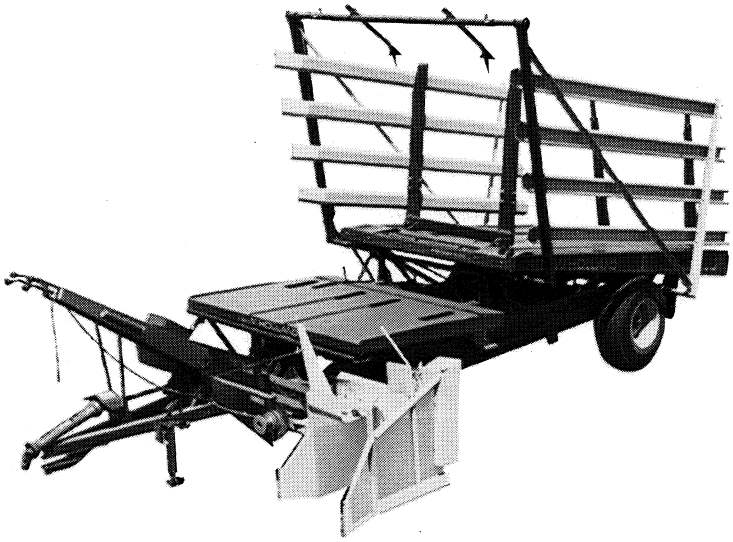
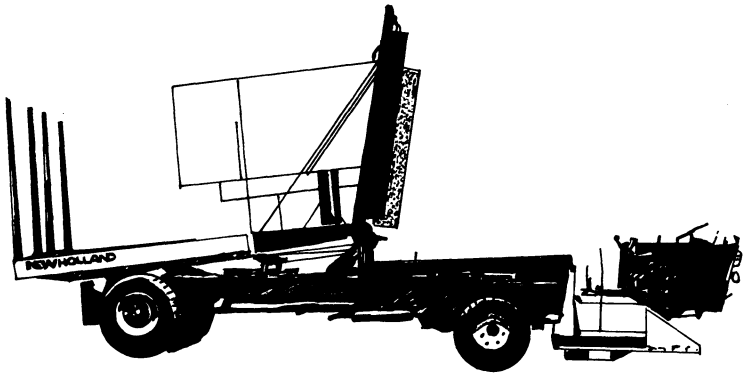
SERVICE MANUAL

BALE WAGONS

MODELS: 1000 1033 1047
1005 1034 1048
1010 1035 1049
1012 1044
1030 1045
1032 1046

SPERRY NEW HOLLAND





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COMPONENTS OF A HYDRAULIC SYSTEM

Basically, hydraulic systems are composed of the following units, each of which will be discussed in this manual.

a. Pump

b. Cylinder or motor

c. Valves
   1. Direct the flow
   2. Regulate the flow
   3. Regulate the pressure

d. Accessories
   1. Reservoir
   2. Oil
   3. Filters
   4. Hoses and tubes
   5. Breathers
   6. Restrictors

PUMPS

It is common to think of a hydraulic pump as a sort of compressor but this is not so. At low pressures oil is virtually incompressible and, even though it may be or can be measurably compressed at high pressures, you should not think of the pump as a compressor. The purpose of the pump is not to compress but to move oil under pressure.

We use gear type pumps on the automatic bale wagon. This is the simplest type of pump. The gears are encased in a housing in which there is an inlet and outlet port. Oil flows or is drawn into the housing through the inlet port, filling the space between the gear teeth with oil. As the gears revolve the gear teeth mesh together forcing the oil out through the outlet port which is in line with the point where the gear teeth come together.

Close fit of the gear teeth within the housing is required to provide a seal between the inlet and outlet sides minimizing internal leakage.

CYLINDERS

The simplest type of cylinder is a single acting or one way cylinder which applies force in only one direction. Fluid directed into the housing displaces the rod forcing it out. Since there is no provision for retracting the rod hydraulically, the retracting force is usually gravity.

A double acting cylinder permits application of hydraulic pressure on either side of the piston to control lineal motion in either of two opposite directions. Because of their simplified construction little can go wrong with the cylinder in itself. The most common problems are external or internal leaks.

VALVES

Basically, valves in a hydraulic circuit do what switches, transformers, and condensers do in an electrical circuit, that is, they control.

1. The direction of oil flow.
2. The volume of oil going to various parts of the system.
3. The pressure of oil at different parts and different points.

Most valves are variations of the above mentioned controls.

Valves more than any other part of the system are precision made. First and foremost they must be accurate and control both the pressure and volume. Here again is a very important reason for a careful selection of hydraulic oils and careful maintenance practices to keep it absolutely clean. The presence of foreign particles could be enough to lodge between these close working parts and cause scoring or even sticking.

1. **Direction of flow.** Control valves are directional devices directing the flow of oil to the proper place at the proper time. Spool type valves, the type we are concerned with, are the most commonly used. This design permits a variety of portal arrangements as well as enabling us to regulate the speed of operation. This is done by throttling with the spools between the lands and grooves of the spool and housing.

   In the valves we use, the spools are positioned by hand or by the use of mechan-

ical linkage operated by the movement of bales. All valves must have a means to limit the travel of the spool. The spool travel must be limited so that the spool stops in the position when the ports are completely open. If the spacers or washers are missing or deformed, the spool can over-travel and begin to close off the port. This would result in a restriction of the oil flow. Some valves are equipped with a centering spring on the spool. This spring returns the spool back to the center or neutral position, when the valve is not being used to transmit oil flow to one of the work ports. If the centering spring were broken or one of the spacers deformed, oil could flow through the valve at the wrong time.

2. **Volume control valves.** This type of valve is usually called a flow divider. Its purpose is to provide a flow of oil with a fixed amount of volume regardless of any variation in pressure. A simple example is a spring loaded spool in a bore where line pressure is equal on both ends of the bore but the flow is in one direction. The strength of the spring is calibrated to permit the spool to open a graduated passage in the bore just enough to permit the required amount of oil to flow through the passage.

   The working parts of the flow divider consist of a spool, spool spring and dampening disc. The spool is drilled out inside to provide an orifice. This orifice regulates the GPM to the priority pressure port. The oil from the pump is directed through the orifice and creates a pressure drop as it passes through the orifice. This pressure differential increases as the pump output is increased and causes the spool to compress the spring. As the spool compresses the spring it begins to close off the holes to the priority port and begins to open the holes to the secondary port. The spool maintains a balance point between the priority port holes and secondary port holes. All oil in excess of the set GPM is directed into the secondary port. The dampening disc between the spool and spring acts as a shock absorber and dampens the movement of the spool. This dampened movement provides a smoother flow of oil from the ports.

3. **Pressure control valves.** The common pressure control valve is a pressure relief valve. In a sense it is a check valve in reverse in that the valve is held on its seat with a heavy spring. When line pressure exceeds a predetermined maximum, the pressure overcomes the spring and pushes the valve off its seat and escaping oil is returned directly to the reservoir. Since this action results in heat formation in the oil the relief valve should be used as little as possible. The basic purpose of the relief valve is to protect the hydraulic system against excessive pressure.

MODEL 1000 STACKLINER HYDRAULIC SYSTEM

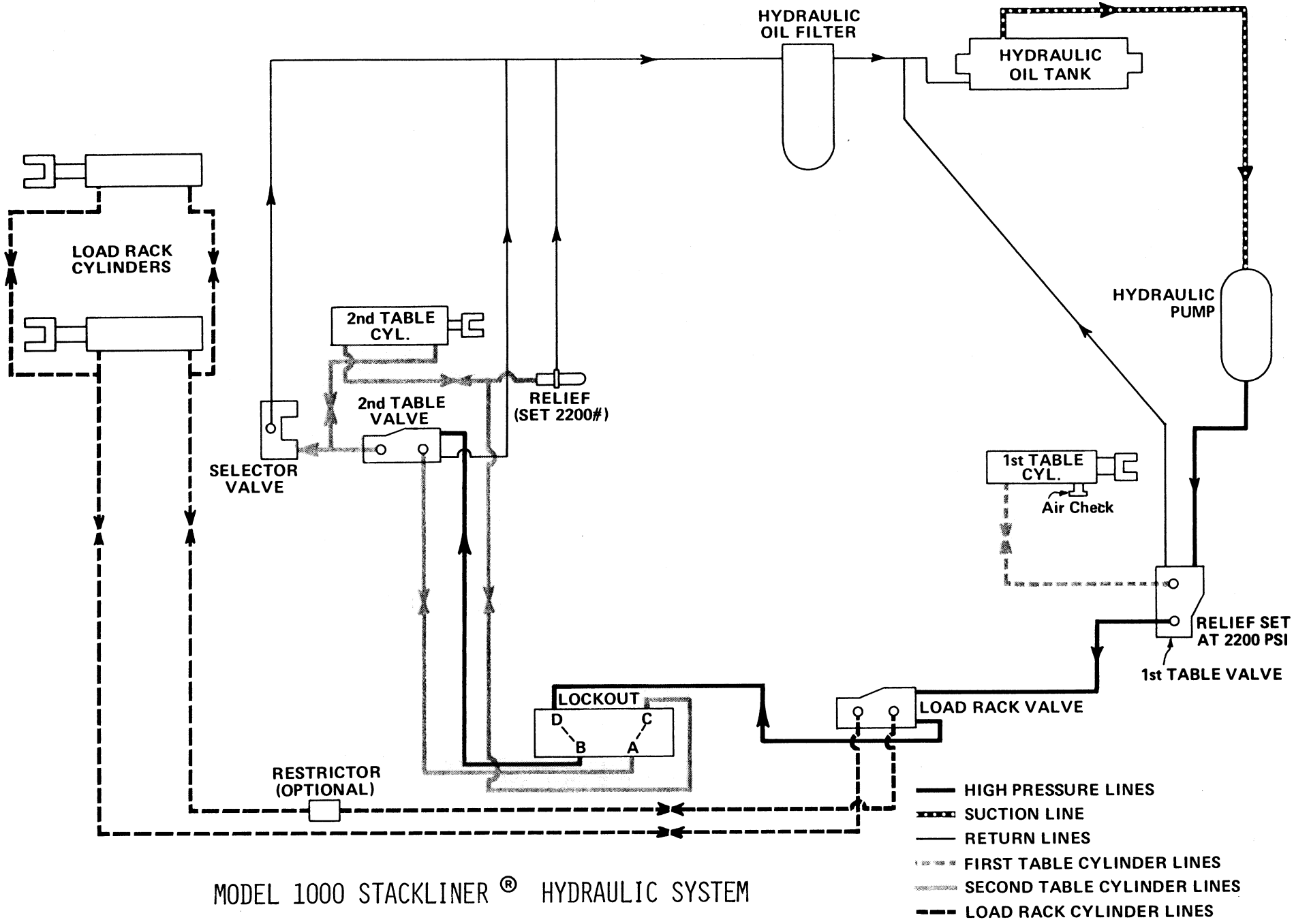
OIL FLOW WHEN THE PUMP IS RUNNING BUT THE WAGON IS NOT BEING OPERATED

The pump will produce a flow of 6 GPM at 540 RPM at less than 100 PSI. The oil flows to the first table valve. A relief valve is built into the first table valve, it is set for a maximum of 2200 PSI. Oil that passes over the relief valve goes directly to the return line and to the oil tank. The bottom work port on the first table valve directs oil to the input port on the load rack valve. The out port on the load rack valve directs oil through the lock out valve and to the in port on the second table valve. The oil then flows through the left work port on the second table valve through the selector valve through the oil filter and on to the oil tank.

