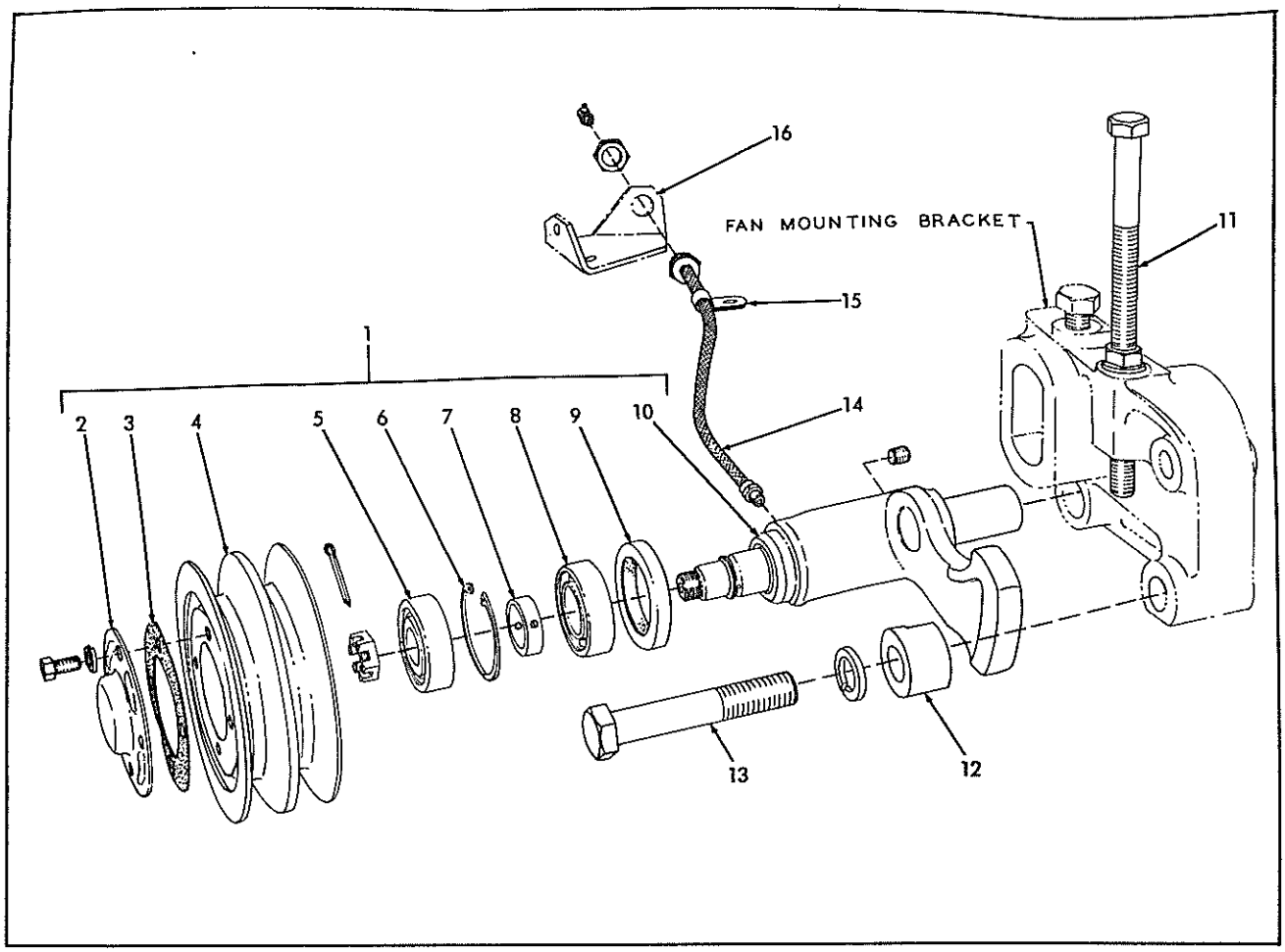


FAN

TRACTOMOTIVE

FAN

ITEM	PART NUMBER	QTY.	PART NAME
1	21392	1	Fan (Interchangeable w/A.C. #090155)
2	6564	6	Capscrew, 3/8" – 16 NC x 2"
	904206	6	Lockwasher, 3/8" ASA Med.
3	21393	1	Spacer, fan (Interchangeable s/A.C. #089019)
4	4348659	1	Hub Assy. (Consists of Items #5 thru #20)
5	4371703	1	Plain Washer, spindle clamping, front
6	4347094	1	Plain Washer, spindle clamping, rear
7	4040381	1	Spindle
	911174	1	Hex Jam Nut, slotted, 1" NF, front
	915946	1	Pin, roll, 5/32" x 1–1/4"
8	4371707	1	Snap Ring, fan hub
9	4040386	1	Retainer, spindle sealing washer
10	4040385	1	Washer, spindle sealing (cork)
11	4040384	1	Washer, retaining, front bearing
12	4371710	1	Gasket, bearing retaining washer
13	4253863	1	Ball Bearing, front
14	4040383	1	Spacer, spindle bearings
15	4640978	1	Washer, spacing, rear bearing
16	4253862	1	Ball Bearing, rear
17	4348502	1	Nut, spindle
	911064	1	Cotter Pin, 1/8" x 1–3/8"
18	4042039	1	Hub, fan
	915274	2	Lubricating Fitting, 45°, 1/8" NPT
19	088561	1	Cap, hub
20	4042081	1	Snap Ring, cap retaining
21	4003603	1	Screw, fan belt adjustment
22	4348281	1	Bracket, fan mounting
	904541	1	Capscrew, 1/2" NC x 1–3/4"
	903642	2	Capscrew, 1/2" NC x 2–1/2"
	904208	3	Lockwasher, 1/2" ASA Med.
23	4616523	2	Belt, fan driving (Furnished in matched pairs only)



FAN BELT TIGHTENER

ITEM	PART NUMBER	QTY.	PART NAME	ASSEMBLY OR PACKAGE NO.
1	4348431	1	Pulley Assy., fan belt tightener (Consists of Items #2 thru #10)	
2	4348118	1	Cover, pulley	
	905660	4	Capscrew, 5/16" NC x 1/2"	
	904205	4	Lockwasher, 5/16" ASA Med.	
3	4348122	1	Gasket, pulley cover	4348450
4	4348421	1	Pulley	
5	4253869	1	Ball Bearing, rear	
6	4252137	1	Snap Ring, pulley retaining	
7	4348121	1	Spacer, bearing	
8	4253862	1	Ball Bearing, front	
9	4253765	1	Seal, oil	
10	4348283	1	Lever Assy. (Includes 1--910230)	
	910230	1	Pipe Plug, 1/8" Slotted	
	913470	1	Hex Jam Nut, 5/8" NF, slotted	
	900807	1	Cotter Pin, 1/8" x 1–1/4"	

(Continued)

FAN BELT TIGHTENER – CONTINUED

ITEM	PART NUMBER	QTY.	PART NAME
	4348205	1	Screw, belt adjustment, 1/2" NC x 8"
11	910510	1	Hex Jam Nut, 1/2" NC
	904208	1	Lockwasher, 1/2" ASA Med.
12	4348442	1	Clamp, locking
13	4348443	1	Capscrew, locking clamp, 5/8" NC x 3–1/2"
	904209	1	Lockwasher, 5/8" ASA Med.
	045507	1	Hose, fan belt tightener lubrication
14	915276	1	Lubricating Fitting, 90° 1/8" NPT
	911049	1	Hex Jam Nut, 5/8" NF
15	040796	1	Clip, hose supporting
16	- - - -	1	Bracket (See Generator)

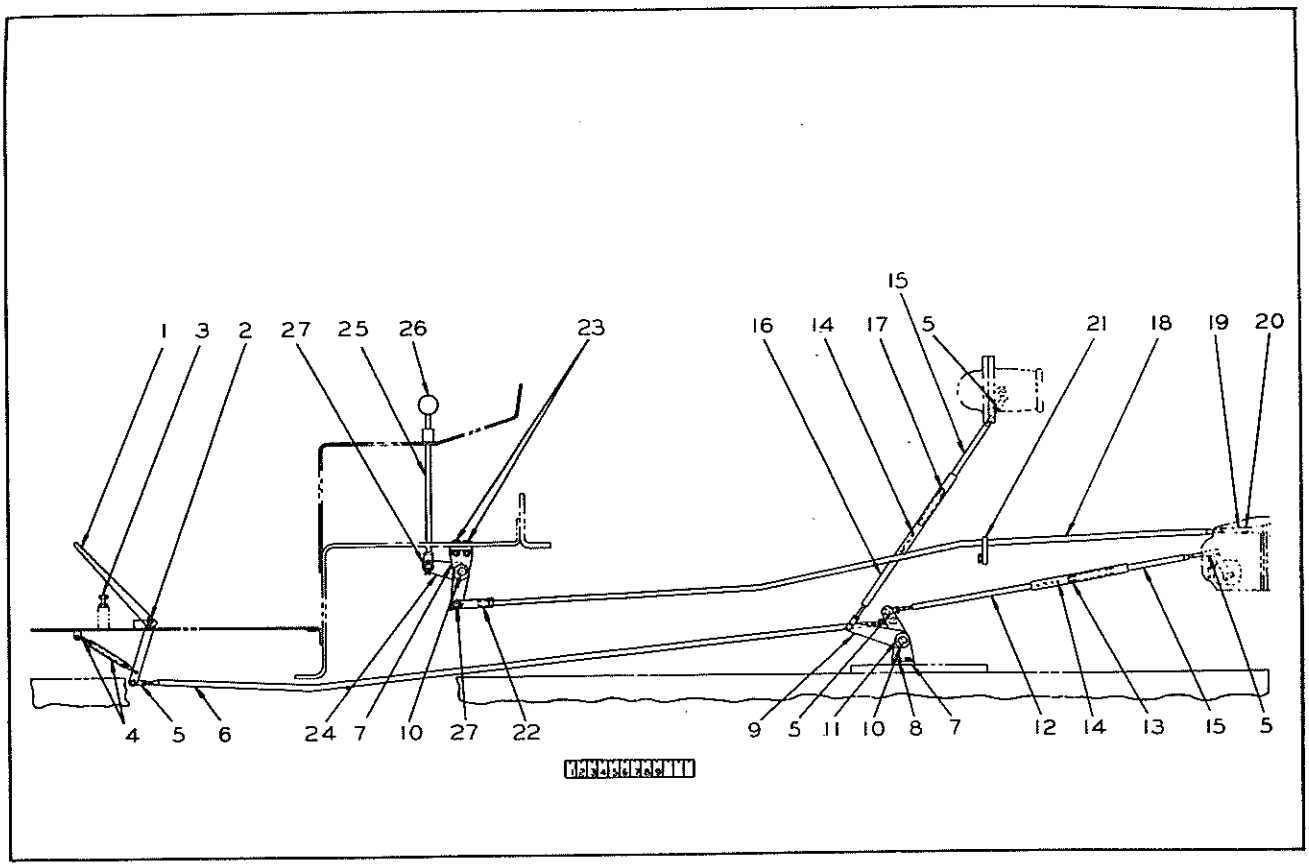


PLATE 710 – ENGINE CONTROLS

ITEM	PART NUMBER	QTY.	PART NAME
1	21664	1	Pedal
2	21696	1	Pin
	904001	2	Cotter Pin, 3/32" x 1/2"
3	1239	1	Capscrew, 1/2" – 20 NF x 1–1/2"
	913177	1	Hex Jam Nut, 1/2" – 20 NF
4	21657	1	Rod
	14226	1	Spring
5	21360	6	Ball Joint
	904204	6	Lockwasher, 1/4" ASA Med.
	911040	12	Hex Nut, 1/4" – 28 NF
6	21648	1	Rod
7	17118	2	Bracket
8	1243	3	Capscrew, 3/8" – 24 NF x 1"
	904206	3	Lockwasher, 3/8" ASA Med.
9	21656	1	Bell Crank Assy. (Includes 2--5955 and 2--5957)
	5955	2	Bearing (Lettered end must face pressing tool)
	5957	2	Seal (Install with lip toward outside)

(Continued)

ENGINE CONTROLS – CONTINUED

(See Plate 710)

ITEM	PART NUMBER	QTY.	PART NAME
10	17119	2	Shaft
11	916937	2	Roll Pin, 1/4" x 1–1/4"
12	21274	1	Rod Weld Assy.
13	20961	1	Spring
14	20995	2	Roll Pin
15	20994	2	Rod Weld Assy.
16	21273	1	Rod Weld Assy.
17	21740	1	Spring
18	21643	1	Rod
19	6563	1	Yoke End
	911040	1	Hex Nut, 1/4" – 28 NF
20	2217	1	Pin
	900970	1	Cotter Pin, 1/16" x 1/2"
21	21652	1	Bar (For fasteners see Engine Assy.)
22	5684	1	Yoke
	913177	1	Hex Jam Nut, 1/2" – 20 NF
23	2048	3	Capscrew, 3/8" – 24 NF x 1–1/4"
	911115	3	Plain Washer, 3/8" SAE
	904206	3	Lockwasher, 3/8" ASA Med.
	911041	3	Hex Nut, 3/8" – 24 NF
24	21651	1	Bell Crank Assy. (Includes 2--5955 and 2--5957)
	5955	2	Bearing (Lettered end must face pressing tool)
	5957	2	Seal (Install with lip toward outside)
25	21614	1	Rod Weld Assy.
26	1171	1	Knob
27	1565	2	Pin
	900806	2	Cotter Pin, 1/8" x 1"

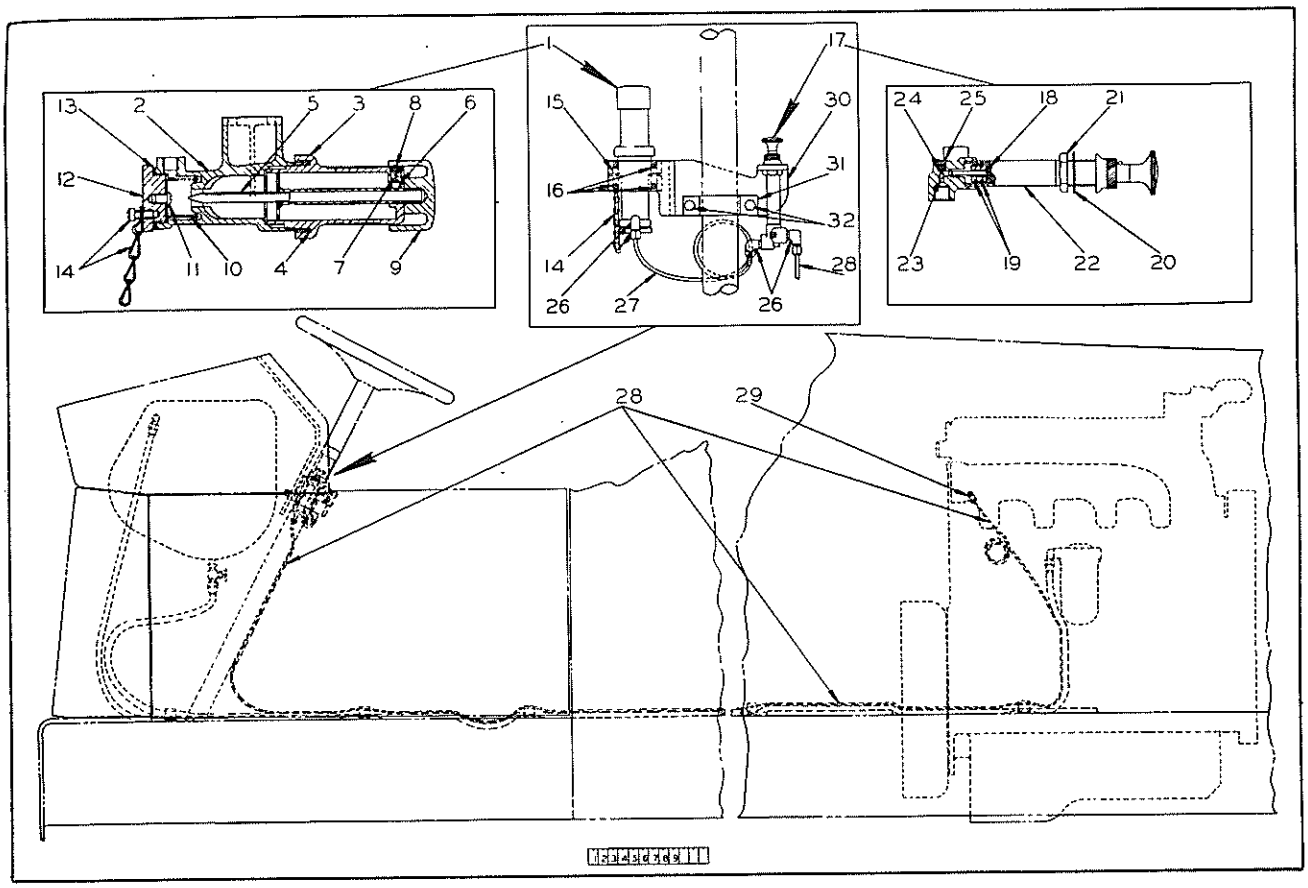


PLATE 727 – ENGINE PRIMER GROUP

ITEM	PART NUMBER	QTY.	PART NAME	Interchangeable with	
1	17782	1	Dispenser Assy. (Includes Items #2 thru #14)	A.C. #075771	
2	22209	1	Body	A.C. #068878	
3	22210	1	Chamber	A.C. #068879	
4	22211	1	Gasket	A.C. #069164	
5	22212	1	Plunger	A.C. #066255	
6	905357	1	Ball, Steel, 3/16" Dia.		
7	22213	1	Spring	A.C. #066251	
8	22214	1	Plug	A.C. #066252	
9	22215	1	Knob	A.C. #068881	
10	22216	1	Strainer	A.C. #068875	
11	915432	1	Machine Screw, 1/4" – 20 NC x 5/16"		
12	22217	1	Plug	A.C. #075770	
13	22218	1	Gasket	A.C. #068876	
14	22219	1	Chain	A.C. #075769	
	901781	1	Machine Screw, #10-32 NF x 1/2"		

(Continued)

(See Plate 727)

ITEM	PART NUMBER	QTY.	PART NAME		
15	17783	2	Gasket	Interchangeable with	
	901174	4	Machine Screw, #10-24 NC x 3/4", Rd. Hd.		
16	904203	4	Lockwasher, #10 ASA Med.		
	901310	4	Hex Nut, #10-24 NC		
17	17786	1	Pump Assy. (Includes Items #18 thru #25)	A.C. #066782	
18	- - - -	1	Piston Assy. (Not serviced separately)		
19	22220	2	Packing Ring (Rubber)	A.C. #066878	
20	22221	1	Washer	A.C. #066873	
21	22222	1	Locknut	A.C. #066872	
22	- - - -	1	Barrel (Not serviced separately)		
23	22223	2	Ball, 5/32" Dia.	A.C. #066876	
24	22224	2	Spring	A.C. #066875	
25	22225	2	Retainer	A.C. #066874	
	915557	3	Elbow, Sealastic		
26	915488	3	Nut, Sealastic		
	915486	3	Seal Ring Assy., Sealastic		
27	17784	1	Tube		
28	17785	1	Tube		
29	17787	1	Elbow Assy.		
30	21882	1	Bracket		
31	6287	1	Clamp		
	1108	2	Capscrew, 3/8" – 24 NF x 1–1/2"		
32	911115	2	Plain Washer, 3/8" SAE		
	904206	2	Lockwasher, 3/8" ASA Med.		
	911041	2	Hex Nut, 3/8" – 24 NF		

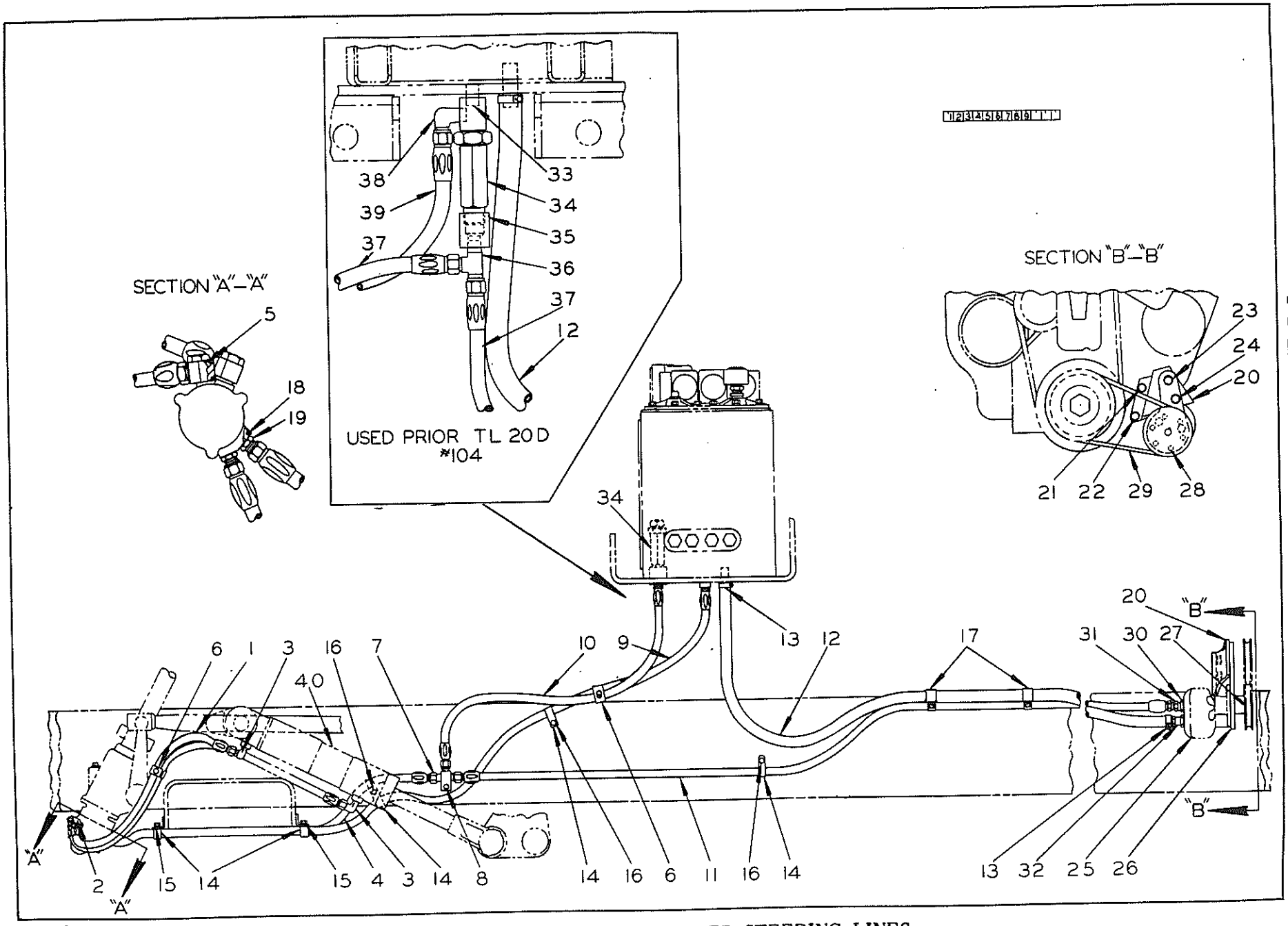


PLATE 719 – HYDRAULIC POWER STEERING LINES

TRACTOMOTIVE

HYDRAULIC POWER STEERING LINES

(See Plate 719)

ITEM	PART NUMBER	QTY.	PART NAME
	21324	1	Hose Assy. (Includes 2--10211 and one Hose)
1	10211	2	Swivel Nut Sub-Assy.
	4230-29	1	Hose (Bare Length) See note - page 105
2	10896	2	90° Elbow (Special)
3	6837	2	90° Elbow
	21325	2	Hose Assy., Power Steering Valve to Tee (Includes 2--10211 and one Hose)
4	10211	4	Swivel Nut Sub-Assy.
	4230-40½	2	Hose (Bare Length) See note - page 105
5	10297	4	Seal Ring
	8932	4	Clamp (Half)
6	2048	2	Capscrew, 3/8" – 24 NF x 1–1/4"
	7009	2	Locknut, 3/8" – 24 NF
7	21846	1	Tee
	21826	1	Clip
	21827	1	Strip
8	1108	1	Capscrew, 3/8" – 24 NF x 1–1/2"
	904206	1	Lockwasher, 3/8" ASA Med.
	911041	1	Hex Nut, 3/8" – 24 NF
	21327	1	Hose Assy., Power Steering Valve to Tank (Includes 1--10211, one Hose and 1--4245)
9	10211	1	Swivel Nut Sub-Assy.
	4230-78¼	1	Hose (Bare Length) See note - page 105
	4245	1	Male Pipe Sub-Assy.
	21756	1	Hose Assy., Tee to Tank (Includes 1--10211, one Hose and 1--4245)
10	10211	1	Swivel Nut Sub-Assy.
	4230-33¾	1	Hose (Bare Length) See note - page 105
	4245	1	Male Pipe Sub-Assy.
	21754	1	Hose Assy., Pressure Line Tee to Pump (Includes 2--10211 and one Hose)
11	10211	2	Swivel Nut Sub-Assy.
	4230-85¼	1	Hose (Bare Length) See note - page 105
12	21323	1	Hose, 3/4" I.D. x 81"
13	10411	2	Hose Clamp
14	5487	10	Clamp

(Continued)

TRACTOMOTIVE

HYDRAULIC POWER STEERING LINES - CONTINUED

(See Plate 719)

ITEM	PART NUMBER	QTY.	PART NAME
15	1243	2	Capscrew, 3/8" – 24 NF x 1"
	904206	2	Lockwasher, 3/8" ASA Med.
	911041	2	Hex Nut, 3/8" – 24 NF
16	1230	5	Capscrew, 3/8" – 24 NF x 3/4"
	904206	5	Lockwasher, 3/8" ASA Med.
17	11411	2	Clamp
18	3975	2	Seal Ring
19	10894	2	Adapter
20	21649	1	Bracket
21	1110	1	Capscrew, 1/2" – 13 NC x 1–1/4"
	904208	1	Lockwasher, 1/2" ASA Med.
22	21405	1	Capscrew, 1/2" – 13 NC x 5"
	904208	1	Lockwasher, 1/2" ASA Med.
23	1239	1	Capscrew, 1/2" – 20 NF x 1–1/2"
	904208	1	Lockwasher, 1/2" ASA Med.
	911043	1	Hex Nut, 1/2" – 20 NF
24	1185	1	Capscrew, 1/2" – 20 NF x 1–3/4"
	910244	2	Plain Washer, 1/2" SAE
	904208	1	Lockwasher, 1/2" ASA Med.
	911043	1	Hex Nut, 1/2" – 20 NF
25	13465	1	Pump Assy.
26	13519	1	Plate
27	13473	1	Pulley
28	2048	6	Capscrew, 3/8" – 24 NF
	904206	6	Lockwasher, 3/8" ASA Med.
	911041	6	Hex Nut, 3/8" – 24 NF
29	17378	1	Cog Belt
30	901828	2	Bushing, 3/4" x 1/2"
31	8304	1	Adapter, 1/2" – 14 NPT
32	14291	1	Adapter, 3/4" – 16 NF x 1/2" NPT
33	901428	1	Close Nipple (Used Prior TL-20D #104)
34	21930	1	Valve Assy. (Power Steering) (Includes 1--21685 and one each Items #14 thru #17 as listed on page 181) (Used prior TL-20D #104)

Also see Plate 717 - Page 190

HYDRAULIC POWER STEERING LINES – CONTINUED

(See Plate 719)

ITEM	PART NUMBER	QTY.	PART NAME
34	21685	1	Cap (Used prior TL-20D #104)
	20506	1	Valve Assy. (Power Steering) (See Item #13 page 181) (Eff. TL-20D #104)
35	21686	1	Coupling
36	21931	1	Tee
37	21932	2	Hose Assy. (Each includes 2--10211 and one Hose)
	10211	4	Swivel Nut Sub-Assy.
	4230-72	2	Hose (Bare Length) See Note
38	6837	1	90° Elbow (Used prior TL-20D #104)
39	21933	1	Hose Assy., Return Line (Includes 2--10211 and one Hose)
	10211	2	Swivel Nut Sub-Assy.
	4230-78	1	Hose (Bare Length) See Note
40	21509	1	Cylinder Assy. (See Item #62, page 152 for includes note)
–	4230	–	Hose, 1/2" x 25 Foot Roll (For service stock)
			NOTE: The factory will furnish 25 foot rolls of hose only. Dealer will furnish hose cut to proper length or in 25 foot rolls.

TRANSMISSION, SUPPORT AND EXTERNAL LINES

(See Plate 724)

ITEM	PART NUMBER	QTY.	PART NAME
1	21559	1	Transmission Assy., Complete (Includes Items #7 thru #11, #32, #33 and Items as listed on pages 109 thru 121)
2	20494	2	Bracket
3	5810	12	Capscrew, 5/8" – 11 NC x 1–3/4"
	904209	12	Lockwasher, 5/8" ASA Med.
4	2977	6	Capscrew, 5/8" – 18 NF x 2–1/4"
	904209	6	Lockwasher, 5/8" ASA Med.
	911044	6	Hex Nut, 5/8" – 18 NF
5	20527	–	Shim (.0598" thick) (Use as required)
6	20522	1	Transmission Support
7	21162	1	Flange
	21206	1	Gasket

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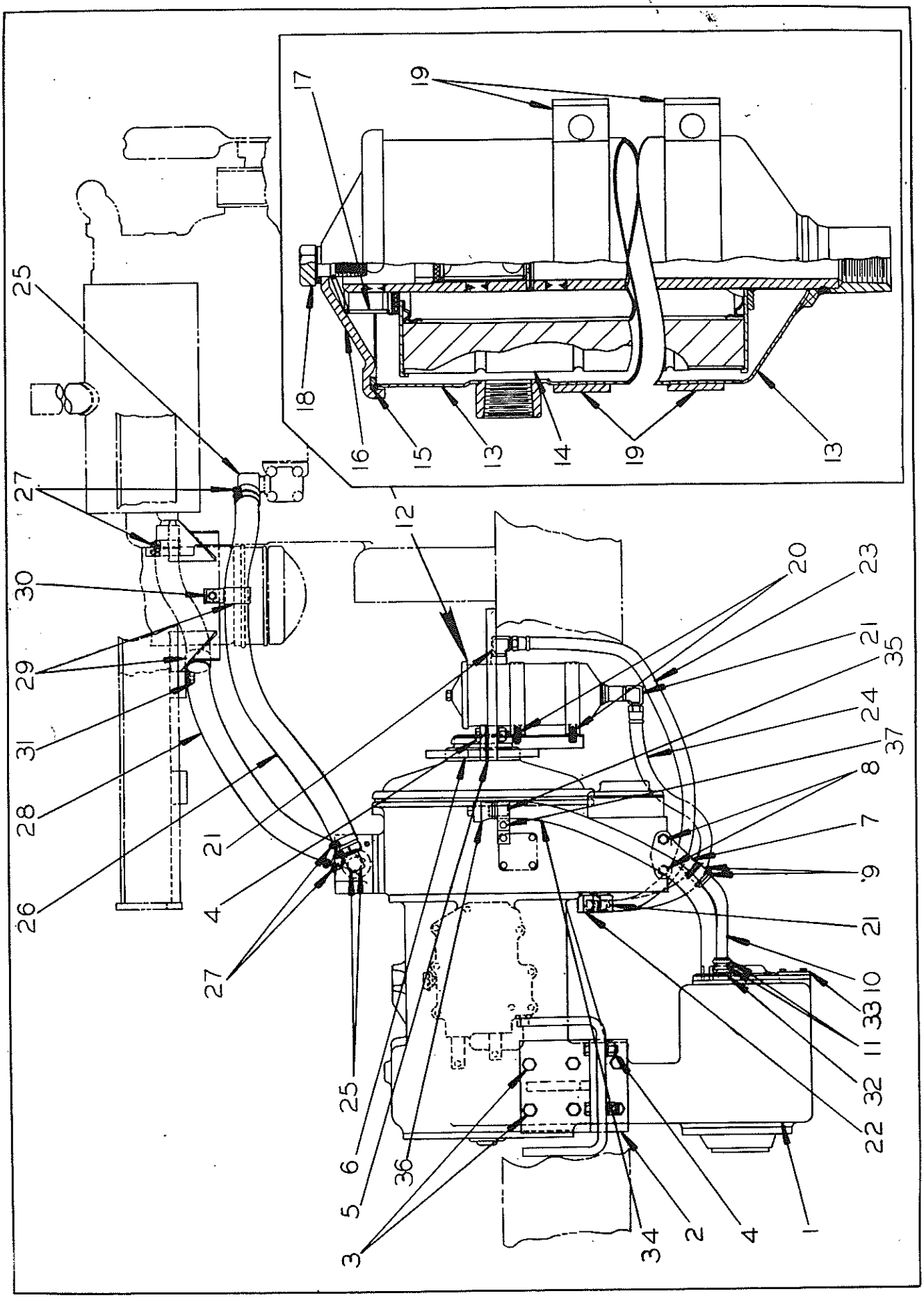

PLATE 724 — TRANSMISSION, SUPPORT AND EXTERNAL LINES

TRANSMISSION, SUPPORT AND EXTERNAL LINES – CONTINUED

(See Plate 724)

ITEM	PART NUMBER	QTY.	PART NAME
8	3147	2	Capscrew, 3/8" – 16 NC x 2–1/2"
	904206	2	Lockwasher, 3/8" ASA Med.
9	21161	1	Hose
	21034	2	Hose Clamp
10	21163	1	Tube
11	21148	1	Hose
	21033	2	Hose Clamp
12	21530	1	Filter Assy. (Includes Items #13, #14, #16 and #19)
13	21944	1	Body
14	22104	1	Element Kit (Includes one Element and Item #15)
	- - - -	1	Element (Order Kit #22104)
15	21942	1	Gasket
16	21851	1	Cover Assy. (Includes Items #17 and #18)
17	21948	1	Spring Assy. (Includes Spring, Retainer, Washer and Gasket) (Serviced as assy. only)
18	1084	1	Capscrew, 1/2" – 20 NF x 1"
	908191	1	Plain Washer, 1/2" (Copper)
19	21943	2	Strap
	903765	2	Machine Screw, 5/16" – 18 NC x 2–1/2"
	904205	2	Lockwasher, 5/16" ASA Med.
	910292	2	Hex Nut, 5/16" – 18 NC
20	2324	4	Capscrew, 5/16" – 24 NF x 3/4"
	910335	4	Plain Washer, 5/16" SAE
	904205	4	Lockwasher, 5/16" ASA Med.
	913636	4	Hex Nut, 5/16" – 24 NF
21	2184	3	90° Elbow, 3/4" NPT
22	1776	1	90° Elbow, 1" NPT
23	21622	1	Hose Assy. (Includes 2--21483 and One Hose)
	21483	2	Swivel Assy.
	21564-34½	1	Hose (Bare Length) See Note - page 105
24	21623	1	Hose Assy. (Includes 2--21483 and one Hose)
	21483	2	Swivel Assy.
	21564-21¼	1	Hose (Bare Length) See Note - page 105

(Continued)

TRACTOMOTIVE

TRANSMISSION, SUPPORT AND EXTERNAL LINES – CONTINUED

(See Plate 724)

ITEM	PART NUMBER	QTY.	PART NAME
25	16775	3	90° Elbow
26	21727	1	Hose
27	13857	8	Hose Clamp
28	21726	1	Hose
29	12545	2	Clamp
	2862	1	Capscrew, 3/8" – 24 NF x 1/2"
30	904206	1	Lockwasher, 3/8" ASA Med.
	911115	1	Plain Washer, 3/8" SAE
	17373	1	Capscrew, 1/2" – 20 NF x 7/8"
31	910244	1	Plain Washer, 1/2" SAE
	904208	1	Lockwasher, 1/2" ASA Med.
	21164	1	Cover
	21146	1	Gasket
32	1107	6	Capscrew, 3/8" – 16 NC x 1"
	904206	6	Lockwasher, 3/8" ASA Med.
	21150	1	Cover and Strainer Assy. (Serviced as assembly only)
	21056	1	Gasket
33	2864	6	Capscrew, 3/8" – 16 NC x 7/8"
	904206	6	Lockwasher, 3/8" ASA Med.
	22128	1	Hose, 1" I.D. x 26" lg.
34	10411	1	Hose Clamp
35	913230	2	Nipple, 3/4" x 1–1/2"
	917511	1	Reducing Coupling, 1" x 3/4"
36	905263	1	Pipe Plug 1" Steel, Ctsk., 13/16" Sq.
	10437	1	Clamp
	1230	1	Capscrew, 3/8" – 24 NF x 3/4"
37	904206	1	Lockwasher, 3/8" ASA Med.
	911041	1	Hex Nut, 3/8" – 24 NF
	21564	–	Hose, 3/4" x 25 Foot Roll (For Service Stock)
			NOTE: The factory will furnish 25 foot rolls of hose only. Dealer will furnish hose cut to proper length or in 25 foot rolls.

