BARBER-GREENE®

A Division of Caterpillar Paving Products Inc.

Operation and Maintenance Manual

MODEL SB-41
ASPHALT PAVER

BG0087

Your Barber – Greene SB-41 Finisher represents the culmination of many years of design and field experience manufacturing bituminous mixing and paving equipment. It incorporates the most advanced engineering features.

Everything possible has been done in the design and construction of this machine to give the greatest ruggedness, versatility and dependability possible.

But regardless of the care and ingenuity which has gone into its manufacture, it can only serve you well if you operate it correctly, maintain it properly, and lubricate it regularly.

This book has been prepared to guide you in its proper operation and maintenance.

The parts in your Barber–Greene Finisher are accurately designed with special alloys, heat treating, specified tolerances, etc. Only an exact duplicate Barber–Greene repair part will function properly. You can only be sure by using genuine Barber–Greene repair parts which can be ordered from your Barber–Greene distributor – frequently from stock.

Our interest in you and your Finisher did not end with the sale. We are interested in having the machine serve you well during its entire life. If at any time we or our distributor can be of further service to you, we will be glad to do so.

RECEIVING MACHINE

Your Barber–Greene Finisher was thoroughly tested, carefully inspected, and properly loaded at the factory. The entire shipment including loose parts was thoroughly checked before it was released to the transportation company.

Upon receipt of the machine, before unloading, carefully inspect for any loss or damage that may have occurred during transportation. It would be well to check it against your freight bill, or against the packing list which will be found in the tool box.

If any loss or damage is discovered, you will save time by immediately notifying the transportation company's agent who will give you the proper forms for making a claim.

Your dealer service department will instruct your personnel in the correct operation and care of this new machine, at no additional cost to you.

Should the machine not have started operation at the time of delivery, your dealer will consider it a favor if you will contact him when ready to operate so he can supervise the initial operation.

A few days advance notice, if possible, will help him greatly in his planning.

DO NOT START THE ENGINE until you have read and understand the section on starting procedure - Section C.

SAFETY FIRST

Most accidents are caused by someone's failure to follow simple and fundamental safety rules or precautions.

Regardless of the care used in the design and construction of machinery, there are many points that cannot be completely safeguarded without interfering with accessibility and efficient operation.

A careful operator is the best insurance against an accident.

THE COMPLETE OBSERVANCE OR ONE SIMPLE RULE WOULD PREVENT MANY THOUSAND SERIOUS ACCIDENTS EACH YEAR.

THAT RULE IS:

Never Attempt To Clean, Oil, or Adjust any Machine While it is in Motion

UNLOADING MACHINE

Remove all wires, bands and blocking .

BY CRANE

The best and easiest method to unload the Finisher is by overhead crane if one is available

It must be able to handle approximately 24,500 lbs.

Hook up cables or chains to lifting rings as shown in Figure A-1, below

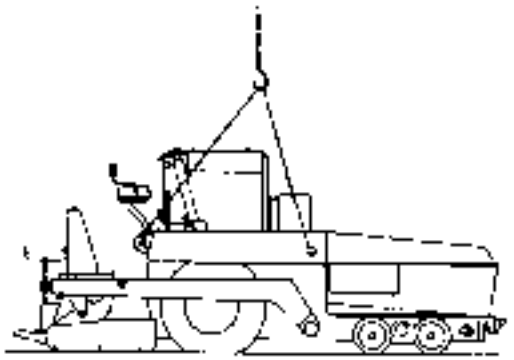

FIGURE A-1

TO PLATFORM

If the Finisher is to be unloaded on to a platform, be sure the platform will support the weight of the machine.

Bridge the gap between car and platform with 4" x 12" oak timbers.

Raise Finisher screed so it rests on the arm stops. Maneuver machine around on car and align wheels with planks, hopper end of the machine forward, and drive off on to platform using lowest operating speed and engine at medium idle.

BY TEMPORARY RAMP

If a crane or platform is not available it will be necessary to construct a ramp. It should be carefully planned and constructed.

Construct the ramp at the end of the car, if possible, and about 30' in length.

Use eight 3" x 12" planks, 16' long for the wheel runways.

Crib up underneath the planks with railroad ties and small blockings so that at no point are the planks unsupported for over 3' of their length.

About 5 lbs. of 60 penny spikes are necessary to tie ramp together solidly and about 32 ties will be needed for cribbing.

Make certain that the lower 6 feet of the ramp incline does not have a pitch exceeding 1½" per foot, or 9 inches for the 6 feet, as the front end of the machine will not clear, or the spreader screws may be damaged as the machine comes off the ramp. See Figure A-2.

CAUTION. If planks are not available for the runways and ties are used, be sure to use dry ties, as creosoted ties are slippery and dangerous.

If only creosoted ties are available, use sand on them to prevent slipping.

Block car so it cannot move either way as the machine is being run off, and set car brakes to insure safety.

RUNNING MACHINE DOWN RAMP

Be sure the screed is raised and rests on the arm stops.

Run machine down ramp, hopper end forward in the direction of forward travel. Perfectly align wheels with runway planks so that steering will not be necessary once the machine is started down the ramp. Use lowest operating speed and engine on medium idle.

NOTE: A snubbing line attached to the rear of the screed frame to prevent the machine from "getting away" is always a good safety measure to use.

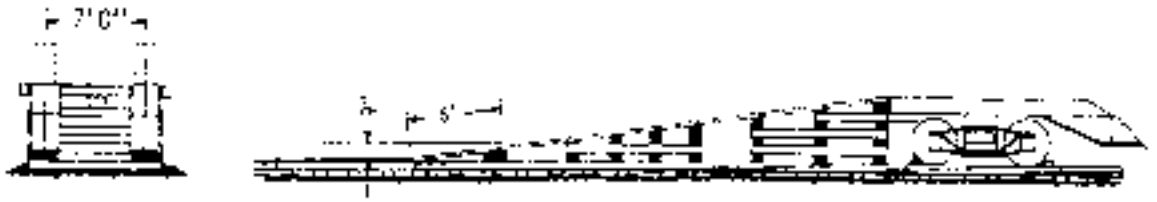

FIGURE A-2

TRANSPORTING FINISHER

ROADING MACHINE (Under its own power)

The wheels of the Finisher are designed primarily for the working function of laying material.

Remember the low ground clearance (five inches) under the machine, also over rough ground the highest travel speed should not be used.

TRAILER HAULING

A machinery trailer (with outriggers) capable of handling 24,500 lbs. may be used for transporting the machine.

Road clearance requirements should be checked for overall width and if the machine is coming off a job with extensions, etc., it may be necessary to remove them.

If a long haul is to be made by trailer, the screed should be lowered from the arm stop and rested on about four 2" x 4"'s about 30" long. Blocks should be spiked at front and rear of wheels. Do not rest screed on anything that may scratch it.

Usually ramp planks and blocking are carried on trailers used for handling heavy machinery. If it is necessary to construct a ramp for loading, refer to "Temporary Ramp" above.

GENERAL DESCRIPTION

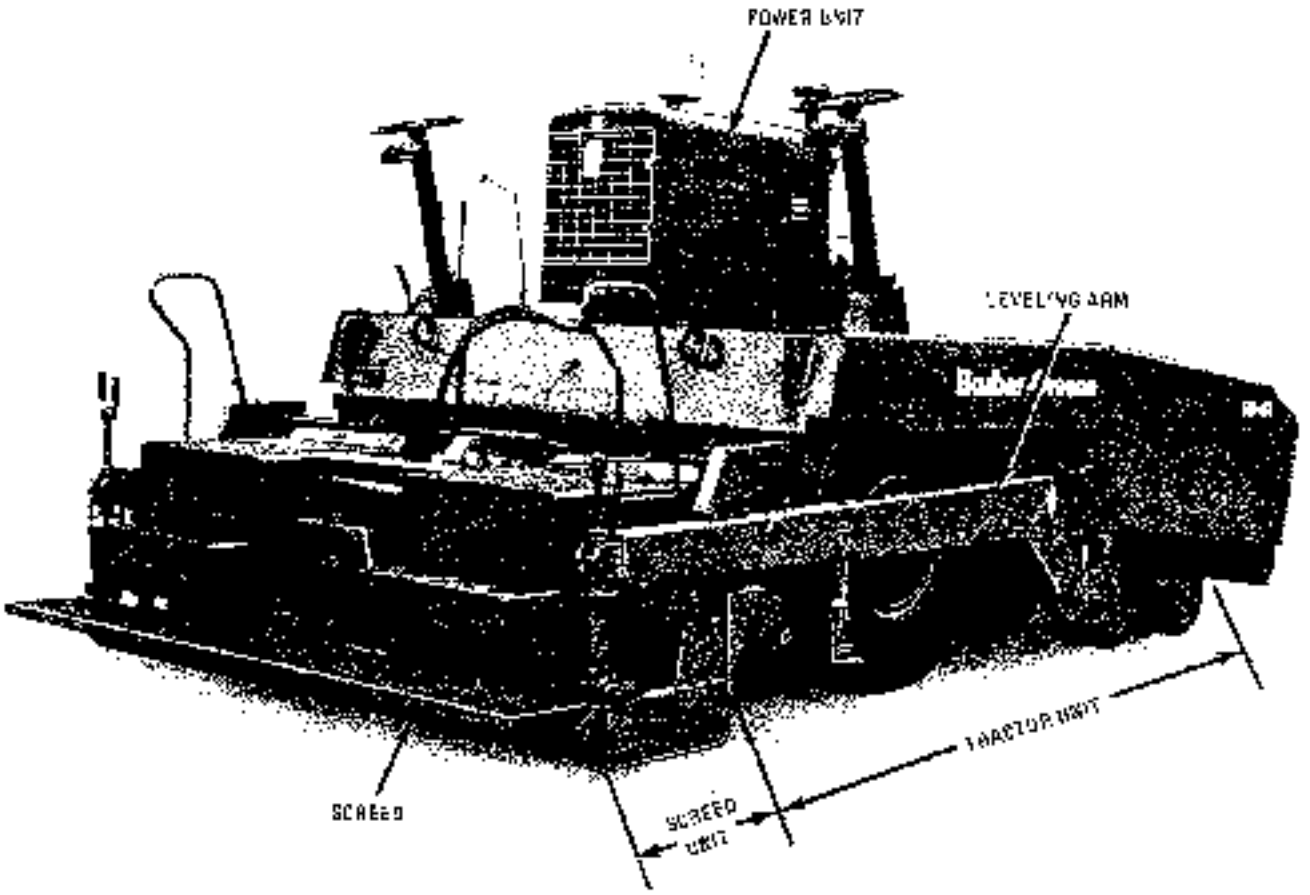

FIGURE B-1

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TRACTOR UNIT

POWER UNIT

The standard power unit used is either the International UB -264 Gasoline or the International UD 282 Diesel with operating speed of 2000 RPM.

PRIMARY & SECONDARY TRANSMISSIONS

The primary and secondary transmissions provide 12 speeds forward and 12 in reverse. An instruction plate gives the positions of the levers for the various speeds. (Refer to Use of Controls, Section C.)

BOGIE WHEELS

The pivoted Bogie Wheels support the front hopper and feeder assembly when paving and are controlled by hydraulic power steering. The four wheels carry 17-3/4 x 6 tires (two per wheel).

TRACTOR WHEELS

The two wheels are chain driven by the transverse drive shafts from the no spin differential of the secondary transmission.

TIRE PRESSURES

Rock Rib (Tube or Tubeless) - 75–80 PSI.
Earthmover Tires - 55 PSI.
Hydro-Flation (Refer to Section C, Page C-9).

OSCILLATING AXLE & TRUCK ROLLERS

Mounted on the oscillating axle at the forward end of the hopper, are the truck push rollers. These rollers contact the rear tires of the truck and allow the finisher to push the truck while it is dumping into the hopper. The oscillating axle prevents slight misalignments of the trucks from changing the steering course of the Finisher.

HOPPER, BAR FEEDERS & SPREADING SCREWS

The self-dumping hopper holds 10 tons of material. The bar feeders feed the material from the hopper to the spreading screws. Adjustable gates control the flow of material to the spreading screws. The spreading screws distribute the material uniformly across the width of the machine in front of the screed unit.

AUTOMATIC FEEDER CONTROL

The automatic feeder control paddles are mounted immediately ahead of the feeder screws and through means of an electric switch, control the feeder clutches. These paddles raise and fall with the flow of material being moved by the auger screws and will, when properly adjusted, maintain the desired amount of material in front of the screed.

TWO-SPEED FEEDER

The two-speed feeder gears are a part of the secondary transmission. A control lever is located on the left side of the tractor unit

Two-speed feeders are used on very thick mat or other difficult laying operations requiring a greater amount of material in front of the screed than can be fed under normal feeder operation.

LEVELING ARMS

The leveling arms connect the tractor and screed units. The hydraulic cylinders that raise the screed unit are located under the leveling arms

SCREED UNIT

A finisher comes equiped with either Tamper or Vibratory Screed Units, depending on customers choice. For detailed information on screed units.
Refer to:

Vibratory Screed Unit – Section H
Tamper Screed Unit – Section I

HYDRAULIC SYSTEM (Refer to Figure B-2)

The hydraulic system is comprised of two subsystems which share a common oil supply tank, strainer, and double pump. The two sub-systems are the screed drive system and the S-B-S system which operates the "S" creed hoist, "B" asket dump, and "S" teering circuit, i.e. S-B-S.

Including the storage tank, the two systems hold 28.6 gallons of hydraulic oil. The common oil strainer is a 100 mesh strainer, located inside the tank. There is also a 10 micron filter on the return.

The constant delivery, double pump is V-belt driven from the forward shaft of the primary transmission. The engine master clutch must be engaged to operate the pump

The screed drive supply unit of the pump delivers 10.5 GPM at 1800 RPM and 100 PSI, and the S-B-S supply unit delivers 7 GPM at 1800 RPM and 100 PSI.

SCREED DRIVE SYSTEM

A. COMPONENTS

1. Relief valve, set to relieve at 1250 PSI.
2. Screed drive valve, two way, two position, normally open, solenoid operated. Solenoid actuated by switch on steering posts.
3. Screed drive motor, gear type, constant displacement.

B. OPERATION

1. CIRCULATING PHASE – applies when no work is being done. Oil flows from the tank, through the strainer, through the shaft end of the double pump, past the relief valve, through the screed drive valve in off position, back to the tank.
2. OPERATING PHASE – applies when screed valve is actuated. Oil flows from the tank through the strainer, through the shaft end of the pump, past the relief valve, past the screed drive valve in on position, through the screed drive motor, through the filter, to the tank. Internal leakage in the motor is fed to the return line by the bleed line.
3. BY-PASS PHASE – applies when relief valve opens. If the pressure in the system rises above 1250 PSI, the relief valve will open, allowing oil to by-pass to the tank.

S–B–S SYSTEM

A. COMPONENTS

1. Basket dump valve, four way, three position, double solenoid operated. Solenoids actuated by switch on steering posts.
2. Screed hoist valve, four way, three position, double solenoid operated. Solenoids actuated by switch on steering posts.
   The above two valves are referred to as "stacked valves."
3. Steering valves and cylinder unit. Steering valves are orbital valves, manually operated. Relief valve is factory set to relieve at 1500 PSI.
4. Main relief valve set to relieve at 1800 PSI
5. Basket dump cylinders (2) double acting single rod end.
6. 10 Micron return line filter

B. OPERATION

1. CIRCULATING PHASE – applies when no work is being done. Oil flows from the tank, through the strainer, through the pump, past the 1800 PSI. relief valve, through the basket dump valve in off position, through the screed hoist valve in "lower" position, through the 1500 PSI relief valve, through the steering valve in "center position", through the filter, to the tank.

3. BASKET DUMP PHASE – applies when basket dump switch on steering post is activated. Oil flows from the basket dump valve in either "raise" or "lower" position to the basket cylinders. Oil displaced from the opposite end of the cylinders flows on to the steering valve.

NOTE – After basket is raised or lowered, screed hoist and steering will not function if basket dump switch is left in activated position.

4. SCREED HOIST PHASE – NOTE – When raising screed, machine cannot be steered. The screed hoist valve has three positions, raise, lower, and hold. In "raise" position, oil flows from the basket dump valve, through the screed hoist valve, to the screed hoist cylinders. In "hold" position the port to the cylinders is blocked and oil flows to the steering circuit. In "lower" position the port to the hoist cylinders is opened to the return line, allowing screed to lower from its own weight.
5. BY-PASS-PHASE – applies when pressure in the S-B-S System rises above 1800 PSI. Relief valve will open returning oil to the tank.