FIRST TABLE

Oil flow when the first table is in operation:

When the first table is tripped to go up, the first table valve spool is pulled out of the valve body. Oil is directed out of the top work port and into the first table cylinder. The first table cylinder extends and the first table raises. While the first table is raising air pressure is built up in the shaft side of the cylinder. This air pressure helps bring the first table to the down position. When the first table trip linkage is tripped to bring the first table down, the first table valve spool is pushed into the valve body and the oil which is in the first table cylinder flows through the first table valve back to the return line. During the time that the first table is raising the work port that supplies oil to the load rack valve is closed. This creates an automatic delay for the second table. The second table cannot raise until the first table has fully placed the bales on the second table and has been tripped to return to the down position.



MODEL 1000 STACKLINER ® HYDRAULIC SYSTEM

LOCK OUT VALVE

Before the oil flows to the second table valve it first flows through the lock out valve. Oil entering the lock out valve from the hydraulic system moves a floating spool and poppet which in turn opens the second port through the lock out valve. When the second port is open, oil can either flow into the cylinder or out of the cylinder and return to the tank. If the oil flow in the hydraulic systems drops to about 0 GPM, the spring on the poppet closes the second port on the lock out valve which prevents oil from returning to the second table cylinder and prevents it from lowering.

SECOND TABLE

The second table valve is a single spool double acting valve. When the spool is pulled out of the valve body oil flows out of the right port on the valve through the lock out valve and into the bottom of the second table cylinder. A relief valve set at a maximum of 2200 PSI is installed in the line which leads to the bottom of the second table cylinder. If it requires more than 2200 pounds pressure to raise the second table, the oil will flow over the relief valve and back to the oil tank. If the working pressure is below 2200 PSI the oil will flow into the second table cylinder and the cylinder shaft will extend raising the second table. The oil which is in the shaft end of the second table cylinder will return to the second table valve and out the return oil line to the tank. Some of the oil can flow through the second table selector valve as long as it is open. When the second table has raised far enough to close the selector valve all the oil must flow back through the second table valve. When the second table trips to return, the valve spool is pushed into the valve body.

The oil flows out of the left port of the second table valve and into the shaft end of the second table cylinder. The oil which is in the bottom end of the second table cylinder flows through the lock out valve to the second table valve and out the return line to the tank. The lock out valve must have oil flowing through the inlet port to open up the poppet on the back port. When the hydraulic system is turned off there is no oil flow. The poppet in the lock out valve closes, trapping the oil in the second table cylinder so that the second table can not fall. After the second table has lowered part way the selector valve opens and the table continues to fall by gravity. All of the oil goes through the selector valve when the table reaches the down position.

LOAD RACK

The load rack valve is a single spool double acting valve. When the valve spool is pushed into the valve body oil flows out the right port and to the base end of the load rack cylinders. A restrictor must be installed in this line if the wagon will be used as a retriever. The purpose of the restrictor is to slow down the load rack as it is being lowered to the down position. As the load rack is raising oil is forced out of the shaft end of the cylinders and flows back to the load rack valve.

To lower the load rack the valve spool is pulled out of the valve body and the oil flows to the left port of the valve into the shaft end of the load rack cylinders. The oil at the base end of the cylinders flows through the optional restrictor into the right port of the load rack valve. The oil that is being returned to the load rack valve flows out at the out port of the valve to the lock out valve to the second table valve to the selector valve and back to the oil tank.

MODEL 1005 STACKLINER HYDRAULIC SYSTEM

OIL FLOW WHEN THE PUMP IS RUNNING BUT THE WAGON IS NOT BEING OPERATED

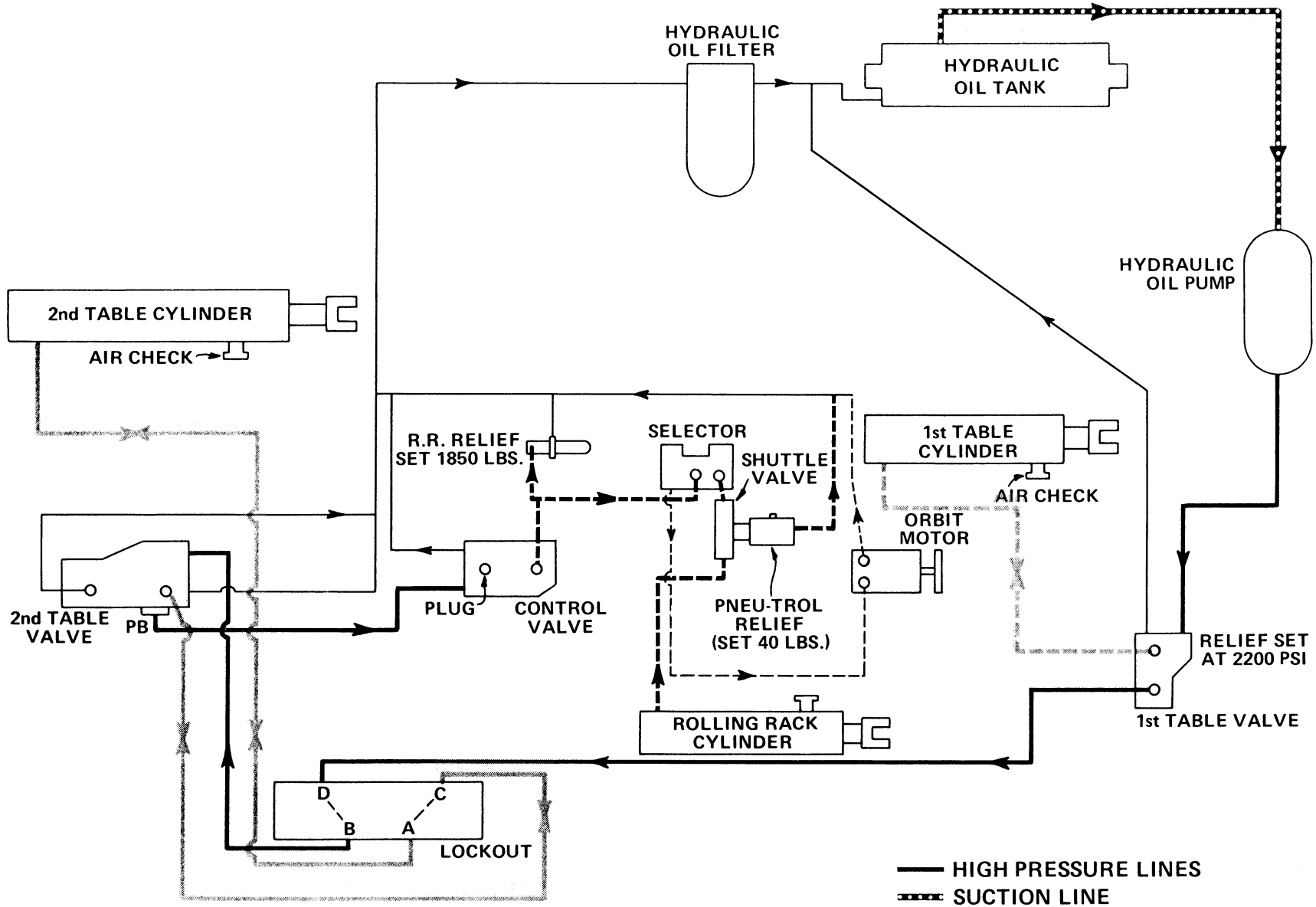
The oil flow for the Model 1005 is the same for the Model 1000 until the second table valve is reached. Oil flows from the left work port on the second table valve through the oil filter and to the hydraulic oil tank. The difference is that it does not go through a selector valve. A selector valve is not needed because a single acting second table cylinder is used.

FIRST TABLE

The oil flow is exactly the same as the Model 1000 Wagon.

SECOND TABLE

When the second table valve spool is pulled out of the valve body, the right work port is open and allows oil to flow through the lock out valve and on to the second table cylinder. As the second table raises air pressure is built up in the shaft end of the cylinder. This air pressure helps to start the table back down. The second table valve spool must be pushed into the valve body to open up the return line to the second table cylinder. This must be done for the second table to return to the down position. The oil in the second table cylinder flows through the lock out valve back to the second table valve and then out the return port of the



MODEL 1005 STACKLINER® HYDRAULIC SYSTEM

valve through the filter and back to the oil tank. If the second table is to be held up to form an end gate when the load is finished, the second table valve spool must be held in the center position. When the valve spool is in the center position the oil is trapped in the second table cylinder and the second table can not fall. Oil from the cylinder is blocked but oil from the hydraulic system passes on through the pressure beyond port and in to the single bale unloading control valve. The second table valve spool is in the center position when a second table manual control handle is placed in the locked position.

ROLLING RACK

The second table manual control handle must be placed in the locked position. This centers the second table valve spool and directs oil out the pressure beyond port and into the single bale unloading control valve. To bring the rolling rack forward the single bale unloading control handle must be pulled to the extreme rear position. This moves the single bale unloading control valve spool into the valve body and pulls the selector valve spool out of the valve body. The oil flows from the right port from the control valve into the selector valve through the shuttle valve and into the base end of the rolling rack cylinder extending the cylinder. If it requires more than 1850 PSI to move the rolling rack forward the oil will flow over the rolling rack relief valve and return to the hydraulic oil tank. This is a safety for the rolling rack.

OPERATION OF SHUTTLE VALVE

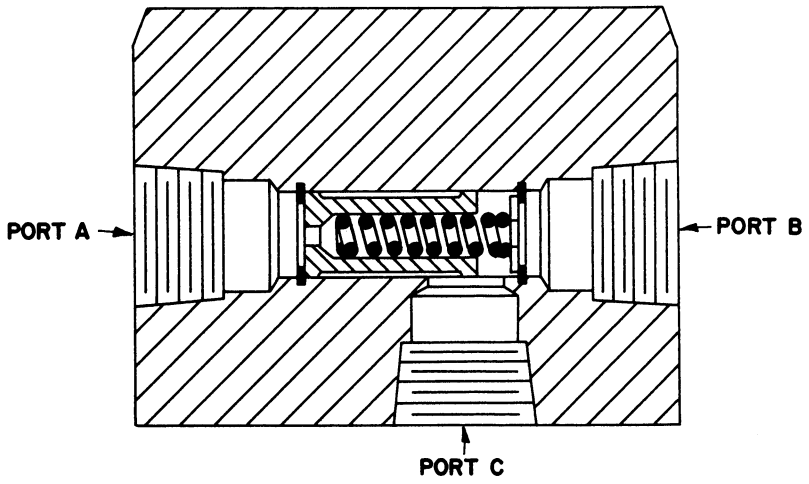
The purpose of this valve in our application is to supply oil at high pressure to the base end of the rolling rack cylinder to move the bales forward when unloading and when loading provide a restriction for the oil coming from the base end of the rolling rack cylinder to prevent rolling rack run away. To accomplish this we use a spring loaded piston which moves under flow to cover port C which is plumbed to a 40 pound relief valve. High pressure oil is introduced through port A which forces the piston toward port B thus sealing off port C.

All oil from Port A is then forced through the small opening in the piston straight through the valve and out port B which is connected to the base end of the rolling rack cylinder. This happens each time the rolling rack control is moved into position to bring the bales forward from the load rack on to the second table. Each time the control is released the piston is forced back to its original position at port A by the spring. The small hole in the piston allows the piston to shift without trapping oil between port A and the selector valve. Since the piston is normally located toward the A port, when loading in the field as bales are delivered from the second table to the load rack and the rolling rack is forced rearward, oil flows out of the base end of the rolling rack cylinder through port B and is diverted to port C. No oil can flow rearward through port A because of the lock provided by the selector valve.