TRACTOMOTIVE

TRANSMISSION - TORQUE CONVERTER AND HOUSING GROUP

(See Plate 720)

ITEM	PART NUMBER	QTY.	PART NAME	
1	21207	1	Converter Housing	
2	21076	1	Snap Ring	
3	21054	1	Snap Ring (External)	
4	21043	1	Ball Bearing	
5	21216	1	Spacer	
6	21101	1	Bearing Retainer	
7	21107	1	Sleeve	
8	21208	2	Seal Ring	
9	2864	6	Capscrew, 3/8" – 16 NC x 7/8"	
10	21214	1	Piston	
11	21153	1	Seal Ring	
12	21203	1	Snap Ring	
13	21187	1	Retainer	
14	21063	1	Snap Ring	
15	21174	1	Ball Bearing (Sealed)	
16	21106	1	Gear, Oil Pump Drive	
17	21089	1	Coupling	
18	21045	2	Ball Bearing	
19	21088	1	Gasket	
20	21105	1	Pump Assy. (Input Oil) (Includes Items #21 thru #27)	
21	21142	1	Body Assy. (Includes 2--21616)	
22	21616	4	Needle Bearing	
23	21103	1	Drive Gear	
24	21102	1	Idler Gear	
25	21144	1	Gasket	
26	21098	1	End Cover Assy. (Includes 2--21616)	
27	1107	4	Capscrew, 3/8" – 16 NC x 1" (Not Shown)	(End Cover to Body Assy.)
	904206	4	Lockwasher, 3/8" ASA Med.	
28	5811	2	Capscrew, 3/8" – 16 NC x 2–1/4"	(End Cover to Transmission Hsg.)
	904206	2	Lockwasher, 3/8" ASA Med.	
29	3264	4	Capscrew, 3/8" – 16 NC x 1–3/4"	
	904206	4	Lockwasher, 3/8" ASA Med.	(Continued)

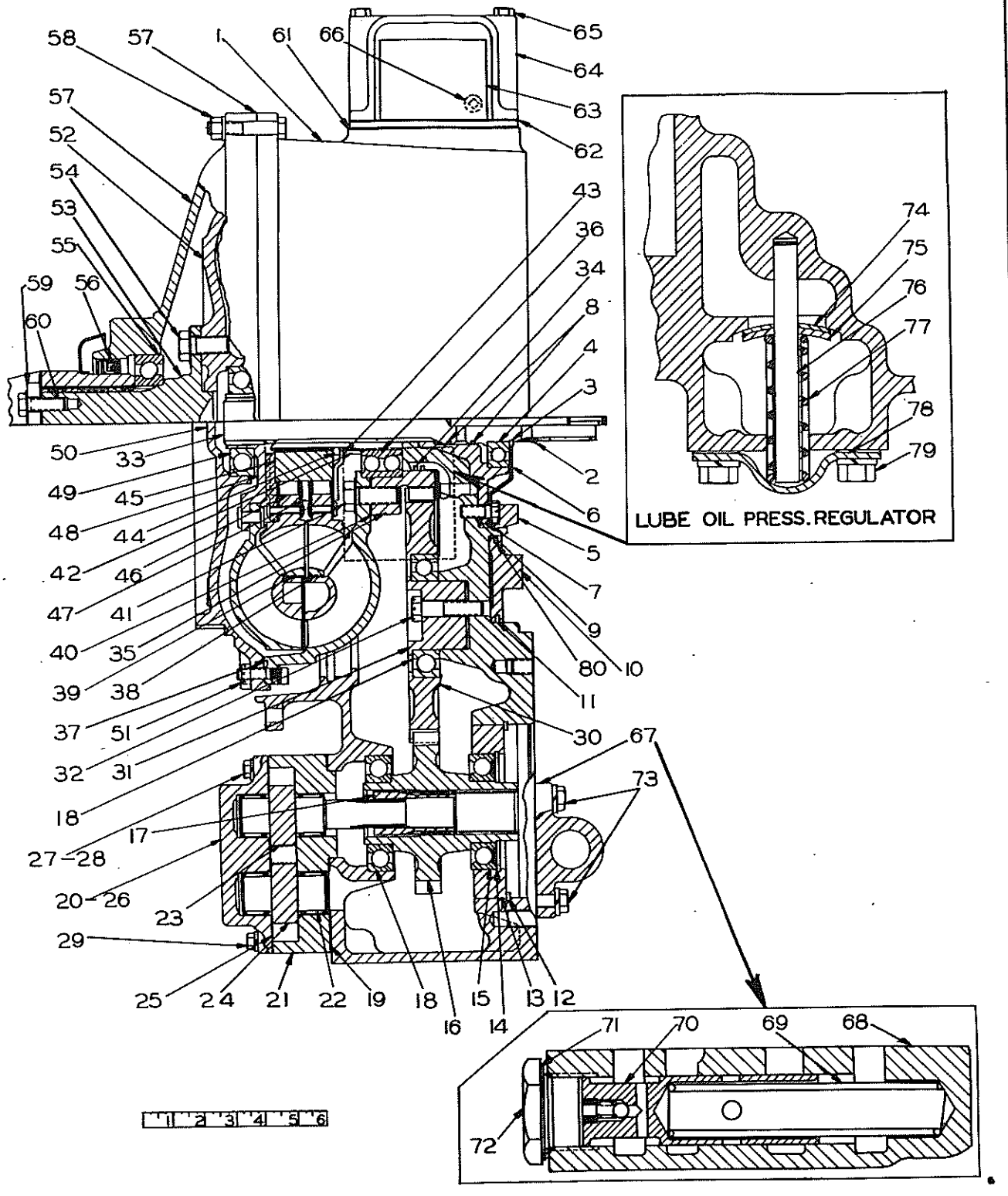

PLATE 720 – TRANSMISSION - TORQUE CONVERTER AND HOUSING GROUP

TRANSMISSION - TORQUE CONVERTER AND HOUSING GROUP – CONTINUED

(See Plate 720)

ITEM	PART NUMBER	QTY.	PART NAME	
30	21184	1	Gear	
31	21179	1	Spindle (Auxiliary Drive Idler)	
32	16773	1	Capscrew, 7/16" – 14 NC x 1–3/4"	
33	21139	1	Shaft (Converter)	
34	21221	2	Seal Ring	
35	21211	1	Gear	
36	21149	1	Ball Bearing	
37	21116	1	Converter Pump Assy. (Includes Pump, Weights & Capscrews)	Serviced
38	21167	1	Stator Assy., First (Includes Stator, Cam, Washer & Rivets)	as assemblies
39	21082	1	Stator Assy., Second (Includes Stator, Cam, Washer & Rivets)	only
40	21210	1	Gasket	
41	1249	6	Capscrew, 1/2" – 20 NF x 1–1/4"	
	21122	3	Locking Strip	
42	21086	1	Spacer	
43	21084	1	Spacer	
44	21087	1	Snap Ring	
45	21085	1	Race	
46	21220	16	Roller	
	21078	16	Spring	
47	21077	1	Spacer	
48	21152	1	Turbine Hub (Includes Turbine, Hub, and Rivets)	
49	21044	1	Ball Bearing	
50	21229	1	Cover	
51	21041	24	Hex Nut, 5/16" – 24 NF	
	904205	24	Lockwasher, 5/16" ASA Med.	
52	21166	1	Cover	
53	21132	1	Shaft, Converter Drive	
54	21028	6	Capscrew, 1/2" – 13 NC x 1–1/8"	
	21122	3	Lock Strip	
55	21046	1	Ball Bearing	
56	21065	1	Seal	
57	21131	1	Cover	

(Continued)

TRANSMISSION - TORQUE CONVERTER AND HOUSING GROUP – CONTINUED

(See Plate 720)

ITEM	PART NUMBER	QTY.	PART NAME
57	21157	1	Gasket
58	1089	12	Capscrew, 3/8" – 24 NF x 2"
	904206	12	Lockwasher, 3/8" ASA Med.
	911041	12	Hex Nut, 3/8" – 24 NF
59	21226	1	Retainer
60	21227	1	Capscrew, 3/8" – 24 NF x 1–1/8"
	21228	1	Locking Strip
61	21067	1	Gasket
62	21066	1	Gasket
63	21222	1	Oil Cooler Core
64	21083	1	Housing, Oil Cooler
65	21031	12	Capscrew, 5/16" – 18 NC x 3–3/4"
66	21037	1	Pipe Plug, 1/4"
67	21204	1	Valve Assy. (Pressure Regulating Valve) (Includes Items #68 thru #72)
	21111	1	Gasket
68	21177	1	Body
69	21145	1	Spring
70	21151	1	Valve Assy., Pressure regulating (Includes Valve, Ball & Retainer) (Serviced as assy. only)
71	21011	1	Gasket
72	21093	1	Plug
73	2084	5	Capscrew, 3/8" – 16 NC x 1–1/4"
	904206	5	Lockwasher, 3/8" ASA Med.
74	21171	1	Washer (Valve Seal)
75	21064	1	Valve (Lube Pressure Regulator)
76	21081	1	Pin
77	21068	1	Spring
78	21160	1	Cover
	21080	1	Gasket
79	2864	4	Capscrew, 3/8" – 16 NC x 3/4"
	904206	4	Lockwasher, 3/8" ASA Med.
80	21154	1	Seal Ring
81	21230	1	Tube (Oil Director) (Not Shown)

TRACTOMOTIVE

TRANSMISSION - CLUTCHES AND HOUSING GROUP

(See Plate 721)

ITEM	PART NUMBER	QTY.	PART NAME
1	21194	1	Clutch Housing
2	21183	1	Piston
3	21140	1	Output Shaft
4	21069	2	Snap Ring
5	21192	1	Carrier Assy. (Low Range) (Includes Items #6 thru #9 and twelve Item #20)
6	21112	6	Pinion
7	21099	6	Pin (Planetary)
8	21118	240	Roller Pin
9	21141	6	Spacer
10	21188	1	Washer
11	21195	1	Gear
12	21191	16	Plate
13	21175	1	Gear (Low Sun)
14	21181	1	Spacer
15	21071	1	Gear (High Sun)
16	21176	1	Piston (High Clutch)
17	21154	2	Seal Ring
18	21178	1	Housing (High Piston)
19	21198	1	Carrier Assy. (High Planetary) (Includes 12--21076 & ½ qty. of Items #21 thru #23)
20	21076	36	Washer
21	21070	12	Pinion
22	21072	12	Pin
23	21074	240	Roller
24	21182	1	Hub
25	21215	20	Plate
26	21193	3	Plate
27	21055	1	Snap Ring
28	21110	1	Drum Assy. (Includes Drum and Pin) (Serviced as assembly only)
29	21057	1	Snap Ring
30	21186	1	Spring (Piston Retainer)
31	21212	1	Piston Assy. (Includes two Balls)
32	21225	2	Ball

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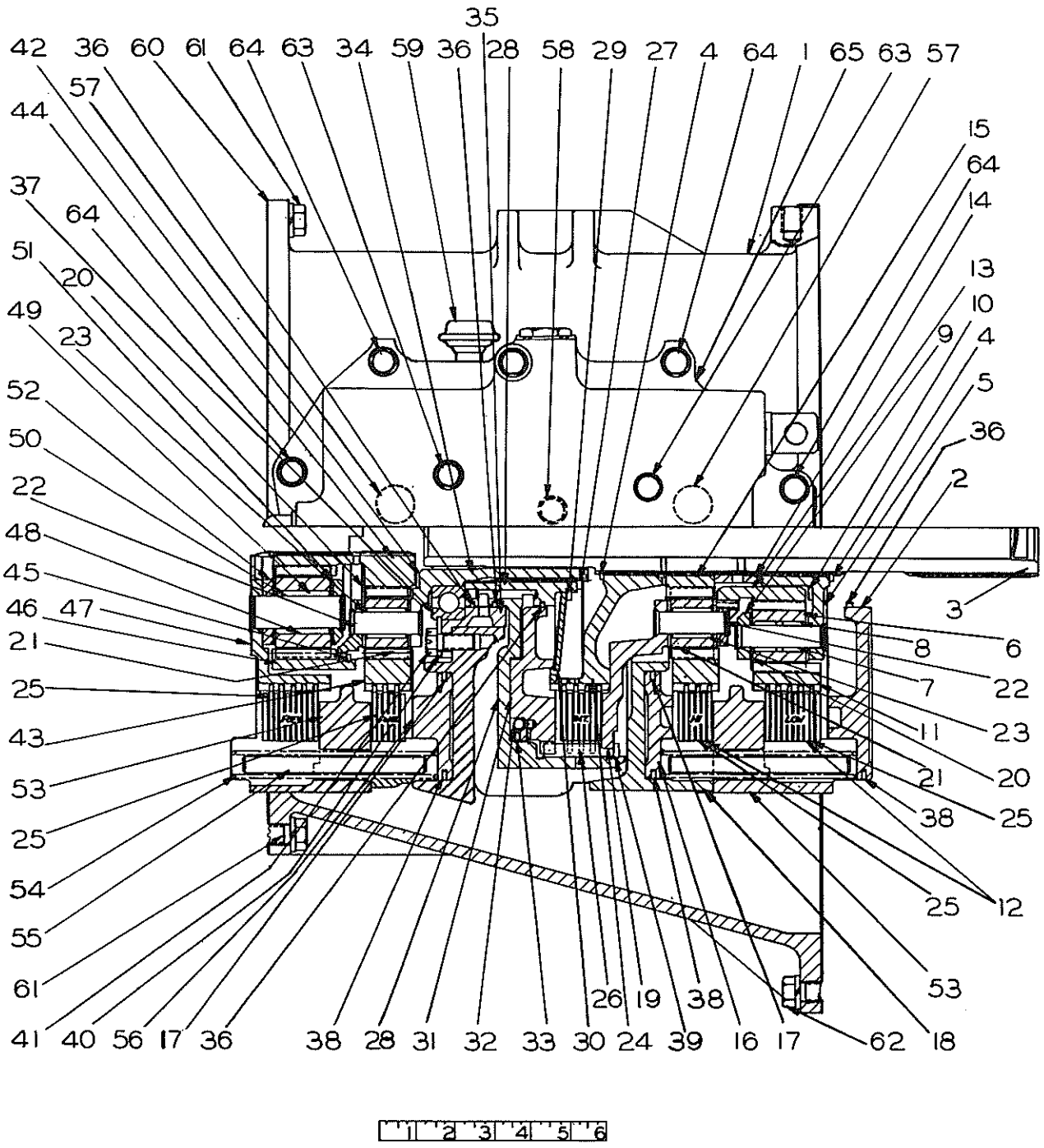

PLATE 721 – TRANSMISSION - CLUTCHES AND HOUSING GROUP

(See Plate 721)

ITEM	PART NUMBER	QTY.	PART NAME
33	21155	1	Seal Ring
34	21109	1	Carrier Assy. (Forward Planetary) (Includes 1--21119)
	21119	1	Bushing
35	21095	1	Hub (Oil Transfer)
36	21121	4	Seal Ring
37	21049	1	Ball Bearing
38	21153	3	Seal Ring
39	21124	1	Snap Ring
40	21100	2	Bearing Retainer
41	2864	4	Capscrew, 3/8" – 16 NC x 7/8"
42	21123	1	Thrust Washer
43	21213	2	Gear (Forward and Hi)
44	21096	1	Sun Gear
45	21079	1	Snap Ring
46	21104	1	Gear, Reverse Ring
47	21218	1	Carrier Assy. (Reverse Planetary) (Includes Items #48 thru #52)
48	21090	4	Pinion
49	21051	88	Roll Pin
50	21097	4	Pin
51	21092	8	Thrust Washer
52	21217	1	Clutch Hub, Reverse
53	21196	1	Anchor
54	21075	24	Spring
55	21036	24	Pin (Spring Guide)
56	21214	1	Piston
57	21185	2	Pin
58	3379	1	Capscrew, 3/8" – 16 NC x 1–1/2"
	904206	1	Lockwasher, 3/8" ASA Med.
59	21062	1	Breather

(Continued)

TRANSMISSION - CLUTCHES AND HOUSING GROUP – CONTINUED

(See Plate 721)

ITEM	PART NUMBER	QTY.	PART NAME
60	21108	1	Gasket (Converter Housing to Clutch Housing)
61	19057	13	Capscrew, 7/16" – 14 NC x 1–1/4" (Clutch Housing to Converter Housing)
	904207	13	Lockwasher, 7/16" ASA Med.
62	21027	18	Capscrew, 7/16" – 14 NC x 1–3/8" (Also see Item #9, page 117)
	904207	18	Lockwasher, 7/16" ASA Med.
63	13767	5	Capscrew, 3/8" – 16 NC x 3"
	904206	5	Lockwasher, 3/8" ASA Med.
64	2048	6	Capscrew, 3/8" – 16 NC x 1–1/4"
	904206	6	Lockwasher, 3/8" ASA Med.
65	21205	1	Valve Assy., Selector (See Item #1, page 121)

TRANSMISSION – TRANSFER GEARS AND HOUSING GROUP

(See Plate 722)

ITEM	PART NUMBER	QTY.	PART NAME
1	21199	1	Housing, Transfer Gear
	21115	1	Gasket (Transfer Gear Housing to Clutch Housing)
2	21172	1	Gear (Output Drive)
3	21047	2	Ball Bearing
4	21201	1	Spindle
5	21156	1	Gear
6	21060	2	Snap Ring
7	21219	1	Roller Bearing
8	21200	1	Spacer
9	21027	18	Capscrew, 7/16" – 14 NC x 1–3/8"
	904207	18	Lockwasher, 7/16" ASA Med.
10	21197	1	Retainer
11	7808	1	Capscrew, 7/16" – 14 NC x 1"
	904207	1	Lockwasher, 7/16" ASA Med.
12	21113	1	Cover
	21114	1	Gasket
13	2048	12	Capscrew, 3/8" – 16 NC x 1–1/4"
	904206	12	Lockwasher, 3/8" ASA Med.
14	21202	1	Shaft Assy. (Output) (Includes 1--21094)
	21094	1	Bushing
15	21173	1	Driven Gear
16	21209	1	Spacer
17	21048	1	Ball Bearing
18	21180	1	Bearing Retainer
	21125	1	Gasket
19	5560	8	Capscrew, 3/8" – 16 NC x 1–3/8"
	904206	8	Lockwasher, 3/8" ASA Med.
20	21065	2	Seal
21	21226	2	Retainer
22	21227	4	Capscrew, 3/8" – 24 NF x 1–1/8"
	21228	2	Locking Plate
23	21127	1	Coupling

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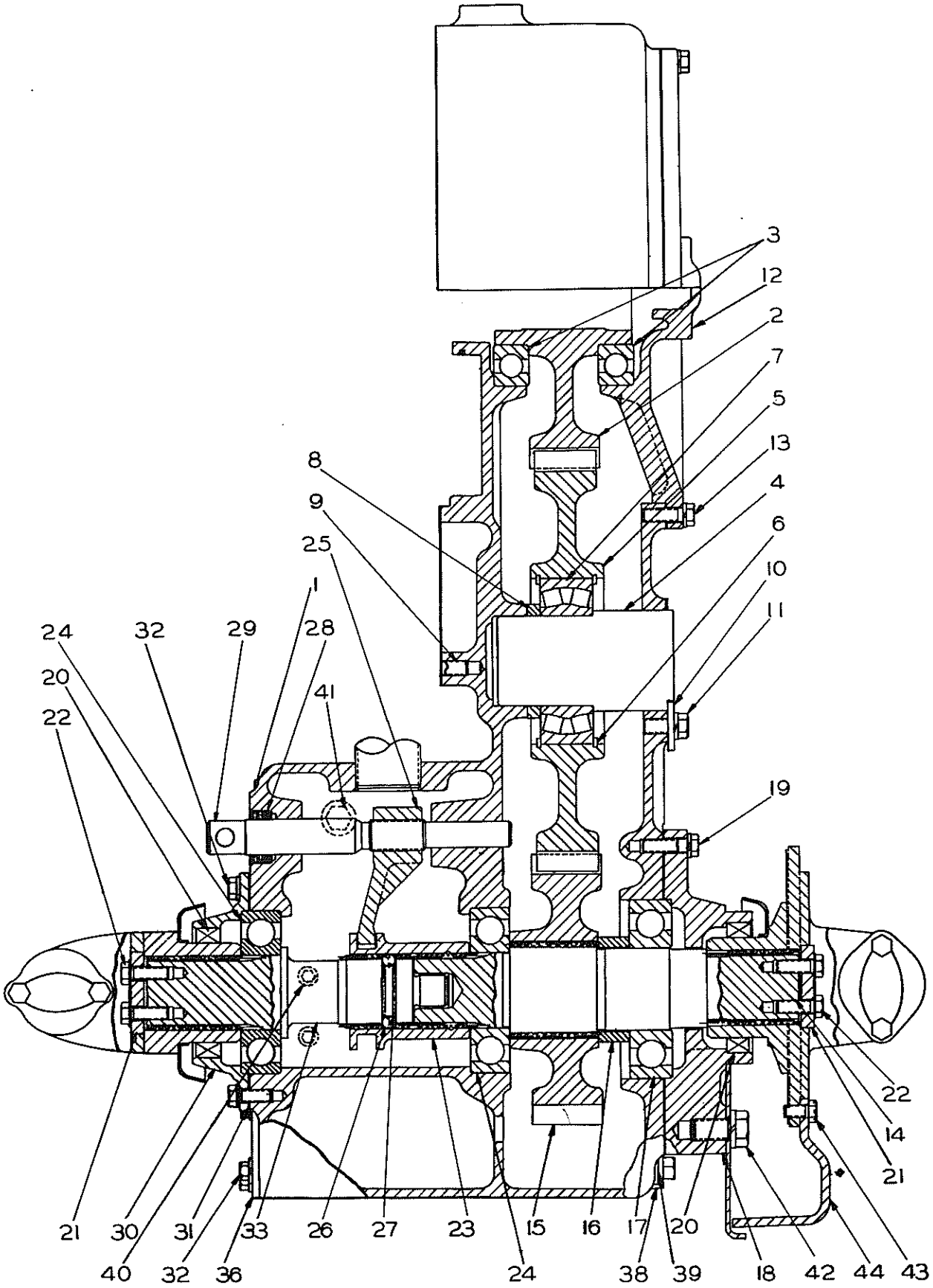

PLATE 722 – TRANSMISSION - TRANSFER GEARS AND HOUSING GROUP

(See Plate 722)

ITEM	PART NUMBER	QTY.	PART NAME	
24	21042	2	Ball Bearing	
25	21128	1	Shifter Fork	
26	21014	2	Ball	
27	21129	1	Spring	
28	21053	1	Seal	
29	21120	1	Shifter Shaft	
30	21159	1	Retainer	
31	21117	1	Gasket	
32	1107	18	Capscrew, 3/8" – 16 NC x 1"	
	904206	18	Lockwasher, 3/8" ASA Med.	
33	21126	1	Shaft	
34	21150	1	Cover & Strainer Assy. (Serviced as assembly only)	Not Shown – See Item #33 – page 106
	21056	1	Gasket	
35	2864	6	Capscrew, 3/8" – 16 NC x 7/8"	
	904206	6	Lockwasher, 3/8" ASA Med.	
36	21147	1	Inspection Cover	
	21146	1	Gasket	
37	21164	1	Cover (Not Shown - see Item #32, page 106)	
	21146	1	Gasket	
38	21039	1	Pipe Plug, 1"	
39	21038	1	Pipe Plug, (Oil Sump Drain)	
40	21037	2	Pipe Plug, 1/4" (Oil Level Plugs)	
41	21013	1	Pipe Plug, (Oil Filler)	
42	2089	3	Capscrew, 5/8" – 11 NC x 1–1/4"	Also see Plate 731 - page 125
	904209	3	Lockwasher, 5/8" ASA Med.	
43	1230	4	Capscrew, 3/8" – 24 NF x 3/4"	
	904206	4	Lockwasher, 3/8" ASA Med.	
44	21728	1	Parking Brake Assy.	

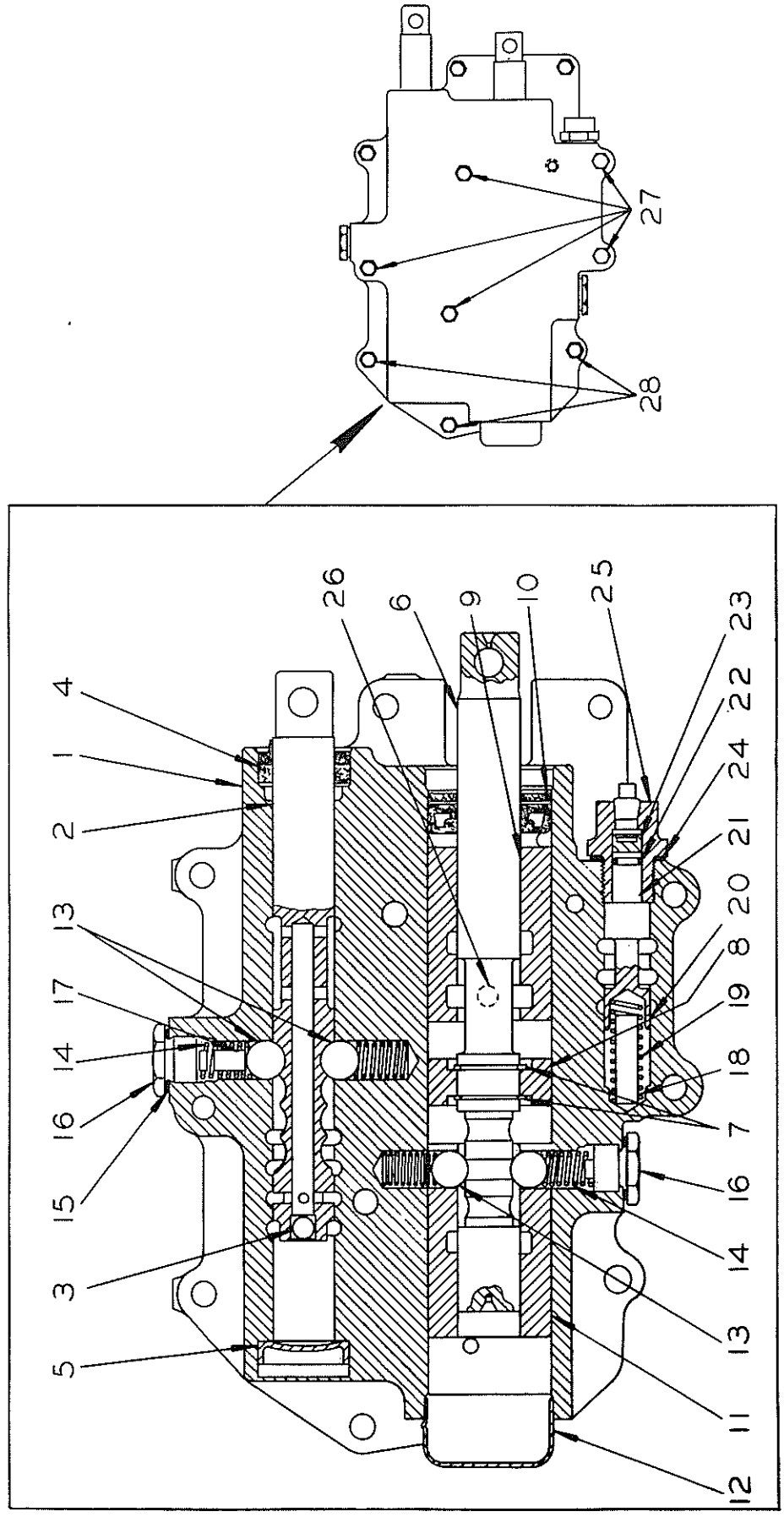

PLATE 723 – TRANSMISSION SELECTOR VALVE ASSEMBLY

TRACTOMOTIVE

TRANSMISSION SELECTOR VALVE ASSEMBLY

(See Plate 723)

ITEM	PART NUMBER	QTY.	PART NAME	
	21205	1	Valve Assy. (Includes one Housing, 1--21190 and Items #2 thru #27)	
1	----	1	Housing (Not serviced separately)	
	21190	1	Gasket (Valve to Transmission Housing)	
2	21137	1	Plunger, Range Selector (Includes one Ball)	
3	21014	1	Ball	
4	21053	1	Seal	
5	21091	1	Plug	
6	21134	1	Plunger, Forward and Reverse	
7	21059	2	Snap Ring	
8	21135	1	Piston (Forward and Reverse)	
9	21136	1	Sleeve, Forward Shift	
10	21138	1	Seal	
11	21133	1	Sleeve (Reverse Shift)	
12	21040	1	Cap	
13	21015	4	Ball	
14	21052	4	Spring	
15	21007	2	Gasket	
16	21050	2	Cap	
17	21061	1	Pin	
18	21004	1	Pin, 3/8" x 1–3/8"	
19	21130	1	Spring	
20	21168	1	Valve	
21	21169	1	Plug (Cut-off Valve)	
22	21058	1	Seal Ring	
23	21143	1	Cup	
24	21006	1	Gasket	
25	21170	1	Plug	
26	21010	2	Set Screw, 3/8" – 16 NC x 3/4"	
27	13767	5	Capscrew, 3/8" – 16 NC x 3"	Also see Items 63 and 64 on page 114
	904206	5	Lockwasher, 3/8" ASA Med.	
28	2048	6	Capscrew, 3/8" – 16 NC x 1–1/4"	
	904206	6	Lockwasher, 3/8" ASA Med.	

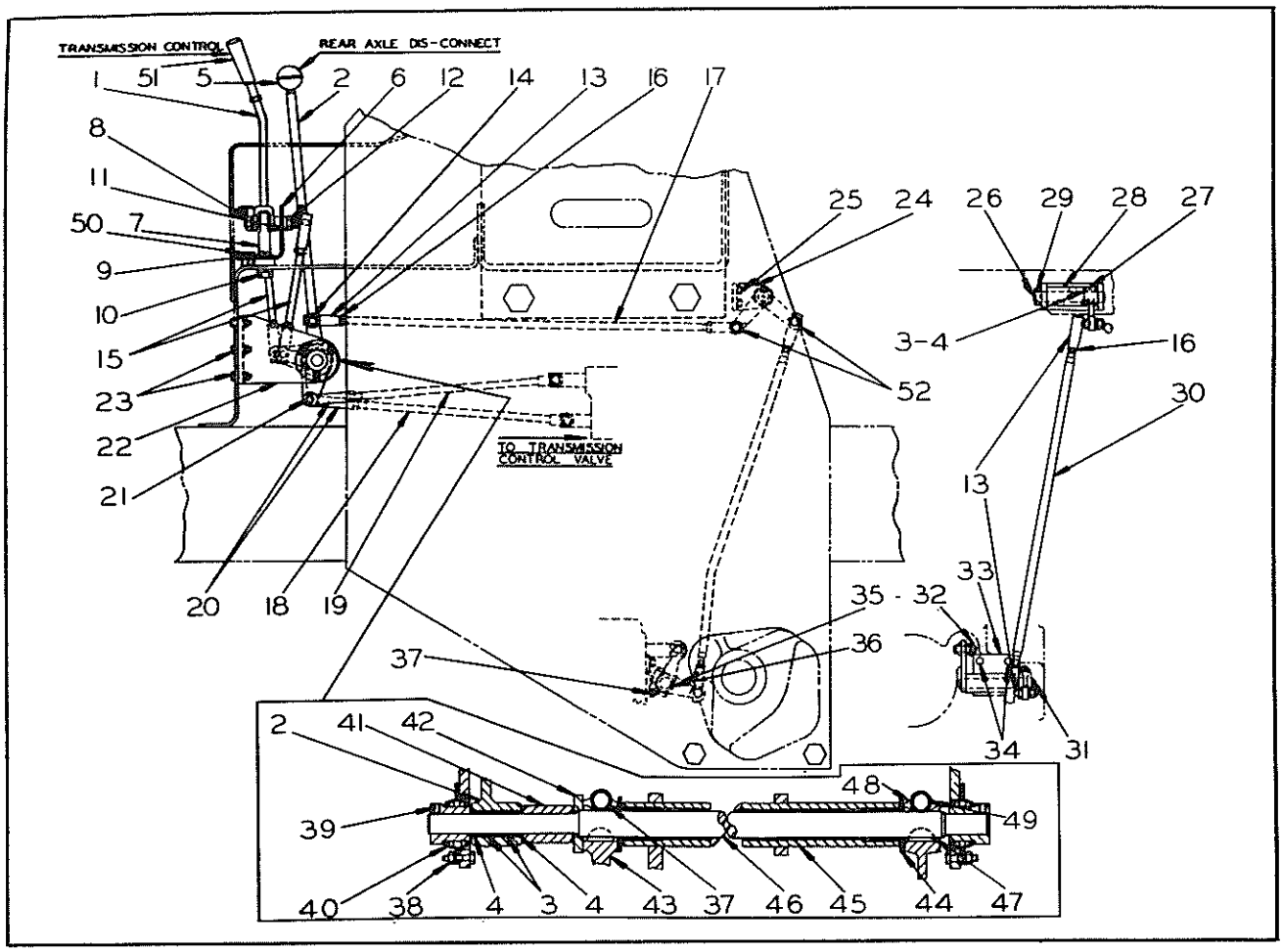

PLATE 692 – TRANSMISSION CONTROL AND REAR AXLE DIS-CONNECT LEVERS

ITEM	PART NUMBER	QTY.	PART NAME
1	20866	1	Lever (Transmission Control)
2	21262	1	Lever Assy. (Includes 2--5955 and 2--5957) (Rear Axle Dis-Connect)
3	5955	3	Bearing (Lettered end must face pressing tool)
4	5957	4	Seal (Install with lips toward outside)
5	1171	1	Knob
6	20964	1	Formed Plate
7	18142	1	Rod End Bearing
8	904209	1	Lockwasher, 5/8" ASA Med.
	911049	1	Hex Jam Nut, 5/8" – 18 NF
9	910543	1	Lockwasher, Ext. Tooth, 5/8"
10	2977	1	Capscrew, 5/8" – 18 NF x 2–1/4"
	904209	1	Lockwasher, 5/8" ASA Med.
11	20874	1	Pin
12	904208	1	Lockwasher, 1/2" ASA Med.
13	17120	8	Ball Joint (Continued)

TRANSMISSION CONTROL AND REAR AXLE DIS-CONNECT LEVERS – CONTINUED

(See Plate 692)

ITEM	PART NUMBER	QTY.	PART NAME
14	904208	7	Lockwasher, 1/2" ASA Med.
	913177	7	Hex Jam Nut, 1/2" – 20 NF
15	20850	2	Rod
16	913177	10	Hex Jam Nut, 1/2" – 20 NF
17	20746	1	Rod
18	20857	1	Yoke and Rod Weld Assy.
19	20861	1	Yoke and Rod Weld Assy.
20	5684	2	Yoke
21	1565	4	Pin
	900806	4	Cotter Pin, 1/8" x 1"
22	20835	1	Bracket (Left)
	20836	1	Bracket (Right)
23	2048	6	Capscrew, 3/8" – 24 NF x 1–1/4"
	911115	6	Plain Washer, 3/8" SAE
	904206	6	Lockwasher, 3/8" ASA Med.
	911041	6	Hex Nut, 3/8" – 24 NF
24	17118	1	Bracket
25	1243	3	Capscrew, 3/8" – 24 NF x 1"
	904206	3	Lockwasher, 3/8" ASA Med.
26	17119	1	Shaft
27	12505	1	Bell Crank Assy. (Includes one Item #3, two Item #4 and two Item #52)
28	21471	1	Spacer
29	916937	1	Roll Pin
30	21654	1	Rod
31	20885	1	Lever
32	1565	1	Pin
	910244	1	Plain Washer, 1/2" SAE
	900806	1	Cotter Pin, 1/8" x 1"
33	20882	1	Bracket Assy. (Includes 2--5955 and 2--5957)
	5955	2	Bearing (Lettered end must face pressing tool)
	5957	2	Seal (Install with lips toward outside)