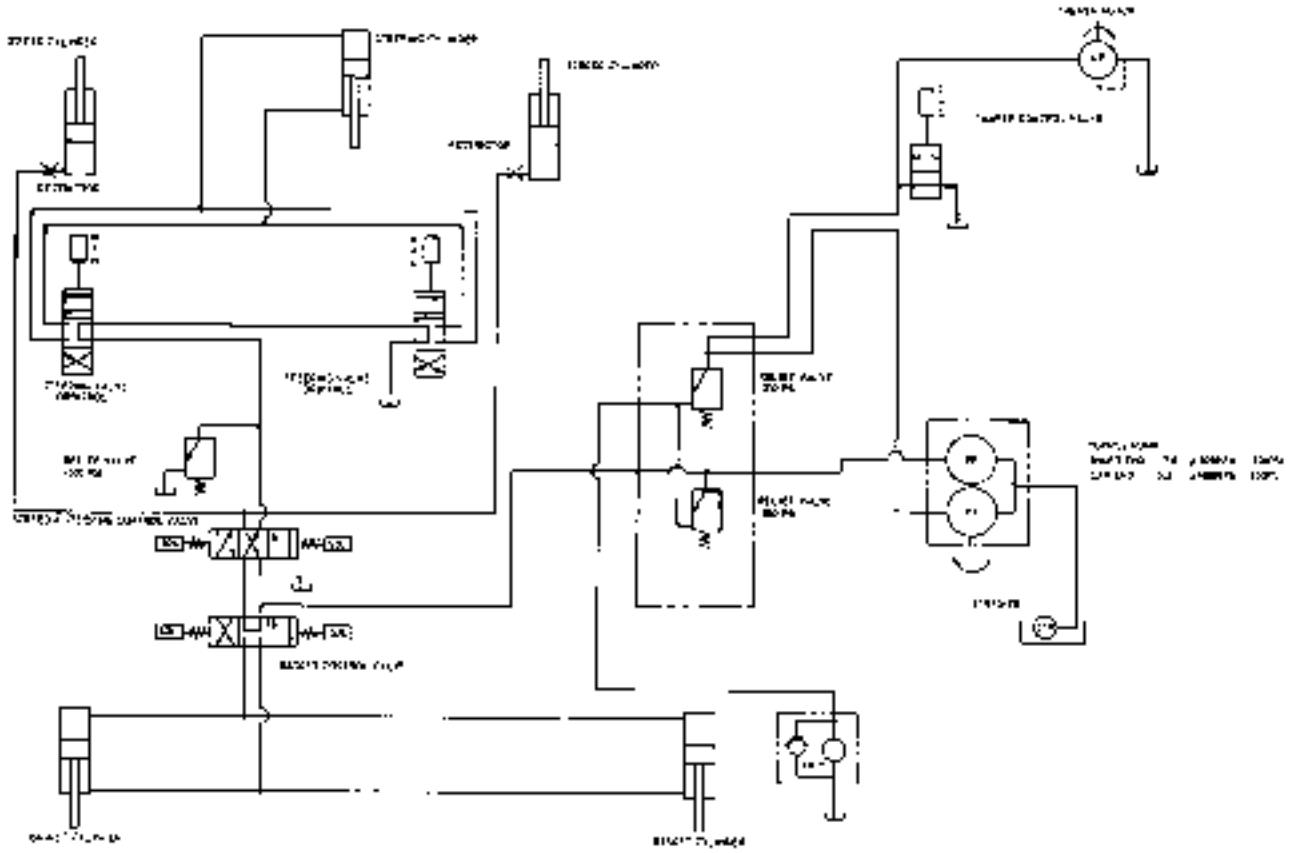

FIGURE B-2 – Hydraulic System Schematic Drawing

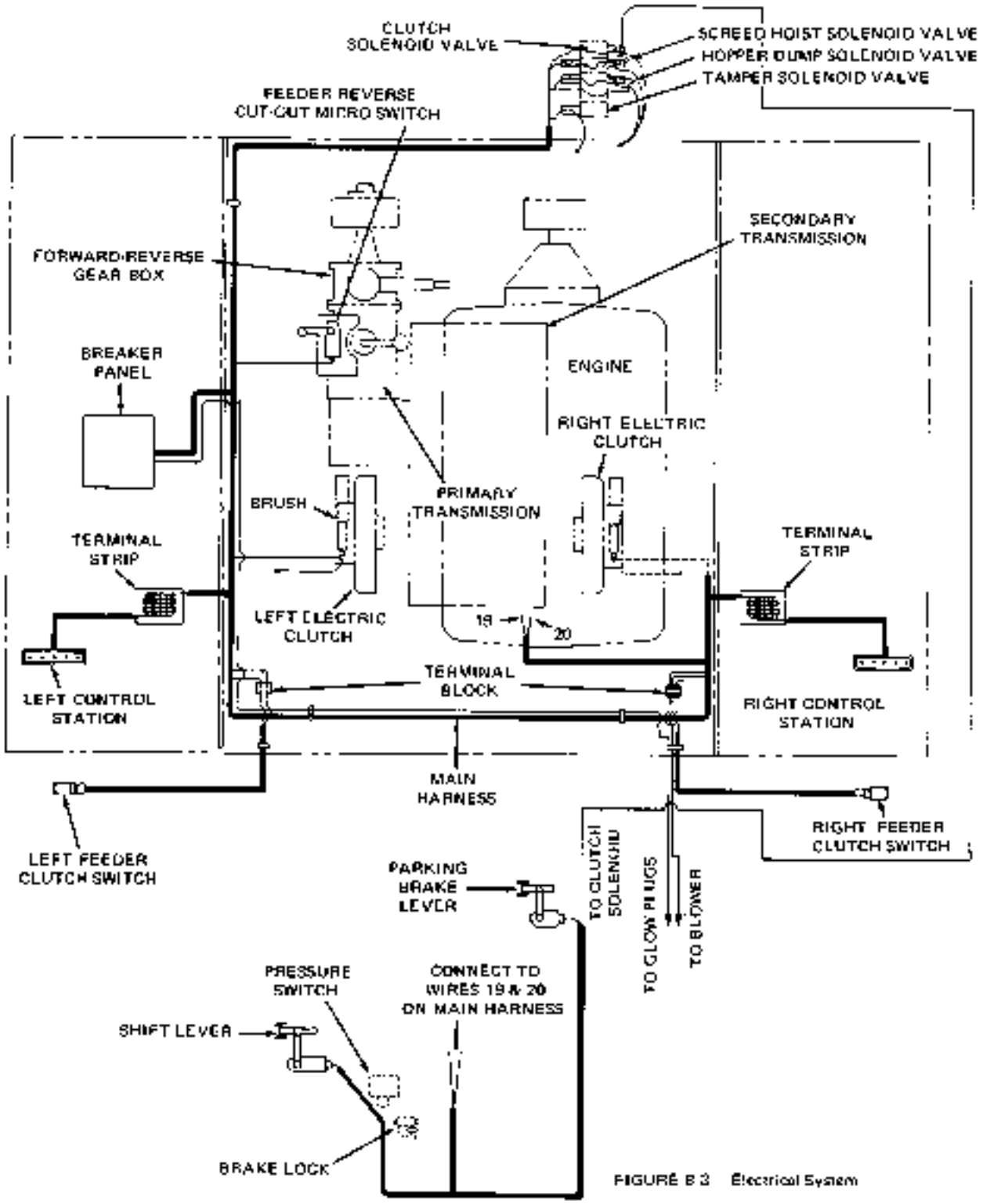

FIGURE B-3 Electrical System

ELECTRICAL SYSTEM (Refer to Figure B-3)*

The SB-41 has a 12 volt electrical system, using a standard battery and an alternator as a power source. The system receives its power through a cable from the power solenoid to a junction panel located at the front left corner of the engine, under decking.

NOTE: When the engine ignition switch is off, all electrical circuits are dead.

COMPONENTS

1. MAIN JUNCTION PANEL – The power cable enters the junction panel and is divided into six individually pro-

tected circuits at the circuit breaker section of the main junction panel.

2. WIRE HARNESS – The harness contains wires which serve all the electrical components of the machine.

*A schematic diagram of the circuits is located in Section G.

CIRCUITS

The wires of the respective circuits in the electrical system follow the wire harness to the point nearest their destination, at which point they branch out to the electrical devices which they serve. All wires in the electrical system are number coded for identification.

1. FEEDER CLUTCH CIRCUIT – This circuit begins at the main junction panel and is protected by a 15 amp. breaker. It goes directly to the feeder reverse cut-out microswitch, located at the primary transmission. This switch is normally in the "open" position and is closed only when the forward-reverse lever is moved to the forward position. When this switch is "open", the clutch circuit is broken, preventing the feeders from being operated in reverse.

   From this switch, the circuit returns to the wire harness and branches to the right and left feeder clutch.

   Located within the feeder clutch brush box is a diode that gives protection from the damaging affects of induced high voltage feed back current. A 10 amp. fuse for each clutch, located on the main junction panel, is protection against current overload.

   The return wire from each clutch re-enters the wire harness. In each case, one wire goes directly to the control switch for that particular feeder while the other wire goes through the harness to the respective control switch on the opposite steering control column.

   The clutch control switches are three position switches with center position being "off". The rearward position is the "manual" position. The forward switch position is the "automatic" position, which energizes the lead wire to the paddle operated switch located above the feeder screw. In "Automatic", feeder clutch is engaged and disengaged by the movement of the automatic control paddle in relation to the material in the feeder screw chamber.

2. SCREED HOIST CIRCUIT – This circuit begins at the main junction panel and is protected by a 6 amp. breaker. This circuit goes to the screed hoist solenoid valve, located behind the two cover plates directly above the feeder tunnel.

   From this solenoid, the circuit returns to the wire harness and branches in both directions: one branch goes to the screed hoist switch located in the center of the switch cluster on the control yoke and the other branch goes to the control switch on the opposite control yoke. Actuating either of the switches completes the circuit and causes the solenoid valve to function, raising or holding the screed.

3. HEATER CIRCUIT – There are two circuits in the heater system. The pump-blower circuit and the glow plug circuit.

   The pump-blower circuit is protected by a 30 amp. breaker. This circuit begins at the main junction panel and goes to the control switch to the right rear of the screed unit.

   The glow plug circuit is protected by a 40 amp. breaker. This circuit begins at the main junction panel and goes to the control switch to the right rear of the screed unit.

4. SCREED DRIVE CIRCUIT – This circuit begins at the main junction panel and is protected by a 6 amp. breaker. It goes to the screed switch, located at the right rear of the tractor unit.

   This switch is normally open and is activated to the "closed" position by the steering clutch linkage as the machine starts moving. From the screed switch the circuit returns to the wire harness to the front of the machine, where it leaves the harness and goes to the screed solenoid valve, located behind the cover plates directly above the feeder tunnel. From this solenoid, the circuit re-enters the harness and branches in both directions: one branch going to the screed switch on the right control column and the other to the screed switch on the left control column. Actuating either switch completes the circuit.

5. HOPPER DUMP CIRCUIT – This circuit begins at the main junction panel and is protected by a 6 amp. breaker. It goes to the hopper dump solenoid valve, located behind the cover plates directly above the feeder tunnel. Before joining the solenoid valve, the circuit divides into two branches, one leading to each of the two solenoids on the valve.

   The left solenoid controls the valve for the raising and dumping the basket and the right solenoid controls the valve for lowering the basket. The return wires re enter the harness where the circuit divides in two branches. One branch wire of both circuits lead to the hopper dump switch on the left control column and the other two branch wires lead to the switch on the right control column. Actuating either switch completes the circuit, energizing the solenoid in that circuit.

CONTROL STATIONS

Under decking, at both operator's control stations, is a terminal strip which provides a quick disconnect between the wire harness and the control column. Five control switches are mounted on the control column cross bar.

ELECTRIC FEEDER CLUTCHES

The feeder clutch circuits supply current to the revolving clutches through a pair of carbon brushes riding collector rings. The electric current creates a magnetic

field which draws the armature into contact with the magnetic plate, causing the two to revolve as one unit. This magnetic cohesion, coupled with the friction between the surfaces of these two units, provides the torque transmitting capacity of this clutch. The slight wearing of the friction surface of the magnet is automatically compensated for by the travel of the armature during engagement.

ELECTRIC SOLENOIDS

The solenoids that operate the various hydraulic valves, consist of an electro magnetic coil and plunger assembly. When actuated, the plunger moves against the valve spool, causing the valve to function. When the solenoid coil is de-energized, the hydraulic pressure returns the valve spool to its original position. The solenoid coils are interchangeable between all valves but the plungers are of specific lengths and are interchangeable only between valves of the same model number. A button on the end of the coil housing may be pushed for manually operating the valve, should the need arise.

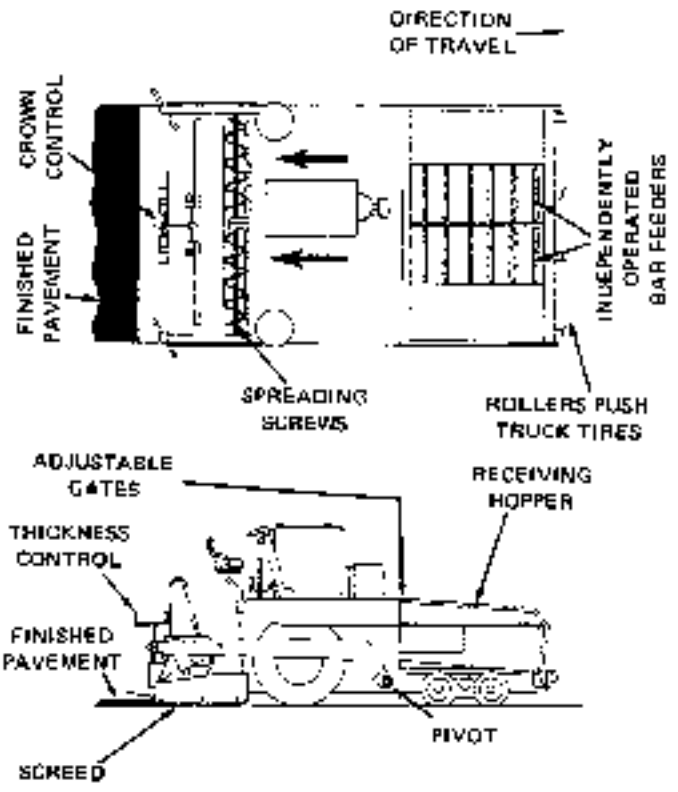

FIGURE B-4 — Flow of Material

THE FINISHER AS A UNIT

In order to understand the principle of the Barber–Greene self leveling Finisher, it is first necessary to have a clear picture of the flow of material through the machine and general sequence of operations.

LEVELING

A brief explanation of the principle of leveling will aid in understanding the operation of the Finisher.

To illustrate and explain the principle of leveling a series of small outline drawings are used.

The tractor unit travels on road base and pulls the screed, Figure B-4.

In operation we will assume the base is level and see how the screed, controls the thickness of mat laid.

The basic principle of the Finisher is: The screed when pulled into the material will automatically ride up or down to seek the level where the bottom of the screed (AB) Figure B-5, or the road surface becomes parallel to the direction of the pull (CD) and continues parallel, laying a definite thickness until the screed alignment is changed.

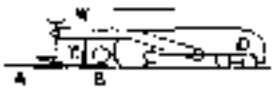

FIGURE B-5

By changing, the thickness control (w), the relationship between the screed and leveling arm, the screed is tilted and rides to a new level.

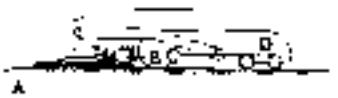

FIGURE B-6

For example to increase thickness, the screed is tilted up and gradually rides up to a higher level. Figure B-6 until line (AB) again becomes parallel to direction of pull (CD), Figure B-7.

NOTE. The sketches shown here (Figs. B-5 through B-18) must necessarily be exaggerated. Actually the initial tilt of the screed is relatively so small it cannot be observed in the finished pavement.

FIGURE B-7

FIGURE B-8

To decrease thickness, the screed is tilted down, Figure B-8, and it will gradually travel to a lower level until (AB) again becomes parallel to (CD) Figure B-9.

Changing the level gradually, or over considerable distance, prevents sudden adjustment or steps that destroy the smooth riding surface. This is a very important fool-proof feature. The importance of this characteristic will be seen as we see how it produces a smooth surface when the base is uneven.

FIGURE B-9

FIGURE B-10

Assume the screed is adjusted for a given thickness of mat, and the wheel travels up to a higher level on the base, Figure B-10.

The screed plate bottom (AB) is automatically tilted up, Figure B-11.

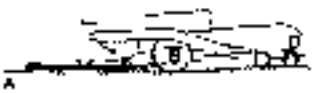

FIGURE B-11

FIGURE B-12

The screed will then travel up to where line (AB) is parallel to (CD), Figure B-12.

When the Finisher encounters a depression, the reverse action takes place, as the wheels travel into the depression or to a lower level, the screed tilts down, Figure B-13.

FIGURE B-13

FIGURE B-14

The screed will then travel down to a lower level where (AB) is again parallel to (CD), Figure B-14.

The Barber-Greene leveling feature depends upon time, or distance, instead of mechanical ratio. The wheels may change level, but it takes time before the screed has climbed to the new level, and the greater the change, the longer it takes. The wheel may be up and over the short bump, holes, manholes, etc., before the screed has had time to noticeably react, thereby leaving a level surface behind. Likewise on long bumps the delayed screed reaction stretches out the variation in level. Thus a mat is laid and compacted on an irregular base without bumps and depressions automatically ironed out, producing a smooth riding surface without abrupt changes.

The most important thing to remember when adjusting thickness control is not to move the control more than two notches at a time. If the control is moved too much without giving the machine time to act, the result is over adjustment with a resultant over-correction in the road surface.

CONTROL OF SCREED

Now let us look at the area of the screed unit and note how each side can be controlled independently

FIGURE B-15

If the corner (Y), Figure B-15, of the screed is raised by control (W2) producing a slight warping in the whole screed surface, this side will gradually come up and level out to the new setting, and the finished mat is thicker on one side as shown.

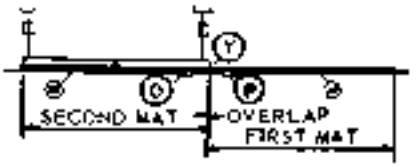

FIGURE B-16

To match mat (N) Figure B-16, already laid, the edge of screed (Y) is kept practically flush with surface of (N) preferable overlapping at an inch or two. This joint is therefore compacted, and the two mats are properly bound together.

In operation, the level of screed at (Y) follows the surface level of mat (N) because the wheel (O) that controls this end runs close to where wheel (P) previously ran.

To provide a crown, the center of the screed is adjusted, as shown, Figure B-17, to whatever amount is required. This can be quickly done without stopping the machine, if so desired.

FIGURE B-17

Due to this degree of leveling control, we have occasionally encountered this problem in the field. The contractor is required to lay over an irregular base a mat of a definite minimum thickness. Tonnage has been figured over the entire area at the same thickness as the minimum. When laying a level surface over an irregular base, where the thickness must necessarily be an average, it is physically impossible to hold to a minimum thickness on the high spots and not overrun the tonnage figured on the minimum thickness.

Either the minimum thickness or minimum tonnage must be sacrificed, otherwise the resurfaced area will be no smoother than the base on which it was laid. This is clarified by Figure B-18.)