OIL FLOW WHEN SECOND TABLE CROSS CONVEYOR IS OPERATING

When the single bale unloading control handle is placed in the unload position, the single bale unloading control valve spool is moved into the valve body and the selector valve spool is in the valve body. Oil flows from the right port of the control valve into the selector valve, out of the left port of the selector valve into the orbit motor. The oil flows through the orbit motor causing it to rotate and flows out the out port and returns to the hydraulic oil tank.

SHUTTLE VALVE



MODEL 1010 STACKLINER HYDRAULIC SYSTEM

The oil flow for the first table, second table, lock out valve and load rack is the same as the Model 1000 Stackliner. Refer to that section for a detailed explanation.

OIL FLOW FOR SINGLE BALE UNLOADING

The second table manual control handle must be placed in the locked position to center the second table valve spool. This opens the pressure beyond port of the second table valve and allows the system oil to flow to the single bale unloading control valve. To move the rolling rack forward the single bale unloading control handle is moved to the rear position. This pushes the control valve spool into the valve body and pulls the selector valve spool out of the valve body. Oil flows out of the right port of the control valve into the selector valve through the shuttle valve and into the base of the rolling rack cylinder.

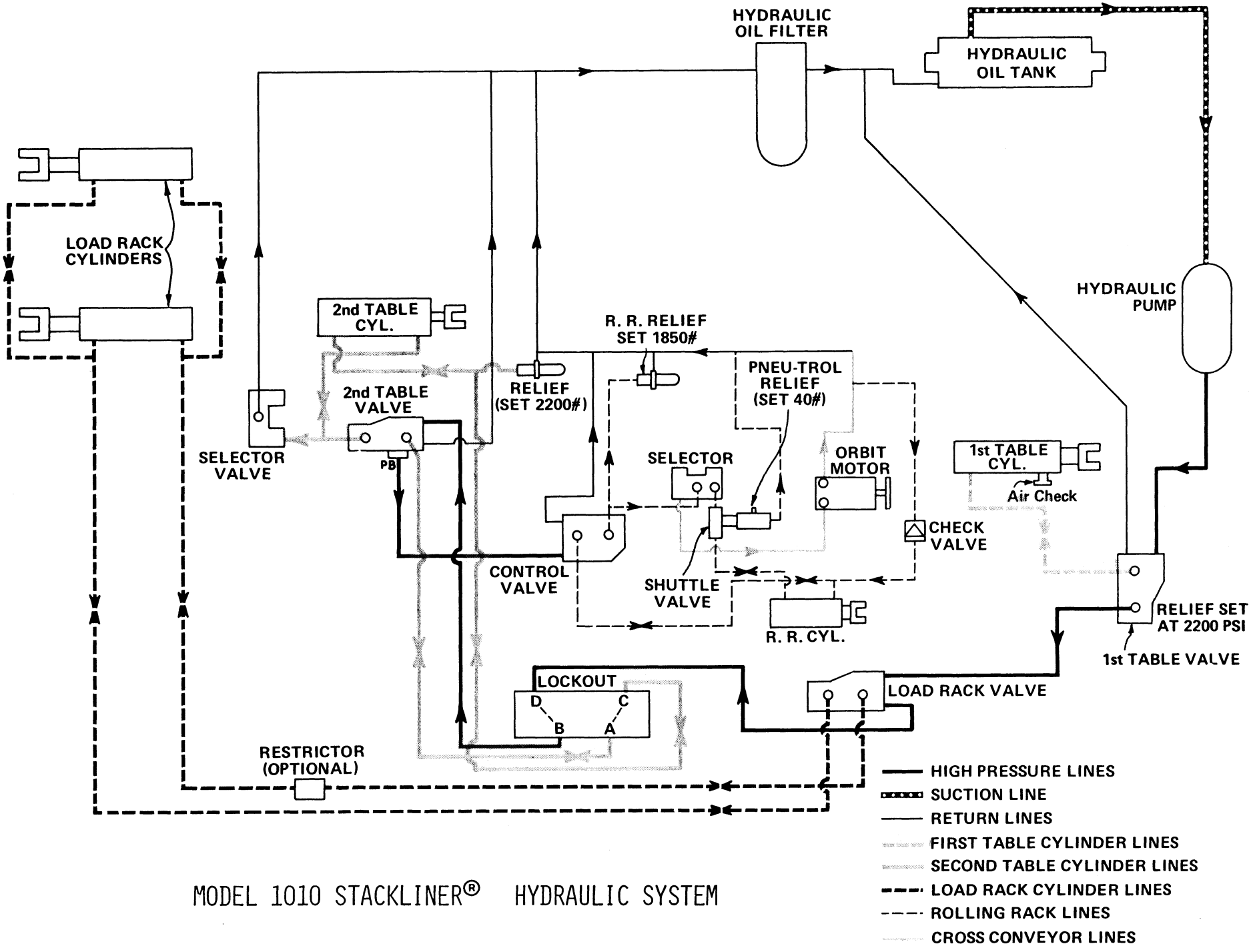
The return oil from the rolling rack cylinder flows back to the left port of the control valve through the outlet line back to the hydraulic oil tank. The oil flow seats the check valve so that it cannot flow to the orbit motor line. When the control handle is placed in the unloading position, the control valve spool is in the valve body and the selector valve spool is in the valve body. The oil flows from the right port of the control valve spool into a selector valve. It flows out of the left work port and the selector valve to the orbit motor causing the orbit motor shaft to turn. The return oil from the orbit motor flows back to the hydraulic oil tank.

The rolling rack is returned to the rear position to prepare for retrieving by moving the control handle to the extreme forward position. This moves the control valve spool out of the valve body and allows oil to flow out of the left work port of the control valve into the shaft end of the rolling rack cylinder.

The oil cannot flow to the return line because it seats the check valve. This forces the rolling rack cylinder to retract. The return oil from the base end of the rolling rack cylinder flows through the shuttle valve to the relief valve and back to return.

When the rolling rack is forward and the wagon is being loaded with bales the rolling rack cylinder must retract as the rolling rack moves back.

The oil in the base end of the rolling rack cylinder flows through the relief valve which is set at 40 pounds and back to the oil tank. The purpose of this relief valve is to reduce rolling rack run away. When the rolling rack cylinder is retracting oil must flow into the shaft end of the cylinder to fill the cavity. This oil comes from the return line of the orbit motor. It opens the check valve and flows into the shaft end of the cylinder. The relief valve for single bale unloading is set at 1850 PSI and 300 PTO speed.



MODEL 1010 STACKLINER® HYDRAULIC SYSTEM

MODEL 1024 STACKLINER HYDRAULIC SYSTEM

The hydraulic pump is chain driven and is rated at 4.5 GPM at 540 PTO speed.

A three spool valve with a pressure beyond port controls the load rack cylinders, rolling rack tine cylinder and the loader cylinder and loader motor. The master relief valve is located in this three spool valve and is set to give a maximum pressure of 1,800 PSI.

LOADER

The one way loader lift cylinder is a one way cylinder. The oil flows, as shown, from the left spool of the three spool to the single acting cylinder and raises the loader. The oil flows back the same line when the loader is lowered. The return oil flows out the return port for the three spool valve to the tank.

The loader motor is a Char-Lynn orbit motor and oil to operate the loader motor (Char-Lynn) flows out the line from the left spool of the three spool valve to the loader motor. The return oil still under pressure joins the oil line from the pressure beyond port of the three spool valve.

FIRST TABLE

The first table valve always receives oil even though the loader motor is operating. The first table valve receives oil either from the pressure beyond port of the three spool valve or from the loader motor. The first table valve is a double acting single spool valve. When the spool is moved to the rear, oil flows out the line to the single acting first table cylinder. When the table raises and trips the valve, the return oil flows back through the line and out the return line from the valve and back to the tank.

SECOND TABLE

The oil for the second table valve flows out the rear port of the first table valve whenever the first table is not in operation. The second table delay is accomplished in this manner. The oil flows, as shown, to the lock out valve and into the second table valve. The second table valve is a single spool double acting valve. When the valve is tripped the oil flows out of the second table valve through the lock out valve to the bottom of the second table cylinder which is a double acting cylinder. Oil flows out of the top of the second table cylinder and back to the second table valve and out the return oil line to the tank. Some of the oil can flow through the second table neutralizing valve as long as it is open. When the second table has raised far enough to close the neutralizing valve, all the oil must flow back through the second table valve. When the second table trips to return, the oil flows out of the second table valve to the top of the cylinder and out of the bottom of the cylinder back to the lock out valve, to the second table valve and out the return line to the tank. The lock out valve must have oil flowing through the inlet port to open up the poppet on the back port. When the hydraulic system is turned off, there is no oil flow, the poppet in the lock out valve closes, trapping the oil in the second table cylinder so that the second table cannot fall. After the second table has lowered part way the neutralizing valve opens and the table continues to fall by gravity. All of the oil goes through the neutralizing valve when the table reaches the down position.

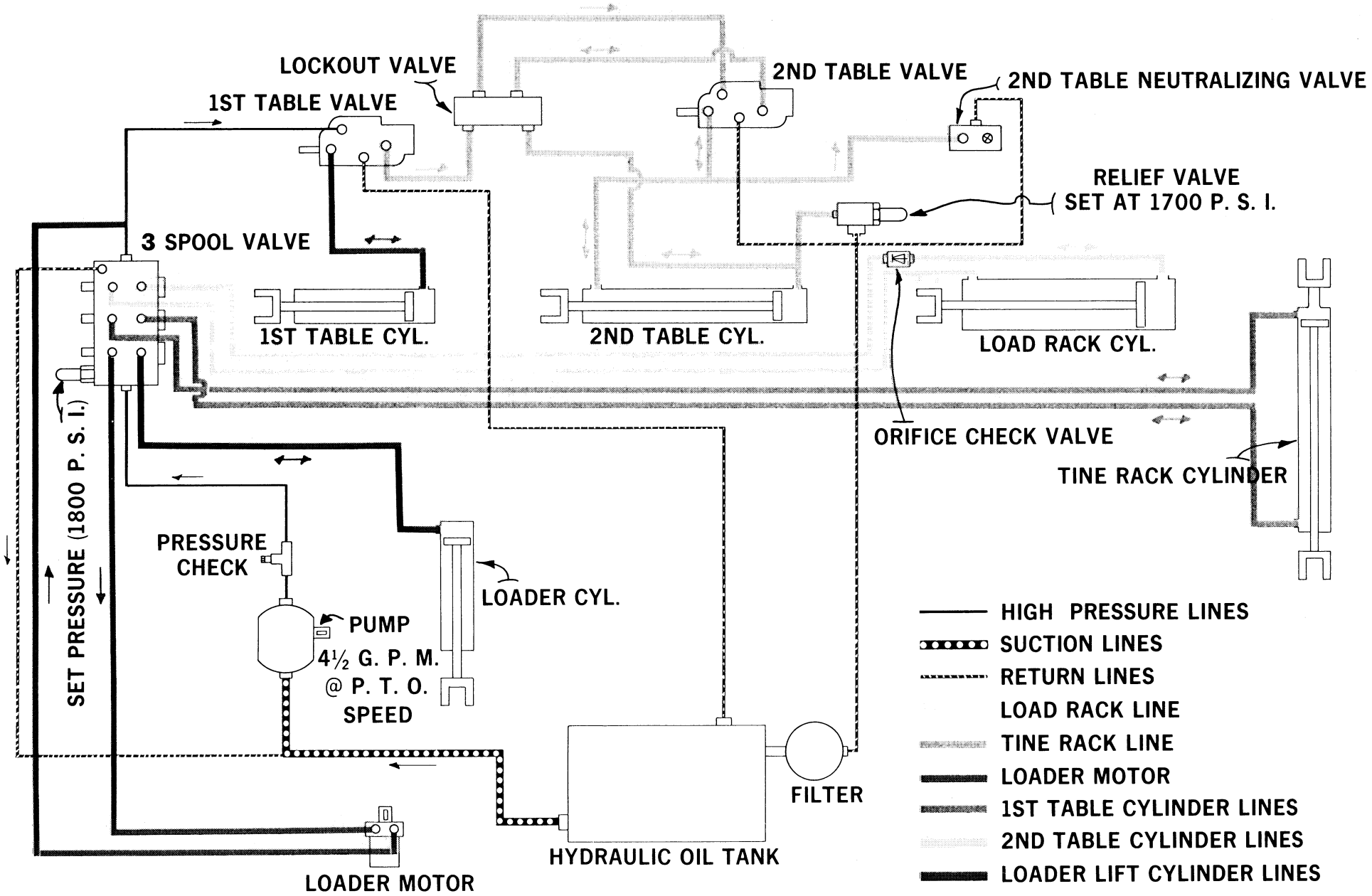
LOAD RACK

The load rack cylinder is a double acting cylinder and is operated by the right hand spool of the three spool valve. The oil lines are shown on chart. The return oil goes from the three spool valve to the tank. A restrictor or orifice check valve slows down the lowering of the load rack to prevent a heavy load from damaging the frame.