(Continued)

TRACTOMOTIVE

TRANSMISSION CONTROL AND REAR AXLE DIS-CONNECT LEVERS – CONTINUED

(See Plate 692)

ITEM	PART NUMBER	QTY.	PART NAME
34	1107	2	Capscrew, 3/8" – 16 NC x 7/8"
	904206	2	Lockwasher, 3/8" ASA Med.
35	12171	1	Lever
36	905122	1	Key, Woodruff
37	1089	2	Capscrew, 3/8" – 24 NF x 2"
	904206	2	Lockwasher, 3/8" ASA Med.
	911041	2	Hex Nut, 3/8" – 24 NF
38	10727	6	Capscrew, 1/4" – 28 NF x 1"
	904204	6	Lockwasher, 1/4" ASA Med.
	911040	6	Hex Nut, 1/4" – 28 NF
39	903835	4	Setscrew, 1/4" – 20 NC x 3/8", Skt. Hd.
40	13474	2	Bearing
41	20886	1	Spacer
42	1785	1	Washer
43	20965	1	Lever Assy. (Includes 1--13909)
	13909	1	Bushing
44	911159	2	Plain Washer, 1" SAE
45	20833	1	Lever Assy. (Includes 2--5895, 2--5896 and two Item #52)
	5895	2	Seal (Install seals with lips toward outside)
	5896	2	Bearing (Lettered end must face pressing tool)
46	20825	1	Shaft
47	905126	2	Key, Woodruff
48	5749	1	Lever
49	3264	1	Capscrew, 3/8" – 16 NC x 1–3/4"
	904206	1	Lockwasher, 3/8" ASA Med.
50	1230	1	Capscrew, 3/8" – 24 NF x 3/4"
	904206	1	Lockwasher, 3/8" ASA Med.
51	21682	1	Grip
52	13909	4	Bushing

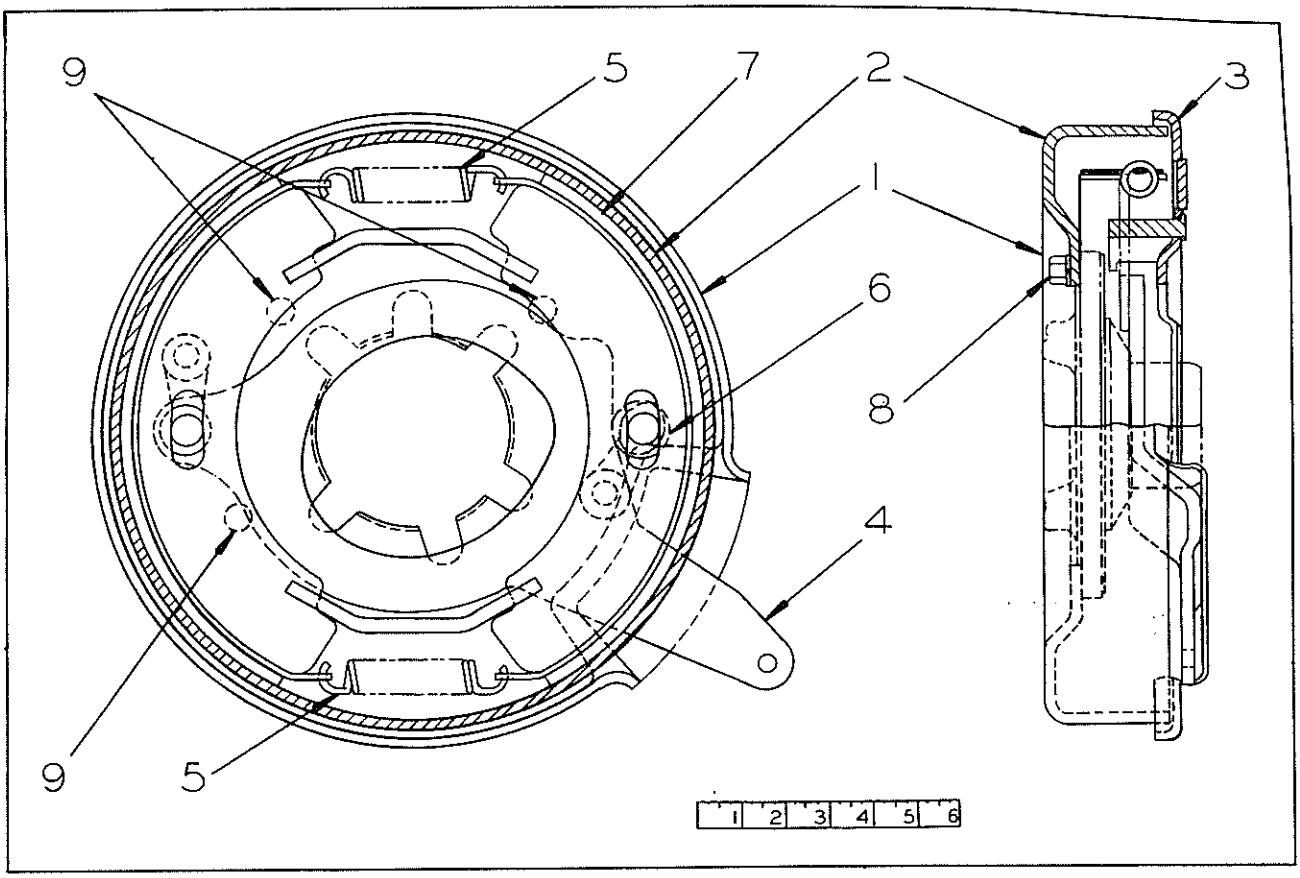

PLATE 731 – PARKING BRAKE ASSEMBLY

ITEM	PART NUMBER	QTY.	PART NAME
1	21728	1	Parking Brake Assy. (Includes Items #2 thru #7)
2	22156	1	Drum
3	22157	1	Backing Plate
4	22155	1	Lever
5	22152	2	Spring
6	22154	1	Roller
7	22153	2	Shoe Assy.
8	1230	8	Capscrew, 3/8" – 24 NF x 3/4"
	904206	8	Lockwasher, 3/8" ASA Med.
9	2089	3	Capscrew, 5/8" – 11 NC x 1–1/4"
	904209	3	Lockwasher, 5/8" ASA Med.

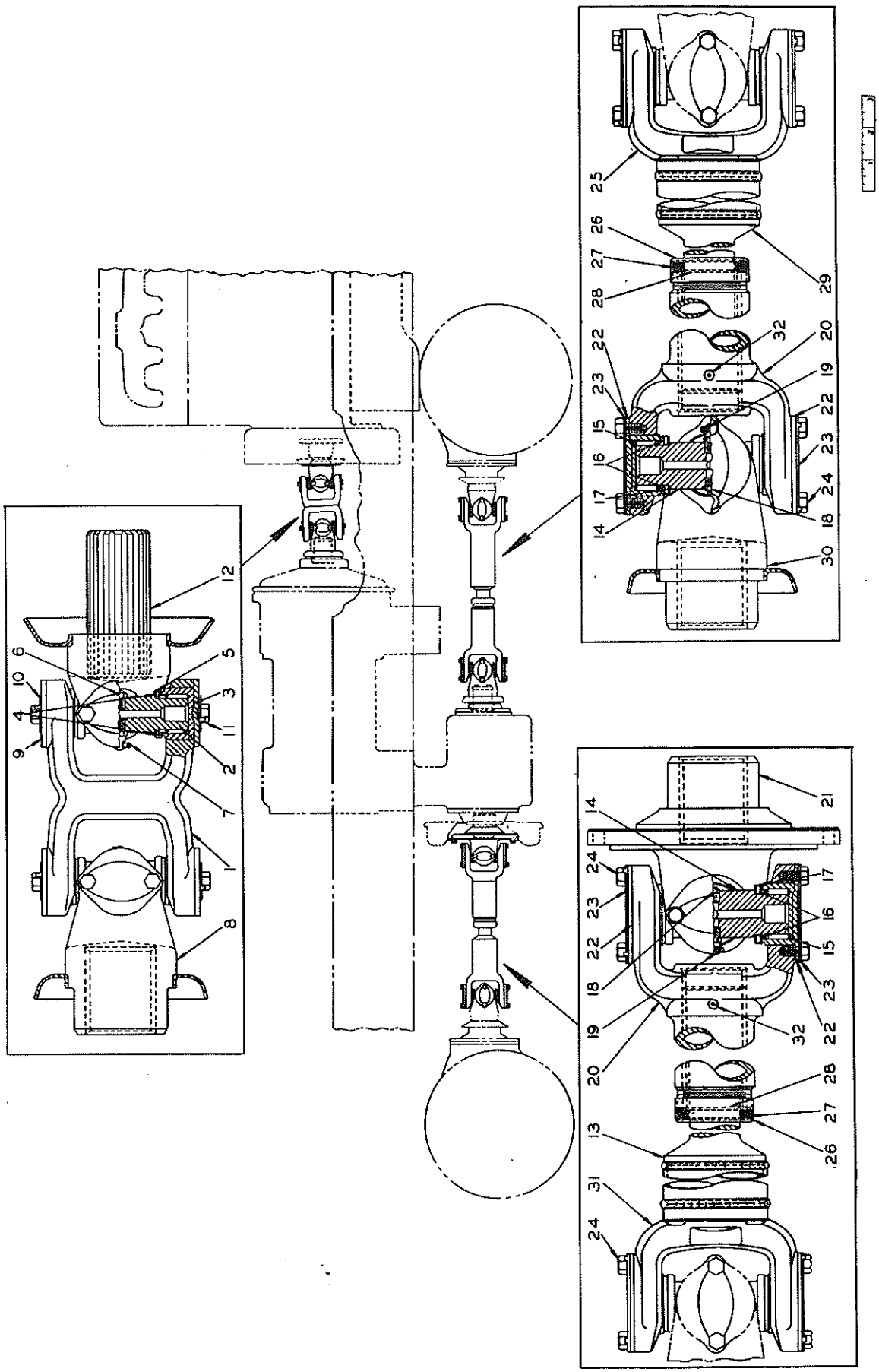

PLATE 725 – DRIVE SHAFT GROUP

TRACTOMOTIVE

DRIVE SHAFT GROUP

(See Plate 725)

ITEM	PART NUMBER	QTY.	PART NAME
1	20295	1	Universal Joint Assy. (Includes 1--13812, Items #2 and #8 thru #11)
	13812	1	Double Center
2	13809	2	Spider and Bearing Assy. (Each includes ½ qty of Items #3 thru #7)
3	13805	8	Bearing Assy. (Each includes Needle Bearing, Retainer & Cap) (Serviced as assy. only)
4	13808	8	Washer, Cork
5	13806	8	Cork Retainer
6	13807	2	Relief Valve
7	915276	2	Lubricating Fitting, 90°, 1/8" – 27 NPT
8	21562	1	Yoke and Deflector (Transmission End)
9	13810	8	Cover Plate
10	13811	8	Lock Plate
11	8689	16	Capscrew, 5/16" – 24 NF x 1/2"
12	21996	1	Yoke and Deflector (Engine End)
13	20277	1	Universal Joint Assy. (Front) (Includes ½ qty. of Items #14, #20, #22 thru #24, #26 thru #28, 1--21560, 1--21997 & 1--914465)
14	21862	4	Spider and Bearing Assy. (Each includes 4--21999, 4--22002, 4--22001, 1--13807 and 1--915276)
15	21999	16	Bearing Assy. (Each includes Needle Bearing, Retainer and Cup)(Serviced as assy. only)
16	22002	16	Cork Washer
17	22001	16	Retainer
18	13807	4	Relief Valve
19	915276	4	Lubricating Fitting, 90°, 1/8" – 27 NPT
20	21864	2	Slip Yoke
21	21560	1	Flange Yoke
22	21863	16	Cover Plate
23	21861	16	Lock Plate
24	8689	32	Capscrew, 5/16" – 24 NF x 1/2"
25	21868	2	Yoke End
26	21867	2	Cap, Dust
27	21866	2	Dust Cap Felt Washer
28	21865	2	Dust Cap Metal Washer
29	20281	1	Universal Joint (Rear) (Includes ½ qty. of Items #14, #20, #22 thru #24, #26 thru #28, 1--21868, 1--21561 & 1--914465)
30	21561	1	Yoke End Assy.
31	21997	1	Yoke End
32	914465	2	Lubricating Fitting, St., 1/8" – 27 NPT

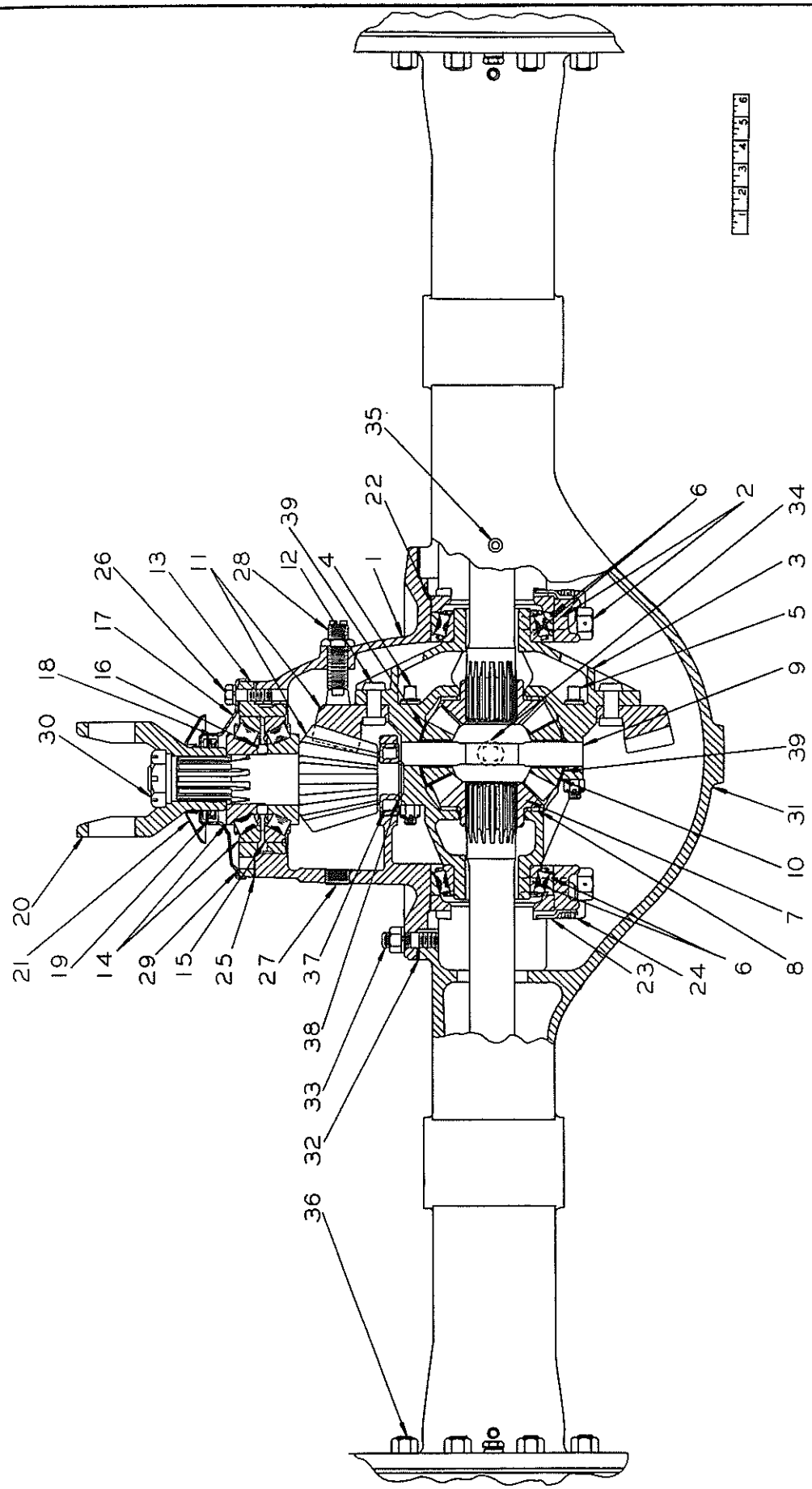

PLATE 728 – DIFFERENTIAL CARRIER AND HOUSING (FRONT AND STEERING AXLE)

TRACTOMOTIVE

DIFFERENTIAL CARRIER AND HOUSING (FRONT AND STEERING AXLE)

Quantity for both Axles – Note Changes Carefully

(See Plate 728)

ITEM	PART NUMBER	QTY.	PART NAME
	20806	1	Front Axle Assy., Complete (Includes parts as listed on pages 129 thru 131, 133, 134, 137, 138, and 143 thru 145. Note changes carefully)
	20807	1	Steering Axle Assy., Complete (Includes parts as listed on pages 129 thru 131, 133 thru 137, 139 & 143 thru 145. Note changes carefully)
1	22023	2	Differential Carrier Assy. (Each includes 1--22024, 2--22109 and ½ qty of Items #3 thru #30)
	22024	2	Differential Carrier and Cap Assy. (Each includes one Carrier, two Bearing Cap 4--22105 and 2--22314)
	- - - -	2	Carrier
	- - - -	4	Bearing Cap
2	22105	8	Capscrew
	22109	4	Lockwire
	22314	4	Dowel
3	22025	2	Differential Drive Gear and Pinion Assy. (Each includes 1--22026 and ½ qty. of Items #11 & #12)
	22026	2	Differential and Cone Assy. (Each includes 1--22027, and Items #7 thru #10)
	22027	2	Differential Case Assy. (Each includes one Case and Items #4 thru #6)
	- - - -	2	Case (Not serviced separately)
4	22101	16	Bolt (Long)
	917360	16	Hex Nut
	22106	16	Lockwire, #16 W and M Ga. x 12" long
5	22102	8	Bolt (Short)
	917360	8	Hex Nut
	22106	2	Lockwire, #16 W and M Ga. x 12" long
6	22047	4	Bearing Cup (For service, order both Cup and Cone)
	22028	4	Bearing Cone
7	22030	4	Gear
8	22397	4	Thrust Washer
9	22031	2	Spider
10	22032	8	Pinion
11	22033	2	Pinion and Gear Assy. (Serviced as assembly only)
12	22034	24	Rivet
13	22035	2	Pinion Bearing Cage Assy. (Each includes ½ qty. of Items #14 thru #16)

(Continued)

DIFFERENTIAL CARRIER AND HOUSING (FRONT AND STEERING AXLE) - CONTINUED

Quantity for both Axles — Note Changes Carefully

(See Plate 728)

ITEM	PART NUMBER	QTY.	PART NAME
14	22036	2	Bearing Cup (For service, order both Cup and Cone)
	22038	2	Bearing Cone
15	22037	2	Bearing Cup (For service, order both Cup and Cone)
	22039	2	Bearing Cone
16	22040	—	Spacer (Use as required)
	22041	—	Spacer
17	22042	2	Bearing Cover and Seal Assy. (Each includes ½ qty. of Items #18 & #19)
18	22043	2	Oil Seal
19	22044	2	Spacer
20	22045	2	Yoke and Slinger Assy. (Each includes one Yoke and 1--22046)
	- - - -	2	Yoke (Not serviced separately)
21	22046	2	Slinger
22	22048	4	Adjusting Ring
23	22049	4	Lock, Adjusting Ring
24	22107	8	Capscrew
	22108	4	Lockwire, #16 W and M Ga. x 6" long
25	22050	—	Shim (.005" thick) (Use as required)
	22051	—	Shim (.010" thick)
	22052	—	Shim (.020" thick)
	22053	—	Shim (.003" thick)
26	22110	16	Capscrew
27	904224	2	Pipe Plug, 3/4" Steel, Ctsk., 1/2" Sq. (Oil Filler)
28	22054	2	Thrust Block
	22111	2	Adjusting Screw
	22112	2	Locknut
29	22055	2	Gasket
30	22056	2	Plain Washer
	22113	2	Hex Nut
	904002	2	Cotter Pin, 1/8" x 2"
31	22057	1	Housing Assy., Front Axle (Includes one Housing & ½ qty. of Items #32 thru #35)
	22281	1	Housing Assy., Steering Axle (Includes one Housing, ½ qty. of Items #32 thru #35 and Item #36)
	- - - -	2	Housing (Front and Steering) (Not serviced separately)

(Continued)

DIFFERENTIAL CARRIER AND HOUSING (FRONT AND STEERING AXLE) – CONTINUED

Quantity for both Axles – Note Changes Carefully

(See Plate 728)

ITEM	PART NUMBER	QTY.	PART NAME
32	22058	2	Gasket (Carrier to Housing)
33	22114	20	Stud (Short)
	22115	8	Stud (Long)
	904209	28	Lockwasher, 5/8" ASA Med.
	911044	28	Hex Nut, 5/8" – 13 NF
34	901667	2	Pipe Plug, 1–1/4" Steel, Ctsk., 3/4" Sq. (Oil Drain)
35	7145	6	Oil Breather Assy. (Serviced as assembly only)
36	22282	16	Stud
	904369	16	Lockwasher, 3/4" ASA Med. (Steering Axle only) (Trunnion Socket to Housing)
	917158	16	Hex Nut, 3/4" – 16 NF
37	22162	2	Bearing
38	22163	2	Snap Ring
39	22029	8	Thrust Washer

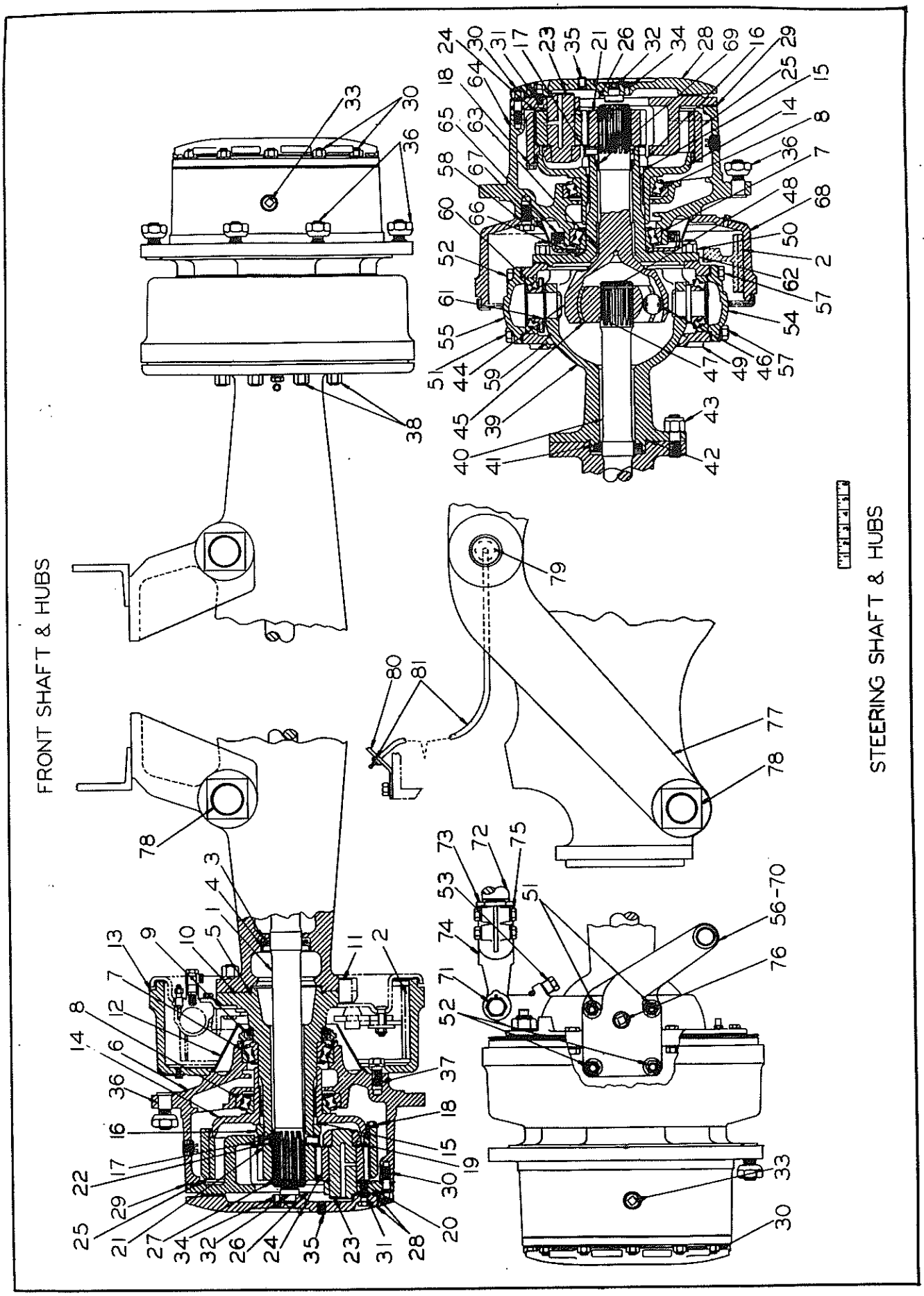

PLATE 729 – PLANETARY HUB AND SHAFT GROUP (FRONT AND STEERING AXLE)

PLANETARY HUB AND SHAFT GROUP (FRONT AND STEERING AXLE)

(See Plate 729)

ITEM	PART NUMBER	QTY.	PART NAME
—	----	2	Front Shaft and Hub Assy., Complete
	----	2	Steering Shaft and Hub Assy., Complete
1	22059	2	Drive Axle Shaft
2	----	4	Brake Assy., Front and Rear (See pages 138 & 139)
3	22065	2	Oil Seal (Axle Shaft)
4	22068	2	Retainer Assy. (Each includes 1--22066)
5	22120	2	Seal Ring
6	22060	2	Hub Assy., Front Axle (Each includes one Hub and 1--22062 & 1--22061)
7	22062	4	Cup (For service, order both Cup and Cone)
	14571	4	Cone
8	22061	4	Cup (For service, order both Cup and Cone)
	22064	4	Cone
9	22067	2	Retainer Assy. (Each includes 1--22066)
	22066	2	Seal Ring
10	22087	2	Spindle
11	22073	4	Dowel
12	22088	2	Oil Slinger
13	22080	2	Brake Drum
14	22086	4	Hub (Planetary Ring Gear) (Each includes 1--22075)
15	22075	4	Sleeve
16	22122	4	Nut
17	22077	8	Lock Nut
18	22177	32	Capscrew
	22069	16	Lock Plate
	22108	16	Lockwire
19	22071	12	Washer (Inner)
20	22072	12	Washer (Outer)
21	22083	4	Gear (20 teeth) (Planetary Sun)
22	22070	4	Washer
23	22081	12	Shaft
24	22084	12	Pinion
25	22082	4	Gear (52 teeth) (Planetary Ring)
26	22085	4	Spider

(Continued)

PLANETARY HUB AND SHAFT GROUP (FRONT AND STEERING AXLE) – CONTINUED

(See Plate 729)

ITEM	PART NUMBER	QTY.	PART NAME
27	22074	4	Snap Ring
28	22079	4	Gasket
	22089	4	Cover
29	22078	4	Gasket
30	22119	48	Stud
	904208	48	Lockwasher, 1/2" ASA Med (Planetary Spider to Hub)
	911043	48	Hex Nut, 1/2" – 20 NF
31	22118	32	Capscrew
32	22076	4	Thrust Button
33	907070	4	Plug (Planetary Oil Filler and Drain)
34	22103	4	Breather
35	22116	4	Plug (Planetary Oil Level)
36	22121	48	Stud
	7152	48	Nut (Special)
37	14598	20	Capscrew, 5/8" – 11 NC x 1–1/2" (Brake Drum to Hub)
	904209	20	Lockwasher, 5/8" ASA Med.
38	904209	16	Lockwasher, 5/8" ASA Med. (For mounting bolts see Plate 739, page 139)
	917906	16	Hex Nut, 5/8"
39	22283	2	Trunnion Socket Assy. (Includes two Bearing Pins) (Serviced as assy. only)
40	22284	2	Drive Shaft
41	22285	2	Oil Seal (Axle Shaft)
42	22286	2	Seal
43	22282	16	Stud
	904369	16	Lockwasher, 3/4" ASA Med. (Trunnion Socket to Housing)
	917158	16	Hex Nut, 3/4" – 16 NF → 7 3029162
44	73 022287	2	Universal Joint Assy. (Outer) (Each includes 1--22288 and ½ qty. of Items #45 thru #48)
	22288	2	Outer Race and Stud Axle
45	22289	2	Cage
46	22290	12	Ball
47	22291	2	Inner Race
48	22292	2	Snap Ring

(Continued)

PLANETARY HUB AND SHAFT GROUP (FRONT AND STEERING AXLE) – CONTINUED

(See Plate 729)

ITEM	PART NUMBER	QTY.	PART NAME
49	22293	1	Steering Knuckle Flange Assy., Left (Includes one Inner and one Companion Flange, 2--22296, 2--14506, 12--14505, 1--22295, ½ qty. of Items #53 and #82, 2--22264, 2--22263, 2--22260 and 2--22262 as listed on page 139)
	----	1	Knuckle Flange, Inner (Not serviced separately)
	----	1	Knuckle Flange, Companion
	22317	1	Steering Knuckle Flange Assy., Right (Includes one Inner and one Companion Flange, 2--14504, 2--14506, 12--14505, 1--22295, ½ qty. of Items #53 & #82, 2--22264, 2--22263, 2--22260 and 2--22262 as listed on page 139)
	----	1	Knuckle Flange, Inner (Not serviced separately)
	----	1	Knuckle Flange, Companion
50	14505	24	Stud
	910153	24	Lockwasher, 9/16" ASA Med. (Flange to Steering Knuckle)
	14422	24	Hex Nut, 9/16" – 18 NF
51	22296	2	Stud, long (Used with Steering Arm)
	14504	2	Stud, long, 5/8" – 18 NF
	904209	4	Lockwasher, 5/8" ASA Med.
	911044	4	Hex Nut, 5/8" – 18 NF
52	14506	4	Stud, short, 5/8" – 18 NF (Two used with Steering Arm)
	904209	4	Lockwasher, 5/8" ASA Med.
	911044	4	Hex Nut, 5/8" – 18 NF
53	14560	2	Stop Nut
	22297	2	Spacer
	22298	–	Shim (Use as required)
54	14562	2	Cap, Lower bearing
	14563	–	Shim (.005" thick) (Use as required)
	14564	–	Shim (.020" thick)
55	14561	1	Cap, Upper R.H. Bearing
	14563	–	Shim (.005" thick) (Use as required)
	14564	–	Shim (.020" thick)
56	22299	1	Steering Arm (L.H. Bearing Cap)
	14563	–	Shim (.005" thick) (Use as required)
	14564	–	Shim (.020" thick)
57	14598	8	Capscrew, 5/8" – 11 NC x 1–1/2" (Flange to Bearing Cap)

(Continued)

PLANETARY HUB AND SHAFT GROUP (FRONT AND STEERING AXLE) – CONTINUED

(See Plate 729)

ITEM	PART NUMBER	QTY.	PART NAME
57	904209	8	Lockwasher, 5/8" ASA Med. (Flange to Bearing Cap)
58	14598	20	Capscrew, 5/8" – 11 NC x 1–1/2" (Brake Drum to Hub)
	910334	20	Lockwasher, 5/8" Int. tooth
59	14568	2	Spring
	14569	2	Seal (Felt) Steering Knuckle
60	14566	4	Cup (For service order both Cup and Cone)
	7271	4	Cone
61	14565	2	Retainer (Upper Steering Bearing Grease)
62	22300	2	Steering Knuckle (Each includes 1--22301)
63	22301	2	Bushing
64	22302	2	Hub and Bearing Assy. (Each includes one Hub, 1--22062, 1--22061 & 12--22119)
65	22309	2	Oil Seal
	22413	2	Retainer Assy. (Each includes 1--22305)
66	22305	2	Pin
67	22306	2	Oil Slinger
68	22307	2	Brake Drum
69	22308	2	Oil Seal (Drive Joint)
70	14494	2	Dowel (Steering Arm Stud)
71	22311	2	Bolt
	22295	2	Bushing
	14581	2	Nut (Tie Rod Yoke)
	14580	2	Pin
	900808	2	Cotter Pin, 1/8" x 1–1/2"
72	20286	1	Tie Rod
73	14577	1	Lock Nut
74	14578	1	Yoke, Left
	14579	1	Yoke, Right
75	14602	4	Bolt
	904208	4	Lockwasher, 1/2" ASA Med.
	911043	4	Hex Nut, 1/2" – 20 NF
76	910230	2	Plug (Trunnion Socket Grease)
77	20319	2	Axle Support, Rear

(Continued)

PLANETARY HUB AND SHAFT GROUP (FRONT AND STEERING AXLE) – CONTINUED

(See Plate 729)

ITEM	PART NUMBER	QTY.	PART NAME
78	10460	4	Pin Weld Assy.
	13046	4	Washer
	911058	4	Castle Nut, 1–1/2" – 12 NF
	901345	4	Cotter Pin, 1/4" x 2–1/2"
79	17556	2	Locknut
	12158	2	Washer
80	20813	1	Plate
	1243	2	Capscrew, 3/8" – 24 NF x 1"
	904206	2	Lockwasher, 3/8" ASA Med.
81	19807	2	Flexible Tube Assy.
	914465	2	Lubricating Fitting, St., 1/8" – 27 NPT
	904209	2	Lockwasher, 5/8" ASA Med.
	911049	2	Hex Jam Nut, 5/8" – 18 NF
82	1110	4	Capscrew, 1/2" – 13 NC x 1–1/4"
	22294	4	Bolt (Not Shown)
	14450	4	Hex Nut (Special)