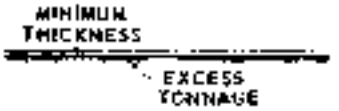

FIGURE B-18

The Finisher is designed to level automatically and when once set for proper thickness and left alone it will produce a much better surface than when manually controlled.

Too much emphasis cannot be placed on the importance of being careful of over adjustment of the thickness controls.

Never move the control more than two notches at a time as stated on plate mounted on control handle, Figure B-19. Allow machine to operate and travel sufficiently (approximately ten feet) before checking results of new setting and making another adjustment.

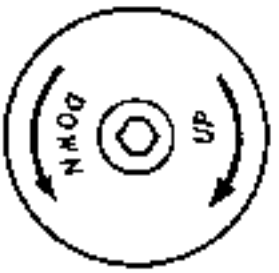

FIGURE B-19 — Thickness Control Instruction Plate

Let the Finisher give a riding surface that will be true under the straight edge and be careful of over adjustment of thickness controls in trying to follow a certain set thickness of the mat. The ideal operation produces a true riding surface and an average thickness of mat.

USE OF CONTROLS

The operator should thoroughly familiarize himself with the instruments and controls provided for operation.

POWER UNIT

There are important differences between various engines; therefore, regardless of previous experience with other power units, the operator will obtain the best results if he fully understands what each control is for and how to use it. (See Engine Operator's Manual furnished in addition to this manual.)

BEFORE STARTING ENGINE

Check the following before starting engine to avoid possible damage:

1. RADIATOR — Should be filled with water or antifreeze solution. (Radiator Capacity approx. 25 qts.)
2. CRANKCASE — Check oil level, oil should be up to level indicated on dip stick.
3. BATTERY — Connect cables and check water level.
4. IGNITION — Examine plugs and wiring to make sure they are in place.
5. FUEL — Check for fuel and open fuel line valve. (Fuel Tank Capacity 29 gals.)

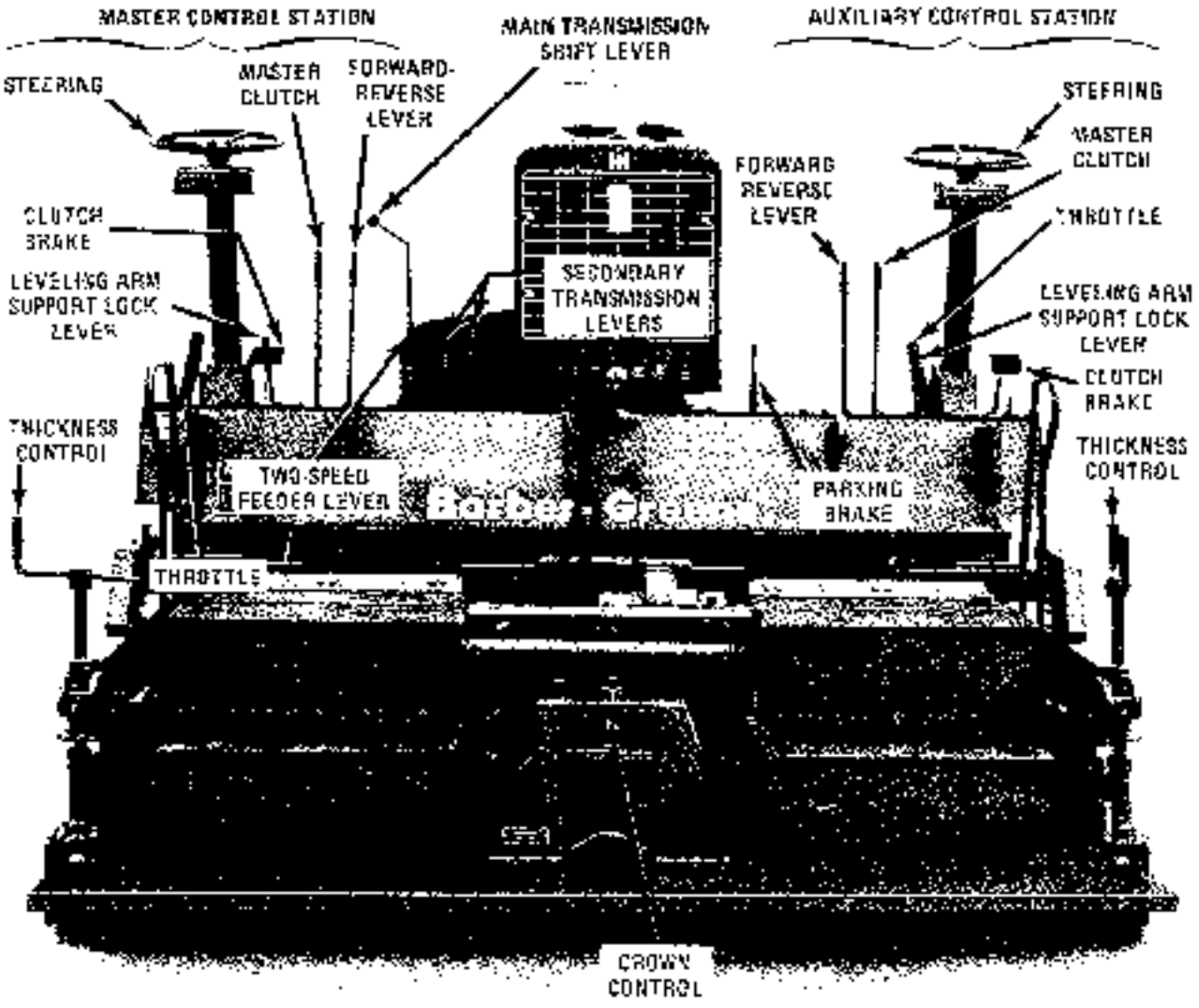

FIGURE C-1 — Operating Controls

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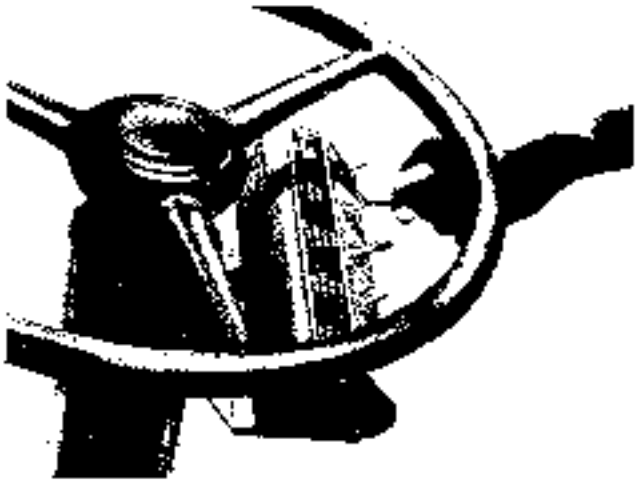

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FIGURE C-2 – Controls

6. MAIN TRANSMISSION – Check lubricant level in both units - (Forward-Reverse gear box and the main 4-speed gear box.)
   Forward-Reverse Gear Box - Level plug on right hand side of gear box.
   Main 4 speed gear Box - Street "L" on right hand side of gear box used for level and filling.
7. SECONDARY TRANSMISSION – Check main and bevel gear sections lubricant level with dip stick, welded to plug in cover. IMPORTANT – Check level before starting machine.
8. HYDRAULIC OIL TANK – Check hydraulic oil level at high-low level cocks, located on hydraulic oil tank.
9. BURNER FUEL TANK – Put fuel in tank before operating pump.
10. A visual inspection should be made to see that all grease points have been lubricated and that the Finisher is ready for operation. It is not necessary to completely relubricate the Finisher as over greasing distorts and blows the seals on anti-friction bearings. (Refer to Lubrication Section F.)

TO START ENGINE

1. Be sure master clutch is disengaged.
2. Refer to Engine Manufacturer's Manual, furnish in addition to this Manual.

PANEL INSTRUMENTS

All gauges and meters on instrument panel reflect the engines operating condition and should be referred to immediately after starting and often during operation.

OIL PRESSURE GAUGE: Normal oil pressure 40 to 50 P.S.I. at operating speed.

AMMETER: At no time during regular operation should the ammeter register DISCHARGE since this will indicate a defective electrical system.

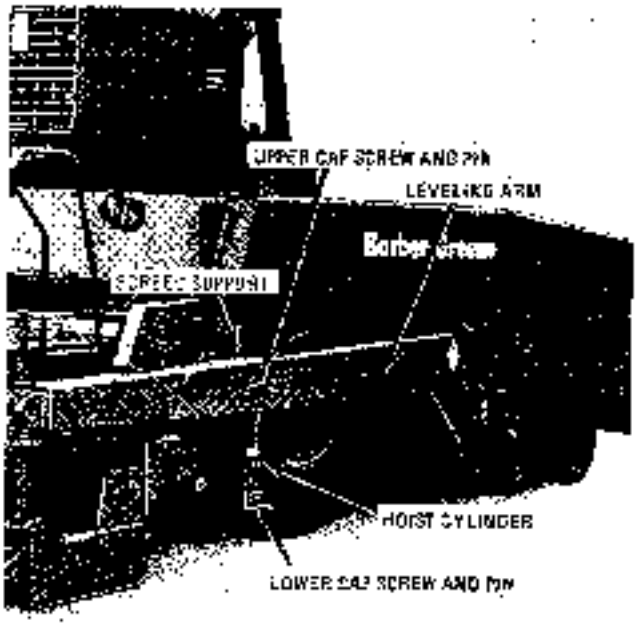

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FIGURE C-3 – Screed Hoist Cylinder & Leveling Arm Support

TEMPERATURE GAUGE: Normal operating temperature approximately 185° to 200° F.

OPERATOR'S CONTROL STATIONS

The model SB-41 Finisher has two Operator's Control Stations. (Refer to Figure C-1.)

The master control station on the left, (looking from the screed end) is used for maneuvering at travel speed, road traveling the machine, and when matching a joint on the left side of the machine.

The auxiliary control station on the right, is used only when matching a joint on the right hand side of the machine, to provide better visibility for the operator.

TO RAISE AND SUPPORT SCREED FOR TRAVEL (Refer to Figures C-1 thru C-3.)

With engine running at operating speed and master clutch engaged, transmission in neutral, push screed hoist switch forward. (Refer to Figure C-2.)

TO SUPPORT SCREED:

1. With screed in raised position, move Leveling Arms Lock lever toward the center of machine, or "lock" position, refer to Figure C-1.
2. Lower screed by putting toggle switch in center position until the leveling arms rest on the supports. Figure C-2.

TO LOWER SCREED: (Refer to Figures C-1 thru C-2).

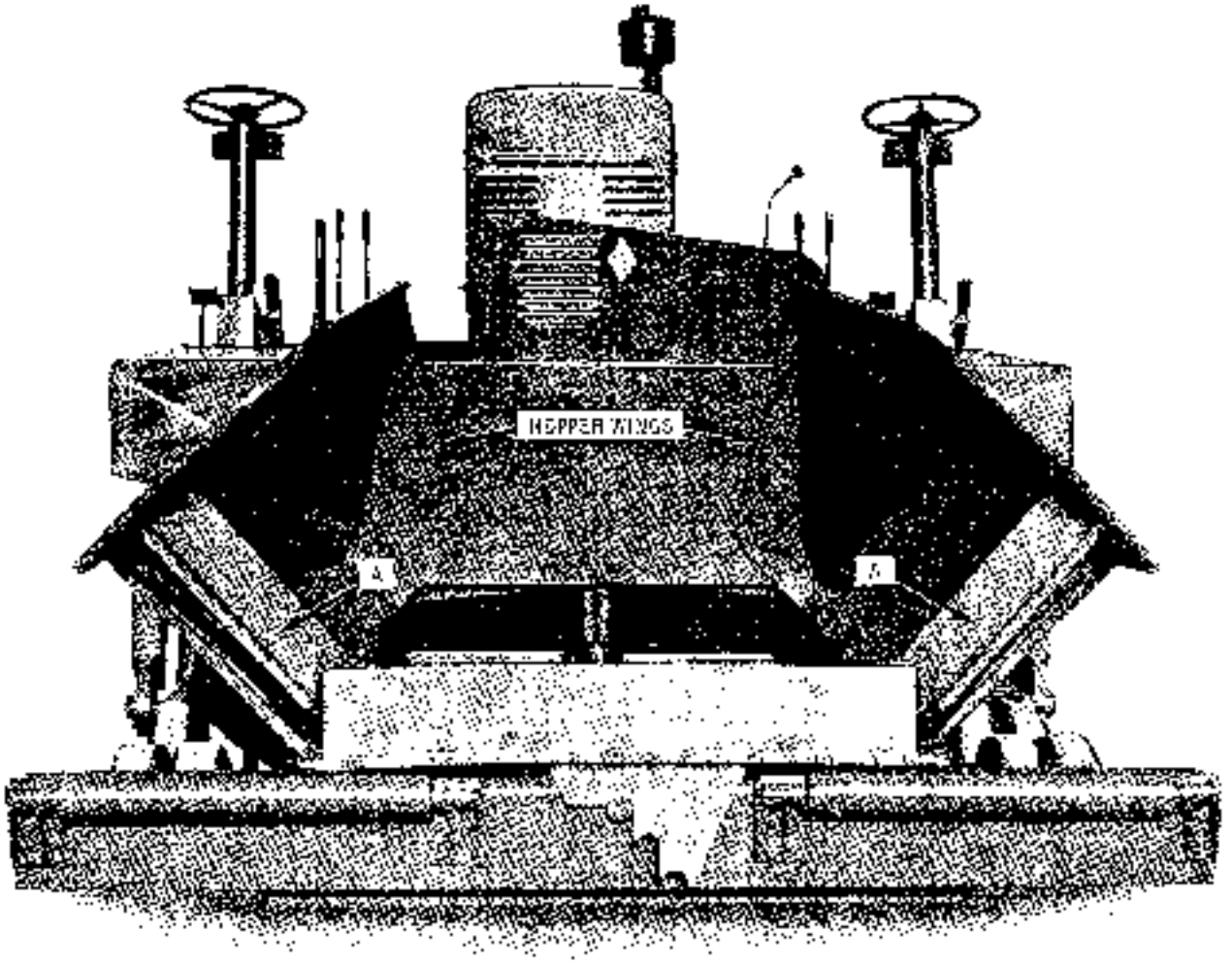

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FIGURE C-4 — Hopper Wings Shown in Raised Position

NOTE When screed is resting on leveling arm supports, the screed must be raised slightly to permit support locks to be moved.

1. Push screed hoist switch forward while moving Leveling Arms Lock lever outward or "Free" position.
2. Move screed hoist switch to center position, lowering screed.

TO RAISE HOPPER WINGS (Refer to Figures C-2 and C-4.)

1. Move Hopper Wing Control Switch, Figure C-2 up. When operating, material will automatically flow from wings to feeders.
2. Move Hopper Wing Control Switch down to lower hopper wings to horizontal position for truck dumping.

TO ENGAGE PAVING AND TRAVEL SPEEDS (Refer to Figures C-5 and C-6.)

TRACTION CLUTCH OPERATION

Power to the wheels is through a normally engaged traction clutch that is operated by a clutch-brake pedal or parking brake lever.

When the pedal is depressed, during paving operation, a normally closed static "0" ring switch is actuated; energizing the clutch solenoid valve. Oil is directed to the clutch cylinder which moves the clutch actuator to disengage the clutch and apply the transmission brake and wheel brake.

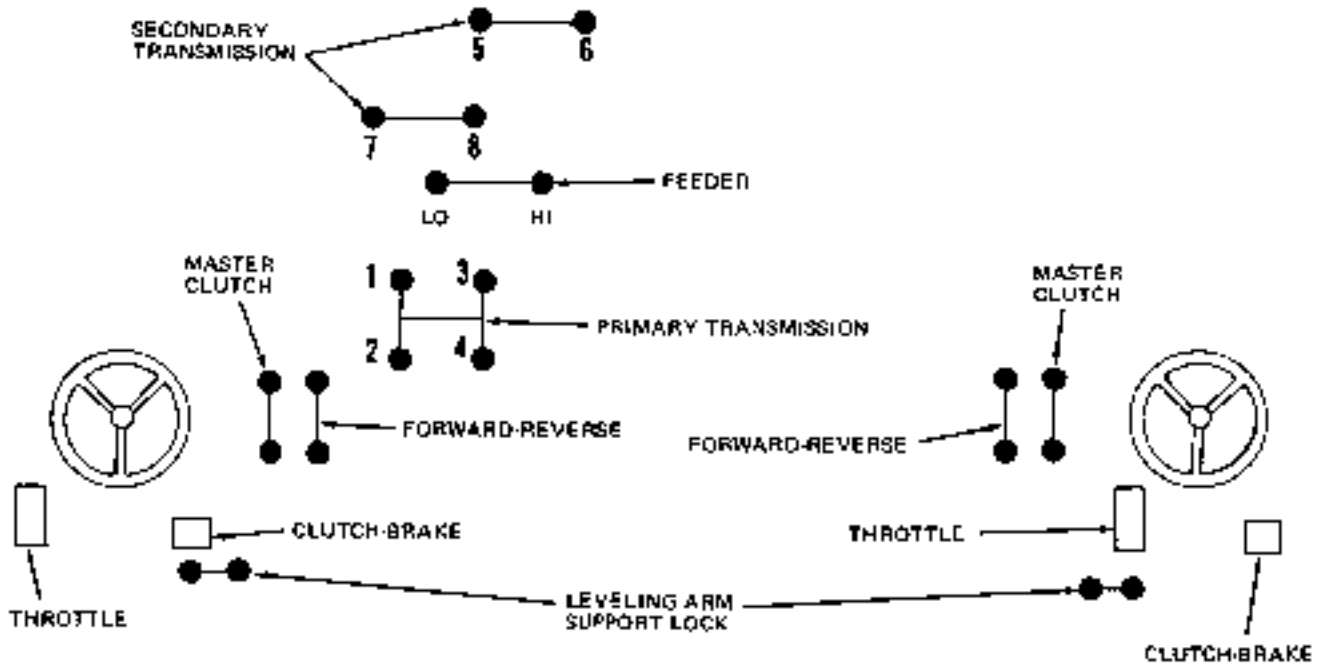

FIGURE C-5 – Transmission and Lever Direction Chart

	FORWARD OR REVERSE SPEED SELECTIONS	LEVER POSITION	F.P.M.@ OPER. R.P.M.
	1	1 6 7	13
	2	1 5 7	18
	3	2 6 7	26
	4	2 5 7	36
	5	3 6 7	48
	6	3 5 7	66
	7	4 6 7	81
	8	4 5 7	111
	9	1 E 8	140
	10	2 E 8	287
	11	3 E 8	527
"E" EITHER POSITION 5 OR 6	12	4 E 8 TRAVEL R.P.M.	M.P.H. 11

FIGURE C-6 – Transmission Setting Speed Chart

PAVING SPEED

With the engine at idle speed and Master Clutch disengaged:

1. Shift Forward-Reverse lever to direction desired.
2. Shift Main Transmission lever to position to obtain desired speed. (1, 2, 3 or 4) Refer to Chart, Figure C-5.
3. Shift Secondary Transmission lever to 5 or 6 and 7 gear. Refer to Chart, Figure C-6.
4. Depress Clutch-Brake pedal and slowly engage Master Clutch for hydraulic pressure to disengage traction clutch.
5. Slowly release Clutch-Brake pedal and advance throttle to desired speed. CAUTION: An inexperienced operator should start the machine in a low gear until he gets the feel of the machine.