LOAD RACK TINES

The tine rack cylinder is a double acting cylinder operated by the center spool of the three spool valve. The oil flows as shown.

MODEL 1024 WAGON



MODEL 1030 STACKLINER HYDRAULIC SYSTEM

The pump on the Model 1030 Bale Wagon is equipped with a flow divider and a relief valve. The flow divider is factory set to send a maximum of 8 GPM to the hydraulic system. The relief valve is set to provide for a maximum of 2,000 PSI.

BALE LOADER

Oil from the flow divider on the pump flows to the bale loader and loader motor control valve. When the control valve spool is pulled out of the valve body oil flows, as shown, to the loader lift cylinder raising the loader. The loader is dropped by pushing the valve spool into the valve body allowing the oil in the lift cylinder and in the line to flow out the return line of the control valve to the hydraulic oil tank. When the valve spool is pushed into the valve body oil flows out the line to the orbit motor. The return oil from the orbit motor flows out the line and connects up to the pressure beyond line from the bale loader and loader motor control valve. When the bale loader and loader motor control valve spool is in the center position, oil flows straight through the valve and out the pressure beyond port of this valve on to the load rack and push off control valve. The oil flows through the load rack and push off feet control valve through the line to the first table valve.

FIRST TABLE

When the first table control valve spool is pushed into the valve body, oil flows, as shown, to the first table cylinder and raises the first table. The port in the first table valve that supplies oil to the second table valve is closed during the time the first table is raising. The second table is therefore automatically delayed. When the first table is completely raised the latch is released allowing the valve spool to move out of the valve body. The oil from the cylinder flows back to the first table valve and out the return line to the hydraulic oil tank. The port is again open in the first table valve to direct the oil flow to the second table valve.

LOCK OUT VALVE

Before the oil flows to the second table valve it first flows through the second table lock out valve. Pressure entering the lock out valve from the hydraulic system moves a floating spool and poppet which in turn opens the second port through the lock out valve. When the second port is open oil can either flow into the cylinder or out of the cylinder and return to the tank. If the oil pressure in the hydraulic system drops to about 0 PSI the spring on the poppet closes the second port on the lock out valve which prevents oil from returning to the second table cylinder and prevents it from lowering.

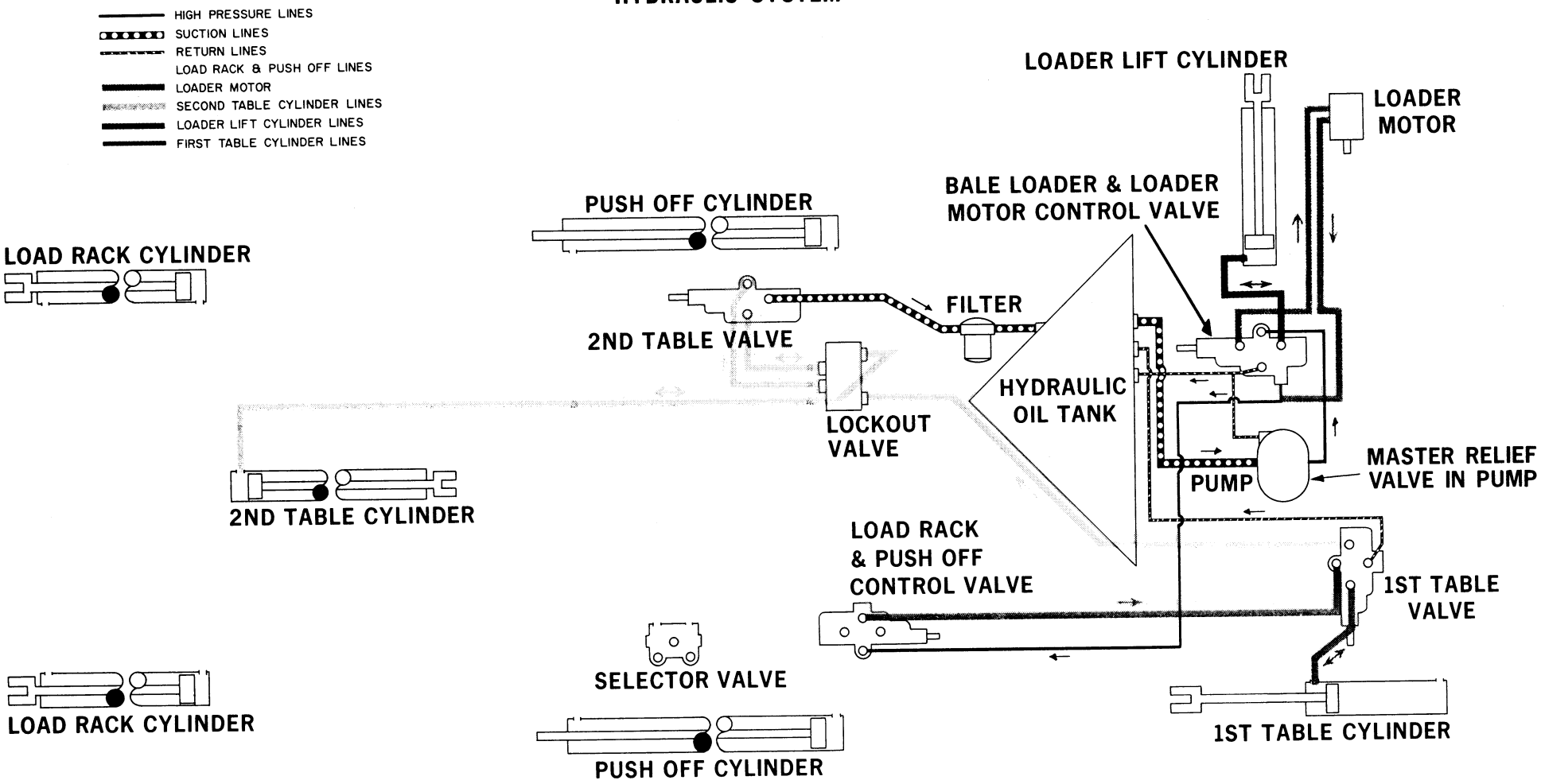
SECOND TABLE

When the second table valve spool is pulled out of the valve body the port is open and allows oil to flow through the lock out valve and on to the second table cylinder. As the second table raises, air pressure is built up in the bottom half of the table cylinder. This air pressure helps start the table back down. The second table valve spool must be pushed back into the valve body to open up the return line to the second table cylinder. The oil in the second table cylinder flows through the lock out valve back to the second table valve and then out the return port of the valve through the filter and back to the oil tank. If the second table is to be held up to form an end gate when the load is finished, the second table valve spool must be held in the center position. When the valve spool is in center position the oil is trapped in the second table cylinder and second table cannot fall. Oil from the cylinder is blocked but oil from the hydraulic system passes on through the second table valve on to the tank.

LOAD RACK & PUSH OFF FEET

The operation of the load rack and the push off feet is controlled by the same handle. A mechanical means is employed to prevent the load rack from being raised or lowered when the push off feet are out. A two way control valve is used in conjunction with a selector valve. The selector valve merely directs the oil from the control valve to a specific place which on the 1030 is either the push off feet cylinders or the load rack cylinders. To raise the load rack, pull forward on the control handle which moves the control valve spool to the rear and directs oil out the front port to the selector valve. The selector valve has been set mechanically to di-

MODEL 1030 AUTOMATIC BALE WAGON
HYDRAULIC SYSTEM



rect the oil out the front port to the front end of the load rack cylinders. The exhaust oil from the opposite end of the load rack cylinders returns to the rear port of the load rack and push off control valve. When the load rack is completely raised it pushes a control rod forward which removes a latch from behind the selector valve arm. The selector valve can now be manually shifted to direct oil to the push off feet and block off the load rack cylinders. When the selector valve spool is moved to the rear oil will flow out the rear port of the selector valve and flow to the front end of the push off feet cylinders. The exhaust oil from the opposite end of the push off cylinders will flow to the rear port of the load rack and push off control valve. When the push off feet move out, a latch is mechanically moved in front of the selector valve arm. The selector valve cannot be moved to direct oil to the load rack cylinders until the push off feet are completely retracted. The push off feet can be retracted by pushing the control handle to the rear which moves the control valve spool forward directing oil out the rear port of the valve. Oil flows out the rear port of the control valve to the load rack cylinders and to push off feet cylinders. The oil is trapped in the load rack cylinders between the cylinder and the selector valve so the oil must flow to the rear end of the push off feet cylinders retracting the feet. The return oil from the front end of the push off feet cylinders flows back to the selector valve and then on to the front port of the load rack and push off feet control valve, on to the first table valve to the second table valve and in to the tank. When the push off feet are fully retracted the front latch is mechanically moved away from the selector valve arm. By pushing further rearward on the manual control handle the selector valve spool is moved forward. Oil flows out the rear port of the load rack and push off feet valve to the rear end of the load rack cylinders. The oil can flow also to the push off feet cylinders but since they are already retracted the oil must flow to the rear end of the load rack cylinders retracting the load rack cylinders. The return oil from the front end of the load rack cylinders flows back to the selector valve then back to the front port of the load rack and push off feet valve.

MODEL 1035 STACKCRUISER HYDRAULIC SYSTEM

The first condition we will discuss is oil flow when the engine is running with the hydraulic system turned on but the Bale Wagon is not operating. Oil from the hydraulic oil tank flows through the suction line from the tank to the hydraulic pump. A built in flow divider on the pump takes off 2½ gallons per minute at a maximum of 1,000 PSI and directs it to the power steering gear. The oil flows through the power steering gear back to the hydraulic oil tank. The rest of the oil put out by the pump goes to another flow divider which directs a maximum of 8 gallons per minute to the hydraulic shut off valve which is turned on, if the valve was turned off, the oil would flow directly back to the hydraulic oil tank. Any excess over the 8 gallons per minute go direct from the flow divider to the hydraulic oil tank. The oil from the shut off valve is directed to the load rack and push off feet valve. The load rack and push off feet valve is a pressure beyond type valve, therefore the oil is directed on to the bale loader motor and loader lift cylinder valve. Since the wagon isn't being operated the oil flows through the loader motor and lift cylinder valve, pressure beyond type valve, out the cross conveyor motor. The cross conveyor motor will run and the oil flows to the first table valve then on to the second table valve and into the hydraulic oil tank.