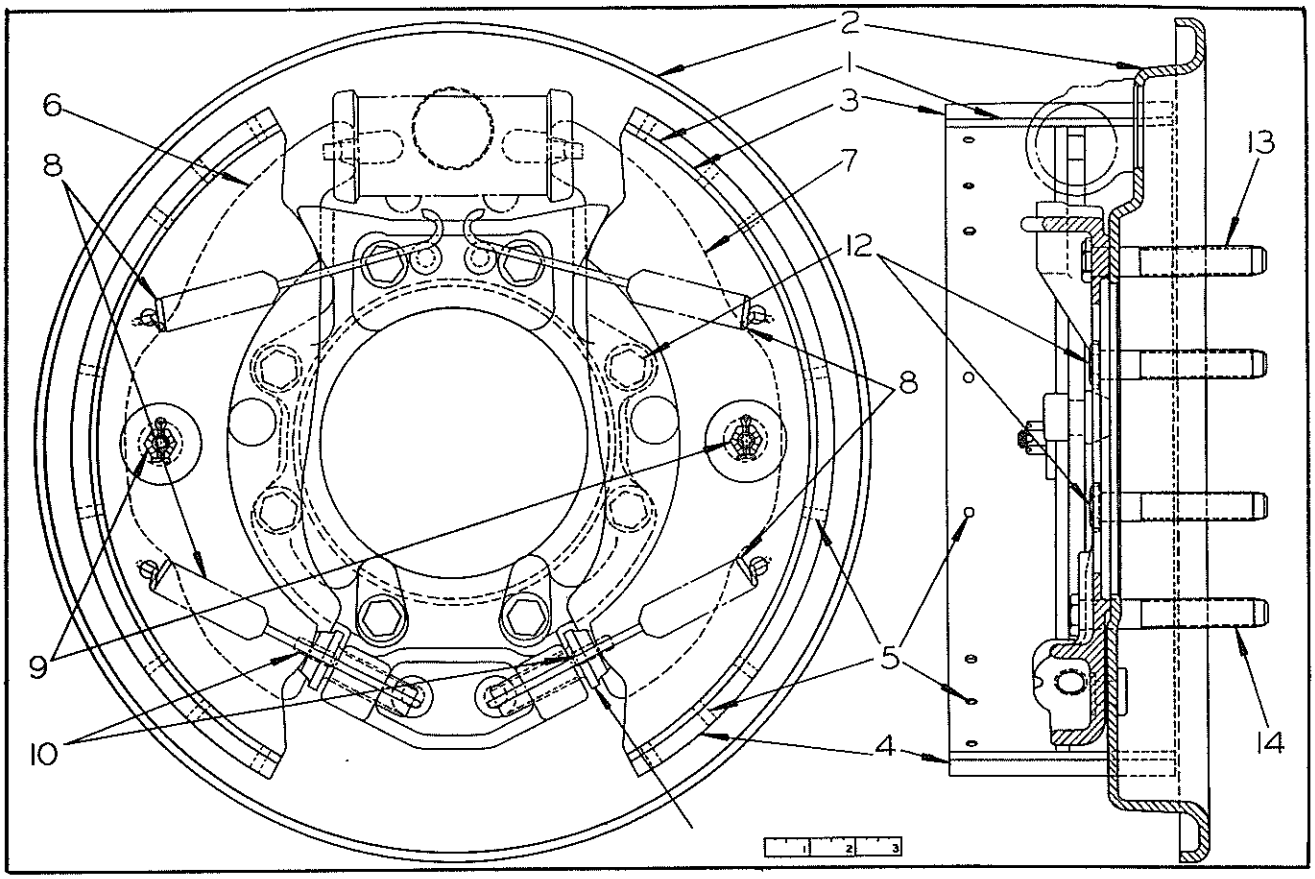

PLATE 738 – BRAKE ASSEMBLY (FRONT AXLE) LEFT AND RIGHT

ITEM	PART NUMBER	QTY.	PART NAME
1	22090	2	Brake Assy., Left & Right (Each includes ½ qty. of Item #2)
2	22091	2	Backing Plate, Spider and Shoe Assy. (Each includes 1--22092, 2--22093 and ½ qty. of Items #6 thru #14)
	22092	2	Backing Plate & Spider Assy. (Serviced as assy. only)
3	22093	4	Shoe and Lining Assy. (Each includes one Brake Shoe and 1--22094 & 16--22123)
	- - - -	4	Brake Shoe (Not serviced, order #22093)
4	22094	4	Lining
5	22123	64	Rivet
6	22095	2	Lever Assy., L.H. Front, R.H. Rear (Serviced as assemblies only)
7	22096	2	Lever Assy., L.H. Rear, R.H. Front
8	22097	8	Shoe Return Spring
9	22099	4	Guide Pin
	22098	4	Washer
	910867	4	Hex Nut
	911438	4	Cotter Pin
10	22100	4	Dust Cover, Adj. Screw Hole
11	22391	4	Adj. Bolt
12	22388	8	Mounting Bolt (Special)
13	22389	4	Mounting Bolt (Special)
14	22390	4	Mounting Bolt (Special)

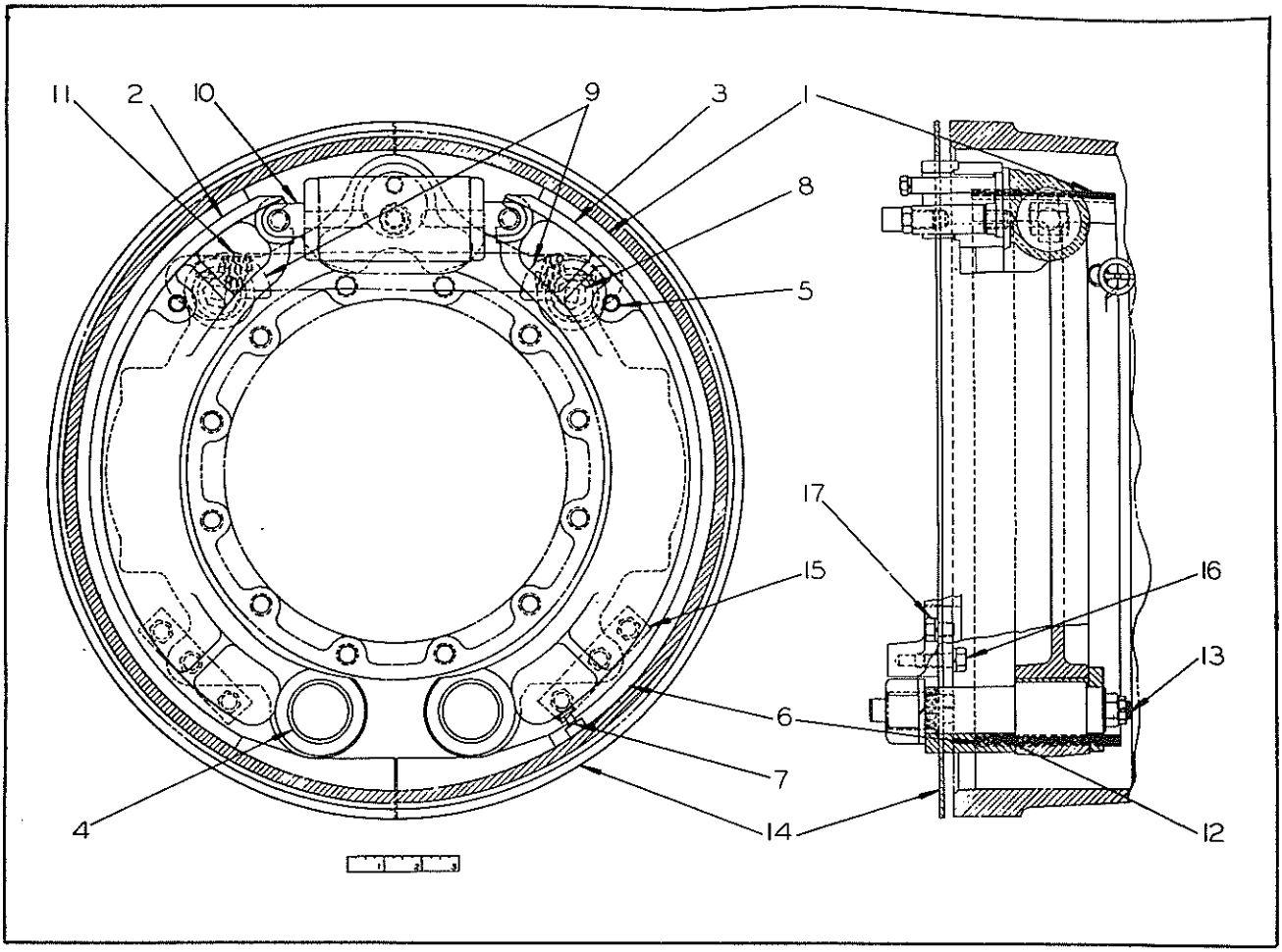

PLATE 739 – BRAKE ASSEMBLY (REAR AXLE) LEFT AND RIGHT

ITEM	PART NUMBER	QTY.	PART NAME
1	22253	2	Brake Assy., Left & Right (Each includes ½ qty. of Items #2 thru #17)
2	22254	2	Shoe Assy., L.H. Forward, R.H. Reverse (Each includes one Brake Shoe)
	- - - -	2	Brake Shoe, L.H. Forward, R.H. Reverse (Not serviced, order #22254)
3	22259	2	Shoe Assy., R.H. Forward, L.H. Reverse (Each includes one Brake Shoe)
	- - - -	2	Brake Shoe, R.H. Forward, L.H. Reverse (Not serviced, order #22259)
4	22255	4	Bushing
5	22256	4	Pin
6	22257	4	Lining (Forward and Reverse)
7	22258	64	Rivet
8	22264	4	Retainer
	22263	4	Spring
	22260	4	Bolt (Each includes 1--22261)
	22261	4	Washer
9	22262	4	Cam

(Continued)

BRAKE ASSEMBLY (REAR AXLE) LEFT AND RIGHT – CONTINUED

(See Plate 739)

ITEM	PART NUMBER	QTY.	PART NAME
10	22265	4	Cylinder Link Assy. (Serviced as assembly only)
11	22266	2	Return Spring
12	22267	4	Anchor Pin
	910916	4	Lockwasher, 1" ASA Med.
	22268	4	Hex Nut
13	22269	2	Link
	22270	2	Bolt
	917360	2	Nut
	900802	2	Cotter Pin, 3/32" x 1"
14	22271	4	Dust Shield
15	22272	4	Plate
16	2864	4	Capscrew, 3/8" – 16 NC x 7/8"
	904206	4	Lockwasher, 3/8" ASA Med.
17	3440	12	Capscrew, 3/8" – 16 NC x 1/2"
	904206	12	Lockwasher, 3/8" ASA Med.
18	----	2	Wheel Cylinder Assy. (See Item #35 page 143)

TRACTOMOTIVE

HYDRAULIC BRAKE SYSTEM

(See Plate 716)

ITEM	PART NUMBER	QTY.	PART NAME
1	21295	1	Master Cylinder Assy. (Includes Items #2 thru #13)
2	- - - -	1	Housing (Not serviced separately)
–	21870	1	Repair Kit, Cylinder (Includes Items #3 thru #6)
3	21871	1	Cup, Primary Piston
4	21872	1	Piston Assy. (Includes parts as listed in Item #4)
	- - - -	1	Piston and Cup Protector Assy. (Not serviced, order 21872)
	21873	1	Cup
	21874	1	Ring
5	14314	1	Lock Wire
6	14315	1	Boot
7	21875	1	Piston Return Spring
8	21876	1	Push Rod
9	13937	1	Stop Plate
10	21877	1	Filler Plug
	21878	1	Filler Plug Gasket
11	13944	2	Outlet Plug
	13943	2	Gasket
12	21879	1	Outlet Fitting
	13943	1	Gasket
13	901651	1	Pipe Plug, 1/8" Steel, 9/32" Sq. Hd.
14	1108	4	Capscrew, 3/8" – 24 NF x 1–1/2"
	904206	4	Lockwasher, 3/8" ASA Med.
	911041	4	Hex Nut, 3/8" – 24 NF
15	20615	1	Bracket
16	1185	4	Capscrew, 1/2" – 20 NF x 1–3/4"
	904208	4	Lockwasher, 1/2" ASA Med.
	911043	4	Hex Nut, 1/2" – 20 NF
17	20446	1	Brake Lever Assy. (Includes 2--5896, 2--5895 and 1--12649)
	5896	2	Bearing (Lettered ends must face pressing tool)
	5895	2	Seal (Install seals with lips toward outside)
18	12649	1	Bushing
19	20410	1	Pin
	1916	1	Lock Pin
	900806	1	Cotter Pin, 1/8" x 1"

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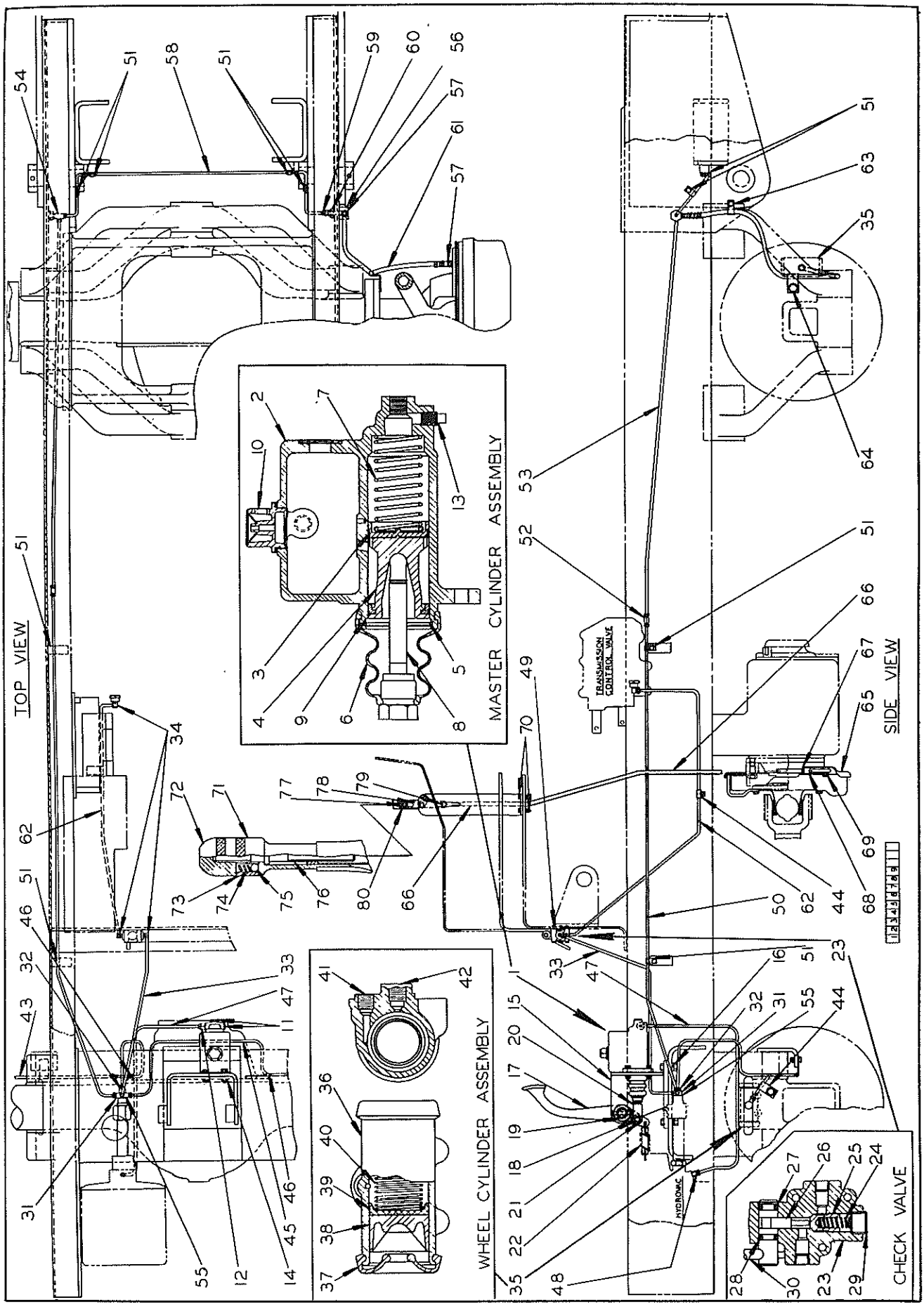


PLATE 716 – HYDRAULIC BRAKE SYSTEM

TRACTOMOTIVE

HYDRAULIC BRAKE SYSTEM – CONTINUED

(See Plate 716)

ITEM	PART NUMBER	QTY.	PART NAME
20	17243	1	Yoke
	913223	1	Hex Jam Nut, 9/16" – 18 NF
21	12612	1	Lockpin
	900806	1	Cotter Pin, 1/8" x 1"
22	15533	1	Rod
	7818	1	Spring
23	12490	1	Check Valve (Axle Disconnect Valve)
	- - - -	1	Housing (Not serviced separately)
24	14042	1	Spring
25	14043	1	Plunger
26	14044	1	Cam Follower
27	14045	2	Back-Up Ring (For service, order both Back-Up Ring and Seal Ring)
28	14047	2	Seal Ring
29	907856	1	Pipe Plug, 3/8" Steel, Ctsk., 5/16" Hex
30	14046	1	Cam Assy. (Includes one Lever)
31	21289	1	Tee
32	21288	1	Fitting Bolt
	6799	1	Washer
33	21619	1	Tube Assy. (Check Valve to Tee)
34	913704	3	90° Elbow, Male Inverted Flare
35	21891	2	Wheel Cylinder Assy., Complete (Each includes 1--21892, 1--22124, 1--14536, 1--14539 and 2--14538) – Front Axle –
	21892	2	Wheel Cylinder Assy. (Each includes 1--21894, 1--21895, 1--21897 and 1--21898)
	22273	2	Wheel Cylinder Assy., Complete (Each includes 1--22274, 1--22279, 1--22277, 1--22278, 1--16215, 1--904204, 1--22280 & 2--14538) – Steering Axle –
	22274	2	Wheel Cylinder Assy. (Each includes 1--21894, 1--21895, 1--21896, 1--21897 and 1--21898)
–	21893	4	Cylinder Repair Kit (Each includes 1--21895 & 1--21897)
36	21894	4	Housing, Wheel Cylinder
37	21895	4	Boot
38	21896	4	Piston
39	21897	4	Cup, Piston
	22276	2	Cup, Filler (Used on Steering Axle only)
40	21898	2	Spring (Front Axle)

(Continued)

HYDRAULIC BRAKE SYSTEM – CONTINUED

(See Plate 716)

ITEM	PART NUMBER	QTY.	PART NAME
40	22275	2	Spring (Steering Axle)
	22124	2	Bleeder Screw
	2864	4	Capscrew, 3/8" – 16 NC x 7/8" (Front Axle)
41	22279	2	Bleeder Screw
	5560	4	Capscrew, 3/8" – 16 NC x 1-3/8" (Rear Axle)
	904206	8	Lockwasher, 3/8" ASA Med.
	14536	2	Inlet Connection
	14537	2	Bolt (Front Axle)
	14539	2	Gasket
	22277	2	Inlet Connection
42	22278	2	Extension, Inlet Connection
	16215	2	Capscrew, 1/4" – 28 NF x 1/2" (Rear Axle)
	904204	2	Lockwasher, 1/4" ASA Med.
	22280	2	Adapter
	14538	6	Gasket
43	21282	1	Tube Assy. (Tee to R.H. Wheel Cylinder)
44	21516	3	Clamp (For fasteners see Axle and Transmission Group)
45	20991	1	Tube Assy. (Tee to L.H. Wheel Cylinder)
46	6769	2	Clamp (For fasteners see Differential Carrier and Housing Group)
47	20990	1	Tube Assy. (Hydrovac to Master Cylinder)
48	17550	1	Connector, Male Inverted
	13943	2	Washer
	12488	3	Capscrew, #10-32 NF x 2", Skt. Hd.
49	910243	3	Plain Washer, #10 SAE
	904203	3	Lockwasher, #10 ASA Med.
	910251	3	Hex Nut, #10–32 NF
50	20998	1	Tube Assy. (Tee to Union)
	2529	6	Clamp
51	1230	6	Capscrew, 3/8" – 24 NF x 3/4"
	904206	6	Lockwasher, 3/8" ASA Med.
52	14862	1	Union, Inverted Flare
53	21255	1	Tube Assy.

(Continued)

HYDRAULIC BRAKE SYSTEM – CONTINUED

(See Plate 716)

ITEM	PART NUMBER	QTY.	PART NAME
54	917593	1	Tee
55	6797	1	Washer
56	20987	2	Adapter
57	21780	4	Copper Washer
58	21258	1	Tube Assy.
59	914646	1	Connector, Inverted Male
60	904209	2	Lockwasher, 5/8" ASA Med.
	911044	2	Hex Nut, 5/8" – 18 NF
61	21291	2	Hose Assy., Complete (Adapter to Wheel Cylinders) (Serviced as assy. only)
62	21620	1	Tube Assy. (Check Valve to Transmission)
63	6991	2	Clamp
	1230	6	Capscrew, 3/8" – 24 NF x 3/4"
	904206	6	Lockwasher, 3/8" ASA Med.
64	21342	2	Clamp (For fasteners see Axle Group)
65	21728	1	Parking Brake Assy. (See Item #1, page 125)
66	20879	1	Yoke and Rod Weld Assy.
67	911048	1	Hex Jam Nut, 3/8" – 24 NF
68	2686	1	Yoke End
69	2208	1	Lockpin
	900942	1	Cotter Pin, 3/32" x 5/8"
70	2324	4	Capscrew, 5/16" – 24 NF x 3/4"
	904205	4	Lockwasher, 5/16" ASA Med.
	913636	4	Hex Nut, 5/16" – 24 NF
71	20591	1	Brake Lever Assy. (Parking Brake) (Includes Items #72 thru #80)
72	21920	1	Cap
73	21921	1	Adjusting Knob
74	21922	1	Spring
75	21923	1	Ball
76	21924	1	Rod (Threaded both ends)
77	21925	1	Pin
	910335	1	Plain Washer, 5/16" SAE
	21926	1	Retaining Ring
78	21927	1	Link
79	21929	1	Pin
	910335	1	Plain Washer, 5/16" SAE
	900802	1	Cotter Pin, 3/32" x 1"
80	21928	1	Adjusting Tube Assy. (Serviced as assembly only)

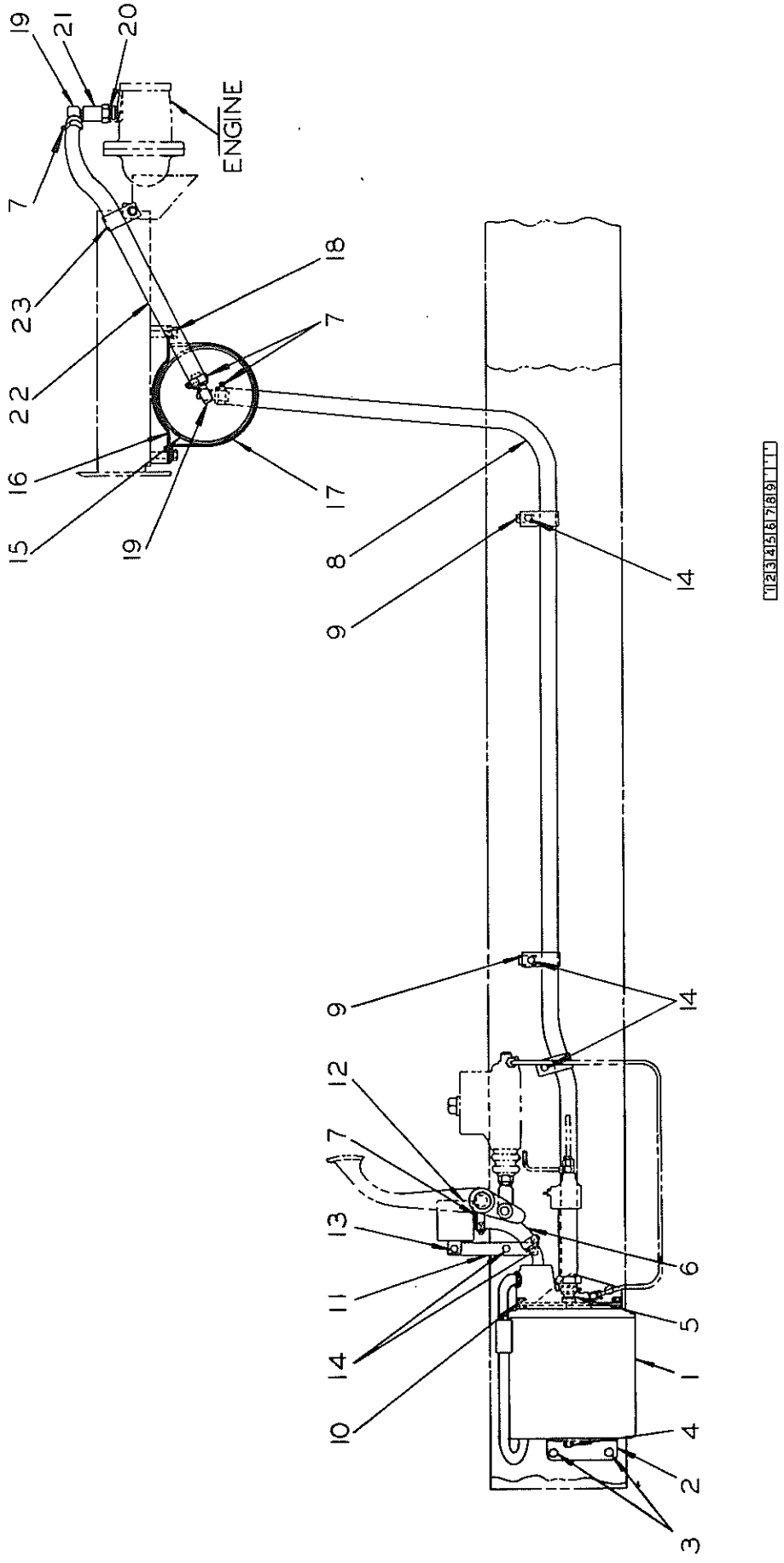


PLATE 718 – VACUUM HYDRAULIC UNIT, TANK AND LINES

TRACTOMOTIVE

VACUUM HYDRAULIC UNIT, TANK AND LINES

(See Plate 718)

ITEM	PART NUMBER	QTY.	PART NAME
1	21292	1	Vacuum Hydraulic Unit (Order repair parts from Bendix Corp., #374750)
2	20531	1	Plate
3	1230	2	Capscrew, 3/8" – 24 NF x 3/4"
	904206	2	Lockwasher, 3/8" ASA Med.
4	904206	4	Lockwasher, 3/8" ASA Med.
	911041	4	Hex Nut, 3/8" – 24 NF
5	21264	1	Nipple (Special)
6	21296	1	Hose, 3/4" I.D. x 5–1/4"
7	10411	6	Hose Clamp
8	21298	1	Hose, 3/4" I.D. x 95"
9	1437	3	Clamp
10	19358	1	Plate
11	20979	1	Strip
12	14869	1	Breather Assy. (Serviced as assembly only)
13	2324	1	Capscrew, 5/16" – 24 NF x 3/4"
	904205	1	Lockwasher, 5/16" ASA Med.
	913636	1	Hex Nut, 5/16" – 24 NF
14	1230	11	Capscrew, 3/8" – 24 NF x 3/4"
	904206	11	Lockwasher, 3/8" ASA Med.
15	21293	1	Tank, Vacuum
16	17274	2	Strap
17	17276	2	Strap
18	1249	4	Capscrew, 1/2" – 20 NF x 1–1/4"
	904208	4	Lockwasher, 1/2" ASA Med.
19	21265	3	90° Elbow (Special)
20	901500	1	Close Nipple
	901828	1	Bushing, 3/4" x 1/2"
21	14866	1	Check Valve Assy. (Serviced as assembly only)
22	21297	1	Hose, 3/4" I.D. x 41"
23	21717	1	Clamp (For fasteners, see Engine Assy.)

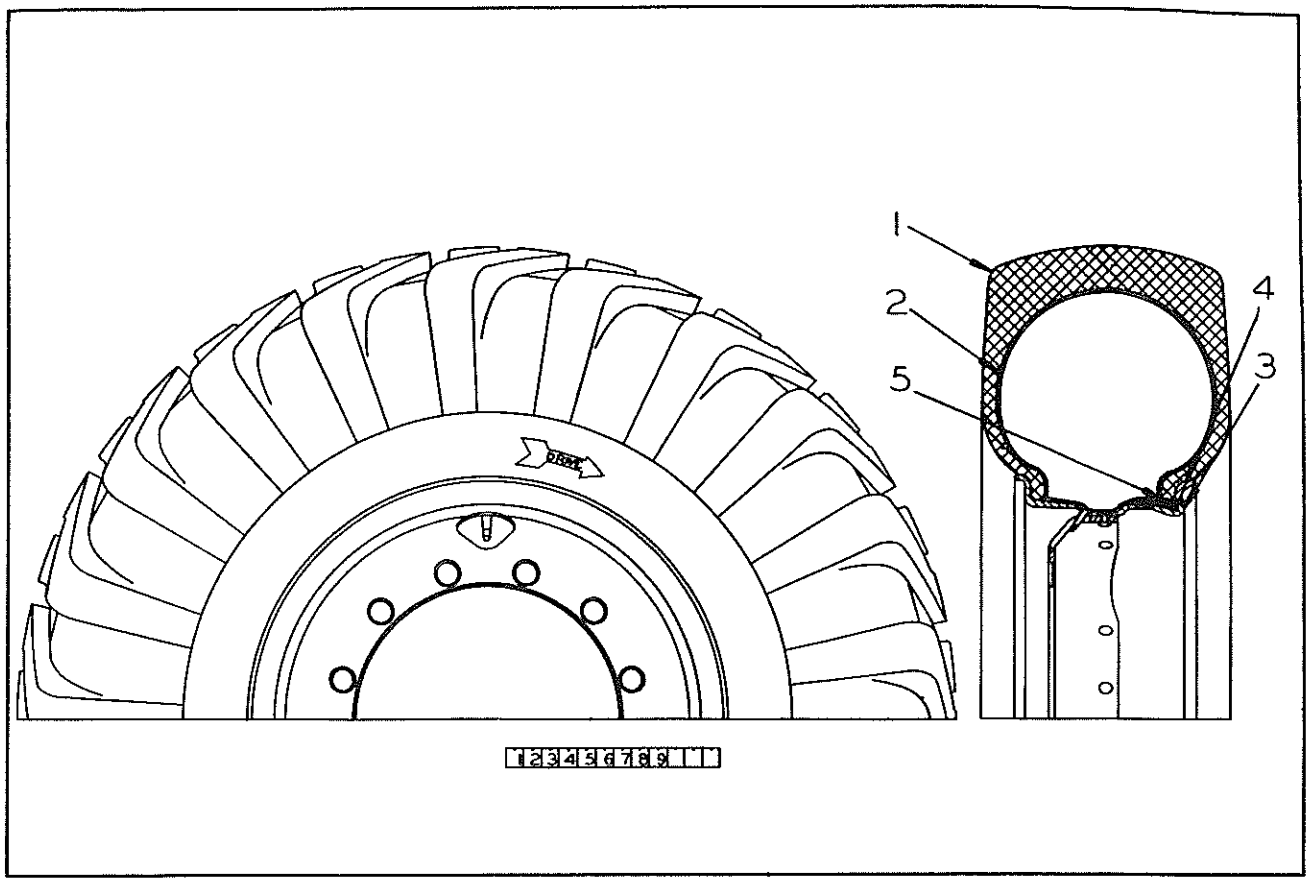


PLATE 735 – TIRE AND WHEEL GROUP

ITEM	PART NUMBER	QTY.	PART NAME
1	- - - -	4	Tire, Grader Lug Type, 14:00-24, 12 Ply, for 8:00 T Rim (Not furnished,
2	- - - -	4	Tube, Std., for 14:00-24 Tire w/TR-218 Valve obtain locally)
3	20966	4	Wheel Assy.(Three piece) (Each includes one Wheel, 1--5096 and 1--5097)
4	5096	4	Side Ring
5	5097	4	Lock Ring

TRACTOMOTIVE

HYDRAULIC POWER STEERING GROUP

(See Plate 709)

ITEM	PART NUMBER	QTY.	PART NAME
1	21821	1	Steering Gear Assy. (Includes Items #4 thru #9, #14 and #24 thru #43)
2	6591	1	Steering Wheel (Includes Steel Cup)
3	6592	1	Horn Button Assy. (Includes one Ring, four Drive Screw, one Rubber Washer, one Brass Cup, one Insulator Washer and one Spring)
4	6584	1	Nut
5	6583	1	Key
6	6582	1	Spring
7	11659	1	Washer
8	6580	1	Bearing Assy. (Serviced as assembly only)
9	11655	1	Housing Assy., Steering Gear (Includes Items #10 thru #13)
10	----	1	Housing (Not serviced separately)
11	----	1	Jacket, Column (Not serviced separately)
12	11654	1	Bearing
13	6614	2	Bushing
14	11658	1	Shaft Assy., Ball, Nut Contact and Steering (Includes Items #15 thru #21 and #23)
15	6598	4	Guide, Ball Return
16	6599	1	Clamp, Ball Return Guide
17	3933	3	Bolt and Washer Assy.
18	6597	106	Ball
19	----	1	Nut, Ball (Not serviced separately)
20	11657	1	Contact Assy., Horn Cable
21	11656	1	Bearing Ring
22	6590	1	Connector Assy. (Includes Screw and Lockplate) (Serviced as assembly only)
	3850	2	Machine Screw, #10-16 x 1/4", Self Tapping
23	6601	1	Terminal Assy., Horn (Includes one Terminal, one Spring and two Insulating Washers) (Serviced as assembly only)
24	20125	1	Adapter Assy. (Includes 1--6577)
	6577	1	Gasket, End Cover
25	16721	1	Needle Bearing
26	16722	1	Seal Ring
27	6572	4	Capscrew, 7/16" – 14 NC x 1–1/8"
	904207	4	Lockwasher, 7/16" ASA Med.