TRAVEL SPEED

(Be sure the screed is raised and locked for travel.)

To change to travel speed:

1. Use any two of the first six (6) gears.
2. Shift 7 gear to 8.
3. Engage Master Clutch and increase throttle to operating speed.

To stop in travel (8) gear.

1. Decelerate engine.
2. Disengage Master Clutch and apply Clutch-Brake pedal. This will apply wheel brake only. The traction clutch will not disengage due to the lock out switch on 8 gear lever position.

MECHANICAL PARKING BRAKE

The mechanical parking brake, located forward and to the right of the engine, locks the transmission brake when the engine is not operating.

To Apply Brake - pull lever up.

To Release Brake - push lever down.

The parking brake switch, automatically prevents a power struggle if the operator attempts to operate with the parking brake on. The parking brake switch actuates the clutch solenoid, disengaging the traction clutch when there is sufficient hydraulic pressure.

THROTTLE

A foot throttle is located at each driving position, on the deck, just to the left of the steering column. Operation is similar to a car.

2300 RPM - Full Speed (NO LOAD)

700 RPM - Idle

The engine torque and efficiency curves are such that at 2000 RPM (operating), adequate power is available to perform all necessary paving functions.

TO OPERATE SCREED (Refer to Figures C-1 and C-2.)

The screed is driven by a hydraulic motor.

1. With engine running, put tamper switch located on steering post, to "on" position, engage master clutch and engine traction clutch.
2. Disengaging the master clutch or traction clutch will stop screed motor. Put screed switch in "off" position to keep screed from operating when master clutch is engaged.

TO OPERATE FEEDERS AND SPREADING SCREWS (Refer to Figure C-2.)

The speed of the feeders and spreading screws is proportional to the paving speed.

The feeder and spreading screw switches are mounted on the steering control post. These switches have three positions. (Manual, automatic and off.)

To operate feeders and screws manually, without moving machine, depress clutch or place 7-8 gear in neutral and engage the master clutch. Move feeder switches down to manual position.

To operate feeders and screws automatically, follow the above instructions for manual operation until material is fed out to the screed end plates, then shut off switches. Set the automatic feeder control paddles. (Refer to "To Set Automatic Feeder Control Paddles" Section D.)

TWO SPEED FEEDER

With the two-speed feeders the "LOW" feeder speed range is the normal speed required for most applications.

"HIGH" feeder speed range is used when conditions (very thick mat or wide paving width) demand more material than can be fed in low feeder speed range.

NOTE – Re-adjust feeder gate opening when shifting to "High" feeder speed range.

CAUTION – Do not run feeders in "high" range over 60 F.P.M. paving speed.

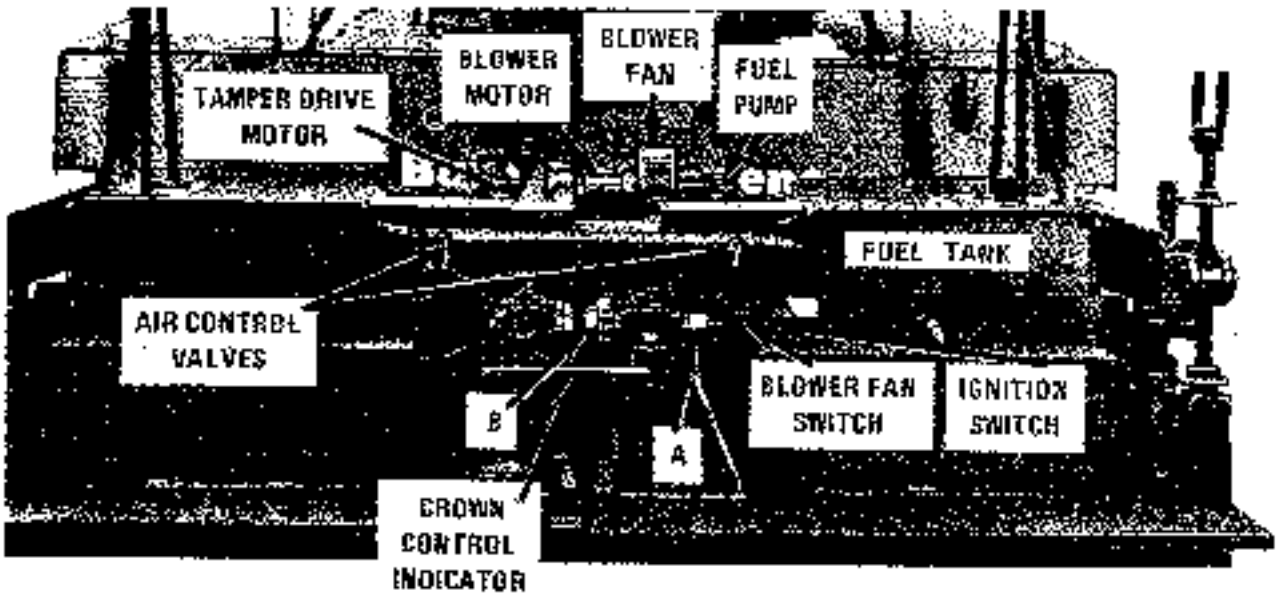

FIGURE C-7 – Screed Heater Controls And Crown Control

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TO OPERATE SCREED HEATER (BLOWER, BURNER & BURNER IGNITER) (Refer to Figure C-7.)

The screed heaters should be turned on prior to receiving material allowing sufficient time to heat screed to operating temperature. Normally 15 minutes is sufficient to heat the screed.

High blower settings should not be maintained for more than 5 minutes.

For proper combustion in the burner, a #1 or #2 diesel fuel oil is recommended. (Preferably #1). The burner fuel is stored in the right hand step on the screed unit. (Refer to Figure C-7.)

LIGHTING PROCEDURE (Refer to Figure C-7.)

1. Turn the pump and blower switch on. DO NOT RUN THE FUEL OIL PUMP DRY. The pump will circulate oil in the system with the burner shut off, provided the fuel oil tank has fuel.
2. Divert air away from side being lit, with air control valve, Figure C-7. This prevents the cooling of the glow plug and the flame blowing out.
3. Press igniter toggle switch to desired position. Left for left burner. Right for Right burner.

NOTE -- Allow 20 to 30 seconds to heat glow plug.

4. Open the fuel valve to the desired burner.
5. When the burner lights, release igniter switch and return air control valve to center.

Follow steps 3 thru 6 to light other burner.

TO SHUT OFF BURNER:

1. Close valve to burner.
2. Allow blower to run long enough to dissipate hot air to prevent over heating blower motor and to purge any possible unburned combustible gases from screed heating chamber.

CROWN CONTROL

The crown control adjusts the screed to produce the desired contour of the finished pavement. To adjust crown:

1. Loosen lock nuts (A) Figure C-7. on the two screws at top center of screed.
2. Using crown adjusting wrench, turn nut (B) so that crown indicator, Figure C-7, raises to increase crown or lowers to decrease crown.

The two screws are connected by a chain which moves the inside screw the same amount as the outside screw. Do not uncouple this chain unless making screed adjustments. (See Maintenance and Adjustments Section C.)

THICKNESS CONTROL (Refer to Figure C-8.)

The thickness controls increase or decrease the depth or thickness of the material being laid.

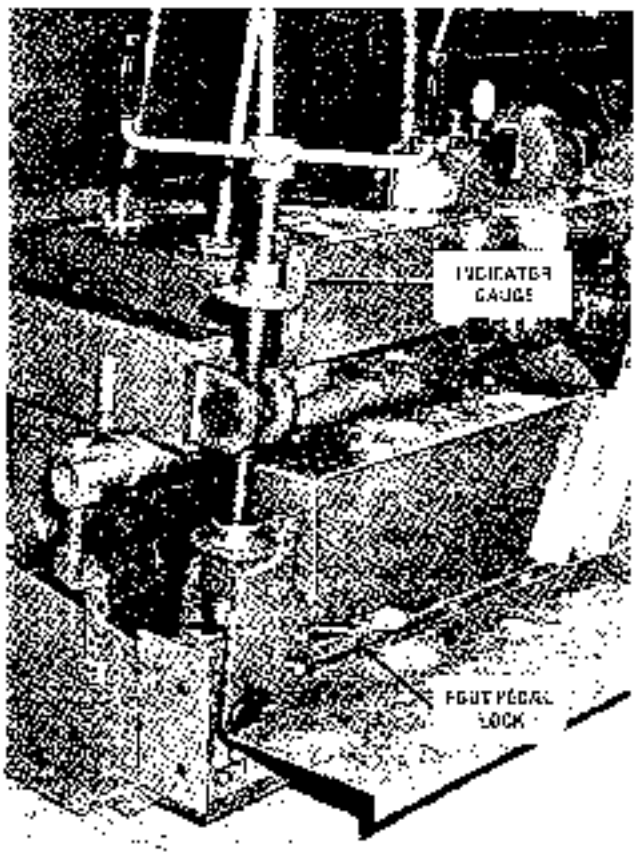

FIGURE C-8 – Thickness Control

1. To increase the depth, turn controls to the right or clockwise.
2. To decrease the depth, turn controls to the left or counterclockwise. A lock is provided at the lower end of the thickness control screws. Figure 8, to secure the position of the controls. This lock is released by means of a foot pedal. Figure C-8, when turning the controls.
3. The level or neutral position can be "felt" when turning the thickness controls with the screed resting on blocks The thickness controls will turn very easy with no drag for a ½ turn or so when the level position is reached.
4. An indicator gauge, Figure C-8, and dial are provided as a guide for the screed operator. When the controls are adjusted for a given depth, on material being laid, he will note the position of the controls. This will guide him in making adjustments up or down when needed, as machine progresses.

A given depth cannot be set with these indicators as the position will vary for different materials and speed; however, the screed operator will adjust the levers to provide the proper depth and thus determine and note the position of the dial for the material being handled.

For additional information refer to "Leveling Control" Section D.)

PREPARING MACHINE FOR USE

SET-UP WIDTH

SELECTING PROPER WIDTH

The first step before starting the laying operation is to decide what width mat to lay, and to prepare the machine with proper extensions, cut-off shoes etc., attachments as required. (Refer to Accessory, Section E for application and installation.)

The standard Finisher, with the use of cut-off shoes, can be set up to lay pavement widths from 8 feet to 10 feet in 3 inch increments.

By adding extensions, (Refer to Accessory, Section E), singly or in pairs, and with the use of cut off shoes, the laying width can be increased from 10 feet to 14 feet in 3 inch increments.

From these possibilities knowing the net width of the pavement to be laid, figure out equal width strips.

The following points must be kept in mind.

1. Allow at least 6" clearance between the outside of the screed and a straight curb for steering. Otherwise the Finisher may become locked against the curb, necessitating backing up and marking the finished surface.
2. When laying multiple strips, subtract the overlaps, (approximately 2"), at each matched joint.
3. On pavements where multiple strips are required, the cut-off strip should be laid prior to the final strip. Then on the last strip the machine can be used standard for whatever width it is set up for.
4. Progress across the street with the cut-off shoe, when used, opposite the matching side.

The selection of proper widths set-ups for laying various width pavements will depend upon a number of factors. The operator will vary them as he becomes familiar with actual operations.

Depending on the specific operation the following points should be considered.

1. Do not overlap excessively at either end of the screed or improper compaction, bridging and tearing may result. Overlap should be held to a minimum at all times.
2. On wide streets it is sometimes desirable to lay middle strip first to be sure crown is straight and in the center of the street.
3. On streets with curb and gutter, the screed can overhang the gutter on the top course. On the binder course, the gutter flange should be treated as a straight curb.
4. On narrow streets and roads under 10 feet width, it is often easier to lay one 11 foot width over the center, and bleed and hand rake surface for remaining width.
5. The Finisher will have a greater capacity when laying the wider strips as the speed is fixed by the type of material. It also simplifies operation. Therefore, it is often better to lay full width strips even if there is some hand spreading required at the curbs, in comparison to laying narrow width strips that come out exactly right. Also, in many cases, less joints will result.
6. In highway paving of narrow roads there may not be clearance on the shoulder to overhang the screed on the cut-off side. Either make first strip the narrow width, or when desirable to maintain crown break in center of road, match with cut-off shoe riding previously laid mat.

INSTALLING ATTACHMENTS

END PLATES (Refer to Figure D-1.)

End plates are provided to be installed at each end of the spreader screws to hold material within the laying width of the machine and to form the edges of the mat being laid. End plates are standard equipment and always necessary except when blending material out to the side.

The end plates, Figure D-1, slide into the guide bar on the end of screed and one end plate support.

The chains provided permit adjustment of their position by means of the chain hooks which fasten to clips of the leveling arms.

The chain hooks are equipped with a long screw thread to provide added adjustability.

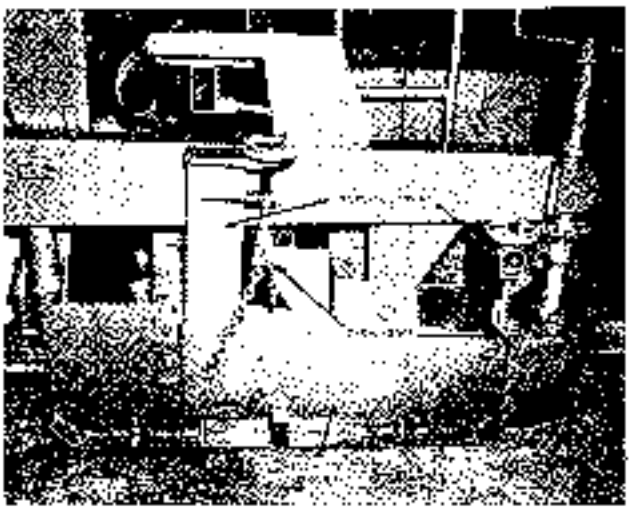

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FIGURE D-1 — End Plate

EXTENSION

It is sometimes desirable, when material is required outside of the regular width of mat laid by the Finisher to remove the end plate and allow material to flow out.

To assist striking-off and leveling this material a plate can be made up in the field as shown below in Figure D-2.

In mounting this plate on the tamper frame, have bottom edge raised above the lower edge of the tamper bar to allow for the additional roller compaction required by the material bleed out.

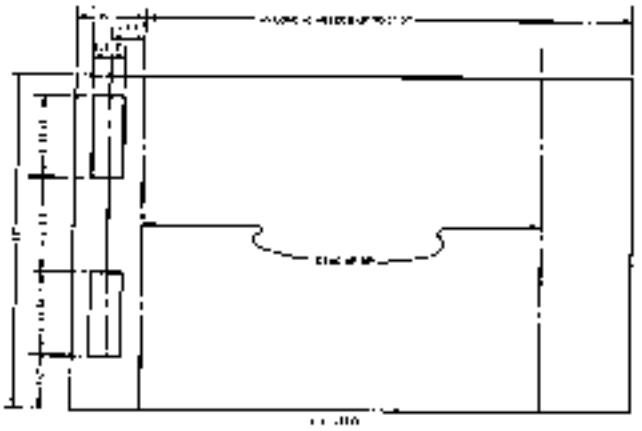

FIGURE D-2 – Dimension Drawing of Extension Plate

CUT-OFF SHOES (Refer to Figures D-3 and D-4)

The cut-off shoes are used when it is necessary to reduce the laying width between end plates.

There are two furnished with the machine, one providing a maximum of one foot reduction in width, in 3" increments, and the other a reduction of two feet in 3" increments.

TO INSTALL:

1. Select the proper shoe to obtain the width desired.
2. Remove or raise the end plate, Figure D-1, and lay cut-off shoe projecting in toward the spreader screw for the desired amount of width reduction.