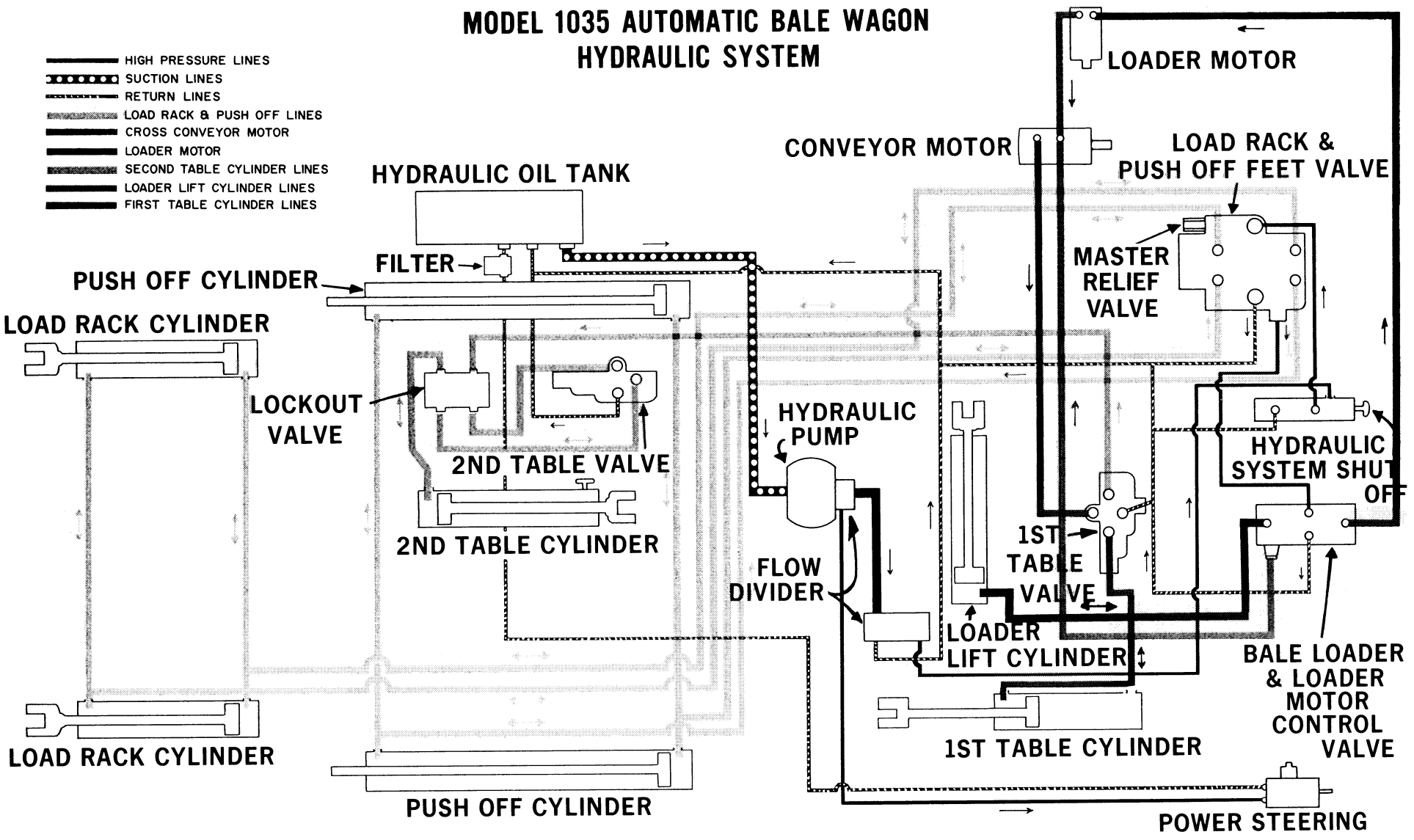
BALE LOADER & CROSS CONVEYOR

We will now follow the oil flow involved in each operation of the bale wagon starting with the lowering of the bale loader. Push forward on the loader control valve handle to allow oil to flow from the lift cylinder back to the valve and into the return line to the hydraulic oil tank. When the handle on the loader control valve is held forward oil flows out the front port of the valve on to the loader motor causing it to run. Oil flowing through the pressure beyond port is blocked whenever the spool is moved. We previously showed that the cross conveyor was driven with oil flowing out the pressure beyond port. The cross conveyor must be running when the loader motor is lifting a bale, therefore, the oil discharging from the loader motor is directed into the input line into the cross conveyor motor. The cross conveyor motor keeps running even though the oil is cut off at the pressure beyond port.

FIRST TABLE

The return oil from the cross conveyor motor is directed to the first table valve. When the

MODEL 1035 AUTOMATIC BALE WAGON HYDRAULIC SYSTEM



first table is tripped, oil flowing from the cross conveyor motor is directed out the right port of the first table valve to the first table cylinder. The second table is automatically delayed because all the oil is being used to raise the first table. When the first table reaches the correct height, the control valve spool is shifted to the right which directs the oil under pressure on to the second table lock out valve and into the second table control valve and into the hydraulic oil tank. Oil from the first table cylinder returns to the first table valve and into the return oil line.

SECOND TABLE

When the second table trips, the oil is directed from the second table control valve through the lock out valve into the second table cylinder. The valve spool in the first table control valve must be pulled to the right to allow oil to flow out the left port of the first table valve and flow through the lock out valve into the second table valve. If the first table valve spool is not pulled all the way to the right, the second table will operate slow. When the second table reaches the correct height the valve spool is shifted into the valve body directing the oil flow to the hydraulic oil tank. Both the return oil from the cylinder and the rest of the hydraulic oil flow out of the second table control valve to the hydraulic oil tank. A lock out valve is incorporated in the system as a safety feature. The lock out valve operates as follows:

LOCK OUT VALVE

Oil under pressure flows into one side of the lock out valve. The oil pushes a floating spool which in turn opens a poppet valve in the line to the second table cylinder. Any time the oil from the first table valve to the lock out valve is shut off, the poppet valve closes blocking the line to the second table cylinder. The oil is shut off by stopping the engine, shutting off the hydraulic system or any break between the lock out valve and the rest of the system. The lock out valve is designed to prevent a raised second table from falling if someone moves the second table control valve to the down position while under the table.

NOTE: THE HYDRAULIC SYSTEM MUST BE SHUT OFF OR THE ENGINE STOPPED BEFORE THE LOCK OUT VALVE WILL CLOSE.

SECOND TABLE LOCK CONTROL

The second table may be held in the extreme raised position by pulling out the second table lock button before the table reaches the top position. The lock control places a stop in front of the second table trip arm which prevents the arm from moving the valve spool all the way forward. The valve spool is centered in the valve body which shuts off the port to the hydraulic cylinder and opens the port to let the incoming oil to the valve return directly to the hydraulic oil tank. Pushing the lock button lets the valve spool move all the way forward opening the return port and allows oil in the cylinder and line to return to the hydraulic oil tank.

LOAD RACK AND PUSH OFF FEET

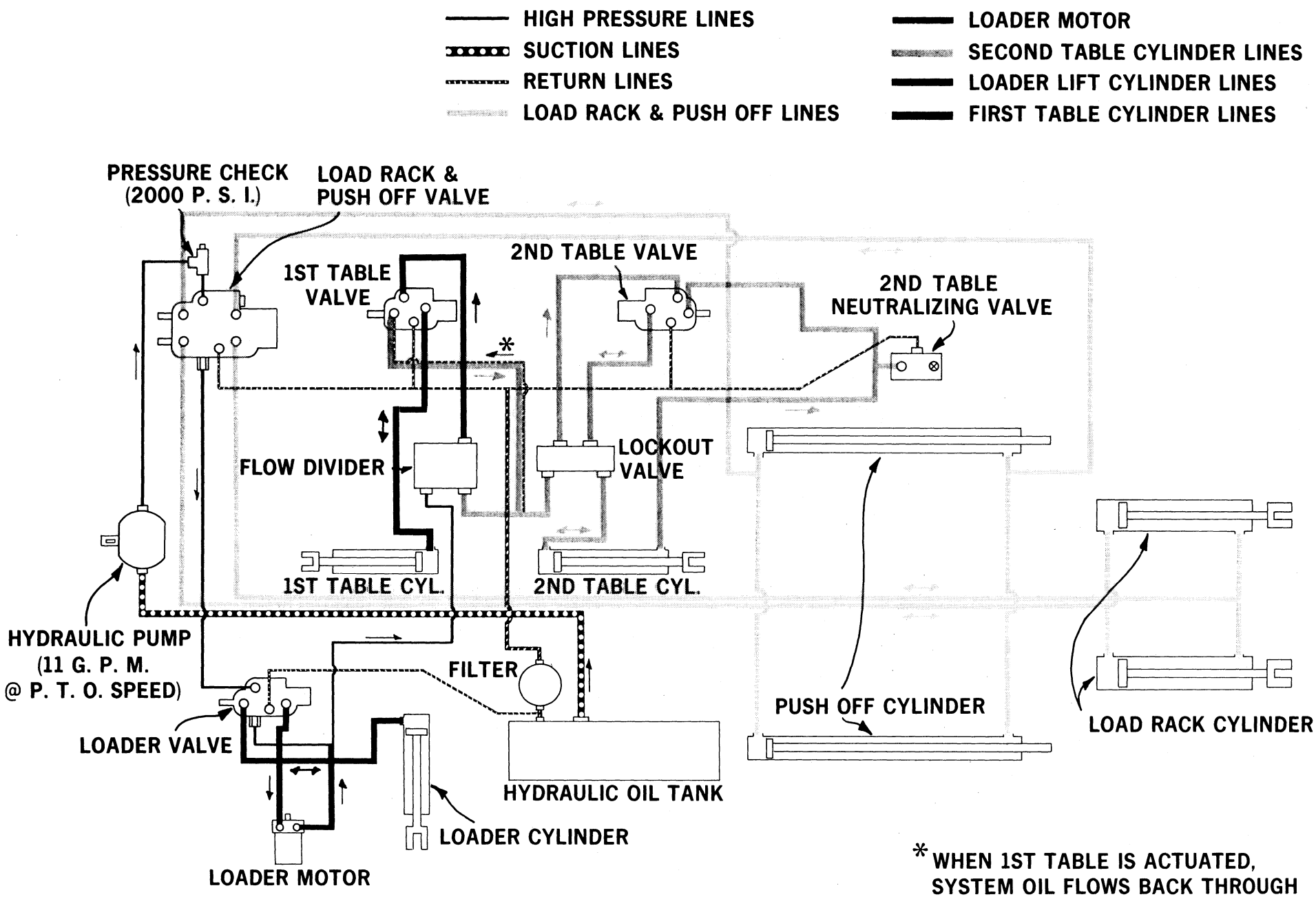
Pulling the load rack control handle all the way to the rear moves the valve spool to close the presure beyond port and direct oil to the bottom of the lift cylinders, and also opens the port to allow oil to flow from the top of the cylinders back into the valve and out the return oil port to the hydraulic oil tank. The valve operates the same as most two way cylinder control valves used on farm machinery. The push off control valve operates the same as the load rack control valve.

MODEL 1044 STACKLINER HYDRAULIC SYSTEM

The hydraulic pump is almost identical to the one used on the Model 1030 and the Model 1046 except it does not have a flow divider. The pump puts out approximately 11 gallons per minute at 540 PTO speed. The load rack push off valve is a double acting valve and the master bypass or relief valve is located in this valve. The relief valve is a cartridge type set at 2,000 PSI. It is not adjustable. The relief valve can be cleaned if pressure is low, otherwise it must be replaced if cleaning does not correct the problem. You must remember the pump could be worn and be causing the low pressure.