(Continued)

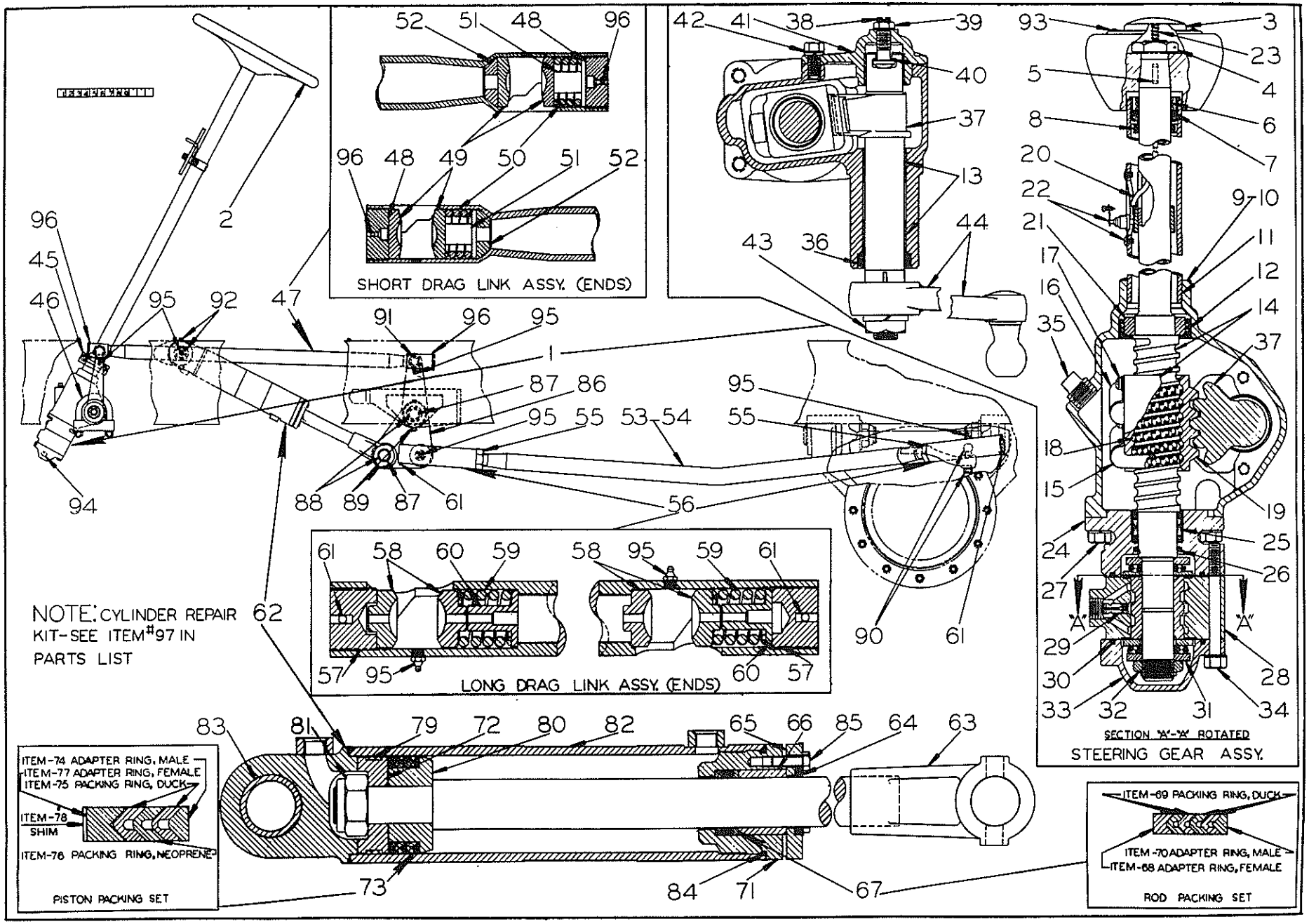


PLATE 709 – HYDRAULIC POWER STEERING GROUP

(See Plate 709)

ITEM	PART NUMBER	QTY.	PART NAME
28	17977	1	Valve Assy. (Includes 5--20583, 10--20582, Item #29, one Housing and one Spool)
	20583	5	Spring
	20582	10	Plunger
29	----	1	Valve Assy., Check (Includes one Ball and one Body) (Not serviced, order 17977)
30	11661	2	Seal
31	11651	2	Bearing Assy.
32	11664	1	Nut
33	20124	1	Cover
34	11663	3	Capscrew, 3/8" – 16 NC x 3--1/2"
	904206	3	Lockwasher, 3/8" ASA Med.
35	905261	1	Pipe Plug, 1/2" Steel, 9/16" Sq. Hd.
36	6585	1	Seal
37	6586	1	Gear
38	3896	1	Adjuster, Lash
39	910876	1	Hex Jam Nut, 7/16" – 20 NF
40	3883	1	Shim (.063" thick)
	3884	1	Shim (.065" thick) Select One
	3885	1	Shim (.067" thick)
	3886	1	Shim (.069" thick)
41	3882	1	Side Cover Assy., Housing (Includes one Bushing)
	3901	1	Gasket, Side Cover
42	2205	3	Capscrew, 3/8" – 16 NC x 3/4"
	904206	3	Lockwasher, 3/8" ASA Med.
43	3904	1	Nut, Pitman Arm
	904369	1	Lockwasher, 3/4" ASA Med.
44	6589	1	Pitman Arm
45	5026	1	"U" Bolt
	904208	2	Lockwasher, 1/2" ASA Med.
	911043	2	Hex Nut, 1/2" – 20 NF
46	5024	1	"U" Bolt
	5017	1	"U" Bolt
	5023	1	Clamp Block

(Continued)

HYDRAULIC POWER STEERING GROUP – CONTINUED

(See Plate 709)

ITEM	PART NUMBER	QTY.	PART NAME
46	904209	2	Lockwasher, 5/8" ASA Med.
	911044	2	Hex Nut, 5/8" – 18 NF
47	10303	1	Drag Link Assy. (Includes Items #48 thru #52)
48	5219	2	Threaded Plug
49	5220	4	Bearing
50	5221	2	Spring
51	17076	2	Spacer
52	5223	2	Seat
53	20520	1	Drag Link Assy. (Includes Items #54 thru #56)
54	20517	1	Bar
55	911207	2	Hex Jam Nut, 1–1/2" – 12 NF
56	20518	1	Socket Assy. (Front) (Each includes ½ qty. of Items #57 thru #61)
	20519	1	Socket Assy. (Rear)
57	21811	2	Threaded Plug
58	21812	4	Bearing
59	21813	2	Spring
60	21814	2	Seat
61	910910	2	Cotter Pin, 7/32" x 3"
62	21509	1	Cylinder Assy. (Includes Items #63 thru #85)
63	21508	1	Piston Rod
64	3658	1	Oil Ring (Wiper)
65	3659	1	End Plate
66	3660	1	Packing Gland Bearing
67	3605	1	Rod Packing Set (Consists of Items #68 thru #70)
68	3608	1	Adapter Ring, Female
69	3607	4	Packing Ring, Duck
70	3606	1	Adapter Ring, Male
71	3661	1	Cylinder Head
72	3672	1	Piston, Upper
73	3673	1	Piston Packing Set (Consists of Items #74 thru #77)
74	3677	1	Adapter Ring, Male
75	3675	2	Packing Ring, Duck

(Continued)

HYDRAULIC POWER STEERING GROUP – CONTINUED

(See Plate 709)

ITEM	PART NUMBER	QTY.	PART NAME
76	3676	1	Packing Ring, Neoprene
77	3674	1	Adapter Ring, Female
78	4313	–	Shim (Use as required)
79	3679	1	Bearing Ring
80	19213	1	Piston, Lower
81	15993	1	Locknut
82	21506	1	Cylinder Tube Assy. (Includes 1--1870)
83	1870	1	Bushing
84	3662	1	Seal Ring
85	3479	3	Capscrew, 5/16" – 24 NF x 1"
	3958	3	Lockwasher (Special)
86	20379	1	Steering Arm Assy. (Includes Item #87)
87	10242	4	Seal (Install seals with lips toward outside)
	10241	3	Bearing (Lettered end must face pressing tool)
88	10489	1	Pin
	10490	1	Pin
89	1621	2	Lock Pin
	900806	2	Cotter Pin, 1/8" x 1"
90	20847	2	Ball Stud
	911116	2	Plain Washer, 7/8" SAE
	914029	2	Hex Nut, 7/8" – 14 NF, Slotted
	900808	2	Cotter Pin, 1/8" x 1–1/2"
91	20848	1	Ball Stud
	911100	1	Plain Washer, 5/8" SAE
	912840	1	Hex Nut, 5/8" – 18 NF, Slotted
	900808	1	Cotter Pin, 1/8" x 1–1/2"
92	21447	1	Pin
	1622	1	Lock Pin
	900806	1	Cotter Pin, 1/8" x 1"
93	912307	4	Machine Screw, #8 x 1/2", Self Tapping
94	12682	2	Bolt, Universal Fitting
95	914465	5	Lubricating Fitting, St., 1/8" – 27 NPT
96	904003	2	Cotter Pin, 1/8" x 2–1/4"
97	13196	1	Cylinder Repair Kit (Includes Items #67, #73, #79, #84 & #85)

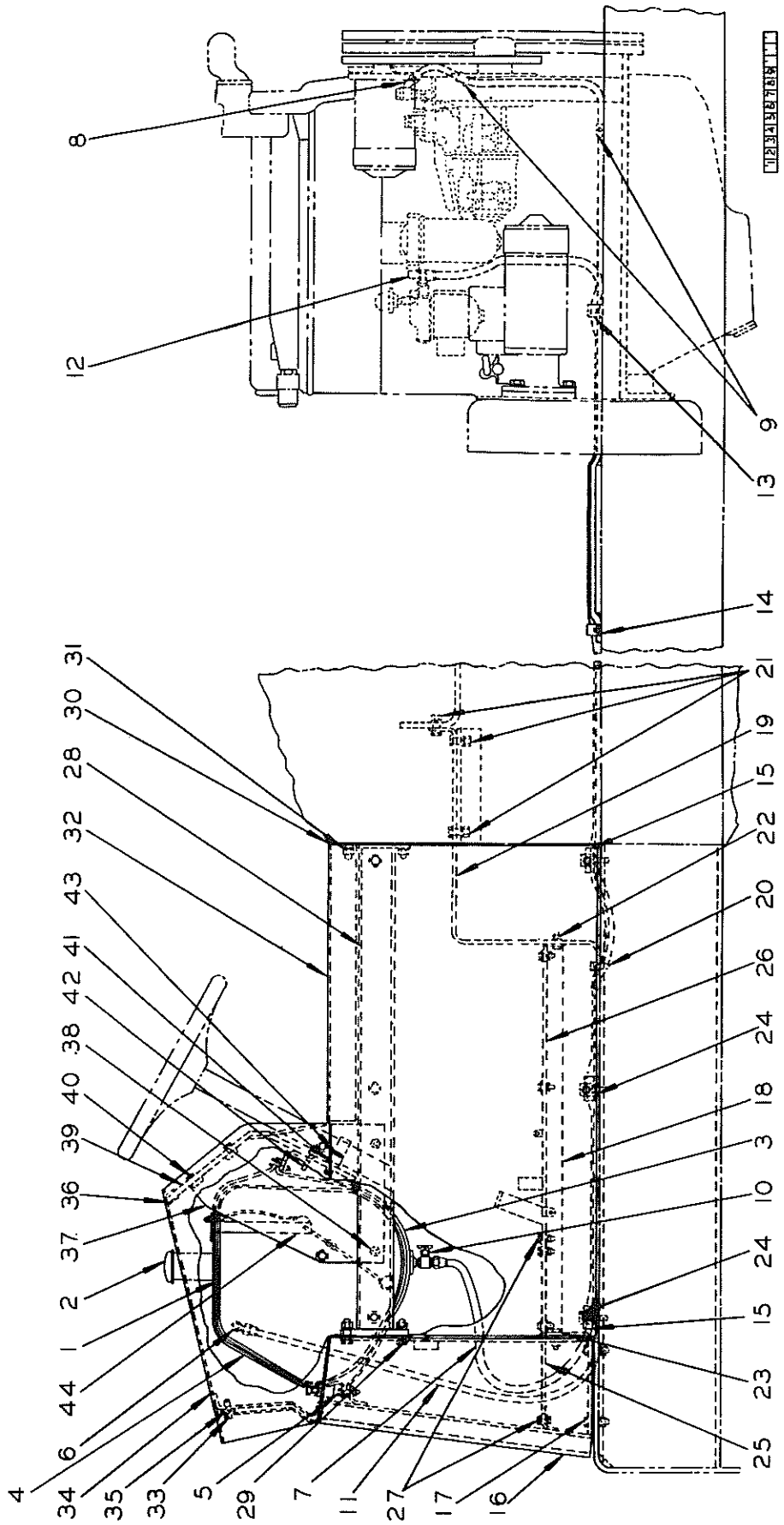


PLATE 711 -- FUEL SYSTEM AND COWL

TRACTOMOTIVE

FUEL SYSTEM AND COWL

(See Plate 711)

ITEM	PART NUMBER	QTY.	PART NAME
1	16425	1	Fuel Tank (Includes Item #2)
2	3530	1	Cap, Fuel Tank
3	13033	2	Strap (Bottom)
	11860	2	Packing Strip
4	13034	2	Strap (Top)
	11860	2	Packing Strip
5	1108	4	Capscrew, 3/8" – 24 NF x 1–1/2"
	904206	4	Lockwasher, 3/8" ASA Med.
	5227	4	Square Washer
	911041	4	Hex Nut, 3/8" – 24 NF
6	910161	1	90° Elbow, 1/4" Flared Tube x 1/8" – 27 NPT
7	21725	1	Hose Assy. (Includes 2--21485 and one Hose)
	21485	2	Swivel Assy.
	21278-173¼	1	Hose (Bare Length) See note - page 157
8	4263	1	45° Elbow
9	14716	2	Clamp (For fastener see Radiator Shell and Engine Group)
10	15750	1	Valve, Shut-off
11	21724	1	Hose Assy. (Return Line) (Includes 2--21269 and one Hose)
	21269	2	Swivel Assy.
	21267-139¾	1	Hose (Bare Length) See note - page 157
12	4267	1	90° Elbow
13	13907	1	Clip
	1230	1	Capscrew, 3/8" – 24 NF x 3/4"
	904206	1	Lockwasher, 3/8" ASA Med.
14	13907	1	Clip (For fastener see Radiator Shell and Hood Group)
15	13907	3	Clip
	1243	6	Capscrew, 3/8" – 24 NF x 1"
	904206	6	Lockwasher, 3/8" ASA Med.
16	20712	1	Cowl, Bottom
17	1239	6	Capscrew, 1/2" – 20 NF x 1–1/2"
	904208	6	Lockwasher, 1/2" ASA Med.
	911043	6	Hex Nut, 1/2" – 20 NF

(Continued)

(See Plate 711)

ITEM	PART NUMBER	QTY.	PART NAME
18	20579	1	Support, Floor Plate, Left
	20580	1	Support, Floor Plate, Right
19	20932	1	Plate Weld Assy.
20	1084	2	Capscrew, 1/2" – 20 NF x 1"
	910244	2	Plain Washer, 1/2" SAE
	904208	2	Lockwasher, 1/2" ASA Med.
21	1239	6	Capscrew, 1/2" – 20 NF x 1–1/2"
	910244	10	Plain Washer, 1/2" SAE
	904208	6	Lockwasher, 1/2" ASA Med.
	911043	6	Hex Nut, 1/2" – 20 NF
22	1243	2	Capscrew, 3/8" – 24 NF x 1"
	904206	2	Lockwasher, 3/8" ASA Med.
	911041	2	Hex Nut, 3/8" – 24 NF
23	2048	2	Capscrew, 3/8" – 24 NF x 1–1/4"
	904206	2	Lockwasher, 3/8" ASA Med.
	911041	2	Hex Nut, 3/8" – 24 NF
24	7178	6	Angle Weld Assy.
25	20792	1	Floor Plate, Front
26	20754	1	Floor Plate, Rear
27	1243	17	Capscrew, 3/8" – 24 NF x 1"
	911115	17	Plain Washer, 3/8" SAE
	904206	17	Lockwasher, 3/8" ASA Med.
	911041	17	Hex Nut, 3/8" – 24 NF
28	20400	2	Channel Weld Assy.
29	1185	4	Capscrew, 1/2" – 20 NF x 1–3/4"
	904208	4	Lockwasher, 1/2" ASA Med.
	911043	4	Hex Nut, 1/2" – 20 NF
30	20476	–	Shim (1/32" thick) (Use as required)
	22139	–	Shim (1/8" thick)
31	1109	4	Capscrew, 1/2" – 24 NF x 2"
	904208	4	Lockwasher, 1/2" ASA Med.
	911043	4	Hex Nut, 1/2" – 20 NF
32	20395	1	Plate, Left

(Continued)

(See Plate 711)

ITEM	PART NUMBER	QTY.	PART NAME
32	20396	1	Plate, Right
33	11457	21	Capscrew, 3/8" – 24 NF x 3/4", Btn. Hd., Skt.
	904206	21	Lockwasher, 3/8" ASA Med.
	911115	21	Plain Washer, 3/8" SAE
34	20696	1	Cowl, Top
35	21448	1	Rubber Strip (Front)
36	21454	1	Rubber Strip (Rear)
37	20589	1	Brace
38	1249	4	Capscrew, 1/2" – 20 NF x 1–1/4"
	904208	4	Lockwasher, 1/2" ASA Med.
	911043	4	Hex Nut, 1/2" – 20 NF
39	20800	1	Instrument Panel
40	1230	4	Capscrew, 3/8" – 24 NF x 3/4"
	904206	4	Lockwasher, 3/8" ASA Med.
41	3878	–	Shim (1/8" thick) (Use as required)
	17781	–	Bar (Use as required)
42	21882	1	Bracket
43	6287	1	Clamp
	1377	2	Capscrew, 3/8" – 24 NF x 1–1/2"
	911115	2	Plain Washer, 3/8" SAE
	904206	2	Lockwasher, 3/8" ASA Med.
	911041	2	Hex Nut, 3/8" – 24 NF
44	20203	1	Fuel Gauge Tank Unit

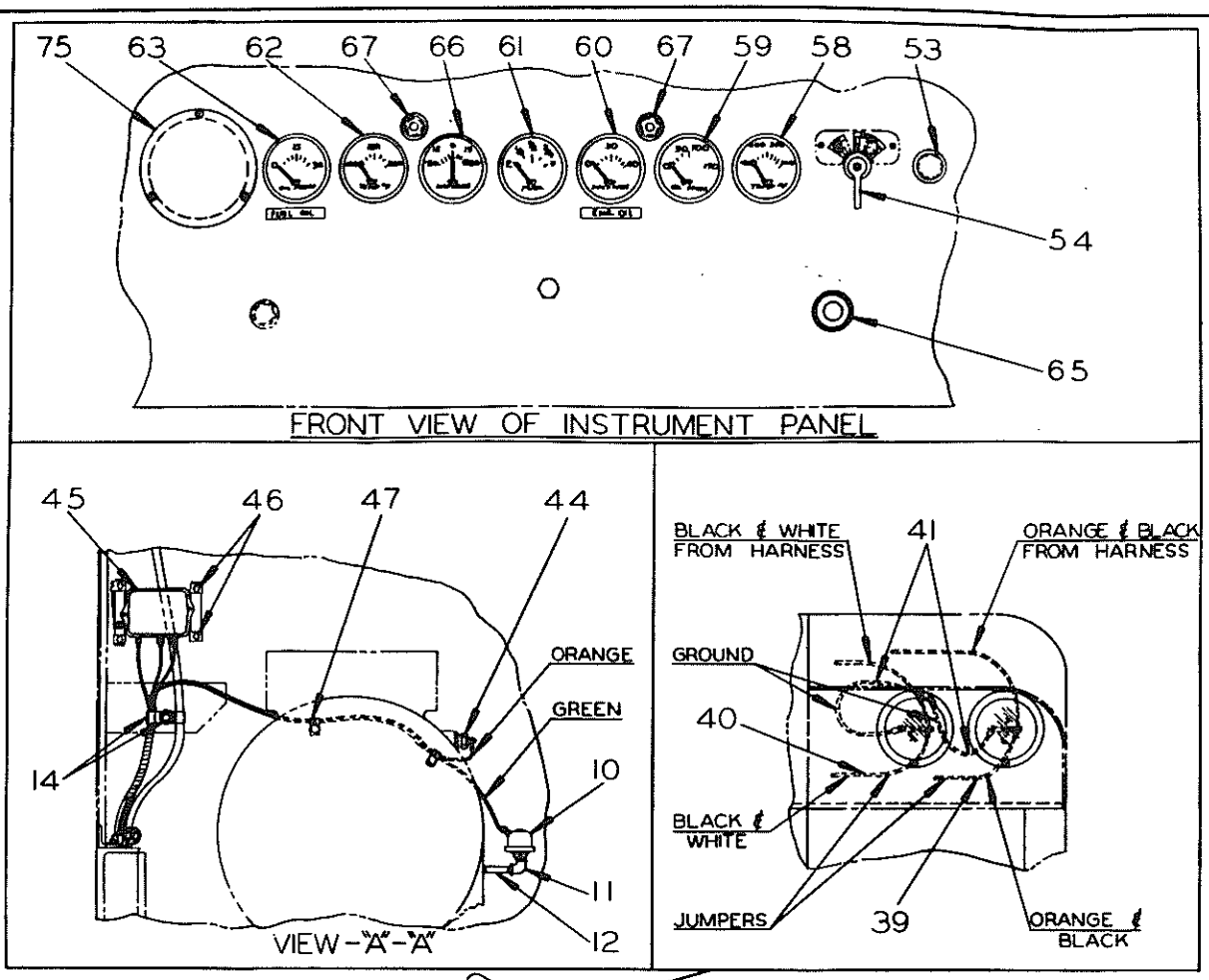
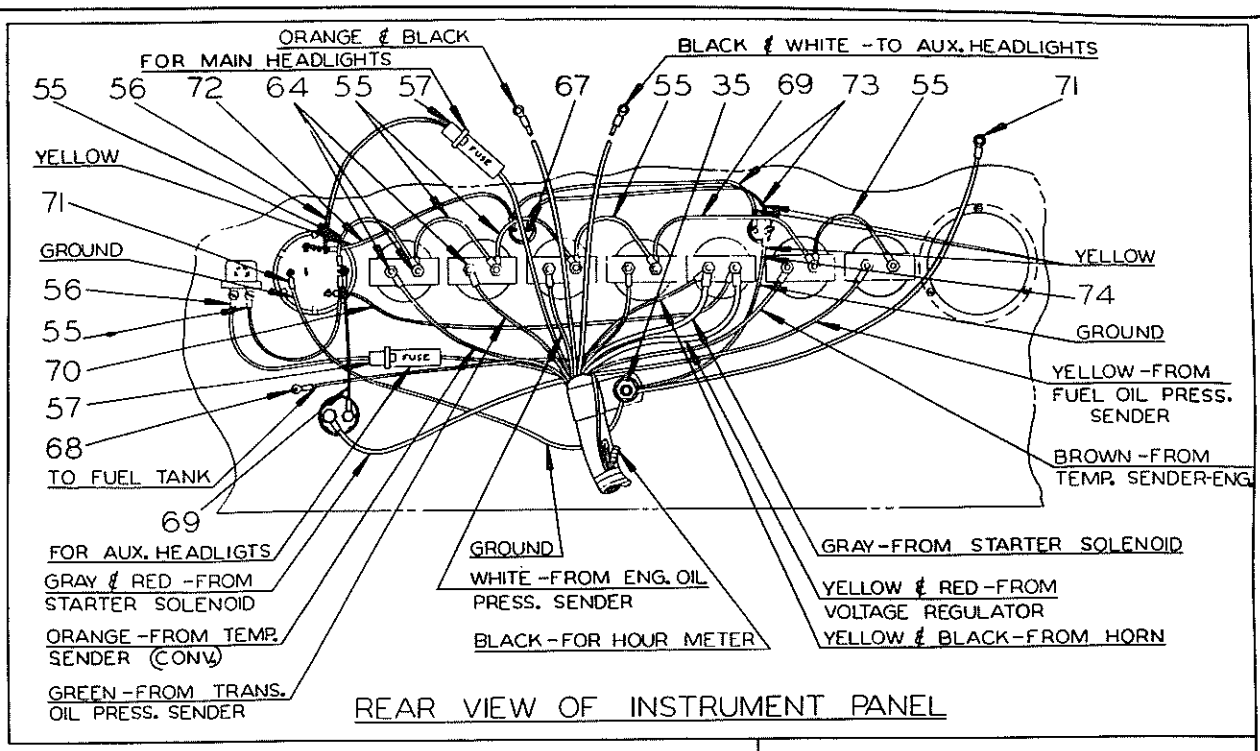
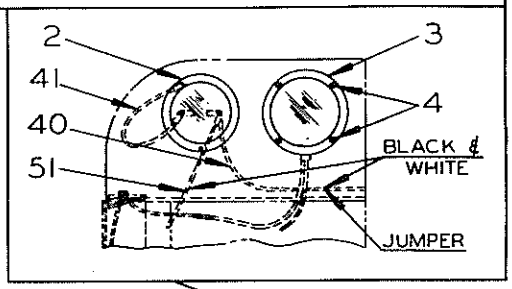


PLATE 704 – ELECTRICAL SYSTEM GROUP





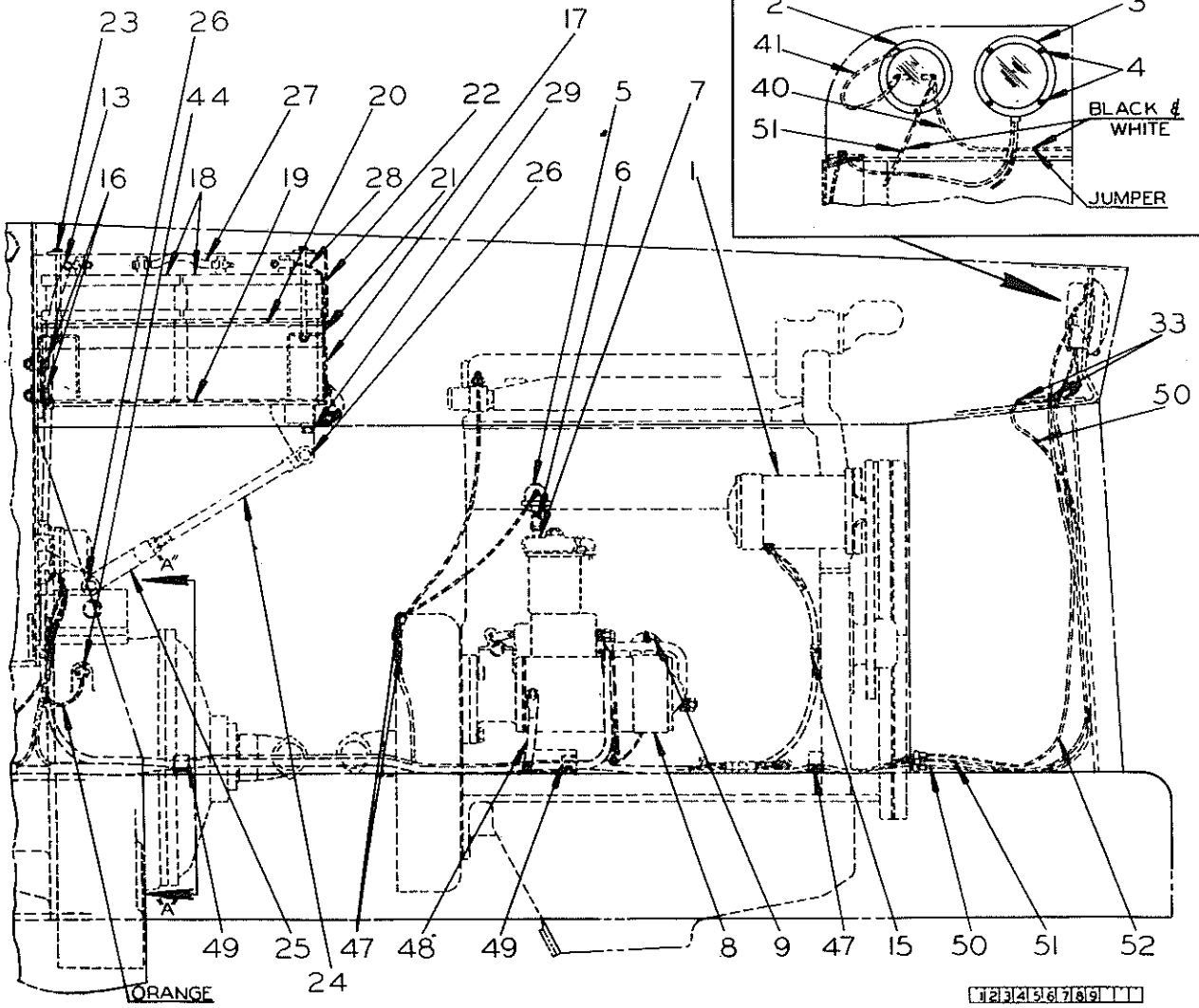


PLATE 704 – ELECTRICAL SYSTEM GROUP

TRACTOMOTIVE

ELECTRICAL SYSTEM GROUP

(See Plate 704)

ITEM	PART NUMBER	QTY.	PART NAME
1	4348613	1	Generator Assy. (See Item #1, page 164)
2	20741	6	Sealed Beam Light Assy. (Auto Lamp Co. #SP-4502) Obtain Locally
	21955	6	Machine Screw, #8-32 NC x 1–1/4" Flat Hd.
3	20670	1	Tail Light Assy. (Auto Lamp Co. #410R2 w/G.E. Bulb #1176) Obtain Locally
4	917441	8	Machine Screw, #8-32 NC x 1/2", Rd. Hd.
	906964	8	Lockwasher, #8 ASA Med.
5	14391	1	Pressure Sender (Fuel Only)
6	907061	1	Reducing Coupling, 1/4" x 1/8" NPT
7	904708	1	Nipple, 1/4" x 1–1/4"
	20793	1	Starting Motor (Order Repair Parts from Delco Remy Division (#1108863)
8	904209	3	Lockwasher, 5/8" ASA Med.
	5812	3	Capscrew, 5/8" – 11 NC x 2–1/4"
9	16961	1	Pressure Sender (Engine Oil)
10	20771	1	Pressure Sender (Transmission Oil)
11	901676	1	90° Elbow, 1/8" NPT
12	901469	1	Nipple, 1/8" x 2"
13	20732	1	Cable
	14716	2	Clamp
14	1230	1	Capscrew, 3/8" – 24 NF x 3/4"
	904206	1	Lockwasher, 3/8" ASA Med.
15	14716	1	Clamp (For fasteners, see Fuel System and Cowl)
	14716	1	Clamp (Upper End of battery cable)
	1239	4	Capscrew, 1/2" – 20 NF x 1–1/2"
16	904208	4	Lockwasher, 1/2" ASA Med.
	910244	4	Plain Washer, 1/2" SAE
	911043	4	Hex Nut, 1/2" – 20 NF
17	21351	1	Battery Support Weld Assy.
18	----	2	Battery, 12 Volt
19	20674	1	Insulator,Battery Bottom
20	20673	2	Insulator,Battery, Left and Right
21	20672	1	Insulator,Battery, Rear
22	20628	1	Cover Assy., Battery (Includes 3--20627)

(Continued)

(See Plate 704)

ITEM	PART NUMBER	QTY.	PART NAME
22	20627	4	Rubber Strip
23	20837	4	Capscrew, 3/8" – 24 NF x 6–1/2"
	911041	4	Hex Nut, 3/8" – 24 NF
24	20745	2	Rod Weld Assy.
	911049	2	Hex Jam Nut, 5/8" – 18 NF
25	12613	2	Adjustable Yoke End
26	12612	4	Pin
	900806	4	Cotter Pin, 1/8" x 1"
27	20733	1	Cable
28	20734	1	Ground Strap
29	1084	1	Capscrew, 1/2" – 20 NF x 1"
	904208	1	Lockwasher, 1/2" ASA Med.
30	20775	1	Horn Assy. (Includes 1-- 21849)
	21849	1	Bracket (Includes one Plate and two Rivets)
31	2324	2	Capscrew, 5/16" – 24 NF x 3/4"
	904205	2	Lockwasher, 5/16" ASA Med.
32	21576	1	Wire Assy. (Includes two Terminals, two Rubber Sleeves and one Restrictor)
33	909363	4	Machine Screw, #4-40 NC x 7/16", Rd. Hd., Self Tapping
34	21558	1	Wire Harness Assy., Complete
35	11632	1	Clamp
	1230	1	Capscrew, 3/8" – 24 NF x 3/4"
	904206	1	Lockwasher, 3/8" ASA Med.
	911041	1	Hex Nut, 3/8" – 24 NF
36	11632	3	Clamp (For fasteners, see Fuel System and Cowl)
37	6479	2	Clamp (Half)
	1230	1	Capscrew, 3/8" – 24 NF x 3/4"
	904206	1	Lockwasher, 3/8" ASA Med.
	911041	1	Hex Nut, 3/8" – 24 NF
38	20740	1	Wire Assy.
39	20739	1	Wire Assy. (Each includes two Terminals and two Rubber Sleeves)
40	20738	2	Wire Assy.
41	6702	6	Wire Assy.

(Continued)

TRACTOMOTIVE

ELECTRICAL SYSTEM GROUP – CONTINUED

(See Plate 704)

ITEM	PART NUMBER	QTY.	PART NAME
42	21322	1	Stop Light Switch
43	20203	1	Fuel Gauge Tank Unit
	20293	1	Gasket
	900558	5	Machine Screw, #10-32 NF x 1/2", Rd. Hd.
	904203	5	Lockwasher, #10 ASA Med.
44	20768	2	Temperature Sender
45	20774	1	Voltage Regulator (Includes Cover and Screws)
46	20794	4	Capscrew, 1/4" – 28 NF x 1–1/4"
	904204	4	Lockwasher, 1/4" ASA Med.
47	2529	5	Clamp
	911115	5	Plain Washer, 3/8" SAE
48	21716	1	Cable
49	13907	2	Clip (For Fasteners see Fuel System and Cowl)
50	21577	1	Wire Assy. (Includes two terminals, two rubber sleeves and one resistor)
51	20735	1	Wire Assy. (Includes two terminals and two rubber sleeves)
52	20737	1	Wire Assy.
53	6704	1	Light Switch
	6703	1	Knob
	906960	1	Lockwasher, 3/8" Internal Tooth
	911048	1	Hex Jam Nut, 3/8" – 24 NF
54	20773	1	Combination Switch Assy. (Includes parts as listed in Item #54)
	917441	2	Machine Screw, #8-32 NC x 1/2", Rd. Hd.
	906964	2	Lockwasher, #8 ASA Med.
55	6622	6	Wire Assy. (Each includes two terminals and two rubber sleeves)
56	6682	2	Wire Assy. (Each includes one terminal, one rubber sleeve and one male tine connector)
57	6480	2	Fuse
58	20767	1	Temperature Gauge Assy. (Converter Oil)
59	20770	1	Pressure Gauge Assy. (Transmission Oil)
60	20765	1	Pressure Gauge Assy. (Engine Oil)
61	20763	1	Fuel Gauge Assy.
62	20759	1	Temperature Gauge Assy. (Water)
63	20757	1	Pressure Gauge Assy. (Fuel Oil)

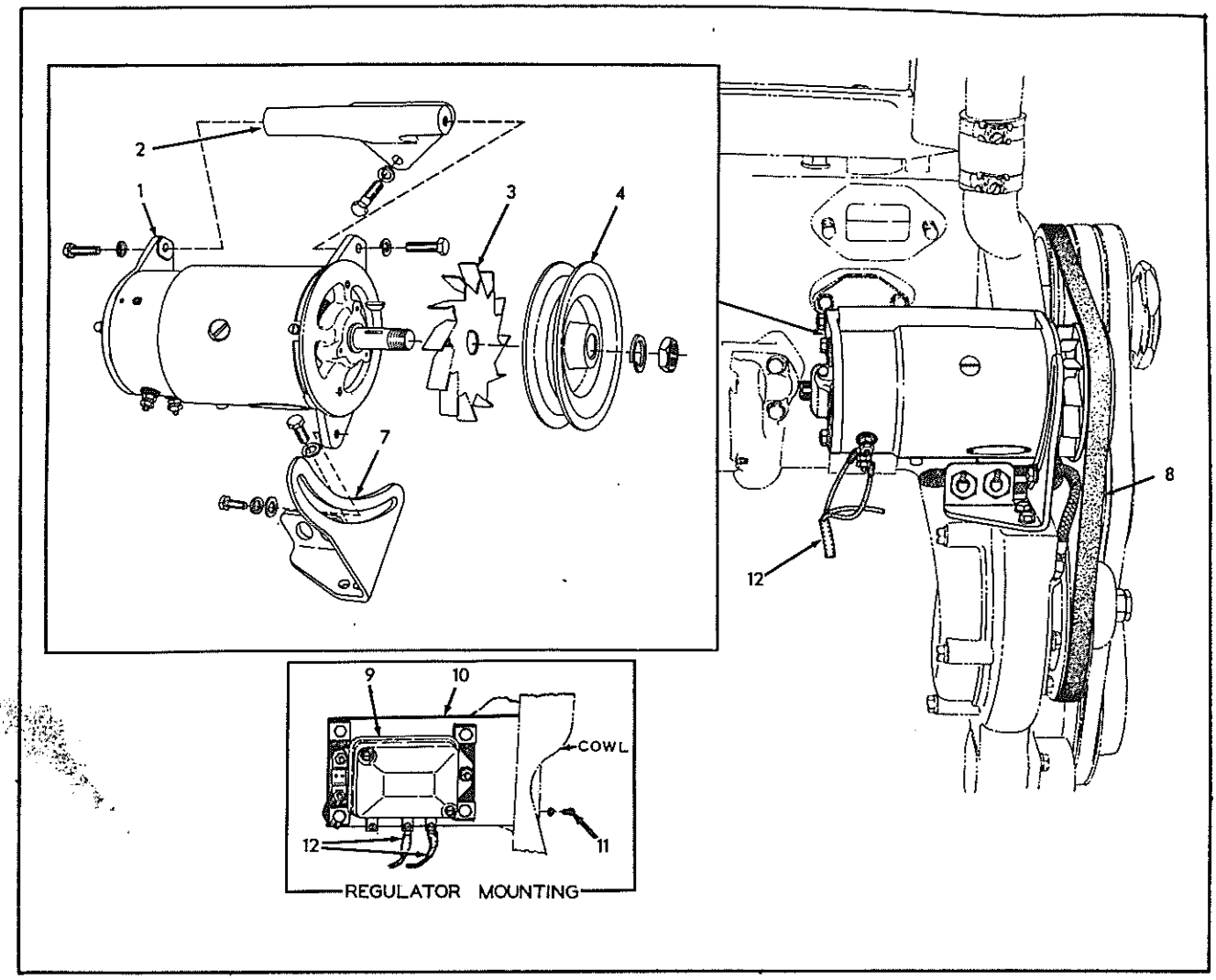
For Fasteners see Transmission Assy., Engine, and Fuel System and Cowl

(Each includes 1--17048, 2--904203, 2--917415, 1--17049, 2--906964 and 2--917385)

(Continued)

(See Plate 704)