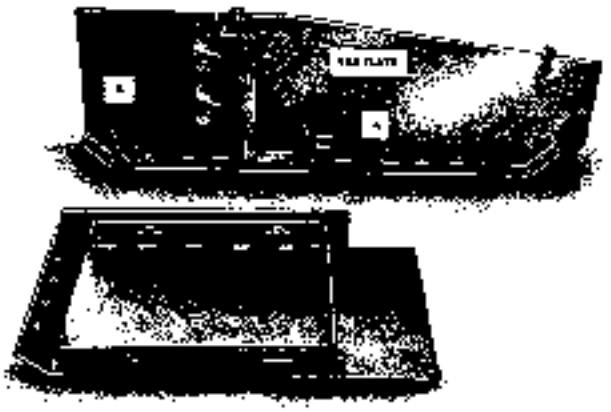

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FIGURE D-3 – Cut-Off Shoe Installation

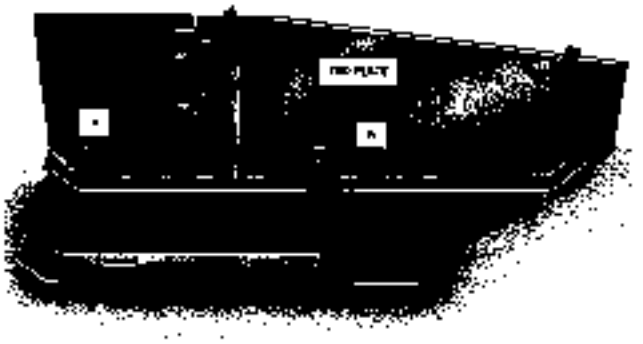

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FIGURE D-4 – Cut-Off Shoe Installed

3. Now lower the end plate, Figure D-4, into the slot on the shoe and drive keeper pins in hole (A).
4. IMPORTANT: In normal paving operations, use one foot less of spreading screw, per side, than paving width. When paving 10' width, use 8' width of spreading screw by sliding keeper keys C, (Figure D-5) to the center of machine. This will stop screw section (A) from turning. Reduce power drag and excess strain on end plate will result if this paving practice is followed.

When cut-off shoes are used, it may be necessary to re-adjust automatic feeder control paddles due to the reduced width.

When operating, do not force excessive amounts of mix onto the cut-off shoe, as this increases the drag and places excessive strain on the end plate.

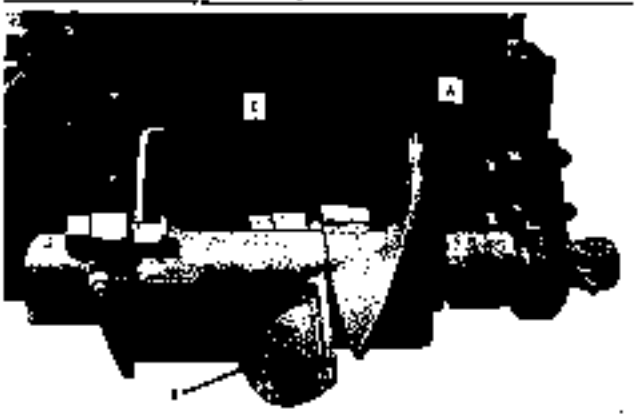

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FIGURE D-5 – Spreading Screw

CAUTION – Before raising screed to travel position, unlock cut-off shoes from end plates to prevent them from coming in contact with the augers.

STEERING GAUGE (Refer to Figure D-6)

To aid the operator in steering the machine a guide bar is provided, which bolts to the hopper end of the main

frame. This may be lined up with the edge of the roadway, grade line, or whatever line has been established for the edge of the mat.

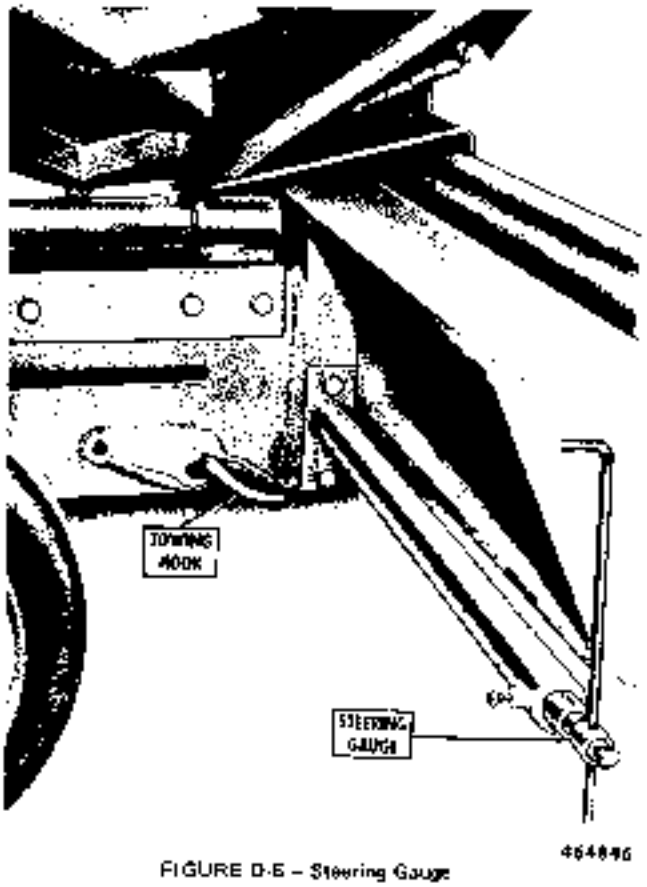

FIGURE D-5 – Steering Gauge

SPRAY CLEANER

The spray cleaner is used when cleaning the machine after it has finished operating.

It consists of a spray nozzle and hose that is attached to the fuel pump on the blower.

TO ATTACH SPRAY NOZZLE AND HOSE:

1. Attach the hose to the pipe nipple.
2. Turn on the cleaning shut-off valve.

OPERATING PERSONNEL

The number of men required to operate the Finisher will depend on the type of project, type of material and the tonnage to be laid per hour.

Two general classifications normally cover all conditions encountered as follows:

A. "Straight run" work laying "hot mixes" of the "high type" on highways or airport runways with no obstructions.
- 1 - Operator for mechanical control of machine.
- 1 - Screed man-to control thickness and level of material laid.
- 1 - Truck dumpers-to assure efficient coordination of dump trucks with Finisher.
- 1 - Shoveler-to clean trucks and to fill all voids accidentally occurring in mat.
- 1 - Raker-to assure even joint and level any shoveled material.

B. "Restricted" work such as city streets where the operation is complicated by manholes, catch basins, intersections, laying to gutter flanges, etc.
- 1 - Operator
- 1 - Screed man
- 1 - Truck dumper
- 2 - Shovelers*
- 2 - Rakers*
- 2 - Lute men-to iron out surface around obstructions.

*The number of shovelers and rakers needed may vary, depending on amount of handwork required on the job

PUTTING MACHINE TO WORK

HEAT SCREED

The first step to starting the actual material laying operation, assuming the machine has been set up with the proper accessories or attachments and to lay the proper width, is to heat the screed to prepare it for proper operating temperature.

WHEN TO USE HEAT ON SCREED

In general, the only reason for heating the screed is to keep the asphalt or material from sticking to it, which causes what is known as a drag or tear. For example, if a truck load, or several truck loads of material have cooled down for some reason as to become unworkable, the screed heater may be utilized to add heat to save dumping this material. This is the only time the screed heater should be operated continuously. If the mix is arriving at the Finisher under specified temperature, the trouble should be corrected at the asphalt mixing plant.

However, if mix specifications require heat on the screed at all times, the burner should be kept as low as possible to prevent over-heating screed and screed components.

To vary the amount of heat transmitted to the sides of the screed, dampers are provided in the "T" at the center of the screed.

SET CROWN

1. Next set the screed to crown required. The amount of crown is usually 1/2" to 5/8", but may vary above or below this average, depending on the relation between base crown and the crown required on the finished surface of the material to be laid.
   If the finished surface is to have a definite crown, regardless of the base, set up the screed to the amount required.
   If the new surface is to have less crown than the base, a sufficient depth of the material should be maintained, so that the old crown in the base does not come through the new surface at the center of the screed.
2. A check on the amount of crown may be made by raising the screed and stretching a string, or using a straight edge, across the width of the screed from one side to the other at the rear.

ALIGN MACHINE

1. Run the machine into position to start laying, with the steering guide gauge properly lined up with the guide line.
2. If the cut-off plates are to be used for the first strip, align machine so that they are on the inside to provide a better finished outside edge.

SET THICKNESS

1. Place two wood blocks, of approximately 20 to 25% greater thickness than the compacted mat required, under the screed near each end, and lower the screed so that its entire weight rests on the blocks. (Refer to Figure E-1.)
   For example, if the mat is to be laid 2" thick compacted, the blocks should be about 2-3/8" thick and approximately 2" long, placed lengthwise in the direction of travel.

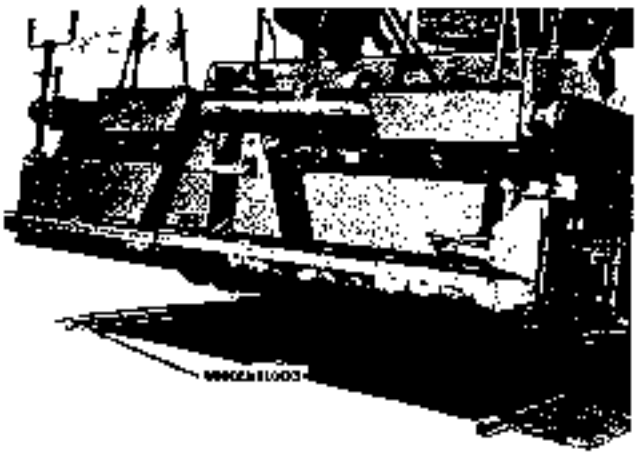

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FIGURE E-1 – Starting Laying Operation

   The blocks are required thicker than the finished compacted mat to allow for additional compaction by rollers in back of the Finisher.
2. Turn the thickness controls so that the front edge of the screed, is about 1/16" above the top of the wood blocks. This is approximately 1¼ turns from the level or neutral position.
   As the screed slides off the blocks it will move on to partly compacted material of the same depth as the block thickness.
   It is sometimes necessary to begin a mat at near zero thickness and gradually build up to specified thickness, as in patch work. To do this, adjust controls as mentioned above, while the screed is resting on blocks. Then raise the screed and replace the blocks with thin strips (approx. 1/4" thick) to prevent scratching the screed surface on abrasive pavement or base surface. Lower the screed and begin paving.

DUMPING TRUCK

1. To start operation, the hopper gates should be set at about a 6 inch opening.
2. With feeders and screws operating have truck back up to Finisher so that rear wheels engage the rollers on the

front of the Finisher. (During paving operation, care should be taken to prevent the truck from bumping the machine when it is standing still as this will mark mat surface.)

3. The truck brake should be set slightly as it starts to dump the load so that it will not roll away from the Finisher. Control of the truck dumping should be such that none of the mix will spill out in front of the machine.
4. The adjustable corner plates of the hopper wings (A) Figure 4, Section C, should be set to accommodate truck discharge.
5. When the material has been carried back into the feeder tunnel and has been discharged and spread uniformly ahead of the screed turn off feeder clutches.

SET AUTOMATIC FEEDER CONTROL PADDLES AND ADJUST MATERIAL FEED

1. Position and set, the automatic feeder control paddles. Figure E-2, at the minimum position where they will actuate the switches to feed more material. The paddles should be turned at a slight angle to the spreading screw. As the material is moved across the screws, it raises the paddles, shutting off the automatic switches, stopping the feeders and screws.
2. Final adjustment of the automatic feeder control paddles is made after the machine has started paving and is moving along at a uniform rate of speed.

NOTE – When a screw extension is used, the paddle should be moved outward to ensure the proper amount of material is conveyed to the extension. (Refer to Figure E-2)

Additional control and finer adjustment of the automatic feeder operation can be made by adjusting the hopper gates to feed the volume of material in proportion to the operation of the automatic feeder. (Refer to "Material in the Screws" Page E-3.) This can be determined after the paving operation has been started by observing the amount and depth of material along the spreader screws and the operation of the automatic feeder control paddles.

It is better to start at a low setting, or volume, and work up to proper control, than to have too much material flooding and overloading the screws.

If, with hopper gates set at full volume, more material is required, change two-speed feeder to "high" and readjust hopper gates starting at a low setting.

CAUTION – DO NOT RUN FEEDERS IN "HIGH RANGE" OVER 60 F.P.M. PAVING SPEED.

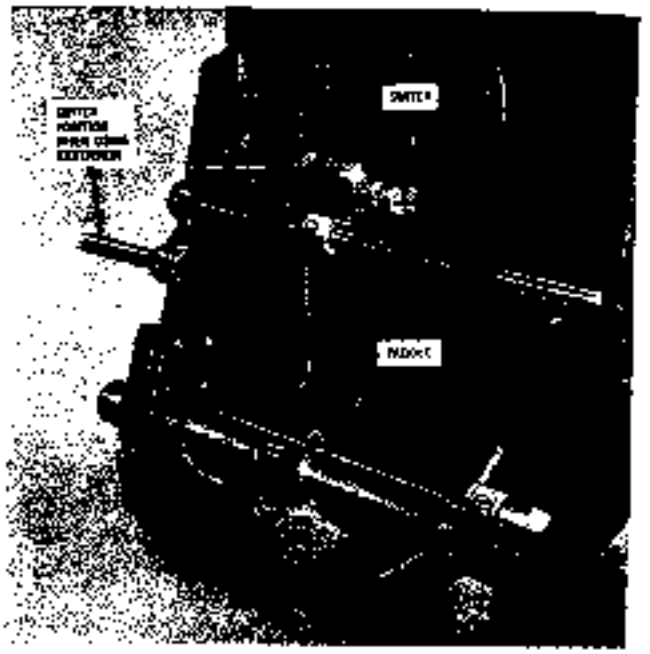

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FIGURE E-2 – Automatic Feeder Control Paddle

After the automatic feeder control paddles have been set and material has been spread uniformly ahead of the tamper, to a depth just above the center of the spreading screws and uniformly across the width of the machine, the paving operation can be started.

START PAVING OPERATION

CAUTION – Screed hoist switch must be in "lower" position when paving.

1. Engage Screed Switch on control post.
2. Set Main and Secondary transmissions for a nominal operating speed. (Refer to "Selection of Operating Speeds" Page E-4).
3. With engine throttle at idle speed, turn on Automatic Feeder Control Switches, engage master clutch and release traction clutch. Increase throttle to operating speed.

MATERIAL IN THE SCREWS

The hopper gates should be regulated so there will be an almost constant flow of material coming to the screws.

It is desirable to regulate the feeder gates so that the automatic feeder controls are working 80%, or 6 to 8 times per minute. The ends of the screws should not be filled too full of material.

The amount of material around the screws does affect the leveling process. If the loose material is not higher than the mat being laid, obviously with the compaction of the tamper and screed, the Finisher will lose level where the screed is starved of material.

Too much material over the top of the screws causes excessive wear on the screws, takes extra power and spills material over the end plates. Also it may cause the screed to rise, resulting in a wavy mat.

HOPPER GATE ADJUSTMENT

The adjustable gates are for the purpose of regulating the capacity of the feeders and controlling the material feed in relation to, and in conjunction with, the Automatic Feeder Control Paddles.

Capacity, type of mix and observation of the operation will best govern the proper hopper gate settings.

If the automatic feeder is falling behind, (not enough material in the screw) open the hopper gate on that side slightly. If the material is building up in the screw too fast, causing the automatic feeder to turn on and off too frequently, the hopper gate on that side should be closed down slightly.

When bleeding material out to one side, or in the case where two screed extensions are mounted on one side, the operator should raise the gate on that side, increasing the volume of material in relation to the volume of material on the other side.

On the fine, dense materials it is better to have the feeders and screws working almost continuously. The gates should be lowered so that the material is fed to the screed as it uses it, although it is desireable to feed a little excess with occasional interruptions rather than to work too close with the danger of running out of material.

ADJUST THICKNESS

1. At this stage the screed operator should carefully check the depth of material laid at each side of the mat and adjust the thickness controls so that the proper depth is obtained.

NOTE – This check should be made at several points across the width of mat before changing adjustment of the thickness controls. The tool may contact a depression or high spot, giving an inaccurate indication of mat thickness.

Do not try to change thickness too rapidly, allow time for machine to level itself.

2. A convenient and simple tool for checking the depth of the mat can be made from a piece of 1/4" rod as shown below:

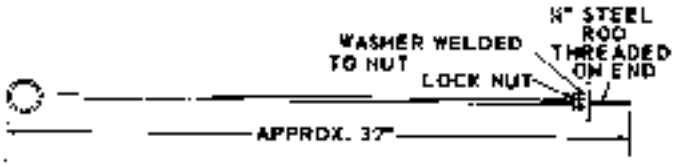


FIGURE E-3 Depth Checking Tool

ROADING MACHINE WITH MATERIAL IN HOPPER

IMPORTANT – When roading the machine for any distance (making a run back, etc.) always have material load in hopper and tunnel at a minimum. Do not road at maximum speed with material in the hopper.

NOTE - NEVER ATTEMPT TO ROAD THE MACHINE FOR ANY DISTANCE WITH THE HOPPER AND TUNNEL FULLY LOADED. The hopper and tunnel hold approximately 10 tons of material when fully loaded. If you attempt to road the machine for any distance you are greatly overloading the machine drives, structural etc., and unnecessarily abusing the machine. It is not designed to be used as a truck to transport material.

The operator should watch and be aware of when he will have to road the machine. He should anticipate his material requirements, raise the hopper wings and continue to operate with wings raised. He should allow the hopper and tunnel to empty as much as possible and reduce the load to a minimum before he attempts to road the machine for any distance.

RAISING HOPPER WINGS

The operator should periodically raise the hopper wings while operating. This will allow material in the wings to flow into the feeder tunnel. This should be done often enough to keep material from packing and cooling in the corners to a point where it may become difficult to work.

NOTE – Before raising hopper wings, the depth of the material on the bar feeders must be low enough to allow material in hopper wings to be discharged.

The machine should be allowed to operate with the hopper wings in a raised position until they are clean and relatively free of material.

SELECTION OF OPERATING SPEEDS

When selecting the Finisher operating speed, it is important to remember that the Finisher should operate at a laying rate slightly greater than the capacity of the asphalt plant supplying the mix. The most satisfactory results are obtained with the Finisher operating continuously. This

allows time for finisher maneuvering, truck delivery and discharge, and other time consuming functions.

When the Finisher is operated at a laying rate considerably greater than the capacity of the asphalt plant supplying the mix, the Finisher must be stopped at short intervals to wait for additional trucks to arrive. This intermittant operation definitely produces inferior job results and has no advantages to the crew or to the contractor.