BALE LOADER

The loader lift cylinder is a one way cylinder and is controlled by the loader valve which is a single spool double acting valve with a pressure beyond port. Oil flows out the line to the cylinder to raise the loader. The loader is lowered by bringing oil back the line and out the return line from the valve to the tank. The loader motor is a Char-Lynn orbit motor and is operated by the loader control valve. Oil



MODEL 1044 WAGON

* WHEN 1ST TABLE IS ACTUATED, SYSTEM OIL FLOWS BACK THROUGH 1ST TABLE VALVE, ACTING AS 2ND TABLE DELAY.

flows through the orbit motor, turning the motor, and out the line that joins the line from the pressure beyond port to the flow divider.

FIRST TABLE

The flow divider divides the flow of oil so that 4 gallons per minute is directed to the first table valve for operating the first table. The secondary flow of oil flows on to the second table lock out valve. The first table valve is a single spool double acting valve made by Cessna. When the first table is tripped oil coming from the primary port of the flow divider flows out the rear port on the first table valve to the first table cylinder raising the first table. The first table cylinder is a single acting cylinder. It has a restrictor to build up air pressure to help start the table down. When the first table is tripped to return, oil flows back, as shown, to the first table valve and into the return oil line back to the oil tank. The 4 gallons per minute now flow out the front port of the first table valve and joins the flow to the second table.

SECOND TABLE

Oil to operate the second table cylinder comes from the secondary port on the flow divider plus the 4 gallons per minute coming out the front port on the first table valve which originally came from the flow divider. The two flows join and enter the front port on the lock out valve going on through it to the second table valve which when tripped directs oil back to the rear ports of the lock out valve and on to the bottom of the second table cylinder. When the second table reaches the desired height and is tripped the return oil flows out the right port on the second table valve to the neutralizing valve which is closed. The oil is directed to the top of the second table cylinder and return oil flows out the bottom of the cylinder back to the lock out valve to the second table valve and to the return line to the tank. When the table gets part way down the neutralizing valve is opened and oil flowing to the neutralizing valve flows either into the top of the second table cylinder or back to the return oil line to the tank. When the second table is all the way down all the flow must go to the tank through the return oil line from the neutralizing valve.

LOAD RACK AND PUSH OFF FEET

The line, as shown, provides oil for the load rack cylinders and push off feet cylinders. The portion of the hydraulic system concerned with operation of the load rack cylinders and push off feet cylinders is a simple two way system using a double spool valve with double acting spools operating double acting cylinders. Oil flows out of the spool being operated to either the top or the bottom of the cylinder and the oil returning flows back to the valve and out through the return oil line to the tank.

OIL FLOW THROUGH HYDRAULIC SYSTEM OF THE MODEL 1046 & 1047 BALE WAGON

We will first follow the flow through the system when the engine is running and the hydraulic system has been turned on, but the wagon is at a standstill.

Oil from the hydraulic oil tank flows through the suction line to the hydraulic pump. The flow divider on the pump takes off 2½ gallons per minute and directs this oil to the power steering gear. The oil from the power steering gear flows back a return oil line to the return oil manifold and from there back to the hydraulic oil tank.

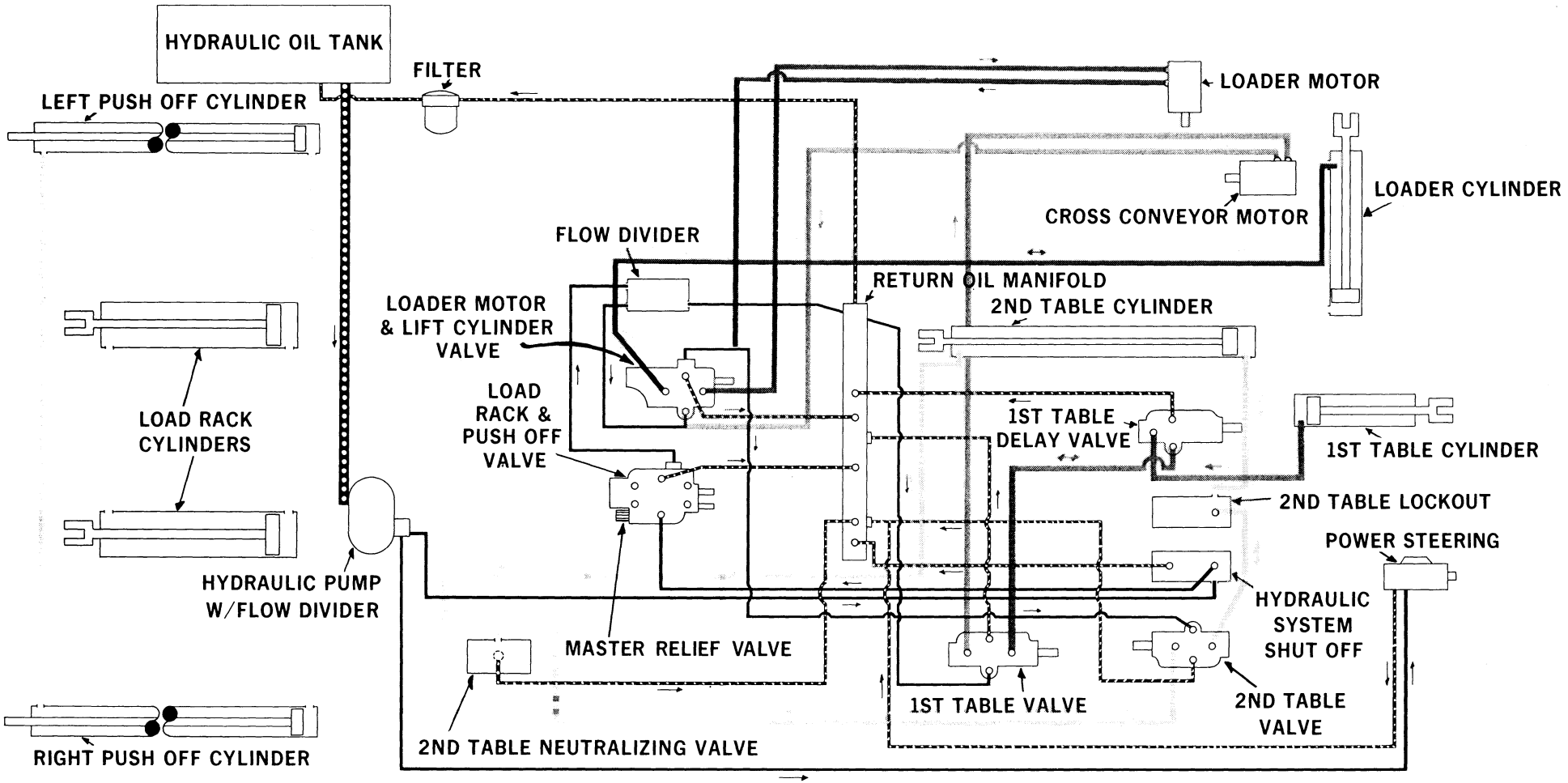
The remaining amount of oil from the flow divider on the pump flows first to the hydraulic shut off valve and with the system turned on, flows from the shut off valve to the load rack and push off valve. The load rack and push off valve is a pressure beyond type valve. The oil flows through this valve and on to the second flow divider in the system. The oil flow is divided by the flow divider.

CROSS CONVEYOR MOTOR

Four gallons per minute of the flow are directed out the primary port to the first table valve. We will now follow this flow of oil. The oil flows through the first table valve out to the cross conveyor motor. The return oil from the cross conveyor motor returns to a Tee at the inlet port of the loader motor and lift cylinder valve. The 4 gallon per minute flow joins oil flow coming out of the secondary port on the flow divider.

The loader motor and lift cylinder valve is a pressure beyond type valve. The oil flows through this valve on to the second table valve. Oil is then directed back to the second table neutralizing valve. The neutralizing valve is po-

MODEL 1046 AND 1047 AUTOMATIC BALE WAGON HYDRAULIC SYSTEM



sitioned to dump oil into the return line to the oil manifold. The oil is then returned from the oil manifold back to the hydraulic oil tank.

BALE LOADER MOTOR OPERATION

The next step in following the oil flow through the system will be when the loader motor is operated to place a bale on the first table. In the previous paragraph we outlined how the oil got to the loader motor and lift cylinder control valve. When the loader motor lever is pushed forward oil flows from the loader motor control valve to the loader motor and returns from the loader motor and joins the oil flow out of the pressure beyond port on the loader motor valve. As we described previously this line continues on to the second table valve and back to the tank.

FIRST TABLE OPERATION

The next step of the oil flow through the system will be the operation of the first table. In the first paragraph we described the flow of oil to the first table valve, where it either could be used to operate the first table cylinder or used to operate the cross conveyor motor. When the first table is tripped oil is shut off from the cross conveyor motor and directed to the first table delay valve.

If the second table is down in position, the oil flow will go from the first table delay valve into the first table cylinder to raise the first table. When the first table returns, oil is forced by the weight of the first table, back through the first table delay valve into the first table valve and out the return oil line to the oil manifold and back to the hydraulic oil tank. As soon as the first table valve was tripped to return the table, the oil is directed out to the cross conveyor motor which starts running again.

SECOND TABLE OPERATION

The next step in the system is the operation of the second table. Oil from the pressure beyond port on the loader motor valve is flowing to the second table valve. When the second table valve is tripped oil flows from the second table valve to the second table lock out valve and on into the second table cylinder. Oil flows in the bottom of the second table cylinder and out the top. Oil returning from the top of the cylinder is directed from the neutralizing valve back to the oil return manifold until the second table reaches its top position. Linkage on the second table shifts the second table neutralizing valve spool so that oil cannot flow from this valve back to the return oil manifold. The linkage also shifts the second table control valve to bring the second table down.

Now oil under pressure flows out of the second table valve to the top of the second table cylinder and returns from the lower end of the second table cylinder back to the second table valve and returns to the return oil manifold and from there to the hydraulic oil tank. After the table has moved about 1/3 of the way down linkage shifts the neutralizing valve so that the oil line to the top of the cylinder is opened direct to the return oil manifold and the table then free falls the rest of the way down. Oil is still going out to the top of the second table cylinder, but since the neutralizing valve is opened instead of oil under pressure going to the top of the cylinder it goes directly to the return line to the return oil manifold and back to the hydraulic oil tank. Just enough oil to fill the cylinder is sucked into the table cylinder as the table lowers.

OPERATION OF THE BALE LOADER LIFT CYLINDER

The next step in the operation after the wagon is loaded is to raise the bale loader. The control handle is shifted to move the loader motor and lift cylinder valve to direct oil out of this valve to the loader lift cylinder which then raises the loader. If the loader is to be lowered, the valve is shifted to direct oil to the loader motor but it also opens the port to allow the oil to return from the loader lift cylinder to the loader motor and lift cylinder control valve and dump back into the return oil manifold and back to the hydraulic oil tank.

LOAD RACK OPERATION

The next step in the oil system is to raise the load rack. When the load rack control handle is moved rearward, the spool is shifted to block off the pressure beyond port. Oil is directed out of the valve into the lower end of the load rack cylinders which raises the load rack and also forces oil out of the top of the cylinders back to the load rack and push off valve and from there direct to the return oil manifold and back to the hydraulic oil tank. The spool is shifted in the opposite direction to lower the load rack and the oil moves in reverse action.

The operation of the push off feet is exactly the same as the operation of the load rack except that you shift the other spool which blocks off the oil from the pressure beyond port and directs the oil to the push off feet. The oil returning from the push off feet is directed back to the return oil manifold and back to the hy-

draulic oil tank.

When the hydraulic system is shut off oil flows from the pump to the hydraulic shut off valve and is directed back to the return oil manifold and back to the hydraulic oil tank.