ITEM	PART NUMBER	QTY.	PART NAME
64	17048	6	Mounting Strap
	904203	12	Lockwasher, #10 ASA Med.
	917415	12	Hex Nut, #10-32 NF
	17049	6	Terminal Separator
	906964	12	Lockwasher, #8 ASA Med.
	917385	12	Hex Nut, #8-32 NC
65	4909	1	Starter Switch
66	20761	1	Ammeter Assy. (Includes parts and listed in Item #66)
	17047	1	Mounting Strap
	904203	4	Lockwasher, #10 ASA Med.
	917415	4	Hex Nut, #10-32 NF
67	21334	2	Panel Light Assy. (Includes one G.E. bulb #313)
	912303	4	Lockwasher, #4 ASA Med.
68	12909	1	Wire Assy.
69	20798	2	Wire Assy.
70	20799	1	Wire Assy.
71	3079	2	Wire Assy. (Each includes two terminals and two rubber sleeves)
72	21331	1	Wire Assy.
73	21332	2	Wire Assy.
74	21333	1	Wire Assy.
75	7945	1	Cover
	903752	3	Machine Screw, #6-32 NC x 1/2", Rd. Hd.
	906963	3	Lockwasher, #6 ASA Med.
	901309	3	Hex Nut, #6-32 NC



GENERATOR

ITEM	PART NUMBER	QTY.	PART NAME
	4348613	1	Generator (10 amp.) (Includes Key, Nut and Washer for pulley) (Delco-Remy #1103014. Order repair parts from local United Motors Service dealer)
1	905662	2	Capscrew, 5/16" NC x 1–1/8"
	904205	2	Lockwasher, 5/16" ASA Med.
	4348609	1	Bracket, generator mounting
2	903632	3	Capscrew, 3/8" NC x 1–1/2"
	904206	3	Lockwasher, 3/8" ASA Med.
3	4502638	1	Fan, generator cooling
4	4348619	1	Pulley
	4335182	1	Link, belt adjustment (also serves as support for water pump and fan belt tightener lubricating hoses)
7	903771	2	Capscrew, 5/16" NC x 7/8"
	915809	1	Capscrew, 5/16" NC x 3/4"

GENERATOR – CONTINUED

ITEM	PART NUMBER	QTY.	PART NAME
	904205	3	Lockwasher, 5/16" ASA Med.
	901165	1	Plain Washer, 5/16" U.S. std.
8	4348408	1	Belt, generator and water pump
	090048	1	Regulator, voltage and current (Delco-Remy #1119164. Order repair parts from local United Motors Service dealer)
9	912178	4	Capscrew, 1/4" NF x 1–1/2"
	904204	4	Lockwasher, 1/4" ASA Med.
	911040	4	Hex Nut, 1/4" NF
10	091779	1	Bracket, regulator mounting
	036032	2	Capscrew, 3/8" NF x 3/4"
11	904206	2	Lockwasher, 3/8" ASA Med.
	911041	2	Hex Nut, 3/8" NF
12	- - - -	1	Harness, generator to regulator (See Electrical System Group)

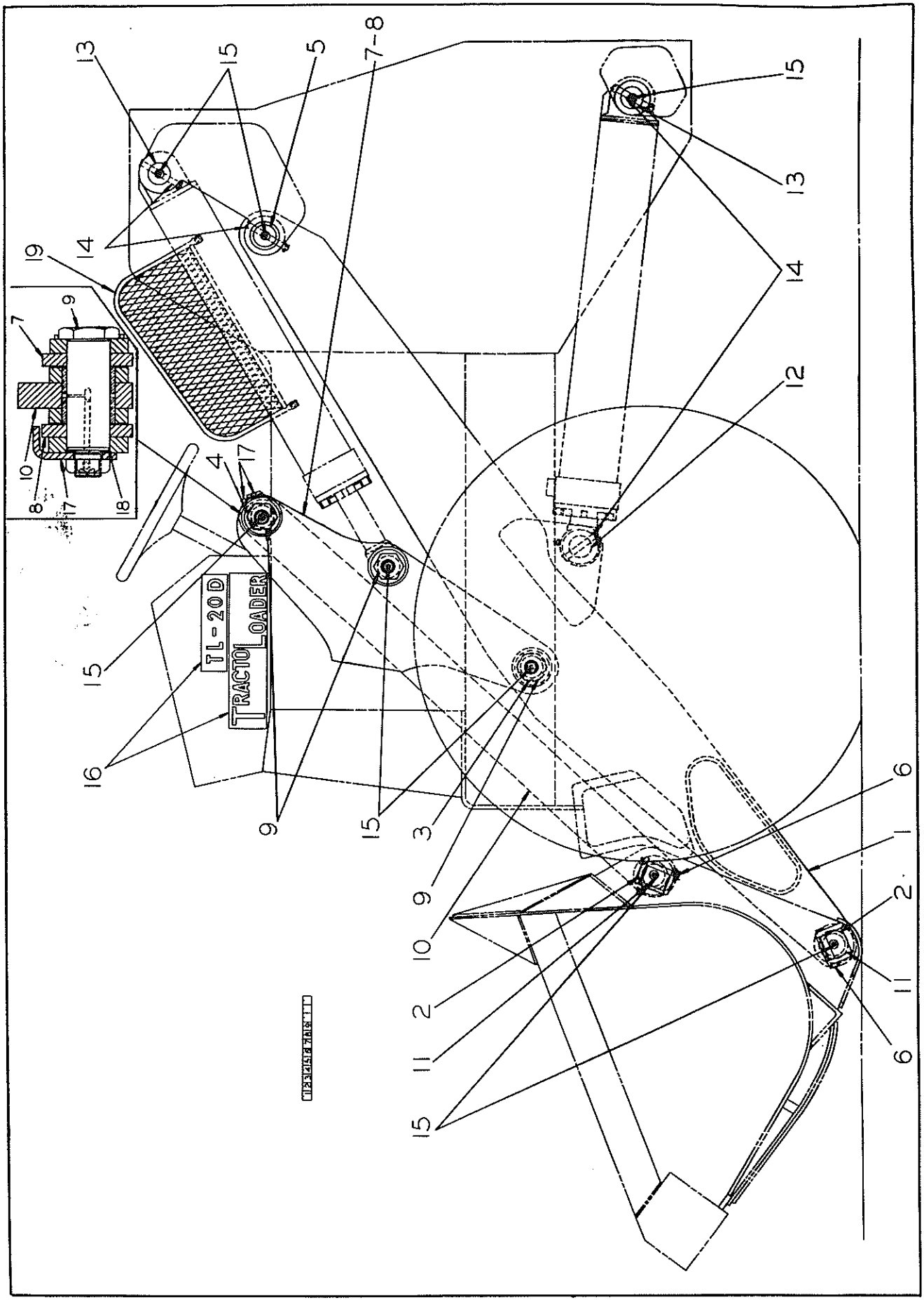


PLATE 688 – LINKAGE GROUP

TRACTOMOTIVE

LINKAGE GROUP

(See Plate 688)

ITEM	PART NUMBER	QTY.	PART NAME	
1	20684	1	Boom Assy. (Includes 4--1066, 2--20677 and 1--20678)	
2	1066	8	Bushing	
3	20677	2	Bushing	
4	20678	4	Bushing	
5	20685	2	Pin	
6	13568	4	Lock Pin	
	911440	4	Cotter Pin, 3/16" x 1–1/8"	
7	20701	1	Cross Link, inside, left	(Prior TL-20D #122, order also Items #17 and #18)
	20702	1	Cross Link, inside, right	
8	20699	1	Cross Link, outside, left	
	20700	1	Cross Link, outside, right	
9	20175	6	Pin	
	1559	4	Washer (Special) (Two each at Dump Cylinder and Boom)	
	5706	6	Locknut, 1–1/2" – 12 NF	
10	20168	2	Dump Link Assy. (Each includes 2--1066 and 1--20678)	
11	20172	4	Pin	
12	20178	2	Pin	
13	20179	4	Pin	
14	11625	8	Lock Pin	
	911440	8	Cotter Pin, 3/16" x 1–1/8"	
15	914465	16	Lubricating Fitting, St., 1/8" – 27 NPT	
16	22318	1	Name Plate and Decal Kit (Consists of parts as listed in Item #16)	
	2940	2	Decal (Powered by A-C)	
	21837	1	Transmission Instruction Plate	
	10080	2	Name Plate (Tracto-Loader)	
	10079	2	Name Plate (Tractomotive)	
	14221	1	Switch Diagram Plate	
	19806	2	Name Plate (TL-20D)	
17	21953	2	Indicator (Bucket level)	
18	21340	–	Washer (Use as required)	
19	21719	1	Guard Assy.	
	1230	2	Capscrew, 3/8" – 24 NF x 3/4"	
	904206	2	Lockwasher, 3/8" ASA Med.	

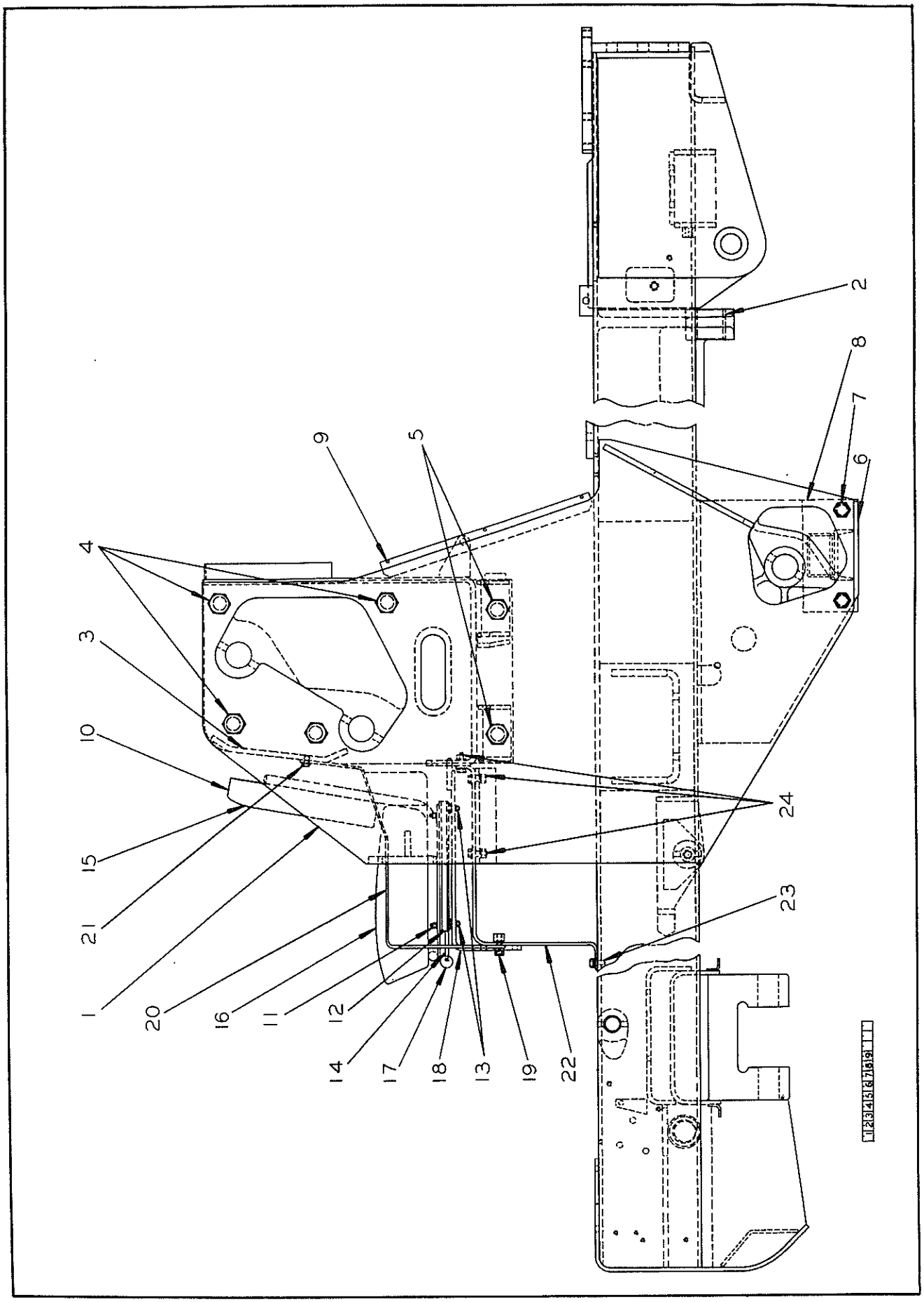


PLATE 705 – FRAME, STABILIZER AND SEAT GROUP

TRACTOMOTIVE

FRAME, STABILIZER AND SEAT GROUP

(See Plate 705)

ITEM	PART NUMBER	QTY.	PART NAME
1	20573	1	Frame Weld Assy. (Includes 2--22231)
2	22231	2	Bushing
3	20661	1	Stabilizer Weld Assy. (Top)
4	20502	8	Bolt, 1–1/4" – 12 NF x 3"
	13494	8	Locknut, 1–1/4" – 12 NF
5	20778	4	Bolt, 1–1/4" – 12 NF x 3–1/4"
	13494	4	Locknut, 1–1/4" – 12 NF
6	20602	1	Stabilizer Weld Assy. (Bottom)
7	6267	4	Capscrew, 1" – 14 NF x 3–1/4"
	910916	4	Lockwasher, 1" ASA Med.
	911047	4	Hex Nut, 1" – 14 NF
8	20603	–	Shim (Use as required)
9	21584	6	Grommet, Bumper Type
10	20812	1	Seat Assy. (Includes Items #11 thru #17)
11	904205	4	Lockwasher, 5/16" ASA Med.
	913636	4	Hex Nut, 5/16" – 24 NF
12	21815	1	Track Assy., Left
	21816	1	Track Assy., Right
13	3479	4	Capscrew, 5/16" – 24 NF x 1"
	910335	4	Plain Washer, 5/16" SAE
	904205	4	Lockwasher, 5/16" ASA Med.
	913636	4	Hex Nut, 5/16" – 24 NF
14	21817	1	Spring
	21818	1	Lever Weld Assy.
15	21819	1	Back Cushion
16	21820	1	Seat Cushion
17	8130	1	Knob
18	20939	1	Plate Weld Assy.
19	1249	2	Capscrew, 1/2" – 20 NF x 1–1/4"
	904208	2	Lockwasher, 1/2" ASA Med.
20	20974	1	Plate Weld Assy., Left
	20975	1	Plate Weld Assy., Right

(Continued)

FRAME, STABILIZER AND SEAT GROUP – CONTINUED

(See Plate 705)

ITEM	PART NUMBER	QTY.	PART NAME
21	1230	8	Capscrew, 3/8" – 24 NF x 3/4"
	904206	8	Lockwasher, 3/8" ASA Med.
22	20932	1	Plate Weld Assy.
23	1084	2	Capscrew, 1/2" – 20 NF x 1"
	904208	2	Lockwasher, 1/2" ASA Med.
	910244	2	Plain Washer, 1/2" SAE
24	1239	6	Capscrew, 1/2" – 20 NF x 1–1/2"
	910244	10	Plain Washer, 1/2" SAE
	904208	6	Lockwasher, 1/2" ASA Med.
	911043	6	Hex Nut, 1/2" – 20 NF

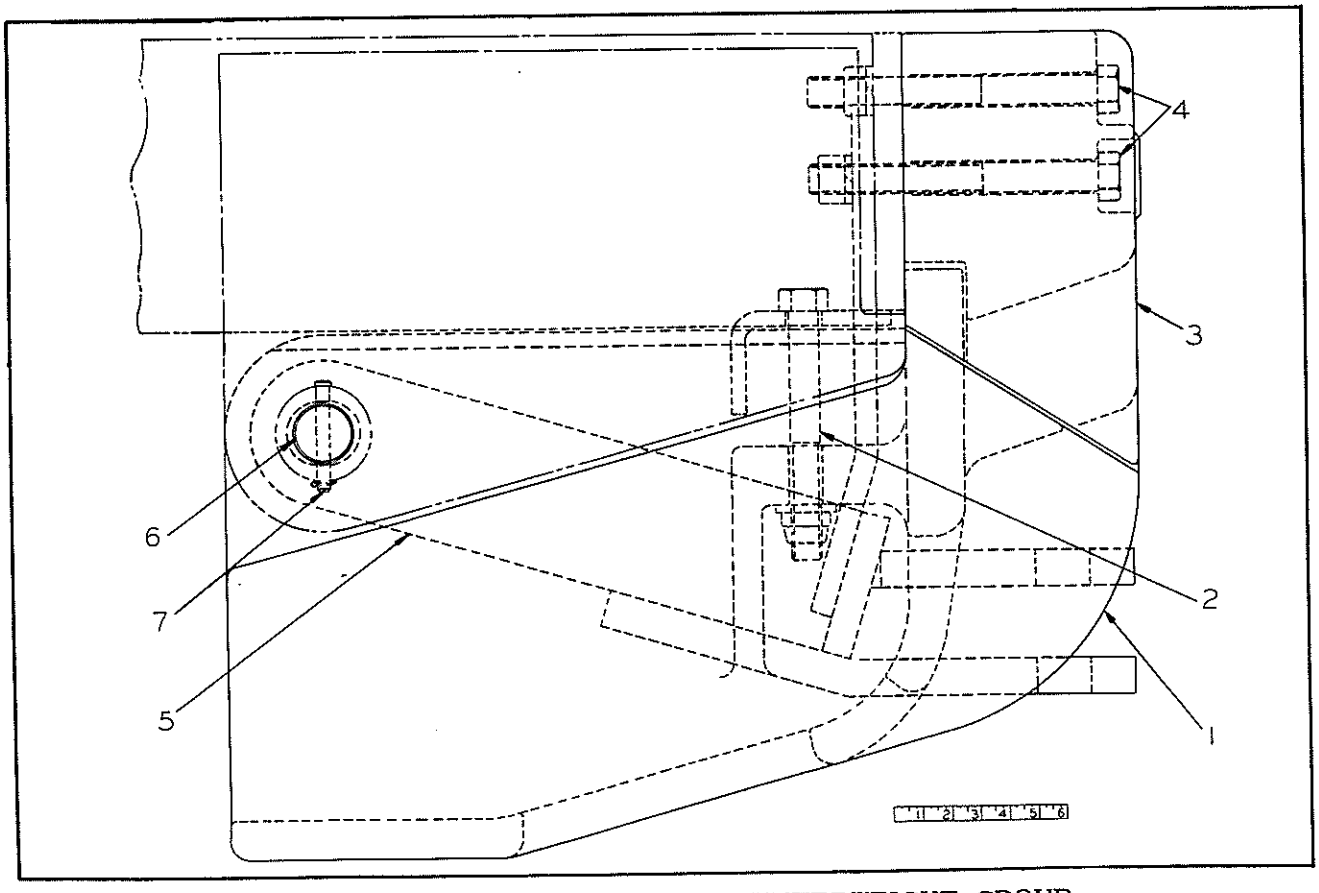


PLATE 701 – DRAWBAR AND COUNTERWEIGHT GROUP

TRACTOMOTIVE

DRAWBAR AND COUNTERWEIGHT GROUP

(See Plate 701)

ITEM	PART NUMBER	QTY.	PART NAME
1	20711	1	Lower Casting
2	20822	2	Capscrew, 1" – 14 NF x 8–1/2"
	2532	2	Washer
	16353	2	Stop Nut
3	20710	1	Upper Casting
4	20821	4	Capscrew, 1" – 14 NF x 10"
	910916	4	Lockwasher, 1" ASA Med.
	911047	4	Hex Nut, 1" – 14 NF
5	20483	1	Drawbar
6	20851	2	Pin
7	1622	2	Lock Pin
	900806	2	Cotter Pin, 1/8" x 1"

RADIATOR SHELL AND HOOD GROUP

(See Plate 706)

ITEM	PART NUMBER	QTY.	PART NAME
1	20820	1	Radiator Guard
2	20803	2	Rod (Threaded both ends)
	911049	6	Hex Jam Nut, 5/8" – 18 NF
3	12613	2	Yoke End, Adjustable
	12612	2	Pin
	900806	2	Cotter Pin, 1/8" x 1"
4	21612	1	Baffle Weld Assy.

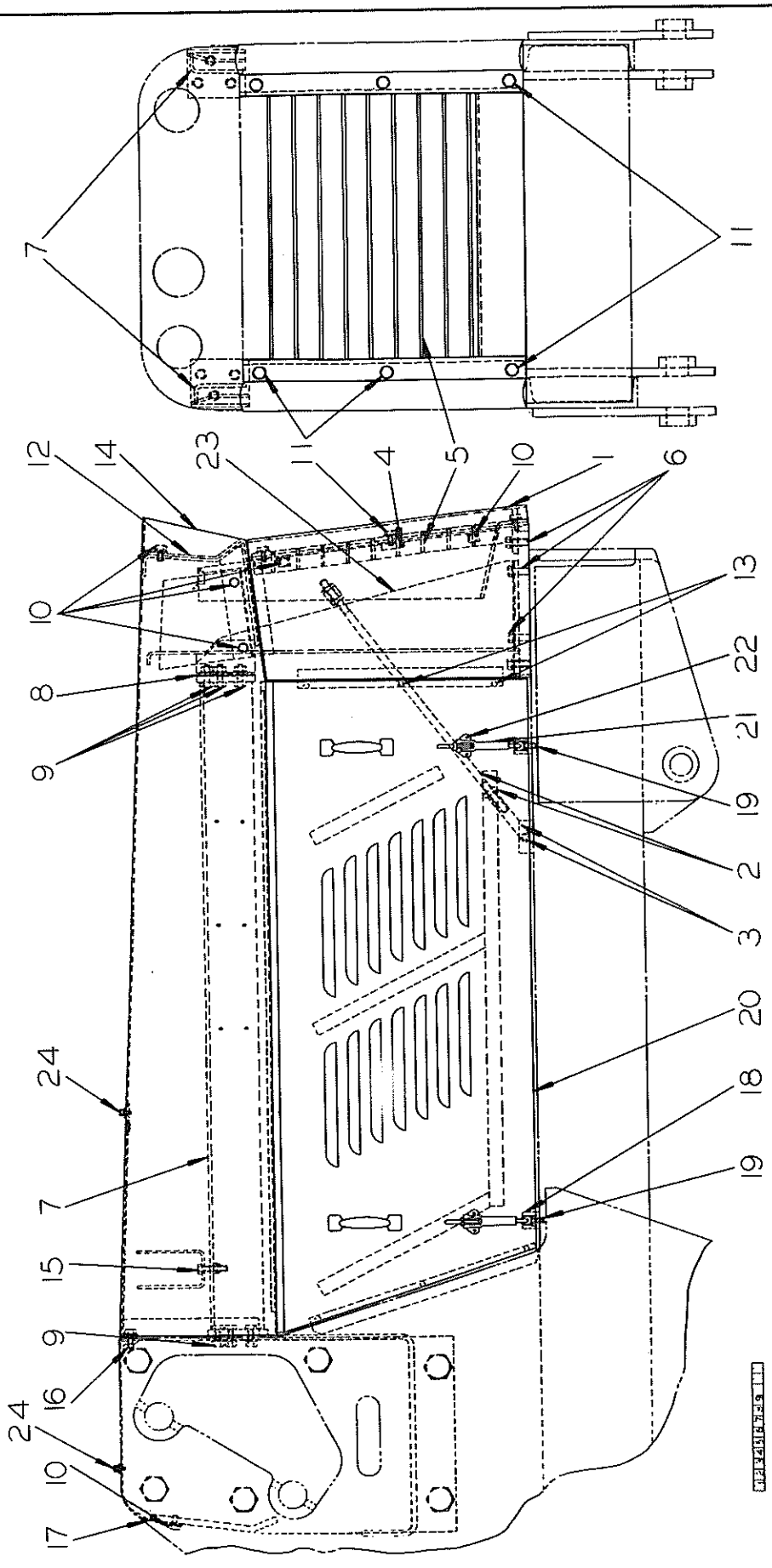


PLATE 706 – RADIATOR SHELL AND HOOD GROUP

RADIATOR SHELL AND HOOD GROUP – CONTINUED

(See Plate 706)

ITEM	PART NUMBER	QTY.	PART NAME
5	20871	1	Grill
6	2056	8	Capscrew, 5/8" – 18 NF x 1–1/2"
	904209	8	Lockwasher, 5/8" ASA Med.
7	20571	1	Brace, Left
	20572	1	Brace, Right
8	20801	–	Shim (Use as required)
9	1239	12	Capscrew, 1/2" – 20 NF x 1–3/4"
	904208	12	Lockwasher, 1/2" ASA Med.
	911043	12	Hex Nut, 1/2" – 20 NF
10	1230	12	Capscrew, 3/8" – 24 NF x 3/4"
	904206	12	Lockwasher, 3/8" ASA Med.
	911115	12	Plain Washer, 3/8" SAE
11	1234	6	Capscrew, 3/8" – 24 NF x 1"
	904206	6	Lockwasher, 3/8" ASA Med.
	911115	6	Plain Washer, 3/8" SAE
12	21613	1	Rubber Strip
13	21584	6	Grommet, Bumper Type
14	22140	1	Hood
15	1089	2	Capscrew, 3/8" – 24 NF x 2"
	7009	2	Locknut, 3/8" – 24 NF
16	2048	2	Capscrew, 3/8" – 24 NF x 1–1/4"
	904206	2	Lockwasher, 3/8" ASA Med.
	911115	2	Plain Washer, 3/8" SAE
17	22146	1	Cover Plate
18	21383	4	Angle
19	1230	4	Capscrew, 3/8" – 24 NF x 3/4"
	904206	4	Lockwasher, 3/8" ASA Med.
20	20503	1	Side Panel Assy., Left (Each includes 2--10478 & 6--900764)
	20504	1	Side Panel Assy., Right
21	10478	4	Fastener
22	900764	12	Rivet
23	20351	1	Shroud Weld Assy.
24	2862	4	Capscrew, 3/8" – 24 NF x 1/2"
	904206	4	Lockwasher, 3/8" ASA Med.
	911115	4	Plain Washer, 3/8" SAE

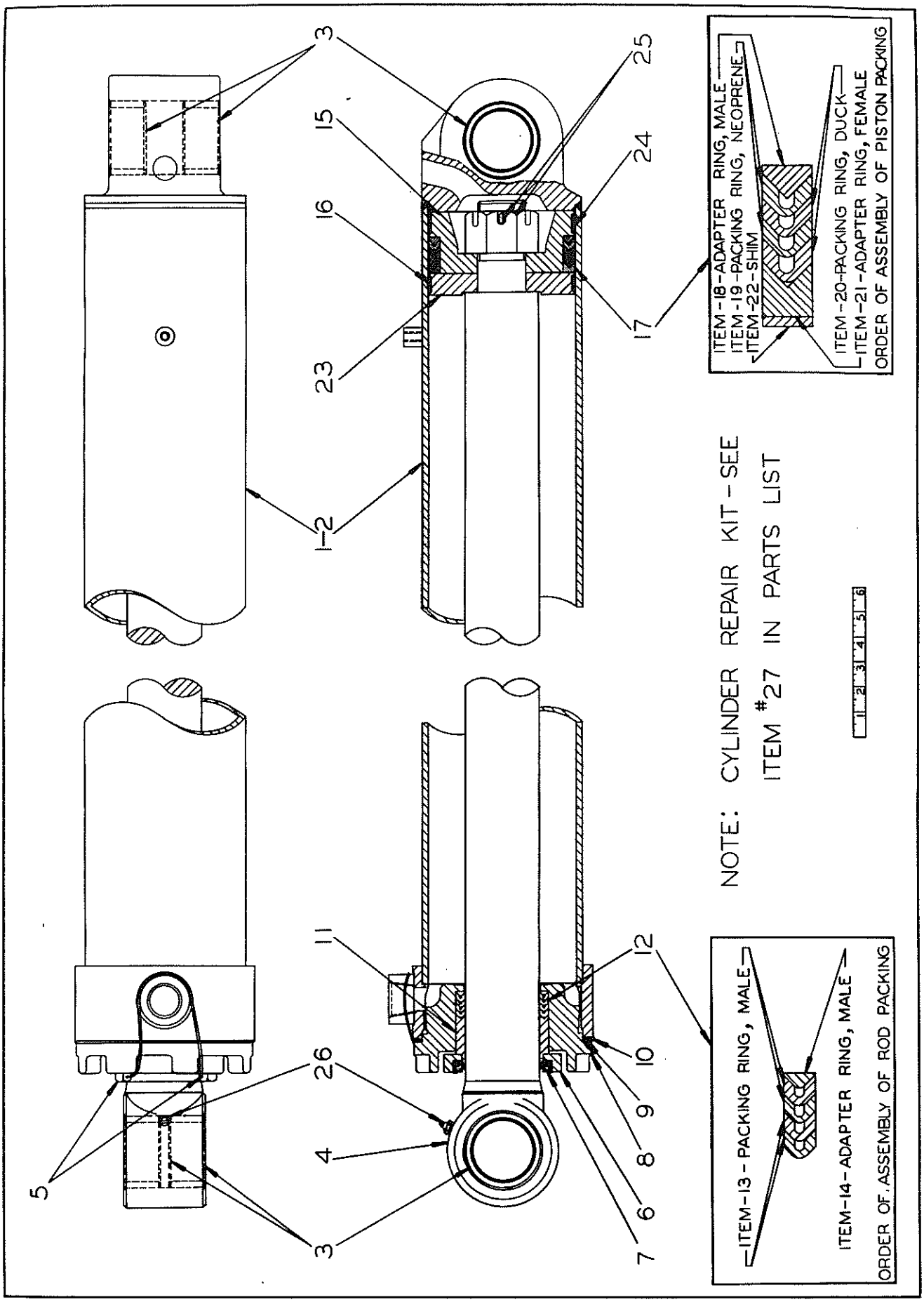


PLATE 689 - LIFT CYLINDER ASSEMBLY

TRACTOMOTIVE

LIFT CYLINDER ASSEMBLY

(See Plate 689)

ITEM	PART NUMBER	QTY.	PART NAME
1	19972	2	Lift Cylinder Assy. (Each includes ½ qty. of Items #2 thru #26)
2	19757	2	Tube Assy., Cylinder (Each includes 2--1119)
3	1119	8	Bushing
4	19969	2	Piston Rod Assy., Lift (Each includes 2--1119)
5	1090	8	Capscrew, 1/2" – 13 NC x 1–3/4", Dr. Hd.
	1085	4	Lockwire, #16 W and M Ga. x 17" Long
6	19937	2	End Plate
7	8139	2	Oil Seal
8	19970	2	Cylinder Head
9	19967	2	Back-Up Ring
10	10292	2	Seal Ring (For service, order both Back-up Ring and Seal Ring)
11	19891	2	Bearing Packing Gland
12	21362	2	Rod Packing Set (Each includes 4--8146 and 1--8147)
13	8146	8	Packing Ring, Male
14	8147	2	Adapter Ring, Male
15	7995	2	Piston (Lower)
16	1850	2	Bearing Ring , Upper Piston
17	4549	2	Piston Packing Set (Each includes 1--1846, 2--1847, 2--1848 and 1--1849)
18	1846	2	Adapter Ring, Male
19	1847	4	Packing Ring, Neoprene
20	1848	4	Packing Ring, Duck
21	1849	2	Adapter Ring, Female
22	7809	–	Shim (Use as required)
23	7996	2	Piston (Upper)
24	4878	2	Bearing Ring, Lower Piston
25	8830	2	Hex Nut, 2" – 12 NF, Slotted
	904015	2	Cotter Pin, 3/8" x 3–1/2"
26	914465	2	Lubricating Fitting, St., 1/8" – 27 NPT
27	21367	–	Cylinder Repair Kit (Includes one each Items #7, #9 thru #12, #16, #17, #23 and 2--1085, 4--1090 and 1--904015)

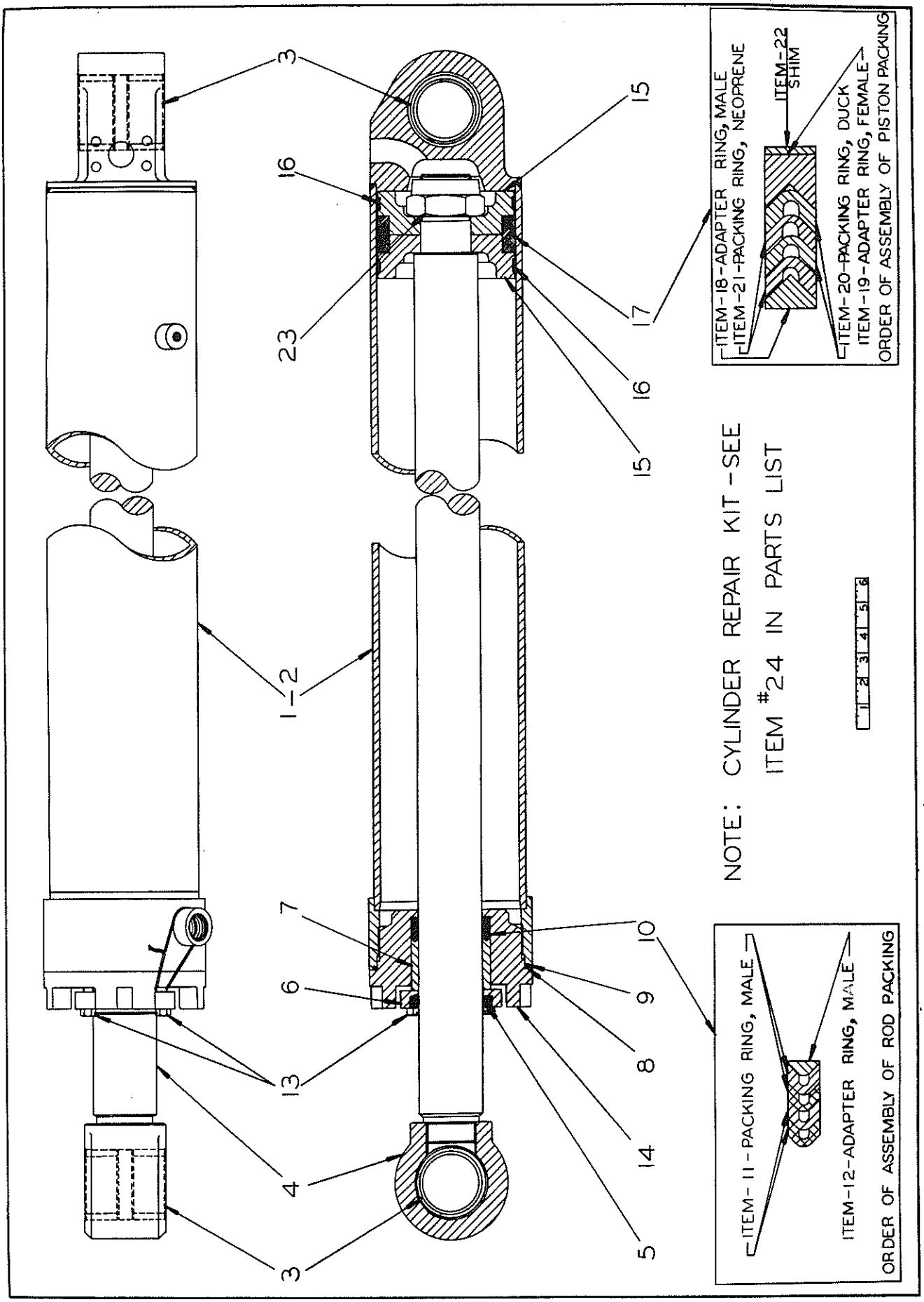


PLATE 690 - DUMP CYLINDER ASSEMBLY - LEFT AND RIGHT

TRACTOMOTIVE

DUMP CYLINDER ASSEMBLY – LEFT AND RIGHT

(See Plate 690)

ITEM	PART NUMBER	QTY.	PART NAME
1	20717	1	Dump Cylinder Assy., Left (Includes ½ qty. of Items #2 thru #22)
	20718	1	Dump Cylinder Assy., Right (Includes ½ qty. of Items #2 thru #22)
2	20715	1	Cylinder Tube Assy., Left (Includes 2--1119)
	20716	1	Cylinder Tube Assy., Right (Includes 2--1119)
3	1119	8	Bushing
4	20132	2	Piston Rod
5	1538	2	Oil Seal (Wiper)
6	16405	2	End Plate
7	16601	2	Packing Gland Bearing
8	16189	2	Back-Up Ring (For service, order both Back-up Ring and Seal Ring)
9	16188	2	Seal Ring
10	21365	2	Rod Packing Set (Each consists of 4--1534 and 1--1532)
11	1534	8	Packing Ring, Male
12	1532	2	Adapter Ring, Male
13	7904	8	Capscrew, 3/8" – 16 NC x 1–1/2", Dr. Hd.
	1085	4	Lockwire, #16 W and M Ga. x 17" Long
14	16272	2	Cylinder Head
15	19973	4	Piston (Upper and Lower)
16	1482	4	Bearing Ring (Upper and Lower)
17	1476	2	Piston Packing Set (Each consists of 1--1459, 1--1458, 2--1466 and 2--1302)
18	1459	2	Adapter Ring, Male
19	1458	2	Adapter Ring, Female
20	1466	4	Packing Ring, Duck
21	1302	4	Packing Ring, Neoprene
22	3160	–	Shim (Use as required)
23	17556	2	Locknut (Special)
24	21366	–	Cylinder Repair Kit (Includes one each Items #5, #7, #9, #19, #17, 2--1482 4--7904 and 2--1085)