However, because trucks sometimes fail to arrive at the Finisher at regular intervals, it may be necessary to increase the laying speed occasionally to prevent several trucks from waiting to discharge their load. This normally means going to the next higher operating speed, than the one being used previously. (Refer to Figure C-6, Page C-4.) for Transmission Setting and F.P.M.)

Based upon his experience, the operator will find that a radical change in speed will require a change in the thickness controls. (Refer to "When Changing Operating Speeds", Page E-6).

THE APPEARANCE OF THE MAT AND THE SMOOTHNESS AND THE LEVELNESS OF THE SURFACE ARE THE BEST INDICATIONS AS TO THE CORRECTNESS OF THE OPERATING SPEED FOR THE TYPE OF MIX BEING LAID.

In general, the denser mixes, such as sheet asphalts, stone filled sheets, dense graded asphaltic concrete, etc., can be laid with better results in the medium speed range rather than the highest laying speed possible. Conversely, open graded mixes, such as binder courses, base mixes, mixes containing little fines or sand, can usually be laid in the high operating range very satisfactorily and most economically.

There are many other circumstances that affect the mat appearance in addition to the speed of the Finisher. One of the most common is asphalt mix cooled below the normal laying temperature which causes a tearing effect under the screed and can usually be eliminated by utilizing the screed heater. (Refer to "When to Use Heat on Screed", Page E-1.)

It is impossible to definitely state the best operating speed for the Finisher. This depends upon many variables including the type of mix and the capacity of the asphalt plant supplying the material. Perhaps the most important thing to remember is this: OPERATE THE FINISHER CONTINUOUSLY WHENEVER POSSIBLE FOR BEST POSSIBLE RESULTS.

MATCHING JOINTS

PARALLEL JOINTS

The question of how much to overlap the joint in matching depends some upon the operator of the machine and how straight he will run alongside his first mat. An overlap of 0" to 2" should be maintained, with the least amount most desireable. For best results, only the runner of the end plate should ride the adjacent mat.

It is always desirable whenever possible to match your strips before the asphalts set up. When doing this, have the roller keep away from the matched edge on the first strip about six inches to a foot. Then the second strip can be laid the same depth as the unrolled part of the first strip, and the roller can put down the joint to better advantage.

In cases where the plans are to lay one side of the road some distance ahead, and the material sets up or is compacted under traffic before the joining strip can be put down, then the full width of the first strip should be rolled.

When matching this strip, hold the depth of the overlapping mat enough higher than the first mat to allow for what additional compaction there might be under the roller. NEVER LET THE FIRST MAT CARRY THE SCREED.

Put the roller on the joint as soon as possible behind the Finisher. While the mix is still workable, the roller will do a very satisfactory job of putting the joint together.

Always match one mat against another with the machine standard, (without cut-off,) on the side of the matched joint. When using the cut-off, put it on the other side of the machine. If the street width requires one mat with the cut-off on both sides of the Finisher, put that mat down first.

ENDING A STRIP

In order to make a good transverse joint one must know the proper method for ending a strip.

It is generally agreed that when ending a strip, a square, vertical edge should be left to accomplish a good bond in the transverse joint.

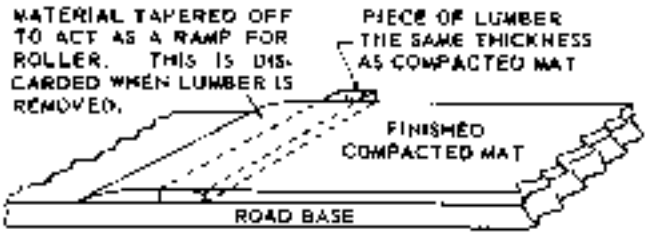


FIGURE E-4 – Ending A Strip

There are several methods that are used to square off and end a strip to insure a good transverse joint.

1. One of the methods commonly used is to use a piece of lumber about 6" wide, and a little longer than the width of the mat, and the same thickness as compacted mat. This is placed in the mat just before the end of the strip. (See Figure 4 above.)
   Toward the end of any given strip, the operator should run the feeders and screws so that the material is spread about the same volume across the front of the tamper. Then stop the feeders and operate the machine forward until the material is almost used up. As soon as any part of the tamper bar becomes exposed, the machine should

be stopped and the screed raised and the machine moved forward.

An opening is then raked square across the mat about 12 to 18" from where the material ends. The piece of lumber, the same thickness as the compacted mat, is then placed in this opening and the material pushed back against the board to firmly hold it in place.

The board is placed in the mat as a support for the roller. The material, on the opposite side of the board from the mat, will act as a ramp for the roller to leave the mat when the rolling is finished.

After the mat has been rolled and set up, the board may be removed leaving a square, vertical edge to insure a good transverse joint when the next strip is joined to it.

2. Another method commonly used for ending a strip or to get the roller on the mat at the beginning of a strip, is to square up and rake an opening, then firm the end of the mat and lay pieces of oiled paper in the opening. The oiled paper is then covered with material formed into a ramp for the roller.

   After the mat has been rolled, the ramp material, on the side of the paper away from the finished mat, is cleaned away and the paper removed leaving a square, vertical edge.

3. Often a rope is laid down, across the area to be paved, near the end of the strip and the Finisher lays the mat right over it. When the mat is then rolled a mark is left across the mat over the rope. The material, at the extreme end of the mat, opposite the rope mark is then cleaned away, the end of the mat firmed by hand leaving a vertical edge for a transverse joint.

TRANSVERSE JOINT

UNCOMPACTED MAT

If the machine is going to be brought back to make the joint before the asphalt has cooled appreciably, keep the roller off the last two yards of the strip.

Then when making the joint, back the raised screed upon the mat until you can see three or four inches of the mat in front of the screed. Then drop the screed upon the mat, fill up the screws with material and proceed as you would in normal operation.

Be sure that the thickness controls are in the same position that they were before you ended the joint. If that position has been changed and forgotten, adjust the thickness controls with the screed resting on the mat. The speed must also be adjusted.

COMPACTED MAT

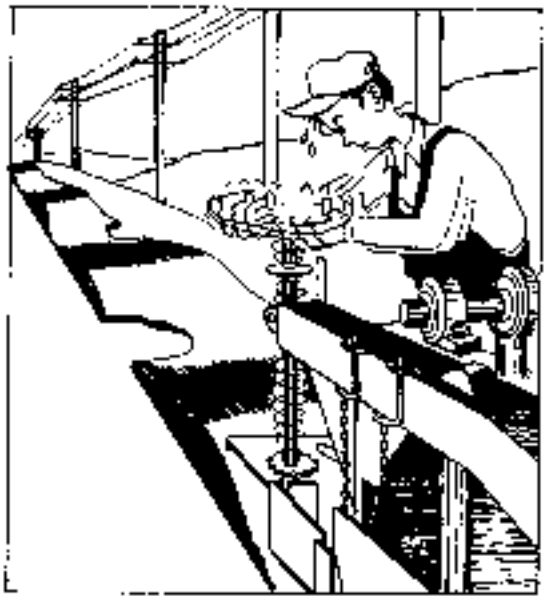
If the transverse joint is to be made to a compacted mat, start off the machine the same as above, only be sure to allow for roller compaction.

CONDITIONS ENCOUNTERED IN FINISHING

LEVELING CONTROL

The most important thing to remember, when adjusting thickness controls, is not to move the control more than a quarter turn at a time.

By watching the road ahead of the Finisher, changes in grade can be met gradually, and the finished road will have a much better riding surface than trying to overcome in a short space, faulty base conditions.



The Finisher is designed to level automatically and when once set for proper thickness, and left alone, it will produce a much better surface than when manually controlled.

Because the base of any road on which you are laying a mat is seldom true under a straight edge, don't expect to hold the thickness of the mat to a very fine measurement. All that you can expect is an average thickness and a level surface.

The material will be thinner over the high spots of the base and thicker over the low spots in proportion to the amount that those places vary from the true level of the base.

Bumps in the finished road may be caused by the operator raising the screed and starting out without giving the cylinders time to go all the way down.

Material may be dropping over the front of the hopper and the wheels run over the pile.

Sometimes in some resurfacing work, the plans call for laying a mat too thin to take out the high spots, and as a result, the screed is held up while riding on that spot. The operator should be on the lookout for such occurrences.

If you are laying a binder course on a base that has holes deep and long enough for a wheel to completely drop into

and run there for a short distance before climbing out again, it would give a better surface if some binder was taken ahead and put in these holes. This method eliminates the manual adjustment otherwise necessary.

Or it may be necessary, as on a highway resurfacing job of considerable distance, having depressions ranging from the length of the machine to several times the length of the machine, to lay a "leveling course," "scratch course," or "wedge course" using the Leveling Attachment on the Finisher (Refer to B-G Distributor, or B-G Factory for Details.) This will either fill these depressions completely and bring them up to grade, or taper the surface into and out of these depressions enough to prevent a rough ride at high speeds.

In laying city pavements if the intersections are high and the new pavement is to follow the same contour, turn the thickness controls to give more depth before coming to the high point or the Finisher will level out the intersection.

NOTE: CROWN IN SCREED SHOULD BE VARIED TO SUIT CONTOUR REQUIRED AT INTERSECTIONS, OR ON THIN MATS ENDS OF SCREED PLATE WILL RIDE BASE

If the catch basins are low at the intersections, turn the thickness control to give less depth, before coming to the low point, or the machine will level here also and bury the catch basin.

If the Finisher is traveling over a catch basin, the material will have to be hand raked around the base to give the finished mat the proper slope for collecting water.

WHEN CHANGING OPERATING SPEED

If the machine has been adjusted to the correct position for the desired depth while traveling in first gear, then when changing to a higher speed, the operator will need to move the leveling controls a little to the right to maintain the same thickness of mat, and the reverse is true as speeds change from fast to slow.

STABILITY OF THE MIX AND ITS RELATION TO LEVELING CONTROL

WHY STABILITY AFFECTS LEVELING

Stability is associated with leveling because the screed is supported on, and by the mat already laid. There must be sufficient density in the material to support the weight of the screed in a position practically horizontal to the base.

When the screed has not built up sufficient density or stability in the mat, due to instability of the mix, the screed will tend to sink in and ride on its heel in an inclined position.

MANHOLES IN STREETS

In resurfacing city streets, manholes must be carefully watched.

If a binder course is laid, the operator will have to stop the machine before the screed strikes the manhole, lift the screed until it is past the manhole.

It is common practice to mark the pavement at one side of the manhole so that when the manhole is under the hopper, the operator can come up as close as possible with the screed.

If the manhole is in the line of a wheel, the operator will need to adjust the thickness controls to counteract the rising of the machine.

If the manhole is more than an inch high, it is good practice to put a few shovels full of material from the hopper in front of the manhole to enable the wheel to climb over it.

In laying the top course, the manholes will not cause trouble because the mat will be a little higher than the manhole. The only caution necessary is to be sure that the screed is holding the proper grade to ride over it.

The top course is laid above the surface of the manhole, about the thickness of the compaction under the roller, and cleaned off before the roller runs over it.

TEARING OF MAT

The word tearing covers a range of defects in the finished mat or mat surface. Tearing is an indication of improper operation, adjustment, or material, and can usually be eliminated with proper attention.

Tearing of the mat may be divided into three types:

1. STARVING THE MAT

Spots or actual holes in the mat which might show up anywhere across the section of the mat requiring extra material to be brought back for filling.

These marks may be caused by any one of a number of things:

Lumps of cold material that will not break up easily under the screed and as a result are pushed along at the face of the screed, starving the mat at that place.

Foreign objects, such as wood or rags, getting into the mix and pushing along in front of the screed.

The most common cause of tearing is a mix that is cold and partially set up due to long hauls.

The first thing to do in trying to solve the problem of this type of tear is to remove the cause, if possible. Insulating truck bodies and covering loads will help hold in the heat.

Heat on the screed will often break down lumps and smooth out the surface.

2. SURFACE TEARS

A shallow surface tear, which looks as if some object had been dragging or scuffing the compacted surface, is known

as a screed tear and is caused by material sticking to, and building up, on the screed.

Instead of the screed ironing out the mat, as in a normal condition, the built up spot on the screed tears and roughens the mat.

Heating the screed generally takes care of this type of tearing. If heat doesn't remedy the condition, the screed should be raised and cleaned off.

Rough, rusty or warped screed surfaces will also cause surface tearing. Also, a deficiency in graduation of the smaller sizes of aggregate particles in the mix will cause an open type of surface texture. In some mixes this is to be desired, but in others it is not desirable and can be corrected only by adding into the mix a sufficient amount of the deficient aggregate size.

On materials that require a heated screed, such as sheet asphalts, it is possible for the screed to get too hot, and in such cases, shut off the heater. A brown color indicates screed is too hot or the material is coming to the machine too hot.

3. CRACKS IN THE MAT

Another type of tear mark across the mat is a series of cracks. These cracks may be 2/8" to 1/2" apart and extend down into the mat a half inch or so. They are not always consistent, but come and go in different places across the mat.

This condition is due to the material being so unworkable, that instead of compacting under the screed, it drags forward slightly before it strikes off. The material will shear at the strike-off surface in preference to being squeezed down to level.

The best solution is to make the material more fluid by means of heat or a change in graduation of material. If this cannot be done reduce speed slightly.

The usual screed tear mark is not serious and will close right up under rolling and traffic. However, it does spoil the appearance of the surface immediately behind the Finisher and steps should be taken to correct it.

Sometimes these same types of tear marks appear on the edges of the mat, indicating an insufficient ironing action by the screed at the ends, or tear marks may appear at the center of the mat, indicating lack of ironing by the screed at the center. (Refer to Screed Adjustment, Section H to correct these conditions.)

Screed tear marks should not be confused with roller cracks, although the appearance is much the same. Roller cracks are usually the result of rolling when mix is too hot.

Roller cracks will develop in certain materials such as bituminous concretes at the intermediate stages of setting up, between the period when the material will flow under the roller and the period when the material will support the roller taking only vertical compaction.

4. MAT TEXTURE

In binder courses the mat texture may normally be open. It may be closed and finely knit as in mixes containing a large percentage of sand. Any lack of uniformity of texture is undesirable and should, if possible be corrected.

Possible causes for lack of uniformity are:

a. Warped screed plates (concave or convex)
b. Rough, rusty or pitted screed plates (Refer to Screed Section)
c. Screed crown
d. Speed machine is operating
e. Type of mix
f. Temperature of mix
g. Mat thickness

Warped screed plates can be checked by placing a straightedge, lengthwise, crosswise and diagonally, in many places on each plate. If the plates are concave, that area will not bear as heavily on the mat as at the edges. If the plates are convex, the adjacent areas will not be bearing as heavily as the convex portion. These areas may produce blemishes in the mat.

Rough, rusty or pitted screed plates do not scour properly, thus producing blemishes in the mat.

The relation of front screed crown to rear crown is important. For average operation, 1/8" to 3/16" more crown is required in the leading edge than in the trailing edge to produce a uniform surface texture. If the mat texture in the center 4 to 6 feet of the mat is more open than at the edges, more front crown is needed. If the outer edge texture is more open, less front crown is needed. (Refer to Screed Section). This adjustment should be made while the machine is operating.

An increase in forward operating speed may cause a more open texture in the mat surface. For best operation, the machine should be kept operating continually, thus the speed should be no greater than necessary to prevent trucks accumulating ahead of the machine.

A change of aggregate graduation will be evident in the mat surface. A deficiency of sand will produce an open texture. An excess of fines (mineral filler) will make the mix dryer and less workable, resulting in pulling or tearing. Changes in asphalt content is apparent in the workability and color of the mix. A decrease in asphalt produces a dull and sometimes brownish appearance, while an excess of asphalt gives a jet black, shiny appearance. An excess of coarse aggregate will result in an open texture surface.

As the mix temperature decreases, the mix becomes stiffer and is more difficult to strike off cleanly, resulting in an open texture mat.

The thickness of the mat should be at least 1-1/2 times that of the largest size stone in the mix or the roller will crush the stone and a very open texture will occur.

ROLLER APPLICATION

The primary purpose of rolling is to obtain maximum compaction and develop stability in the pavement. The use of heavy rollers, however, is lessened when the Finisher is used, as the screeding action of the Finisher puts a high percentage of the initial compaction into the bituminous pavement and leaves the surface smooth. In many cases, very little additional compaction is obtained with a roller behind the Finisher.

WHEN TO USE THE ROLLER

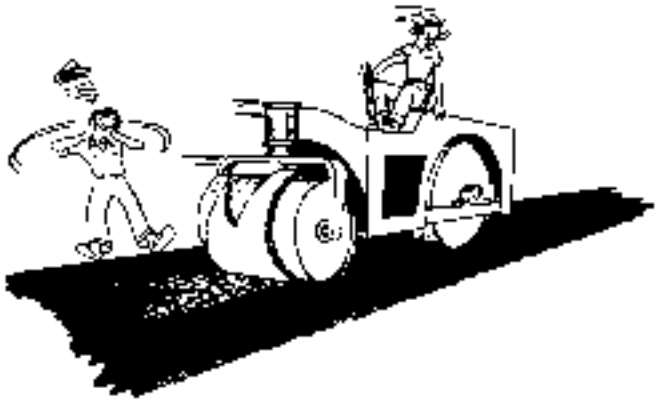
It is difficult to specify the weight of roller, when to start rolling, and how much rolling is to be done behind the Finisher because of the many variables encountered.

On cold type mixes using cut-back asphalts and light tars, it is sometimes necessary to hold back rolling from 1 to 48 hours, while on hot mixes the roller should be placed on the fresh pavement as soon as it will support the roller load without squashing out to the side or shoving ahead of the roller. In any case rolling should be continued until the mixture is uniformly compacted and the surface is true to established grade and crown.

OPERATING ROLLER

Care in operating the roller is very important. The roller operator can make or break the finishing job.

When rolling bituminous mixes behind the Finisher, the front or steering roller should be away from the Finisher so as to prevent turning the steering roller on the uncompacted surface.



The roller operator can make or break the finishing job.

The roller should never be allowed to stand on an uncompacted mat.