FIRST TABLE DELAY VALVE OPERATION

The first table on the Model 1046 is loaded with two bales. When the second bale is in place and the cross conveyor chain has moved it over to trip the first table valve, the cross conveyor will stop. If the second table is in operation at this time, the first table delay valve is opened by means of a spring. Oil from the delay valve is directed to the return oil manifold and back to the hydraulic oil tank instead of to the first table cylinder. The first table remains down and will not operate until the second table has returned to the down position and pushed down the handle which closes the delay valve and allows the first table to complete its cycle.

Follow the oil flow on the chart to become familiar with the valves and the motors through which the oil must flow on its way back to the hydraulic oil tank. You can see that any malfunction in any of these valves and orbit motors may cause failure of the next valve in the system to operate properly. When checking out problems in this oil flow on the 1046 Automatic Bale Wagon, you should first check the pressure from the pump.

Pressure is checked at the pipe tee on top of the second table lock out valve. Install a pressure gauge of 2500 pounds or more capacity at this point, operate the engine at full speed, raise the second table with the manual control until the table by-passes and check the reading on the gauge. If the pressure is not 2000 pounds per square inch, it may be necessary to clean or replace the relief valve.

MODEL 1048 STACKCRUISER HYDRAULIC SYSTEM

OIL FLOW WHEN THE PUMP IS RUNNING BUT THE WAGON IS NOT BEING OPERATED

The pump will produce a flow of 13.5 GPM at 1800 RPM or 23 GPM at 2500 RPM. The capacity of the hydraulic oil tank is 19 gallons. The pump is equipped with a flow divider with a built in relief valve for the priority flow. The flow divider diverts the first 2.5 GPM at a maximum of 1500 PSI to the power steering. The return oil from the power steering flows to the hydraulic oil tank. The secondary oil from the flow divider on the pump flows to the hydraulic shut off and lock out valve. If the master hydraulic control handle is in the rear position the oil will flow back to the oil tank. If the control handle is in the forward position the oil will flow to a flow divider. The master relief valve is teed into this line between the hydraulic shut off valve and the flow divider. It is set for a maximum pressure of 2,000 PSI. The flow divider diverts 4 GPM to the in port of the loader lift valve. The oil flows through the pressure beyond port of the loader lift valve to the in port of the first table valve.

It flows out the right work port of the first table valve and through the cross conveyor motor. The return oil from the cross conveyor motor flows to the loader motor valve where the flow is joined by the secondary flow from the flow divider. The combination of the two flows continues on to the second table valve. It flows out the left work port of this valve and into the in port of the load rack and push off valve. It flows out of the out port of this valve and flows back to the oil tank. The secondary relief valve is located in the load rack and push off feet valve. It is set for a maximum pressure of 1950 PSI.

BALE LOADER

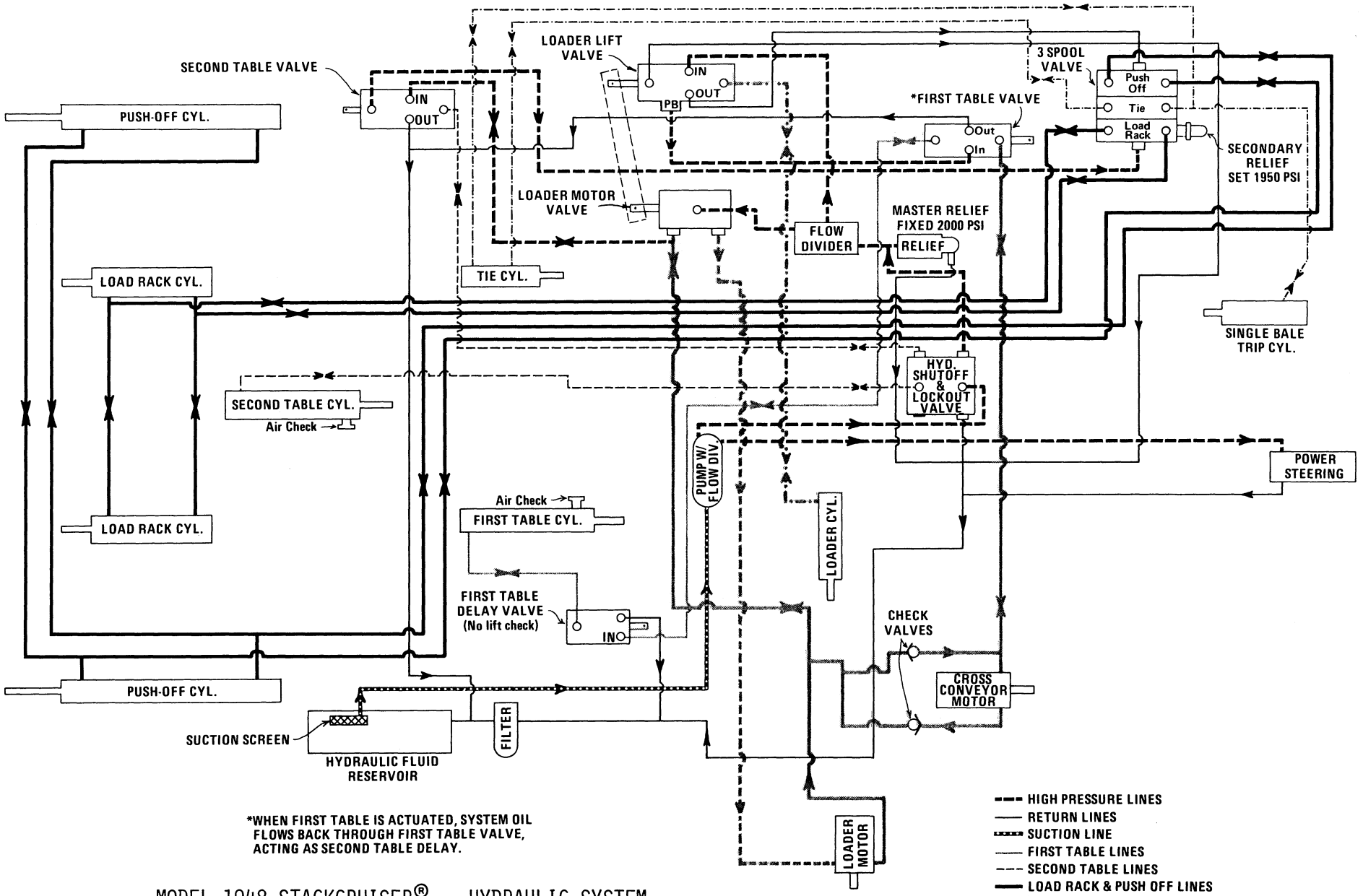
The loader lift valve receives 4 GPM from the priority port of the flow divider. When the valve spool is pulled out of the valve body oil flows out of the right work port to the loader cylinder extending the cylinder and raising the bale loader. When the valve spool is pushed into the valve body the right work port becomes a return port and the weight of the loader pushes the oil out of the loader cylinder through the right work port and out of the return port back to the oil tank.

LOADER MOTOR

The loader motor valve receives its oil from the secondary port of the flow divider. When the loader motor valve spool is pushed into the valve body the oil flows out of the right port and flows through the loader motor. The return oil from the loader motor joins up with the return oil from the cross conveyor motor and flows to the in port of the second table valve.

FIRST TABLE

The first table valve receives its oil from the



*WHEN FIRST TABLE IS ACTUATED, SYSTEM OIL FLOWS BACK THROUGH FIRST TABLE VALVE, ACTING AS SECOND TABLE DELAY.

MODEL 1048 STACKCRUISER® HYDRAULIC SYSTEM

pressure beyond port of the loader lift valve. When the first table valve spool is pulled out of the valve body, the oil flows out of the left work port and into the first table delay valve. If the delay valve spool is in the valve body the oil flows out of the left port and into the first table cylinder raising the table. If either the second table or the loader is raised, the first table delay valve spool will be out of the valve body and the oil will flow out of the top right port and back to the oil tank. When the first table valve spool is pushed into the body the left work port becomes a return port and the weight of the first table forces the oil out of the first table cylinder through the delay valve out of the bottom right port and back to the left port of the first table valve. It flows through the out port of the first table valve back to the filter and to the oil tank.

SECOND TABLE

The second table valve can receive its oil from three sources:

(1) The left port of the loader motor valve.
(2) The return oil from the loader motor.
(3) The return oil from the cross conveyor motor.

If the first table is actuated this oil will flow through the upper check valve and back through the first table valve to the oil tank. This acts as the second table delay. When the second table valve spool is pulled out of the valve body, the oil flows out of the right work port through the hydraulic shut off and lock out valve and into the base end of the second table cylinder. The cylinder extends and raises the second table. As the cylinder is extending air pressure is built up in the shaft end of the cylinder. This air helps return the second table to the down position. When the second table valve spool is pushed into the valve body, the right work port becomes a return port. The weight of the second table plus the air pressure forces the oil out of the second table cylinder to the hydraulic shut off and lock out valve back to the second table valve out the return line and back to the tank. If the hydraulic master control handle is pulled to the rear position the oil will be trapped between the hydraulic shut off and lock out valve and the second table cylinder. This will not allow the second table to fall. However, always remember to prop the second table with the second table support before working underneath the table.

AUTOMATIC TIE

The three spool valve for the push off feet, automatic tie and load rack receives its oil from the left work port of the second table valve. It will not receive oil if the second table valve spool is not in the in position. When the center valve spool is pushed into the valve body, oil flows out the right center work port and flows to the base end of the tie cylinder and to the single bale trip cylinder. The return oil from the tie cylinder flows back to the left work port and on to the tank.

LOAD RACK AND PUSH OFF FEET

When the load rack valve spool is pushed into the valve body, the oil flows out the right work port and to the base end of the load rack cylinders. The return oil from the shaft end of the cylinders flows back to the left work port and on to the tank.

When the push off valve spool is pulled out of the valve body, oil flows out the left work port and to the base end of the push off cylinders. The return oil from the shaft end of the push off cylinders flows back to the right work port and then back to the tank.

CAUTION!

BEFORE MAKING ANY ADJUSTMENTS OR LUBRICATING THE MACHINE, LOWER THE HYDRAULIC SHUT-OFF GATE, SHUT OFF THE ENGINE AND MAKE SURE THE SECOND TABLE AND LOAD RACK ARE FULLY RAISED AND SECURELY BLOCKED. DO NOT MAKE ADJUSTMENTS WHEN THE TABLES ARE LOADED.

TROUBLE SHOOTING

Hydraulic mechanisms are precision units and their continued smooth operation depends on proper care, therefore, do not neglect hydraulic systems. Keep them clean. Change the oil and oil filter at established intervals. If in spite of these precautions improper operation does occur, the cause can generally be traced to one of the following:

1. Improper adjustments.
2. Dirt, decomposed packing, water, sludge, rust, etc. in the system.
3. Insufficient fluid in the system.
4. Internal or external leakage.
5. Presence of air in the system.
6. Mechanical damage or structural failure.
7. Use of the wrong viscosity or type of oil.