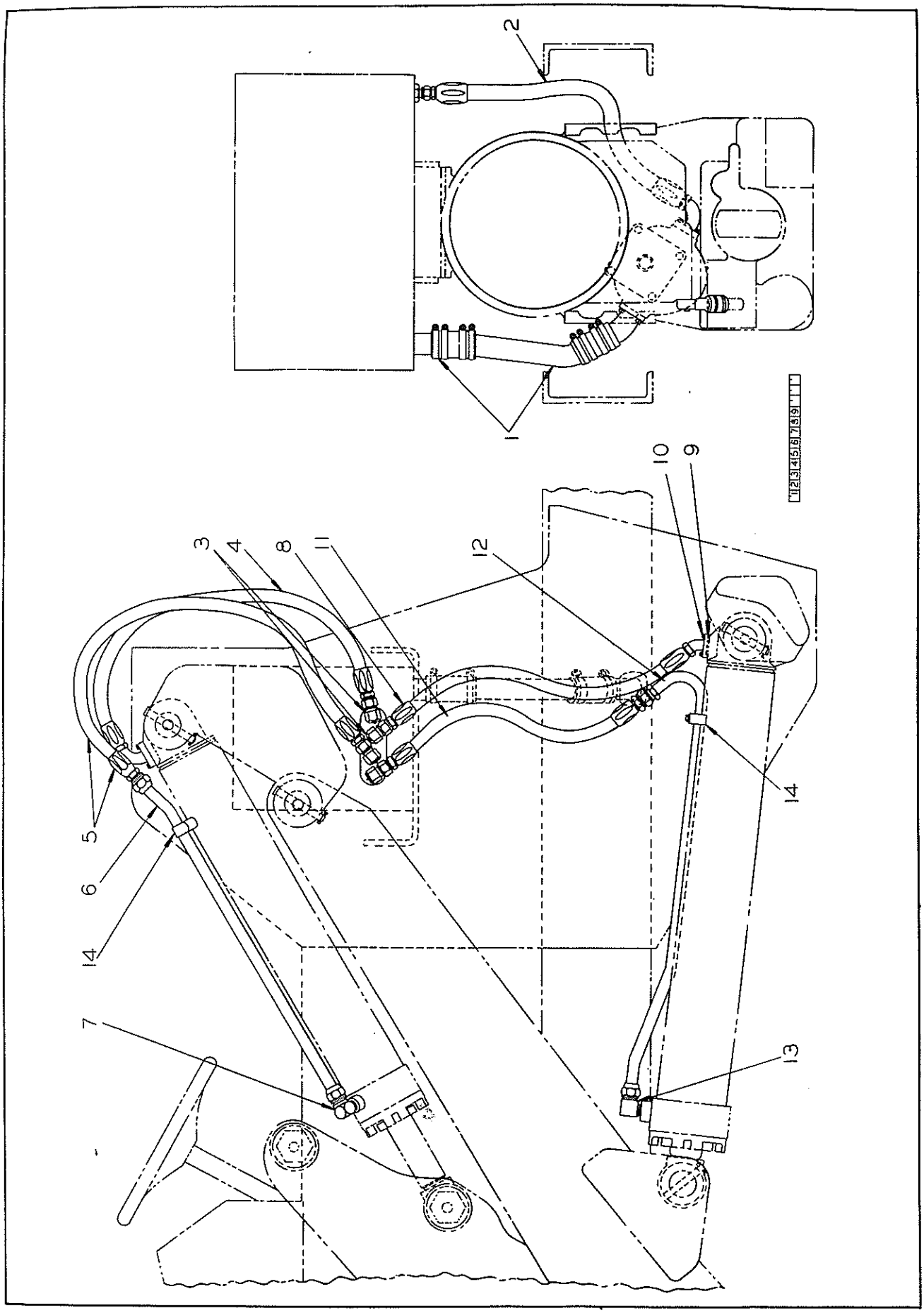


PLATE 730 – HYDRAULIC PIPING GROUP

TRACTOMOTIVE

HYDRAULIC PIPING GROUP

(See Plate 730)

ITEM	PART NUMBER	QTY.	PART NAME
		1	Suction Line (Includes parts as listed in Item #1)
	20804	1	Tube
1	11534	1	Gasket
	11412	1	Adapter Pump End
	1249	4	Capscrew, 1/2" – 20 NF x 1–1/4"
	904208	4	Lockwasher, 1/2" ASA Med.
	20955	2	Hose, 2" I.D. x 5" long
	9300	8	Hose Clamp
		1	Pressure Line (Includes parts as listed in Item #2)
	20727	1	Hose Assy. (Includes 1--10176, one Hose and 1--11219)
	10176	1	Swivel Nut Sub-Assy.
	1582-25	1	Hose (Bare Length) See Note - page 180
2	11219	1	Hose Fitting Assy.
	2227	2	Seal Ring
	13123	2	Flange Clamp Pump End
	2236	4	Capscrew, 7/16" – 20 NF x 1–1/4"
	904207	4	Lockwasher, 7/16" ASA Med.
3	21607	8	Swivel Elbow Assy. (Serviced as assembly only)
	21371	2	Hose Assy., Dump (Each includes 1--4194, one Hose and 1--11842)
	4194	2	Swivel Nut Sub-Assy.
4	4187-40	2	Hose (Bare Length) See Note - page 180
	11842	2	Hose Fitting Assy.
	21369	2	Hose Assy., Return (Each includes 2--11597, one Hose and 2--4194)
	11597	2	Swivel Nut Sub-Assy.
5	4187-29½	2	Hose (Bare Length) See Note - page 180
	4194	2	Swivel Nut Sub-Assy.
6	20790	2	Tube Assy., Dump Cylinder
7	4638	2	90° Elbow
	21370	2	Hose Assy., Lift (Each includes 1--21341, one Hose and 1--4194)
	21341	2	Hose Fitting Assy.
8	4187-33	2	Hose (Bare Length) See Note - page 180
	4194	2	Swivel Nut Sub-Assy. (Continued)

HYDRAULIC PIPING GROUP – CONTINUED

(See Plate 730)

ITEM	PART NUMBER	QTY.	PART NAME
9	3909	4	Seal Ring
10	13481	8	Flange Clamp (Half)
	2048	16	Capscrew, 3/8" – 24 NF x 1–1/4"
	904206	16	Lockwasher, 3/8" ASA Med.
11	21368	2	Hose Assy., Return (Each includes 1--4194, one Hose and 1--12436)
	4194	2	Swivel Nut Sub-Assy.
	4187-36¾	2	Hose (Bare Length) See Note
	12436	2	Male Flare Sub-Assy.
12	20139	1	Tube Assy., Left
	20140	1	Tube Assy., Right
13	17944	2	90° Elbow
14	1131	4	Clamp
	1230	4	Capscrew, 3/8" – 24 NF x 3/4"
	904206	4	Lockwasher, 3/8" ASA Med.
15	4187	–	Hose, 3/4" x 25 Foot Roll (For Service Stock)
	1582	–	Hose, 1" x 25 Foot Roll

NOTE: The factory will furnish 25 foot rolls of hose only. The dealer will furnish hose cut to proper length or in 25 foot rolls.

TRACTOMOTIVE

HYDRAULIC TANK GROUP

(See Plate 703)

ITEM	PART NUMBER	QTY.	PART NAME	
	20484	1	Tank and Valve Assy., Complete (Includes 1--21647, 7--3909 and Items #6 thru #10)	
1	21647	1	Tank Assy., Complete, less Control Valve (Includes 1--20459 and Items #2 thru #4, 11--3909 and #11 thru #56)	
	20459	1	Bare Tank, less all covers and gaskets (For fasteners, see Piping Group)	
2	16093	3	Plug	
	16070	1	Bulkhead Union	
3	2227	1	Seal Ring	
	16394	1	Hex Nut (Special)	
	16100	1	Valve Mounting and Manifold Plate	
	16281	1	Gasket	
4	904206	12	Lockwasher, 3/8" ASA Med.	
	13072	12	Hex Nut, 3/8" – 16 NC (Brass)	
	19683	12	or Hex Nut, 3/8" – 16 NC (Aluminum)	
5	3909	18	Seal Ring (Used with Control Valve and Item #37)	
6	16812	4	Seal Ring	
7	1620	1	Seal Ring	
8	16391	1	Control Valve Assy. (See Item #1, page 187)	
9	16466	5	Capscrew, 1/2" – 20 NF x 4–1/4"	
	904208	5	Lockwasher, 1/2" ASA Med.	
10	10847	2	Capscrew, 1/2" – 20 NF x 5"	
	904208	2	Lockwasher, 1/2" ASA Med.	
11	20506	1	Valve Assy., Safety (Bucket Return Line) (Adjust to 2000 psi)	(Each includes
12	20506	1	Valve Assy., Safety (Bucket Dump Line) (Adjust to 1350 psi)	one Items #14
13	20506	1	Valve Assy., Safety (Power Steering) (Adjust to 975-25 psi)	thru #18)
14	19598	3	Body	
15	19977	3	Plunger Assy. (Includes one Ball) (Serviced as assembly only)	
16	16277	3	Spring	
17	20521	3	Hex Jam Nut (Special)	
18	16278	3	Cap	
19	907856	1	Pipe Plug, 3/8" Steel, Ctsk., 5/16" Hex	
20	20438	1	Tube Assy. (Pressure Line)	
21	16347	1	Connector	

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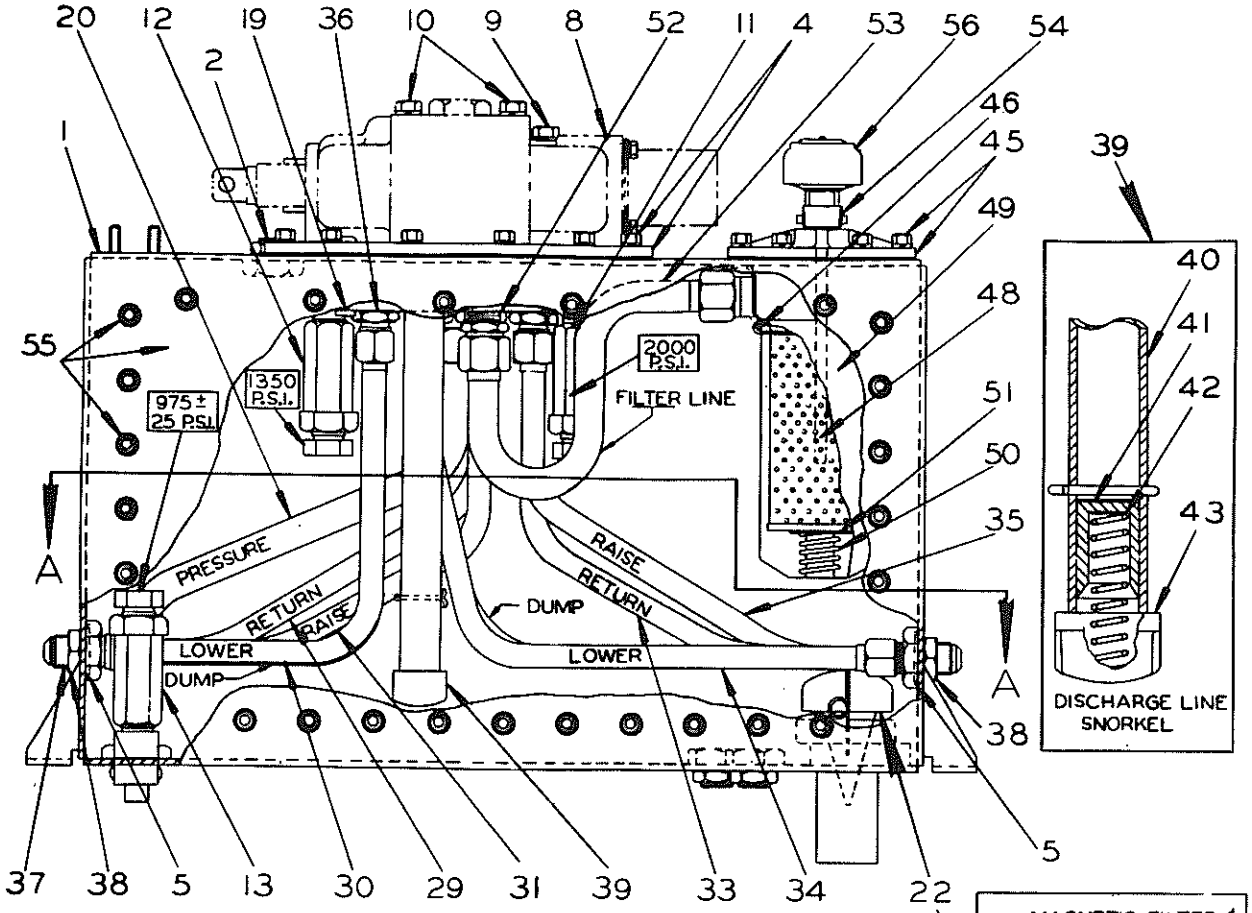
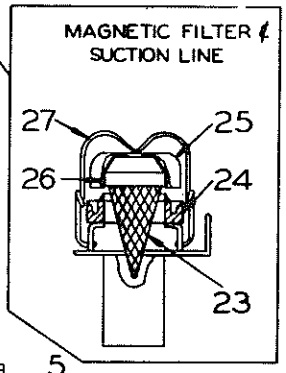
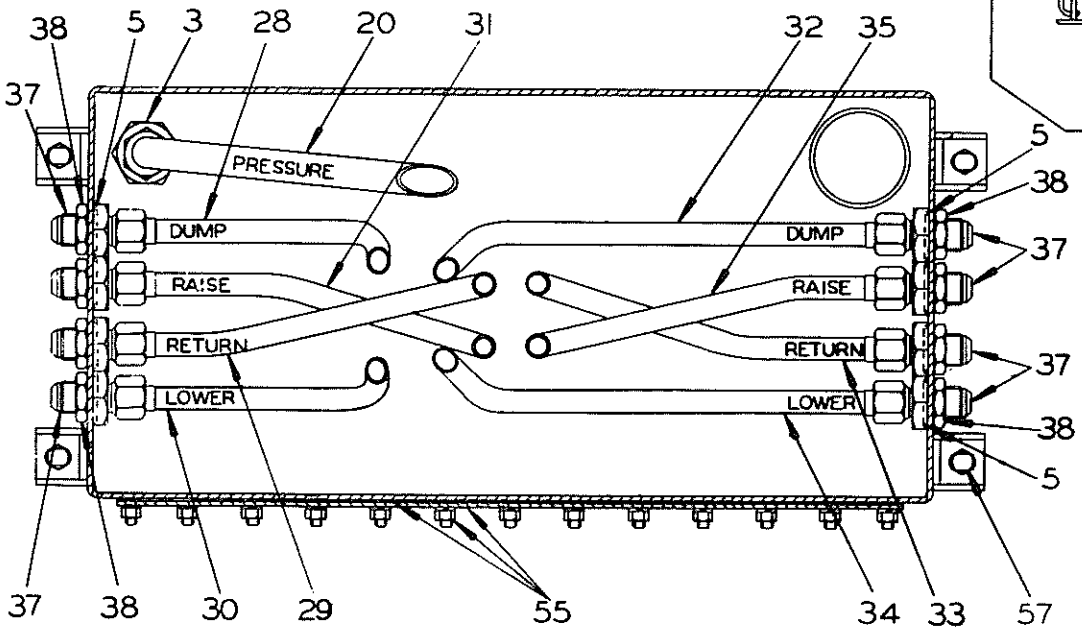
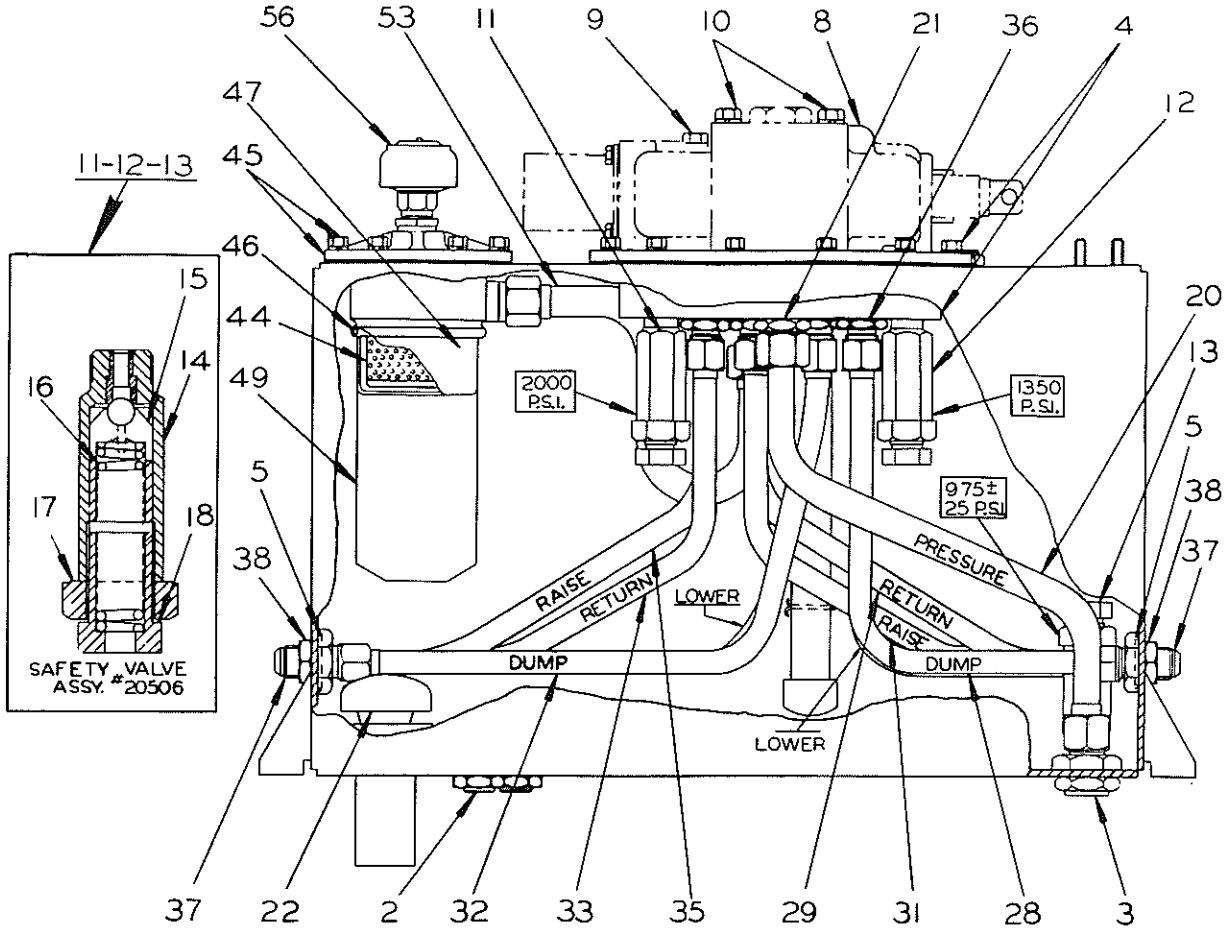


FRONT VIEW

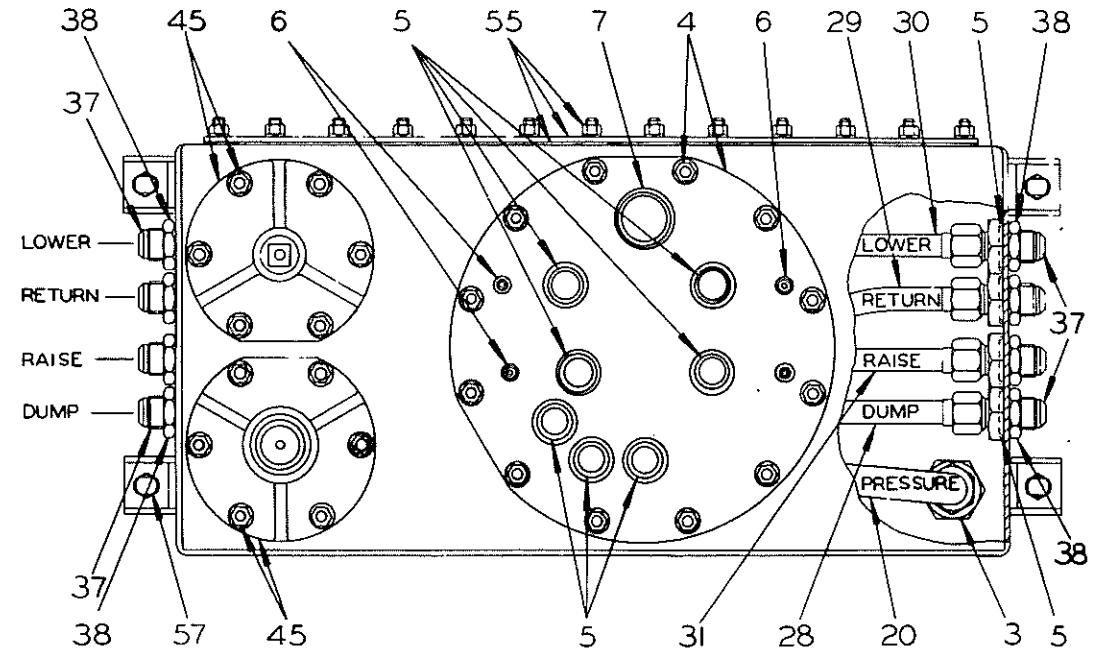




SECTION A—A



REAR VIEW



TOP VIEW MINUS VALVE

TRACTOMOTIVE

HYDRAULIC TANK GROUP – CONTINUED

(See Plate 703)

ITEM	PART NUMBER	QTY.	PART NAME
22	- - - -	1	Magnetic Filter and Suction Line (Includes Items #23 thru #27)
23	10653	1	Strainer
24	13850	1	Magnet
25	13852	1	Baffle
26	13847	1	Baffle Support
27	13848	1	Bail
28	20448	1	Tube Assy., Dump
29	20433	1	Tube Assy., Return (R.H. Cylinder)
30	20447	1	Tube Assy., Lower (R.H. Cylinder)
31	20426	1	Tube Assy., Raise (R.H. Cylinder)
32	20444	1	Tube Assy., Dump
33	20426	1	Tube Assy., Return (L.H. Cylinder)
34	20443	1	Tube Assy., Lower (L.H. Cylinder)
35	20433	1	Tube Assy., Raise (L.H. Cylinder)
36	16322	8	Connector
37	16069	8	Bulkhead Union
38	16404	11	Hex Nut (Special)
39	- - - -	1	Discharge Line (Snorkel) (Includes Items #40 thru #43)
40	16395	1	Discharge Pipe
	904002	1	Cotter Pin, 1/8" x 2"
41	16398	1	Plunger
42	20394	1	Spring
43	16396	1	Cap
44	19695	1	Element Kit (Includes one Air Breather Element, 2--16282, one Filter Element, and one Tank Breather Element)
	- - - -	1	Element, Air Breather (Order Kit 19695)
45	16078	2	Cover
	16282	2	Gasket
	904206	12	Lockwasher, 3/8" ASA Med.
	13072	12	Hex Nut, 3/8" – 16 NC (Brass) or
	19683	12	Hex Nut, 3/8" – 16 NC (Aluminum)
46	16392	2	Seal Ring
47	16080	1	Breather Case

(Continued)

(See Plate 703)

ITEM	PART NUMBER	QTY.	PART NAME
48	- - - -	1	Element, Oil Filter (Order Kit 19695)
49	16079	1	Filter Case
50	16399	1	Spring
51	16403	1	Washer
52	3627	1	Adapter, 1" JIC
53	20442	1	Tube Assy., Filter
54	16703	1	Dip Stick Weld Assy.
	20457	1	Gasket
	20458	1	Cover Plate
55	904206	31	Lockwasher, 3/8" ASA Med.
	13072	31	Hex Nut, 3/8" – 16 NC (Brass)
	19683	31	Hex Nut, 3/8" – 16 NC (Aluminum) or
	2766	1	Breather Assy. (Includes 1--2767, 1--2768, one Breather Element, 1--914172 and
	2767	1	Base 1--904203)
	2768	1	Cap
56	- - - -	1	Breather Element (Order Kit 19695)
	914172	1	Machine Screw, #10-32 NF x 1–1/4"
	904203	1	Lockwasher, #10 ASA Med.
	901829	1	Bushing, 1" x 3/4"
	1239	4	Capscrew, 1/2" – 20 NF x 1–1/2"
57	11243	4	Washer
	904208	4	Lockwasher, 1/2" ASA Med.
	911043	4	Hex Nut, 1/2" – 20 NF

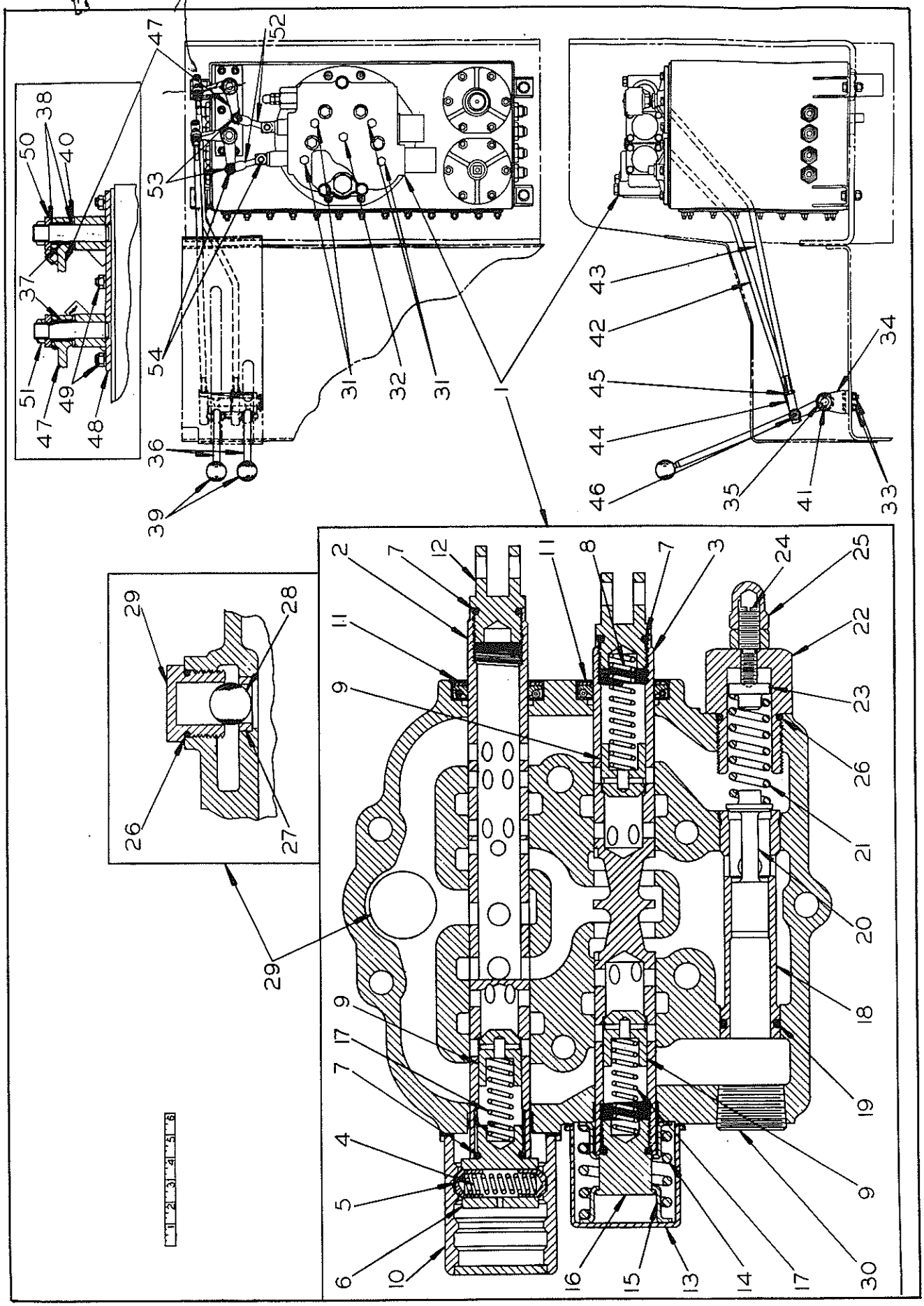


PLATE 700 – CONTROL GROUP

TRACTOMOTIVE

CONTROL GROUP

(See Plate 700)

ITEM	PART NUMBER	QTY.	PART NAME
1	16391	1	Valve Assy., (Includes one Housing and Items #2 thru #32) 7302G347
	- - - -	1	Housing (Not serviced separately) → 7303B119
2	- - - -	1	Plunger, Float (Not serviced separately) OK
3	- - - -	1	Plunger, Double Acting
4	16928	1	Spring
5	16927	2	Detent Poppet Plunger
6	16932	1	Cap (Detent Poppet)
7	2633	4	Seal Ring
8	10857	1	Spring
9	1717	3	Check Valve Plunger
10	16911	1	Detent Cap
	16912	1	Gasket
	6301	4	Capscrew, 5/16" – 18 NC x 3/4"
	904205	4	Lockwasher, 5/16" ASA Med.
11	1719	2	Seal
12	1721	2	Plunger Eye
13	16923	1	Spring Cover
	16912	1	Gasket
	6301	4	Capscrew, 5/16" – 18 NC x 3/4"
	904205	4	Lockwasher, 5/16" ASA Med.
14	16924	1	Spring
15	16925	2	Spring Retainer
16	16926	1	Cap
17	1716	2	Spring
18	16920	1	Relief Valve Seat
19	16921	1	Seal Ring
20	3914	1	Relief Valve Plunger
21	4724	1	Spring
22	16919	1	Cap
23	3912	1	Spring Guide
24	16918	1	Adjusting Screw
25	911043	1	Hex Nut, 1/2" – 20 NF
	3911	1	Acorn Nut
26	3909	2	Seal Ring

(Continued)

TRACTOMOTIVE

CONTROL GROUP – CONTINUED

(See Plate 700)

ITEM	PART NUMBER	QTY.	PART NAME
27	16929	1	Plunger Seat
28	20876	1	Ball
29		1	Flow Control Valve, Raise & Lower (Includes 1--16931 and Items #26 thru #28)
	16931	1	Cap
30	4727	1	Pipe Plug, 1–1/4" Ctsk., 3/4" Hex
31	907859	4	Pipe Plug, 1/4" Steel, Ctsk., 1/4" Hex
32	907856	1	Pipe Plug, 3/8" Steel, Ctsk., 5/16" Hex
33	2048	3	Capscrew, 3/8" – 24 NF x 1–1/4"
	911115	3	Plain Washer, 3/8" SAE
	904206	3	Lockwasher, 3/8" ASA Med.
	911041	3	Hex Nut, 3/8" – 24 NF
34	17118	1	Bracket
35	17119	1	Shaft
36	21260	2	Lever Assy. (Each includes 2--5955 and 2--5957)
37	5955	6	Bearing (Lettered end must face pressing tool)
38	5957	8	Seal (Install with lips toward outside)
39	1171	2	Knob
40	910255	3	Plain Washer, 3/4" SAE
41	916937	1	Roll Pin
42	20742	1	Rod
43	20743	1	Rod
44	17120	4	Ball Joint
45	913177	4	Hex Jam Nut, 1/2" – 20 NF
46	904208	4	Lockwasher, 1/2" ASA Med.
	913177	4	Hex Jam Nut, 1/2" – 20 NF
47	20839	2	Bell Crank Assy. (Each includes 1--5955 and 2--5957)
48	20988	1	Bracket
49	904206	6	Lockwasher, 3/8" ASA Med.
	13072	6	Hex Nut, 3/8" – 16 NC (Brass)
			or
	19683	6	Hex Nut, 3/8" – 16 NC (Aluminum)
50	17086	2	Washer (Special)
51	17085	2	Lock Nut, 3/4" – 16 NF
52	20984	2	Link Assy. (Each includes 1--13909)
53	13909	2	Bushing
54	1565	4	Lock Pin
	900806	4	Cotter Pin, 1/8" x 1"

AVOID ACCIDENTS

Most accidents, whether they occur in industry, on the farm, at home, or on the highway, are caused by the failure of some individual to follow simple and fundamental safety rules or precautions. For this reason most accidents can be prevented by recognizing the real cause and doing something about it before the accident occurs.

Regardless of the care used in the design and construction of any type of equipment, there are many conditions that can not be completely safeguarded against without interfering with reasonable accessibility and efficient operation.

A CAREFUL OPERATOR IS THE BEST INSURANCE AGAINST AN ACCIDENT.

THE COMPLETE OBSERVANCE OF ONE SIMPLE RULE WOULD PREVENT MANY THOUSAND SERIOUS INJURIES EACH YEAR, THAT RULE IS:

NEVER ATTEMPT TO CLEAN, OIL, OR ADJUST A MACHINE WHILE IT IS IN MOTION!