Care should be taken when reversing the roller on a fresh mat so as to do the reversing, slow and smooth enough, to prevent making unnecessary lumps in the finished surface that may be difficult to remove.

ROLLING JOINTS

When matching hot joints with the Finisher so that the material in the first and second joint will be soft enough to roll together, it is advisable not to roll the first strip too close to the edge to be joined with a second strip.

The roller should be held about 8" to 12" away from the edge and this joint should be rolled as soon as possible after the second strip has been joined to the first strip.

In the case of a long strip on which a cold joint is anticipated, the entire strip should be rolled, but care should be taken not to allow the edge of the rollers to project beyond the edge of a new mat.

LAYING AIRPORTS AND LARGE AREAS

Due to the extreme width of airports (100' to 300' wide) their great length up to 6500', it is a real problem to construct a surface free from water pockets - very undesirable in landings and take-offs.

If the base is smooth and layed close to grade, good results can be obtained without the use of grade lines. It is a good plan to start at the edge of the runway and work toward the center. In this way, if the joints do not roll smooth, they will not tend to form water pockets. (Refer to Figure E-5.)

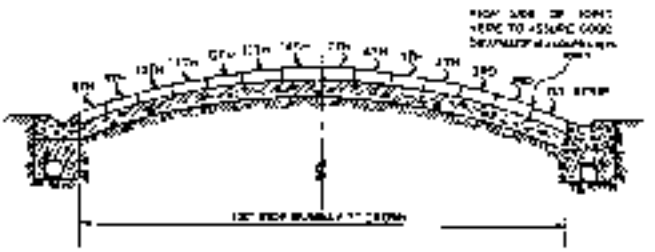


FIGURE E-5

A method often used to assure a true crown is to check the mat transversely behind the Finisher with a straight-edge or crown board, upon which is mounted a hand level. The level is so adjusted, that when the level bubble records level, the end of the straight-edge nearest the center of the mat is higher than the outside end.

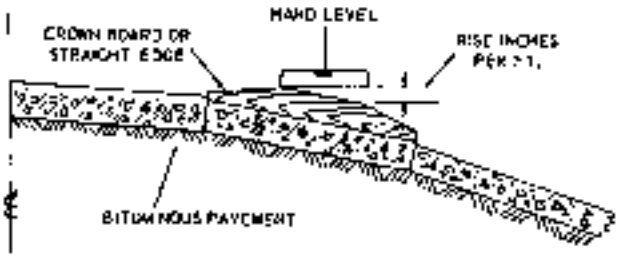


FIGURE E-6

For example, if a 5" crown is needed on a 100' wide runway and the Finisher is laying 10' strips, then the level should be adjusted so when the bubble indicates level, the end of the 10' straightedge nearest the center of the mat will be 1" higher than the outside edge, or 1/10" rise per foot. (Refer to Figure E-6.)

If the above methods are used, good drainage should be obtained even though there is some variation in the longitudinal grade. It is always desirable to lay two courses on a varying base as most of the irregularities of the first course surface can be ironed out with the second course.

GENERAL CLEANING

A half hour spent cleaning the machine at the end of the day's work will pay in better performance and satisfaction and lower maintenance cost. The machine should be moved off the asphalt pavement so the solvent used will not damage the pavement.

Attach spray cleaner for cleaning machine. (Refer to Spray Cleaner Section D.)

Clean material off sides and front of hopper, then spray well.

Also spray the truck rollers while turning them over a few times so they will be free to move the next morning.

The truck rollers mounted in the oscillating axle frame in front of the hopper will at times become so jammed with material that they will not turn when pushing a truck. The shaft for these rollers fits in a self aligning bushing in hanger bracket on the push roller frame, which may be removed for cleaning.

Let the bar feeders and screws run while spraying them well with kerosene or fuel oil.

It is important that the screed be kept clean while the Finisher is operating and also at the end of the day. The screed acts both as an iron on the surface of the road and also as part of the leveling control of the Finisher. (Refer to Section H or I).

Its care might be compared to that of a plowshare. In order for the screed to scour it must be cleansed and oiled after the day's work is done.

This scouring condition is very important in laying dense materials because any build-up of material on the screed will cause a mark on the finished mat.

It is recommended to clean and oil well after finishing the day's work regardless of the mix. Then if the machine is idle next day, rust will not form on the screed.

LUBRICATIONS

Nothing can add to the life of the machine more than thorough lubrication of the moving parts, properly executed at the correct intervals. When time and availability of the machine are at a premium, it is absolutely inexcusable to have a breakdown resulting from improper lubrication, since this can so easily be avoided.

LUBRICATING INSTRUCTIONS

Detailed instructions regarding the lubrication of the Finisher are given in the Lubrication Chart and the Lubrication Drawing on the following pages. The Lubrication Chart specifies the points to be serviced, the hourly intervals, the type and quantity of the lubricant to be used, and specific instructions regarding the service to be performed. The Lubrication Drawing, Figure 1, is used for identification and location of the various points of lubrication and service.

ANTI-FRICTION BEARINGS

The anti-friction bearings used on the Finisher have been lubricated at the factory. The grease cannot be seen since it is concealed within the bearings by the grease retainer seals.

Over-greasing distorts and damages these seals allowing dirt to enter and greatly shorten the life of the bearing.

NEVER USE A POWER OPERATED GREASE GUN ON ANTI-FRICTION BEARINGS.

LUBRICATE ONLY AS DIRECTED IN THE LUBRICATION CHART

The number of shots of grease from the grease gun is based on greasing with a standard 13 oz. hand gun delivering 1 oz. of grease to 54 shots of the gun, using the recommended grease. One shot of the gun = 1/54 oz. of grease.

An operator who knows the value of proper lubrication is a credit to himself and is an asset to his employer. In doing so he cuts down lost time and increases the life of the machine.

1. He keeps his grease gun clean and wipes each grease fitting with a clean cloth to prevent grit from being pumped into the bearings.
2. He keeps his grease and oil containers clean and their covers in place, except when using, to keep dust and dirt out of the lubricant.
3. He keeps each lubricant container well labeled and makes no mistake in using the correct lubricant in the right places.
4. He has studied his lubrication charts and does not guess when lubricating his machine.
5. He keeps his machine as clean as possible and removes all excess grease and oil which may accumulate during the day.
6. WHEN LUBRICATING BALL OR ROLLER BEARINGS HE IS CAREFUL NOT TO BLOW THE SEALS THROUGH OVERGREASING.

LUBRICATION CHART SB-41 FINISHER

INTERV. HOURS	PT.	IDENTIFICATION	NO. OF POINTS	TYPE OF LUBE	QUAN.	REMARKS
10	1	Thickness Control	2	MPG	2 Shots	On Threads
	5	Bar Fdr. Hd. Shafts	2	MPG	Purge	Back of Machine *
	15	Bar Fdr. Ft. Shafts	4	MPG	3 Shots	Grease from on top
50	2	Thickness Control Bearings	2	MPG	2 Shots	
	3	Ecc. Shaft Brgs. Pillow Block	4	MPG	2 Shots	DO NOT OVERGREASE
	4	Ecc. Shaft Ecc. Brgs.	4	MPG	2 Shots	DO NOT OVERGREASE
	7	Front Power Throwout Brg.	1	MPG	2 Shots	Grease thru hole in V-belt Guard on Right Side
	8	Drive Univers. Jts.	4 (2 ea. side)	MPG	2 Shots	DO NOT OVERGREASE
	9	Drive Take-up Brgs.	2 (1 ea. side)	MPG	3 Shots	
	10	Hopper Cyl. Support	4	MPG	2 Shots	Grease under Back of Hopper
	12	Front P.T.O. Brg.	2	MPG	2 Shots	Grease thru hole in V-belt Guard on Right Side
	13	Bogie Frame Pivot	2 (1 ea. side)	MPG	3 Shots	
	14	Bogie King Pins	8 (4 ea. side)	MPG	3 Shots	
	16	Push Rollers	4	MPG	2 Shots	
	17	Hopper Pivot Shaft	4	MPG	2 Shots	Grease Under Hopper Both Ends
	18	Input Shaft (Fwd.-Rev.)	1	MPG	7 Shots	Between V-belt Pulley & Trans.
	22	Hydraulic Tank	1	HO	Check	Check Hi and Lo Level
	27	Master Cl. Link. Brgs.	4	EO	2 Shots	Main & Controls Link.
	29	Level. Arm Pivot	2	MPG	2 Shots	Front Pivot Shaft
	32	Spreading Screw Brgs.	4	MPG	4 Shots	Fittings piped to top for ease of greasing
	33	Tamper Conn. Lins.	2	MPG	2 Shots	Under Ecc. Shaft and Rear of Screed

INTERV. HOURS	PT.	IDENTIFICATION	NO. OF POINTS	TYPE OF LUBE	QUAN.	REMARKS
50	34	Leveling Arm Pivot	2	MPG	2 Shots	Grease under Leveling Arm at Pivot Shaft
	35	Gear Box (Vib. Screed)	4	MPL		Check Level
	36	U-Joints (Vib. Screed)	All	MPG	1 Shot	
200	10	Fwd.-Rev. Trans. Control Shaft	2	MPG	2 Shots	Top of Fwd.-Rev. Trans.
	20	Fwd.-Rev. Prim. Trans.	1	MPL	Check	Check level at Plug on side of Trans.
	21	Warner Prim. Trans.	1	MPL	Check	Check level at Plug on side of Trans.
	23	B.G. Second. Trans. (Bevel Gear Sect.)	1	MPL	Check	Check level at Plug Stick on top of Trans.
	24	B.G. Second. Trans. (Main Sect.)	1	MPL	Check	Check level at Plug Stick on top of Trans.
	28	Fwd.-Rev. Lev. Link	1	MPG	4 Shots	Middle of Link Tube
	30	Feeder Drive Chain Tightener	2	MPG	2 Shots	Tunnel opening at Rear of machine
	31	Screw Drive Chain Tightener	1	MPG	2 Shots	Screw Support
500	35	Gear Box (Vib. Screed)	4	10W30	2/3 pt.	Drain Refill to Correct Level
1000	6	Fdr. Screw Ctr. Shaft	4	MPG	4 Shots	Under Rear Deck
	11	Bogie Wheel Brgs.	4	MPG		Repack
	20 & 21	Warner Prim. Trans.	1	MPL	4 qts.	Drain and Refill to correct level (Both boxes are filled thru level "all.")
	22	Hyd. Oil Tank	1	HO	26 Gal.	Drain and Refill to correct level at HI and Lo level test
	23	B.G. Second. Trans. (Bevel Gear Sect.)	1	MPL	10 qts. SAE 90	Drain and Refill to correct level.
	24	B.G. Second. Trans. (Main Section)	1	MPL	57 qts. SAE 90	Drain and Refill to correct level.
	25	Drive Wheel Brgs.	2	MPG		Repack

EO — Engine Oil — Military Equivalent MIL-L-2104 Type
MPL — Multipurpose — Gear Lubricant Military Equivalent MIL-L-2105 Type
HO — Hydraulic Oil or Equivalent SAE Oil
MPG — Multipurpose Grease

* Use Moykote BR2-S or Equivalent

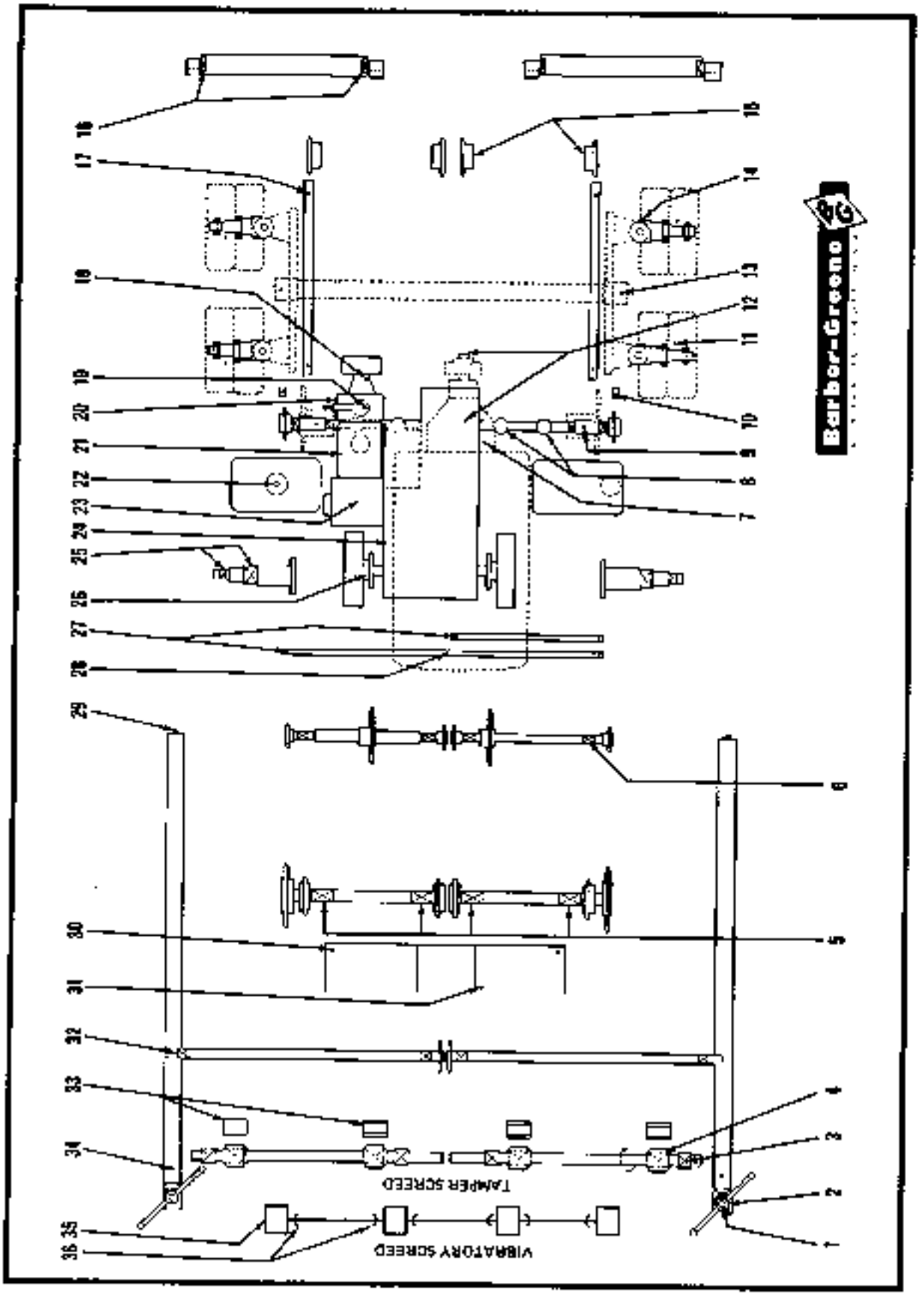


Figure F-1 – Lubrication Chart

MAINTENANCE AND ADJUSTMENTS

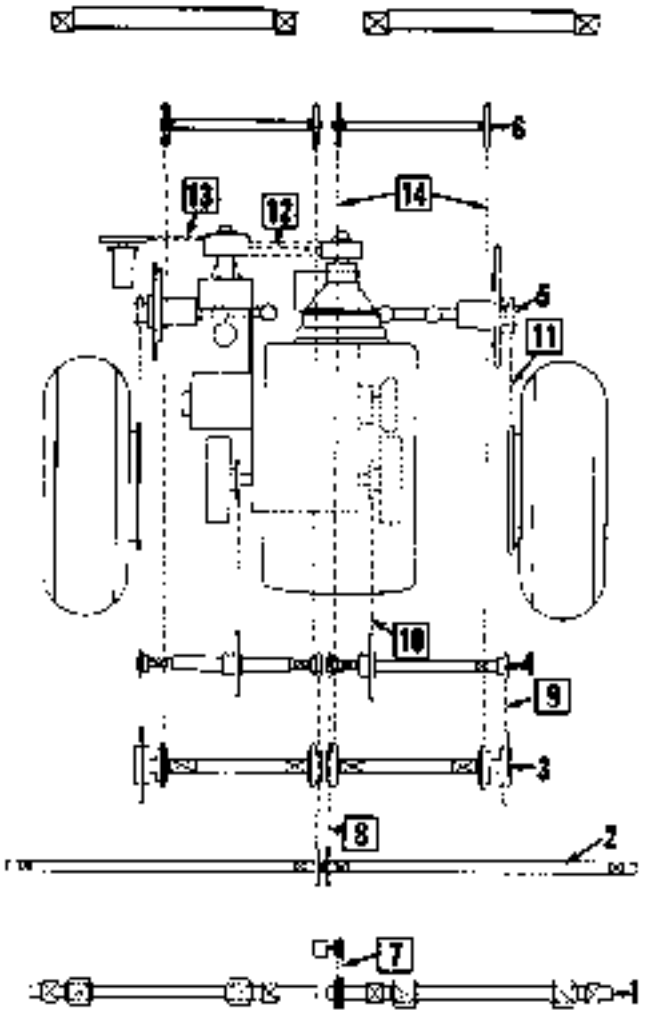


FIGURE G-1 - Shafting and Drive Chain Chart

SHAFTING IDENTIFICATION

1. Tamper Eccentric Shaft
2. Screw Conveyor
3. Bar Feeder Head Shaft
4. Feeder and Screw Counter Shaft
5. Transmission Extension Drive
6. Bar Feeder Foot Shaft

DRIVE CHAIN AND BELT IDENTIFICATION

7. Tamper Eccentric Shaft Drive V-Belt
8. Screw Conveyor Drive Chains
9. Bar Feeder Drive Chains
10. Feeder and Screw Counter Shaft Drive Chains
11. Wheel Drive Chains
12. Main Drive Belts
13. Hydraulic Pump V-Belts
14. Bar Feeder Chains

ADJUSTING V – BELT TENSION

NOTE – V-belts must not be stretched over the rims of sheave grooves. Reduce the span between sheaves enough to permit the belts to be assembled without stretching.