Some possible causes of specific troubles which may be encountered and their remedy are indicated in the following tables:

TROUBLE SHOOTING HYDRAULIC PUMPS

PROBLEM — Noisy pump.

a. Answer — Oil level too low in reservoir. Maintain oil level high enough over the suction line to pump so that oil will not vortex and draw air into suction line. If pump is drawing air, oil will turn milk colored.

b. Answer — Oil too heavy. Heavy oil will not flow through suction line and into pump suction port fast enough to prevent the pump from cavitating. Use type of oil recommended in Owner's Manual.

c. Answer — Suction line plugged or collapsed. Inspect line for internal obstructions and correct size. Pump should not pull more than 5 inches of mercury vacuum for maximum pump life.

d. Answer — Suction line screen plugged. Clean screen and change hydraulic oil.

e. Answer — Air leaks at pump intake piping joints, at pump shaft packing can be tested by pouring oil on joints while listening for change in sound of operation and tighten as necessary.

f. Answer — Reservoir air vent plugged. Air must be allowed to breathe in the reservoir. Clean or replace breather.

g. Answer — Remove rag, paper, etc. that might have been pulled into the suction line or pump.

h. Answer — Realign coupling that might be misaligned.

i. Answer — Properly torque tie bolts in pump to prevent air leaking into the pump body.

j. Answer — Replace worn or broken parts inside pump.

PROBLEM — Oil Heating.

a. Answer — Oil supply too low. Maintain oil level at full mark. The oil reservoir is designed to hold enough oil to maintain a safe operating temperature. If the oil level is low, the oil temperature will increase.

b. Answer — Relief valve setting too high or too low. Set relief valve at correct pressure. A high relief valve setting will allow too much slippage past the gears and pump. A low relief valve setting will allow too much oil to pass over the relief valve thus creating heat. Allowing the pump to run over relief valve for excessive length of time will burn up the pump. Can be caused by a sticking valve spool.

c. Answer — Oil in system too light. Drain reservoir and refill with proper viscosity. Light oil will allow too much internal slippage in pump, valve and cylinders thus creating heat.

d. Answer — Contaminated oil. Drain reservoir, change filter and refill with proper viscosity of clean oil. Foreign particles in oil increase friction and increase heat.

e. Answer — Internal oil leakage in pump due to wear. It will be necessary to repair or replace the pump.

f. Answer — Open center valves may not be in the neutral position. Make certain that these valves are neutralized and that any pressure relieving valves are in the correct position.

PROBLEM — Foaming Oil.

a. Answer — Reservoir oil level too low. Fill reservoir to proper level. Low oil level will cause oil to vortex and aerate oil.

b. Answer — Air leaking into suction line. Tighten fittings and hose clamps. Loose fittings or clamps allow air to be sucked into the oil line.

c. Answer — Wrong kind of oil. Drain reservoir and fill with recommended oil.

d. Answer — Return oil being returned above oil level in reservoir.

PROBLEM — Low pump flow under pressure.

a. Answer — Worn body. Replace body if I.D. of gear pockets exceeds acceptable limits. Refer to pump Service Manual.

b. Answer — Worn drive or idler gears. Measure gear width, if gear is measured less than acceptable limits, replace gear. Refer to pump Service Manual.

c. Answer — Broken molded "V" seal or phenolic gasket. Replace all seals in pump with seal repair kit. The broken "V" seal prevents the pump from being pressure loaded.

d. Answer — Body rotated 180 degrees from correct location. A small hole is drilled through the body connecting the presure cavity to the pressure loading seals. If the body is reassembled 180 degrees from the correct location, the pump will not be pressure loaded.

e. Answer — Low fluid level in reservoir. Fill to recommended oil level.

f. Answer — Oil intake pipe or suction screen plugged. Clean filter or otherwise remove obstruction.

g. Answer — Air leak in suction line preventing priming or causing noise and irregular action of control circuit. Repair leaks.

h. Answer — Pump turning too slowly to produce high volume. Increase engine RPM to RPM recommended in Owner's Manual.

i. Answer — Dirt in pump. Dismantle and clean.

j. Answer — Dirt in flow divider restricting movement of spool. Dismantle and clean.

k. Answer — Broken spring in flow divider. Replace.

l. Answer — Flow divider not adjusted correctly. It will be necesary to use a flow meter to measure the volume of flow and correctly adjust the flow divider.

m. Answer — Drive shaft or key sheared.

PROBLEM — No Pressure in the System.

a. Answer — Pump not delivering oil for any of the reasons listed under "Low Pump Flow Under Pressure."

b. Answer — Relief valve setting not high enough. Increase pressure setting, using a pressure gauge, to the pressure recommended in the Owner's Manual. A cartridge type relief valve is not adjustable and is preset at the factory. If the system is equipped with this type relief valve it cannot be adjusted, however, to insure cleanliness in this system, snap ring, washer, and screens may be removed and cleaned with air and replaced. If the pressure is still too low, it will be necessary to replace the cartridge type relief valve.

c. Answer — Spring may be broken on pin type relief valve. Replace spring and adjust valve.

d. Answer — Relief valve leaking. Check seat for score mark and reseat.

e. Answer — Internal leakage in control valves or cylinder. To determine location

progressively block off various parts of circuit. When trouble is located — repair.

f. Answer — Relief valve seat loose or not located in the correct position. Correct or replace valve.

g. Answer — Mechanical trouble. Broken shaft, loose coupling, etc. Mechanical trouble is often accompanied by noise that you can locate very easily. If you find it necessary to disassemble, refer to the service manual.

PROBLEM — Excessive Wear of Component Parts in Hydraulic System.

a. Answer — Abrasive matter in the hydraulic oil being circulated through the pump. Drain and flush the hydraulic system and replace filter.

b. Answer — Viscosity of oil too low at working conditions. Use recommended oil.

c. Answer — Sustained high pressure above maximum pump rating. Check the relief valve for maximum pressure setting.

d. Answer — Drive coupler on pump misaligned. Check and correct.

e. Answer — Air recirculation causing chatter in system. Remove air from system.

PROBLEM — Breakage of Parts Inside Pump Housing.

a. Answer — Excessive pressure above maximum pump rating. Check relief valve for maximum pressure setting.

b. Answer — Seizure due to lack of oil. Check the reservoir level, screen over intake line and possibility of restriction in suction line.

c. Answer — Solid matter being wedged in pump. Clean and drain hydraulic reservoir.

d. Answer — Excessive tightening of tie bolts in pump. Refer to Service Manual for correct torque.

e. Answer — Drive chain too tight.

f. Answer — Misaligned drive coupling.

TROUBLE SHOOTING THE HYDRAULIC SYSTEM ON AUTOMATIC BALE WAGONS

1000, 1005 1010 STACKLINER

PROBLEM — First table will not raise or raises slowly.

a. Answer — Oil flow is not available at the first table valve. Check the hydraulic pump.

b. Answer — The first table valve spool is not pulled out of the valve body and oil flow is not being directed to the first table cylinder.

c. Answer — Oil pressure cannot be obtained because of malfunction of first table relief valve.

d. Answer — First table cylinder seals are leaking.

PROBLEM — First table will not return to the down position.

a. Answer — The first table valve spool is not pushed into the valve body where it should be to allow oil in the first table cylinder to return to the oil tank. Check the mechanical linkage for correct operation. Check the spool spacer on the valve.

b. Answer — The air breather in the first table cylinder is plugged.

c. Answer — The table pivot points are binding or the cylinder is binding.

d. Answer — Return hose is restricted.

PROBLEM — Second table will not raise or raises slowly.

a. Answer — The second table control valve spool is not pulled out of the valve body and is restricting oil flow to the second table cylinder.

b. Answer — The first table valve spool is not in the correct position to direct oil flow to the second table valve.

c. Answer — The second table cylinder seals are leaking.

d. Answer — Relief pressure is set too low and specified relief pressure of 2200 PSI cannot be obtained. Re-adjust the two relief valves.

e. Answer — Oil flow from the pump is low. Refer to hydraulic pump trouble-shooting section.

f. Answer — Lock out valve is sticking.

PROBLEM — Second table cannot be held in up position.

a. Answer — The second table valve spool is not in the center position. Check the mechanical linkage and the adjustment of the manual control handle.

b. Answer — The second table relief valve is leaking. Check for oil flow from the exhaust part of the relief valve.

c. Answer — The seals in the second table cylinder are leaking. Check for leakage past the piston.

d. Answer — When the hydraulic pump is not running the lock out valve should hold the second table in the raised position. If the table falls when the pump is not running and the cylinder seals do not leak and the lines do not leak the lock out valve is at fault.

PROBLEM — Second table will not fall down or falls down slowly.

a. Answer — The second table cylinder air pressure valve on the Model 1005 will not build up air pressure.

b. Answer — The second table control valve spool is not shifted into the valve body.

c. Answer — Selector valve is not correctly adjusted.

d. Answer — Poppet in lock out valve is broken or binding and will not allow oil to flow from the cylinder to the oil tank.

e. Answer — Cylinder shaft bent.

f. Answer — Low oil flow and lock out valve is not completely open.

PROBLEM — Relief valve bypasses when second table is in down position.

a. Answer — The second table selector valve is not adjusted correctly or the linkage does not move the spool into the valve body. The spool must be in the body to divert the oil flow from the second table valve to the oil tank.

PROBLEM — Rolling rack will not move forward or moves forward slowly.

a. Answer — Second table valve spool is not in the center position. Adjust the second table manual control linkage.

b. Answer — Single bale unloading control valve spool is not pushed into the valve body.

c. Answer — Selector valve spool is not pulled out of the valve body.

d. Answer — Shuttle valve spool is binding and is not directing oil flow to the rolling rack cylinder.

e. Answer — Seals are leaking in the rolling rack cylinder.

f. Answer — Rolling rack relief valve is set too low and 1850 PSI can't be obtained.

g. Answer — Pressure beyond port seal in second table valve is leaking.

h. Answer — Bales are too heavy or they are wet and will not slide on load rack.

PROBLEM — Rolling rack will not move to position on Model 1010.

a. Answer — Single bale unloading control valve spool is not pulled out of the valve body.

b. Answer — The check valve is not seating and directing oil flow to the rolling rack cylinder.

c. Answer — Rolling rack cylinder seals are leaking.

PROBLEM — Second table cross-conveyor chain will not run or runs slowly.

a. Answer — Refer to a, b, f, g — answers under rolling rack will not move forward or moves forward slowly.

b. Answer — Selector valve spool is not pushed into the valve body.

c. Answer — Orbit motor is worn out or is damaged.

PROBLEM — Load rack will not raise or raises slowly.

a. Answer — Relief valve is not set at 2200 PSI.

b. Answer — Load rack is overloaded.

c. Answer — Load rack cylinder seals are leaking.

d. Answer — Restrictor is installed backwards or is plugged.

e. Answer — Low oil level.

PROBLEM — Load rack lowers too fast.

a. Answer — The optional restrictor used for retrieving is not installed or was installed backwards.

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PROBLEM — Loader motor will not turn or turns slowly.

a. Answer — The control valve spool should be pushed into the valve body to direct the flow of oil to the orbit motor. If the valve spool has not moved the complete distance the oil flow to the orbit motor will be reduced and will reduce the speed of the orbit motor.

b. Answer — The system pressure is too low.

c. Answer — The relief valve may be bypassing because the second table neutralizing valve is not adjusted correctly.

d. Answer — Refer to orbit motor section.

PROBLEM — First table does not go up far enough.

a. Answer — Adjust the return trip to release the latch at a later time.

b. Answer — First table bent.

PROBLEM — First table goes up part way and drops down.

a. Answer — The latch is not catching. Adjust the valve so that the linkage does not bottom out.

PROBLEM — First table goes up slow.

a. Answer — The first table control valve spool is not fully opened up and is restricting the oil flow to the first table cylinder.

b. Answer — The tractor engine is running too slow for the hydraulic pump to produce full volume.

c. Answer — One of the control valve spools in the three spool valve is not in the center position and is restricting the oil flow in the first table valve.

d. Answer — Pressure beyond port has an internal leak.

PROBLEM — The first table will not return to the down position.

a. Answer — The return port is not open because the first table valve spool has not been pulled out of the control valve body.

b. Answer — First table cylinder shaft binding.

c. Answer — First table pivot points dry and binding.