"NATIONAL SAFETY COUNCIL"

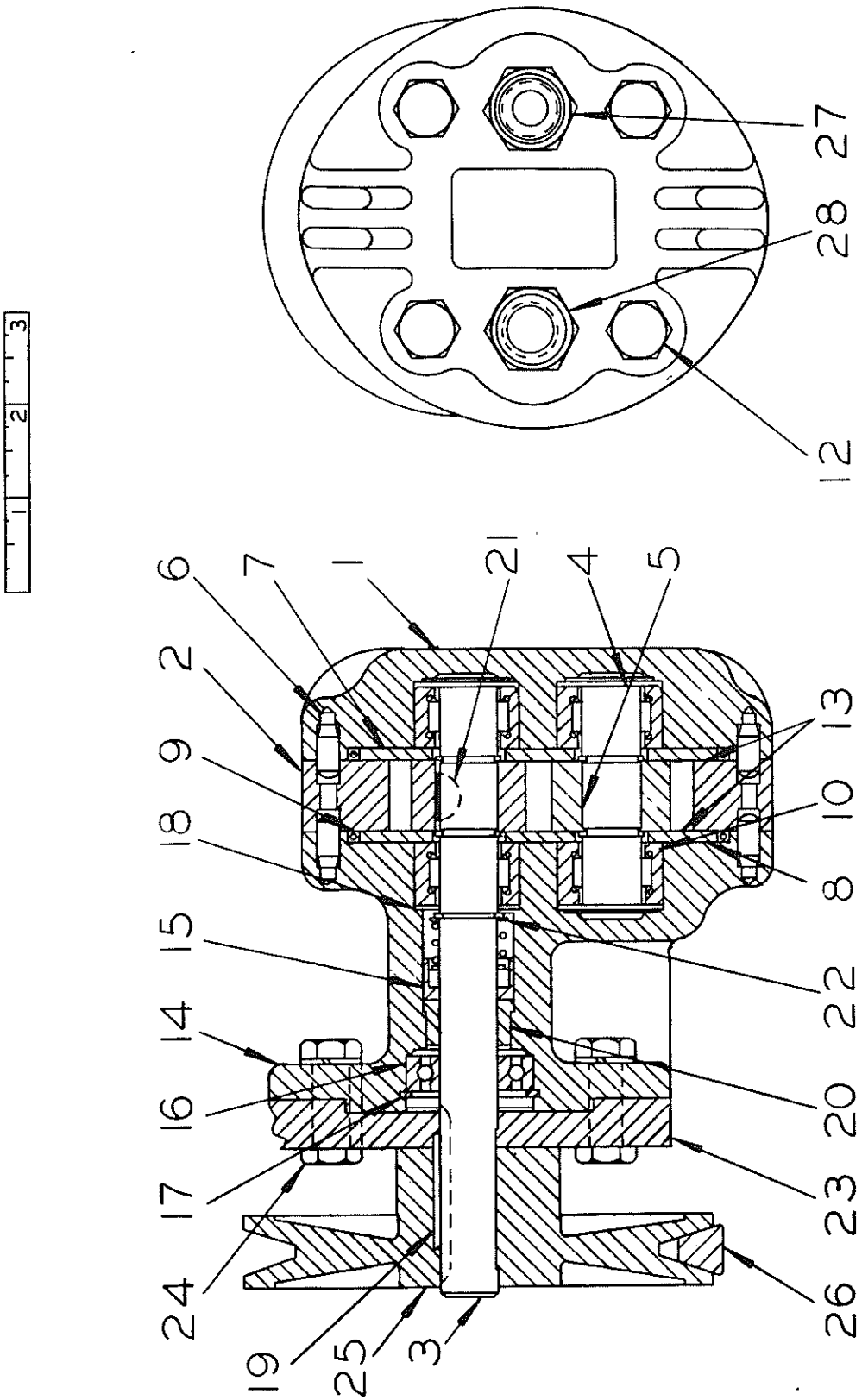


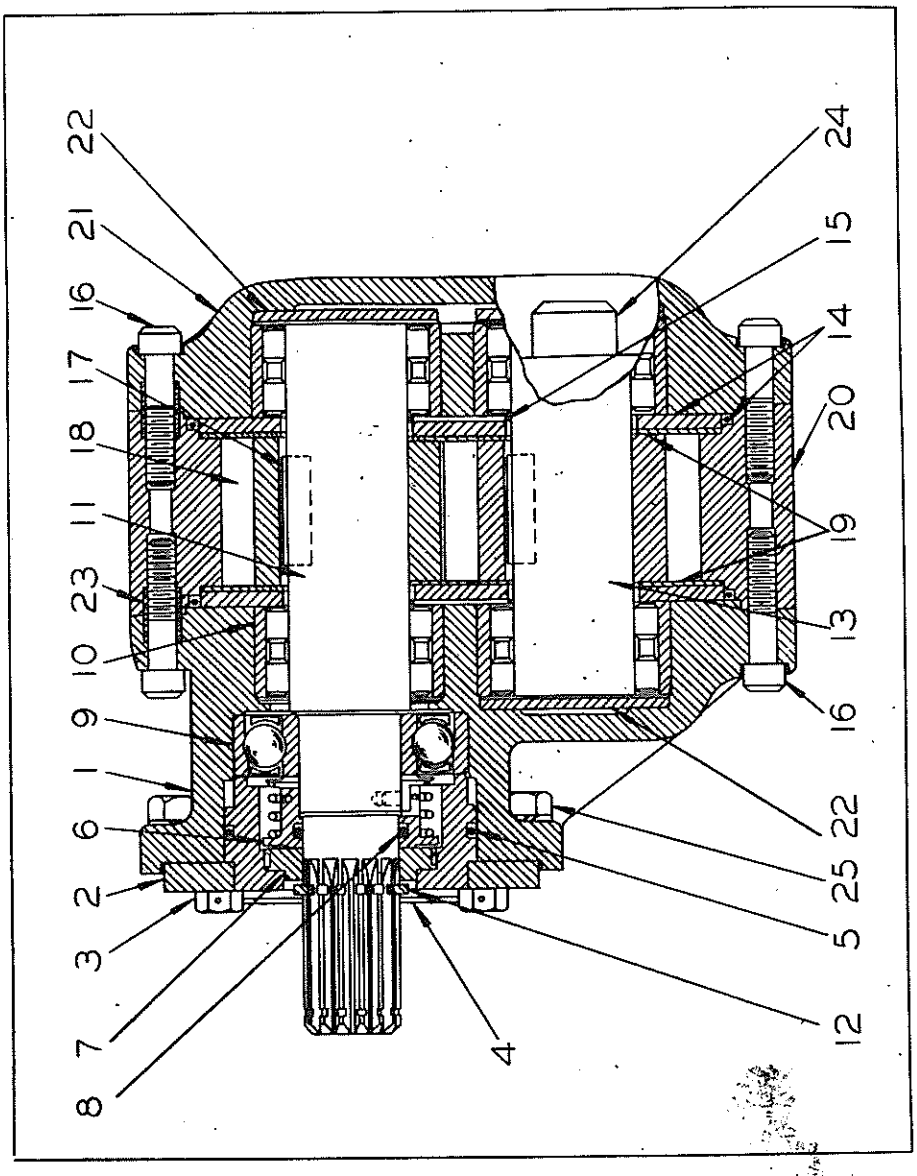
PLATE 717 – HYDRAULIC POWER STEERING PUMP

TRACTOMOTIVE

HYDRAULIC POWER STEERING PUMP

(See Plate 717)

ITEM	PART NUMBER	QTY.	PART NAME
1	13465	1	Pump Assy. (Includes Items #2 thru #22)
2	15664	1	Housing
3	15661	1	Drive Shaft
4	15660	1	Driven Shaft
5	15659	2	Gear
6	15658	4	Dowel Pin
7	15657	1	Wear Plate
8	15656	1	Wear Plate
9	15655	2	Seal Ring
10	15654	4	Bearing
11	15662	1	End Cover
12	15663	4	Capscrew, 7/16" – 20 NF x 2–1/2"
	15889	4	Washer (Special)
13	15666	–	Gasket (Use as required)
	15667	–	Gasket
14	15665	1	Adapter Cover
15	15652	1	Seal Assy. (Also order 15651)
16	15650	1	Bearing
17	15649	1	Snap Ring
18	15653	5	Snap Ring
19	916024	1	Square Key, 3/16" x 1–1/4"
20	15651	1	Spacer (Seal Seat)
21	905121	1	Key
22	15887	1	Washer (Special)
23	13519	1	Mounting Plate
24	2048	6	Capscrew, 3/8" – 24 NF x 1–1/4"
	904206	6	Lockwasher, 3/8" ASA Med.
	911041	6	Hex Nut, 3/8" – 24 NF
25	13473	1	Pulley Assy. (Includes 1--905564)
	905564	1	Set Screw, 5/16" – 18 NC x 3/8"
26	17378	1	Cog Belt
27	14291	1	Adapter, 3/4" – 16 NF x 1/2"
	901828	1	Bushing, 3/4" x 1/2"
28	8304	1	Adapter, 1/2" – 14 NPT
	901828	1	Bushing, 3/4" x 1/2"



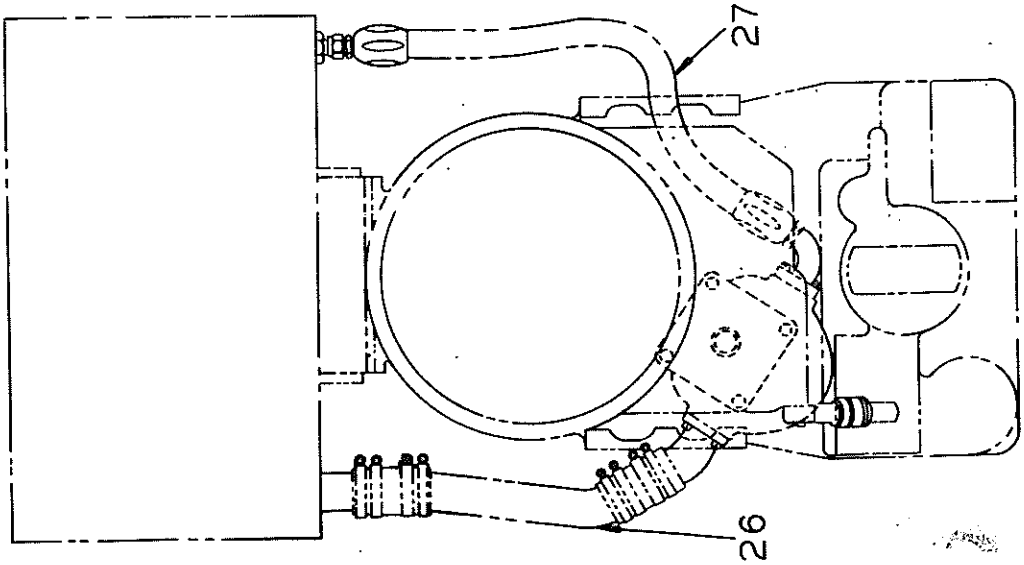


PLATE 713 – HYDRAULIC PUMP GROUP

TRACTOMOTIVE

HYDRAULIC PUMP ASSEMBLY

(See Plate 713)

ITEM	PART NUMBER	QTY.	PART NAME
1	21384	1	Pump Assy. (Includes 1--21883 and Items #2 thru #25)
	21883	1	Adapter Cover
2	21886	1	Seal Retainer Assy. (Serviced as assembly only)
3	7381	6	Capscrew, 3/8" – 24 NF x 1", Dr. Hd.
4	10603	1	Lockwire, #16 W and M. Ga. x 22" long
5	11907	1	Seal Ring
6	22401	1	Seal Assy. (Includes Item, #8) (Also order Item #7)
7	22400	1	Seal Seat
8	12680	1	Seal Ring
	12681	1	Back-Up Ring (For service, order both Seal Ring and Back-Up Ring)
9	11878	1	Ball Bearing
10	12695	4	Bearing
11	21887	1	Drive Shaft
12	22402	1	Snap Ring
13	21888	1	Driven Shaft
14	11886	2	Wear Plate
	11905	2	Seal Ring
15	2227	4	Seal Ring
16	11881	4	Capscrew, 3/8" – 24 NF x 1–3/4", Skt. Hd.
17	12564	2	Flat Key
18	21889	2	Gear
19	11901	–	Gasket (.001" thick) (Use as required)
	11902	–	Gasket (.002" thick)
20	21890	1	Housing
21	11885	1	End Cover
22	11884	3	Thrust Washer
23	11883	2	Dowel Sleeve
24	11889	4	Capscrew, 7/8" – 14 NF x 4–1/2", Skt. Hd.
25	21750	4	Capscrew, 1/2" – 13 NC x 1–3/8"
	904208	4	Lockwasher, 1/2" ASA Med.
26	----	1	Suction Line (See Hydraulic Piping Group)
27	----	1	Pressure Line

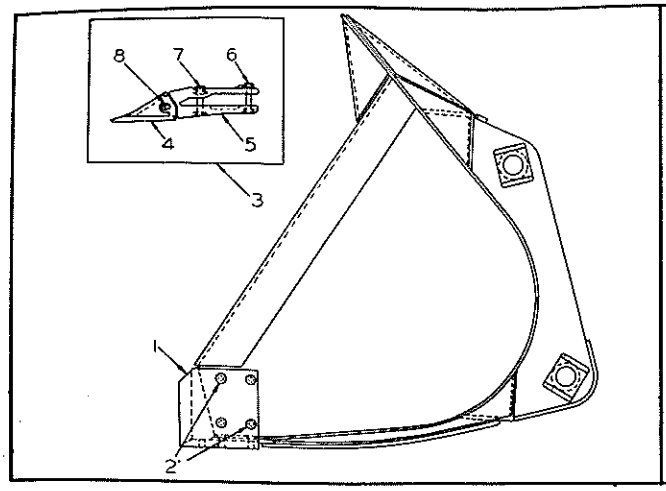


PLATE 691 – BUCKETS

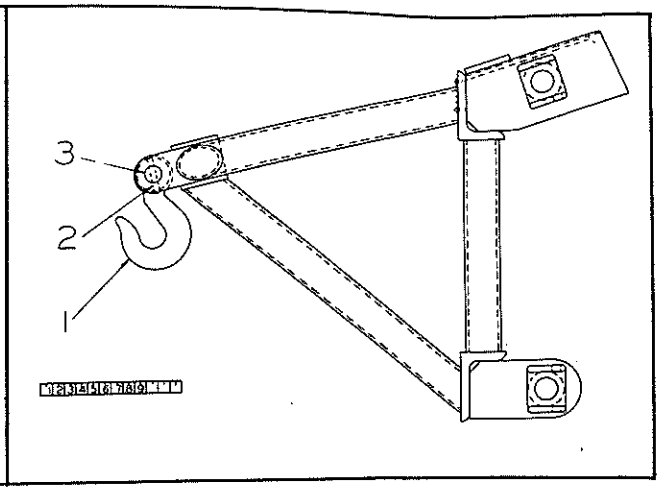


PLATE 741 – CRANE HOOK

ITEM	PART NUMBER	QTY.	PART NAME
–	- - - -	1	Bucket Assy., Complete, Std. 2 Cu. Yd., Riveted Cutting Edge – Machinery Item - see
–	- - - -	1	Bucket Assy., Complete, 4 Cu. Yd., Riveted Cutting Edge – your Allis-Chalmers Dealer
1	16763	1	Cutting Edge, 3/4" Thk., 86-1/2" Wide (Order also 28-911575) For 2 Cu. Yd. Bucket
	21759	1	Cutting Edge, 3/4" Thk., 93-3/4" Wide (Requires Welding) For 4 Cu. Yd. Bucket
2	911575	–	Rivet, Ctsk. Hd., 1/2" x 2" (For qty. required, see Item #1)
3	14989	11	Bucket Tooth Assy. (Includes one each Items #4 thru #8)
4	14986	11	Tip
5	14988	11	Shank
6	19718	11	Capscrew, Hex Hd., 1/2" – 20 NF x 2–7/8" Alloy H.T.
	19733	11	Hex High Nut, 1/2" – 20 NF
7	19717	11	Capscrew, Hex Hd., 1/2" – 20 NF x 2–5/8" Alloy H.T.
	19733	11	Hex High Nut, 1/2" – 20 NF
8	14987	11	Roll Pin
9	1544	1	Name Plate (Not Shown)
10	918633	4	Rivet, 3/16" x 13/32" (Not Shown)

CRANE HOOK – (See Plate 741)

ITEM	PART NUMBER	QTY.	PART NAME
–	- - - -	1	Crane Hook, Complete (Machinery Item - see your Allis-Chalmers Dealer)
1	3458	1	Hook
2	1621	1	Lock Pin
	900806	1	Cotter Pin, 1/8" x 1"
3	4830	1	Pin

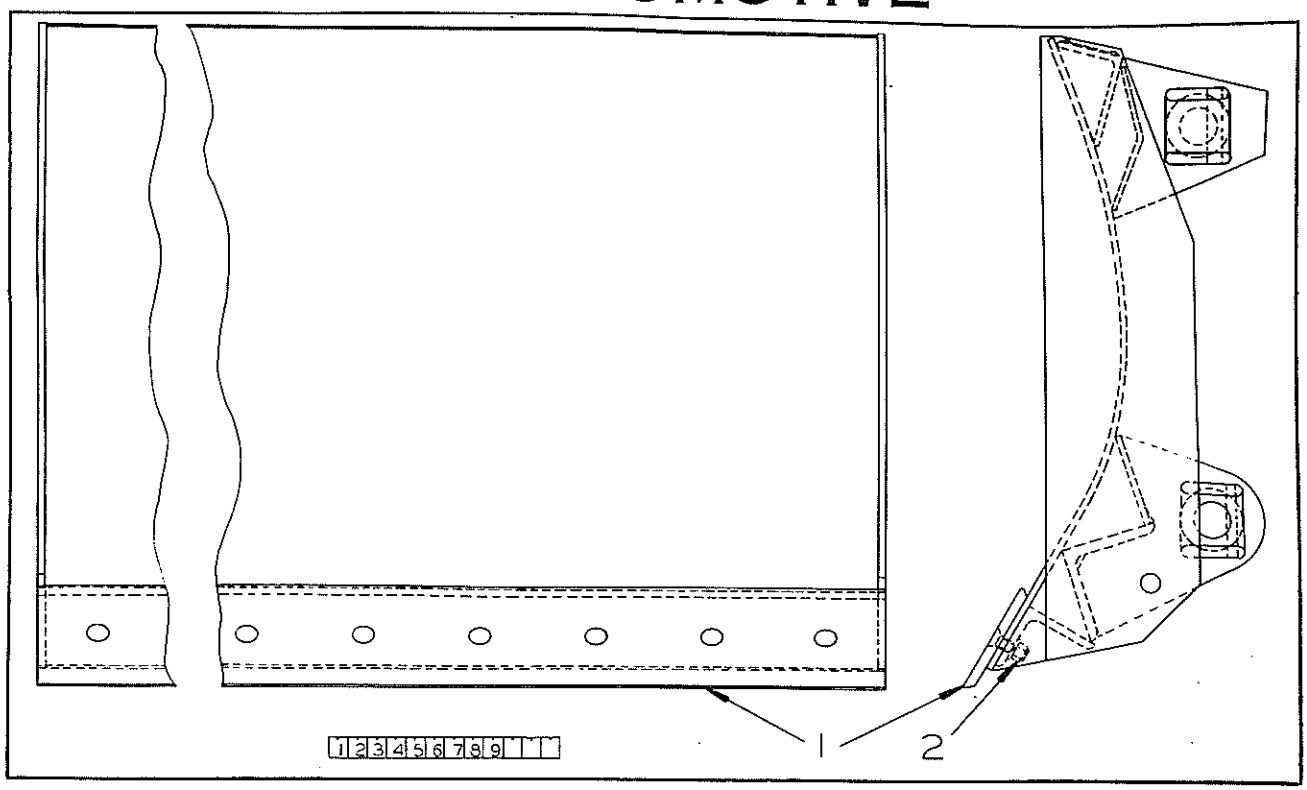


PLATE 732 – TRACTO-DOZER MOLDBOARD ASSEMBLY

ITEM	PART NUMBER	QTY.	PART NAME
–	- - - -	–	Tracto-Dozer Moldboard, Complete (Machinery Item - see your Allis-Chalmers Dealer)
1	1683	1	Cutting Edge (For 96" Moldboard)
	1432	16	Plow Bolt, 5/8" – 11 NC x 2", Ctsk. Hd.
2	904209	16	Lockwasher, 5/8" ASA Med. (For 96" Moldboard)
	911029	16	Hex Nut, 5/8" – 11 NC
–	1544	1	Name Plate
–	910219	4	Drive Screw, #7 x 5/16"

ACCUMULATOR KIT

(See Plate 733)

ITEM	PART NUMBER	QTY.	PART NAME
–	21831	1	Accumulator Kit (Includes Items #1, #2, #10 thru #22 and #26 thru #36)
1	16936	1	Accumulator Assy. (Serviced as assembly only)
2	19649	1	Selector Valve (Includes Items #3 thru #9)
3	- - - -	1	Valve Housing (Not serviced separately)
4	- - - -	1	Plunger (Not serviced Separately)
5	19656	1	Stud
6	910510	1	Hex Jam Nut, 1/2" – 13 NC
7	910244	2	Plain Washer, 1/2" SAE

(Continued)

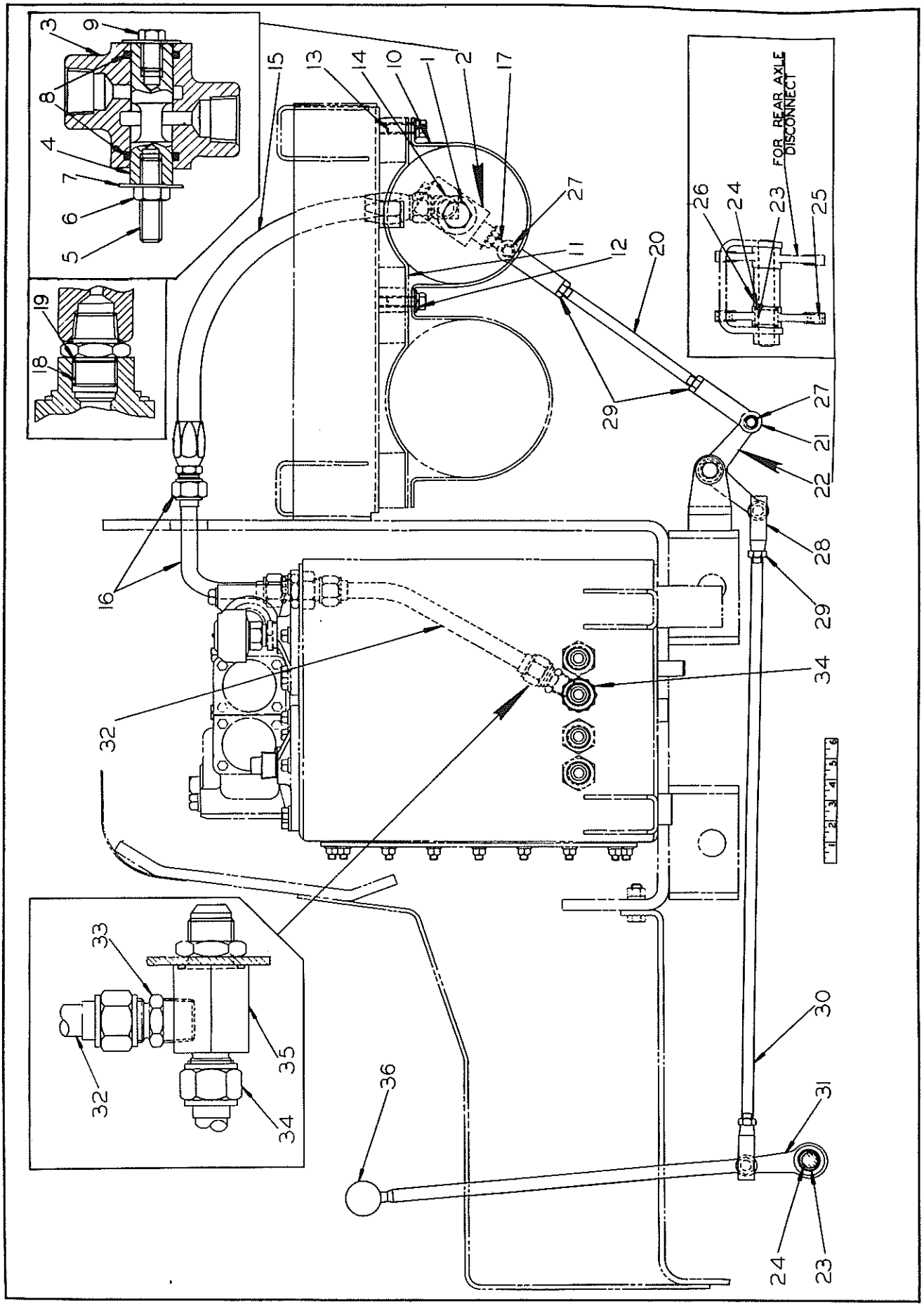
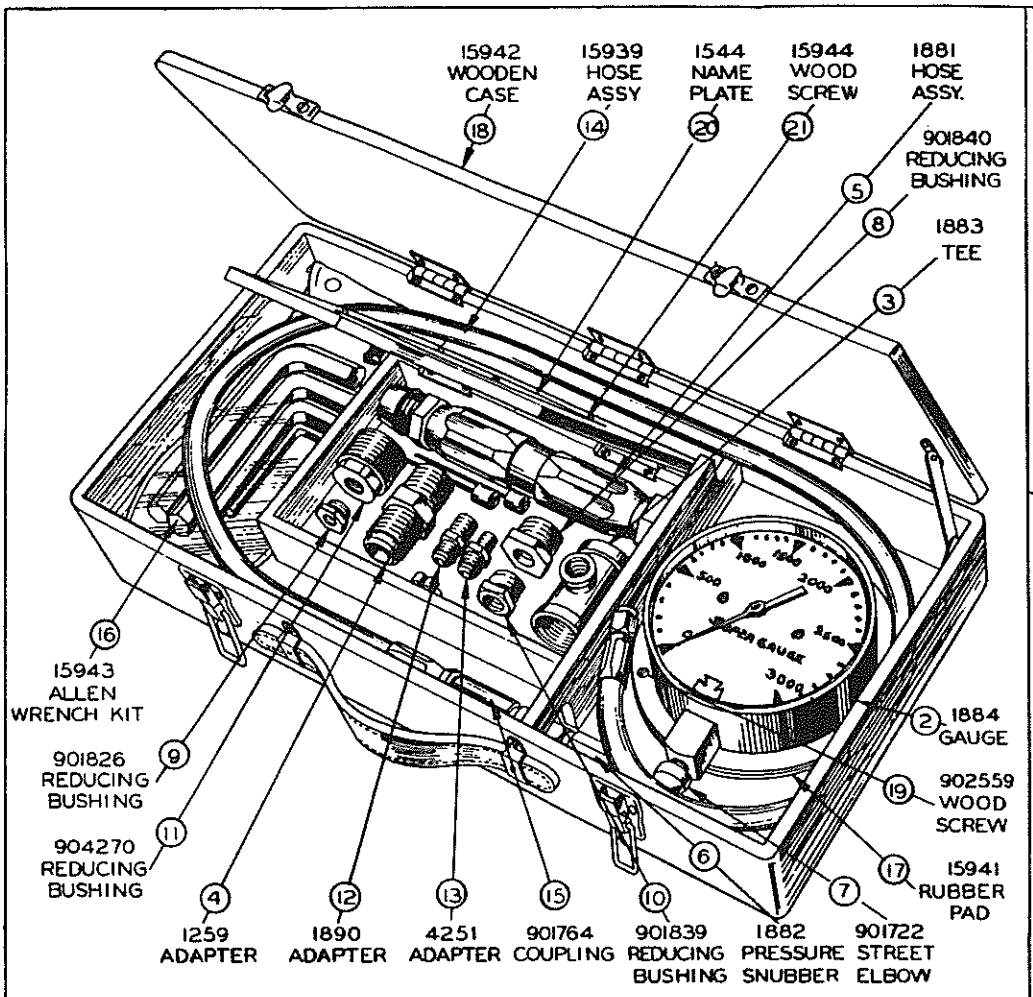


PLATE 733 – ACCUMULATOR KIT

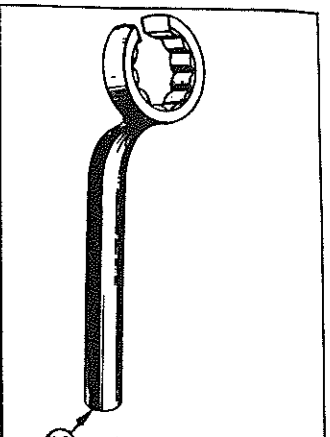
ACCUMULATOR KIT – CONTINUED

(See Plate 733)

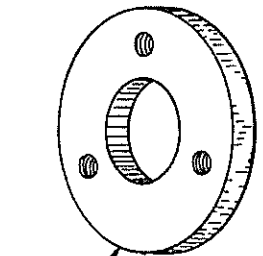
ITEM	PART NUMBER	QTY.	PART NAME
8	4704	2	Seal Ring
9	19655	1	Capscrew, 1/2" – 13 NC x 3/4"
10	14758	1	Strap
11	14756	1	Clamp
12	14754	2	Strip
13	1239	4	Capscrew, 1/2" – 20 NF x 1–1/2"
	904208	3	Lockwasher, 1/2" ASA Med.
14	2184	1	90° Elbow
15	22138	1	Hose Assy. (Includes one Hose and 2--3589)
	1550-19	1	Hose (Bare Length) See Note - Page
	3589	2	Swivel Nut Sub-Assy.
16	21829	1	Tube Assy.
17	20284	1	Rod End
18	20209	1	Adapter
19	16939	1	Seal Ring
20	20748	1	Rod, Threaded
21	5684	2	Yoke
22	12505	1	Bell Crank Assy. (Includes 1--5955, 2--5957 and 2--13909)
23	5955	3	Bearing (Lettered end must face pressing tool)
24	5957	4	Seal (Install seal with lips toward outside)
25	13909	2	Bushing
26	20977	1	Spacer
27	1565	2	Pin
	900806	2	Cotter Pin, 1/8" x 1"
28	17120	2	Ball Joint
29	913177	4	Hex Jam Nut, 1/2" – 20 NF
30	20746	1	Rod, Threaded
31	21262	1	Lever Assy. (Includes 2--5955 and 2--5957)
32	21828	1	Tube Assy.
33	2006	1	Adapter
34	21830	1	Tube Assy.
35	20377	1	Bulkhead Tee
36	1171	1	Knob



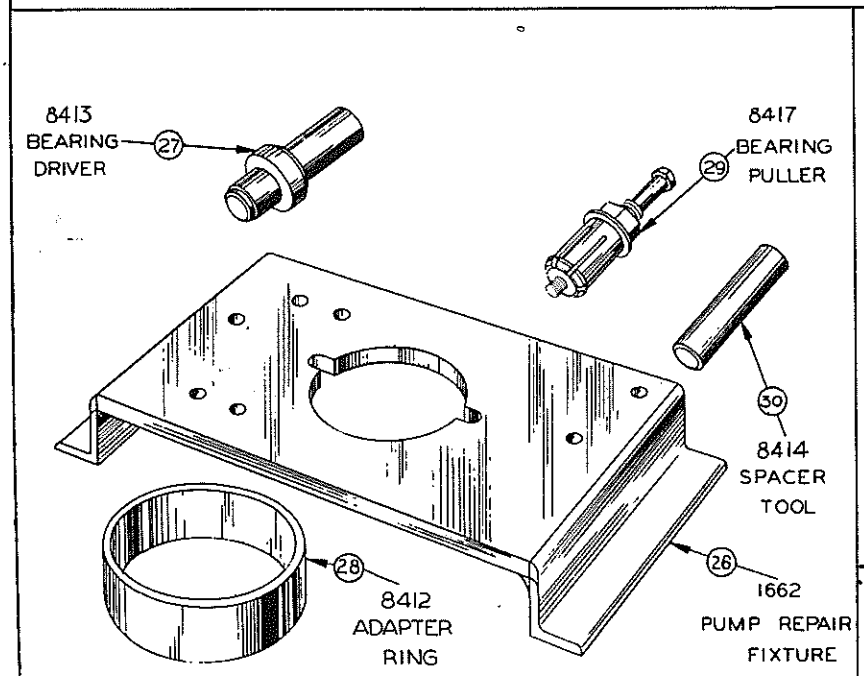
(1)—15945 MASTER GAUGE KIT



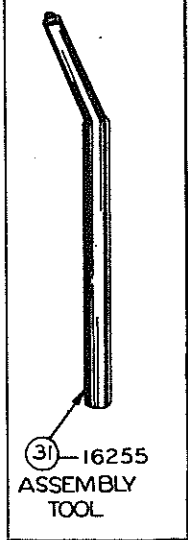
(32)—15370 FLARE NUT WRENCH



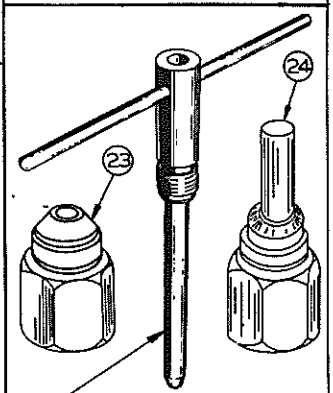
(34)— 22403 SPACER TOOL



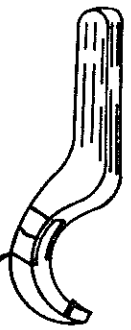
(25)—8416 PUMP REPAIR TOOL KIT



(31)—16255 ASSEMBLY TOOL



(22)— HOSE ASSEMBLY TOOL



(33)—12743 SPANNER WRENCH

TRACTOMOTIVE

SPECIAL TOOLS

(See Plate 737)

ITEM	PART NUMBER	QTY.	PART NAME
1	15945	1	Gauge Kit (Includes Items #2 thru #21)
2	1884	1	Pressure Gauge, 3000 psi
3	1883	1	Tee, 3/4" x 3/4" x 1/4"
4	1259	1	Adapter, 3/4" x 3/4"
5	1881	1	Hose Assy. (Includes 1--1260, one Hose and 1--1261)
	1260	1	Swivel Nut Sub-Assy.
	1550-4	1	Hose (Bare Length)
	1261	1	Male Sub-Assy., 3/4"
6	1882	1	Pressure Snubber (Includes two Pistons)
7	901722	1	90° Elbow, Street, 1/4"
8	901840	1	Reducing Bushing, 3/4" x 1/4" C.I., Hex Hd.
9	901826	1	Reducing Bushing, 3/8" x 1/4" C.I., Hex Hd.
10	901839	1	Reducing Bushing, 1/2" x 1/4" C.I., Hex Hd.
11	904270	1	Reducing Bushing, 1" x 1/4" C.I., Hex Hd.
12	1890	1	Adapter, 3/8" Pipe thread
13	4251	1	Adapter, 1/4" Pipe thread
14	15939	1	Hose Assy. (Includes 1--1888, 1--1889 and one Hose)
	1888	1	Male Sub-Assy., 1/4" Pipe thread
	1889	1	Swivel Nut Sub-Assy., 1/2" – 20 NF
	1891-43	1	Hose (Bare Length)
15	901764	1	Coupling, 1/4" Steel
16	15943	1	Allen Wrench Kit, 1/8", 1/4", 3/8", 1/2", 9/16" (Only as set)
17	15941	1	Rubber Pad, 1/8" thick, 6" Dia.
18	15942	1	Wooden Case, 3–1/4" x 10–5/8" x 19–1/2"
19	902559	3	Wood Screw, #6 x 1/2" Round Head
20	1544	1	Name Plate
21	15944	4	Wood Screw, #8 x 3/8" Round Head
			HOSE TOOLS
22	1577	1	Assembly Tool, 3/4" (For Single Wire Braid Hose)
23	8004	1	Assembly Tool, 3/4" (For Double Wire Braid Hose)
24	4237	–	Assembly Tool, 5/8" (For Single Wire Braid Hose)
			PUMP REPAIR TOOLS
25	8416	1	Pump Repair Tool Kit (Includes one each Items #26 thru #30)
26	1662	1	Pump Repair Fixture
27	8413	1	Bearing Driver
28	8412	1	Adapter Ring
29	8417	1	Bearing Puller (Includes 1--8418, 1--8419, 1--913093, 1--911051 and 1--8421)
	8418	1	Expander Bolt
	8419	1	Sleeve
	913093	1	Plain Washer, 1–1/32" I.D. x 1–3/4" O.D. x 10 Ga.
	911051	1	Hex Jam Nut, 1" – 14 NF
	8421	1	Capscrew, 3/8" – 24 NF x 5"
30	8414	1	Spacer Tool
			TOOTH TOOL
31	16255	1	Assembly Tool
			TUBE AND CYLINDER REPAIR TOOLS
32	15370	1	Flare Nut Wrench, 1–1/4"
33	12743	1	Spanner Wrench
34	22403	1	Spacer Tool (Power Steering Adjustment)

ASSEMBLY OR PACKAGE NO.	DESCRIPTION
4348450	GASKET SET, engine overhaul
	1 035249 GASKET, oil drain plug
	2 4113897 GASKET, regulating valve nut
	4 4251987 RING, sealing, valve lifter cover nut
	2 4253106 RING, sealing, oil cooler flange
	1 4253801 RING, sealing, flywheel housing
	1 4335056 GASKET, water pump volute
	4 4346138 GASKET, intake manifold
	1 4346169 GASKET, oil pipe
	1 4346456 GASKET, water inlet pipe
	1 4346744 GASKET, water pump
	1 4347031 GASKET, water by-pass pipe
	1 4347120 GASKET, timing hole cover
	4 4348063 GASKET, exhaust manifold
	1 4348071 GASKET, rocker cover
	1 4348111 GASKET, cover plate
	2 4348112 GASKET, valve lifter cover
	1 4348122 GASKET, pulley cover
	1 4348126 GASKET, timing gear cover
	1 4348133 GASKET, breather tube
4348637	RING SET, piston
	2 4347235 RING, compression (2nd and 3rd groove)
	2 4347438 SPRING, oil control ring
	2 4347439 RING, oil control
	1 4347458 RING, compression (top groove)
4348638	PISTON AND SLEEVE KIT
	2 4346184 RING, sealing, cylinder sleeve
	2 4347235 RING, compression (2nd and 3rd groove)
	2 4347438 SPRING, oil control ring
	2 4347439 RING, oil control
	1 4347458 RING, compression (top groove)
	1 4348072 SLEEVE, cylinder
	1 4348447 PISTON ASSEMBLY

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