ADJUSTING 3V–5V–8V SECTIONS

1. When assembling new belts, tighten them to about two times normal tension. There will be a rapid drop in tension during the "run-in" period (first 24 to 48 hours) while the belts seat themselves in grooves. After the first day or two a check should be made for the correct amount of tension in each belt.

MAIN DRIVE BELTS (Refer to Figure G-2)

There are 5 V-Belts driving the transmission from the power unit.

TO ADJUST BELTS:

1. Loosen four engine support frame bolts (A) (one shown)
2. Loosen Lock nuts (B) on take-up bolts.
3. Tighten nuts (C) until correct belt tension is obtained. Approximately 3/8" mid-belt movement.
4. Tighten lock nuts (B) and support frame bolts (A).

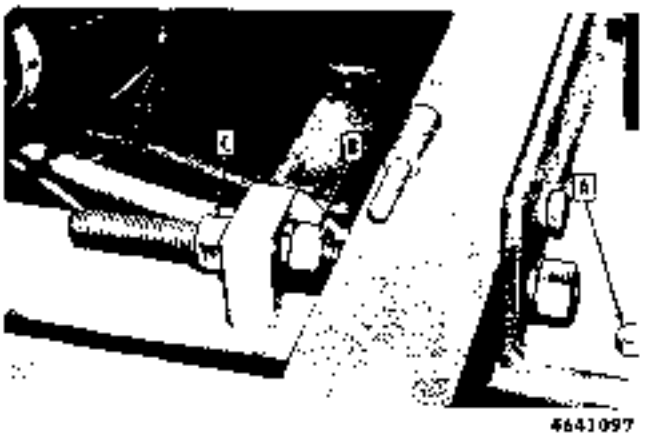


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FIGURE G-2 — Main Drive Belt Adjustment

WHEEL DRIVE CHAIN (Refer to Figure G-4).

There are two wheel drive chains, one on each side. These chains are adjusted by pivoting the wheel drive extension shaft bearing housing.

TO ADJUST CHAINS:

1. Loosen three bolts (A)
2. Adjust turnbuckle to obtain correct chain tension 1" of Mid. chain movement.
3. Tighten bolts (A) and nut (B)

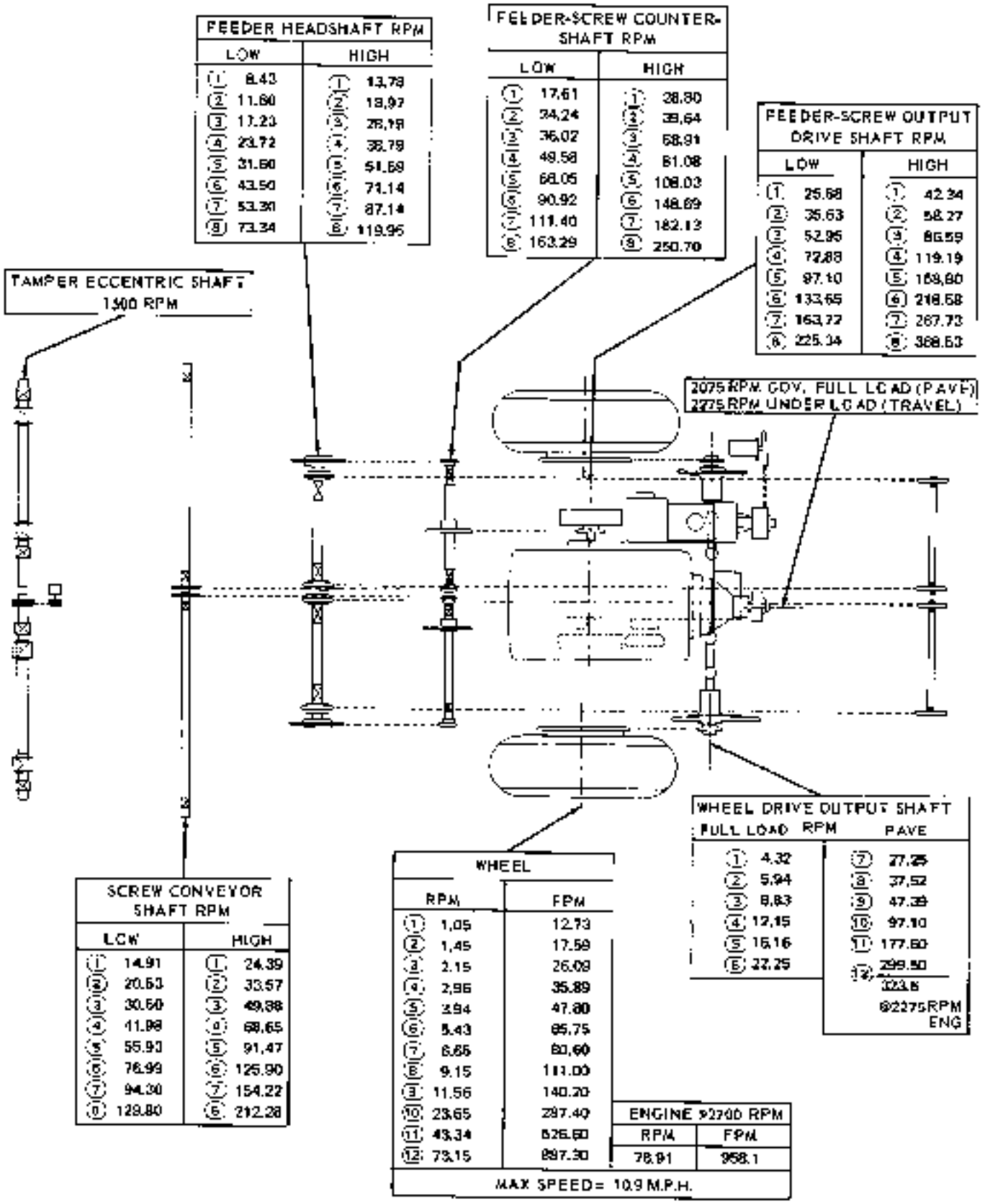

FIGURE G-3 – Speed Chart

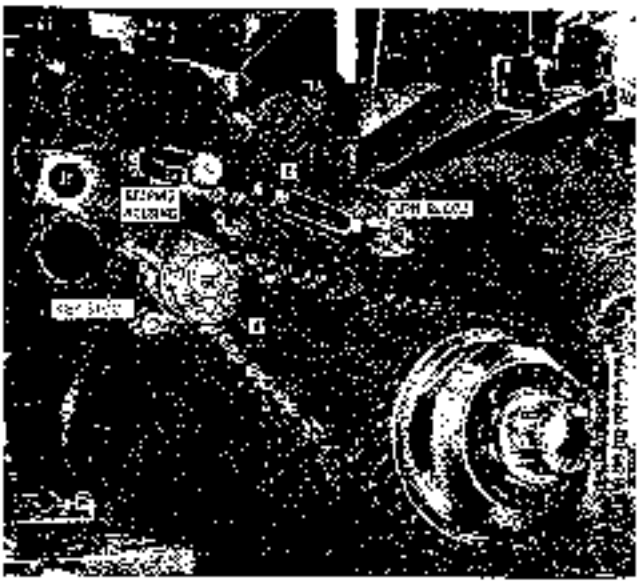

FIGURE G-4 — Crawler Drive Chain Adjustment

BAR FEEDER & SCREW CONVEYOR COUNTERSHAFT DRIVE CHAINS (Refer to Figure G-5.)

The feeder and screw countershafts are driven by two chains, one for each shaft.

TO ADJUST CHAIN:

1. Loosen bolt (A) and jam nut (B).
2. Turn bolt (C) to draw take-up shoe outward against chain, until proper chain tension. ½" of mid-chain movement
3. Tighten bolt (A) and jam nut (B).

BAR FEEDER DRIVE CHAINS (Refer to Figure G-6.)

The bar feeders are chain driven from the feeder and screw countershaft to the bar feeder headshaft.

TO ADJUST CHAINS:

1. Loosen lock nut (A) on adjusting bolt (B), one for each drive chain.
2. Turn in adjusting bolt (B) to obtain proper chain tension. ½" of mid-chain movement.
3. Tighten lock nut (A).

SCREW CONVEYOR DRIVE CHAINS (Refer to Figure G-6.)

The screw conveyors are driven by two chains, (one for each screw) from the feeder and screw countershaft

TO ADJUST CHAINS:

1. Loosen lock nut (C) on adjusting bolt (D), one for each drive chain,
2. Turn in adjusting bolt (D) to obtain proper chain tension. ½" of mid-chain movement,
3. Tighten lock nut (C).

HYDRAULIC PUMP V-BELT ADJUSTMENT (Refer to Figure G-7)

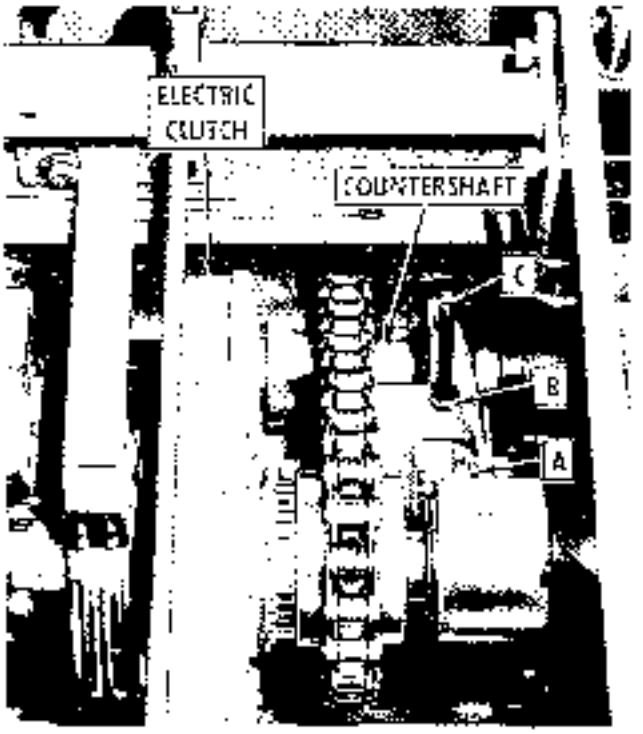

FIGURE G-5 — Bar Feeder & Screw Conveyor Countershaft Drive Chains

The tension of the hydraulic pump V-belt is adjusted by moving the hydraulic pump.

TO ADJUST BELT TENSION:

1. Loosen (4) mounting bolts (A).
2. Loosen lock nuts (B) on adjusting bolts (C).
3. Turn adjusting bolts (C), moving hydraulic pump upward, until proper belt tension is obtained. Approximately 3/16" mid-belt movement.
4. Tighten bolts (A) and lock nuts (B).

BAR FEEDER TAKE-UP

The bar feeder chains are adjusted by four take-up bolts, two for each chain located in the box at the front of the hopper.

The bar feeder chains should be adjusted so there is very little slack on the return run bars under the hopper. This is desirable to reduce wear on the bars and to prevent chain from climbing over the teeth on the drive sprockets. Feeder bars should drop about 1/4" to 3/8" as they come off flight return bars.

TO ADJUST CHAIN:

1. Lift front hopper plate (A), Figure G-8 to provide access to the take-ups.
2. Remove cotter pins and holding rod.
3. Adjust both take ups (B) evenly.
4. Replace holding rod and cotter pins.

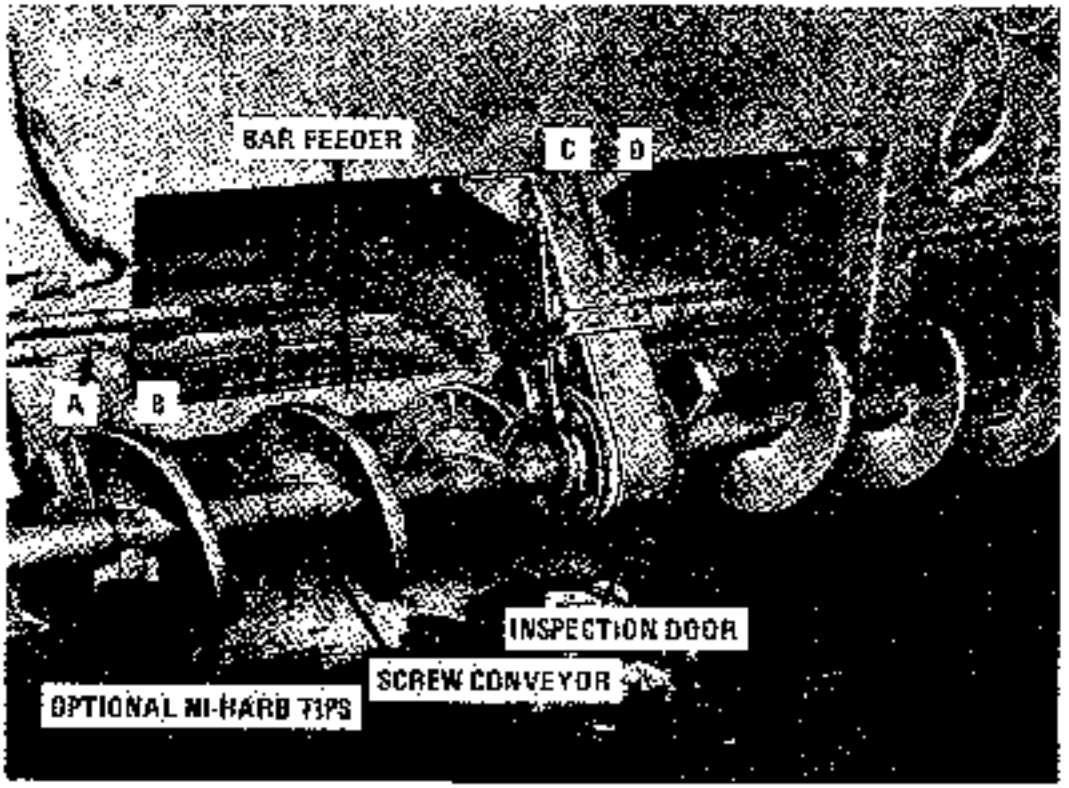

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FIGURE G-6 – Bar Feeder and Screw Conveyor Drive Adjustments

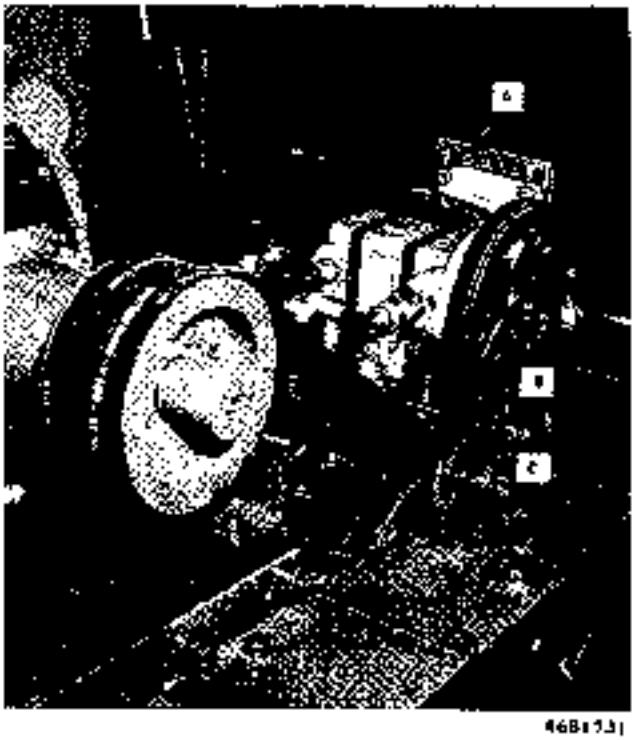

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FIGURE G-7 – Hydraulic Pump V-Belt Adjustment

5. Repeat the same procedure for the other bar feeder chains.

NOTE If the bar feeder chain assemblies are removed, or as in the case of installing a new assembly, be sure that they are installed so the direction of chain travel of the foot and head shaft is as shown in Figure G-9. If the chain assemblies are not installed properly, the keeper pins (A), will interfere with the feeder bars (B), and be broken.

CLUTCH AND BRAKE ADJUSTMENTS

MASTER CLUTCH (Refer to Figure G-10).

The master clutch is adjusted thru the hand hole on top of the transmission bell housing.

TO ADJUST CLUTCH:

CAUTION: BE SURE ENGINE IS NOT RUNNING WHEN ADJUSTING CLUTCH.

1. Remove cover plate from transmission bell housing.
2. Pull out lock pin (A).
3. Turn lock pin and clutch carrier (B) to the right (Clockwise) one notch, at which point the lock pin goes back into position.

   One notch is usually sufficient to tighten clutch. When the clutch is properly adjusted the lever will engage with a distinctive firm snap

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FIGURE G-8 Bar Feeder Take-up

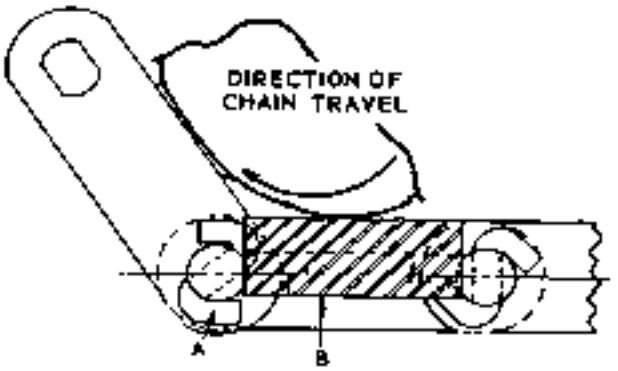

FIGURE G-9

TRANSMISSIONS

The Main and Secondary Transmissions need no maintenance and adjustments other than proper and periodic lubrication. Refer to Lubrication Section F.

FEEDER & SCREW DRIVE ELECTRIC CLUTCH ADJUSTMENT (Refer to Figure G-5).

Once properly installed, the clutches need no further adjustment or maintenance for the life of the friction surfaces.

If a clutch fails to operate or if the acceleration time increases, a careful check of the components will isolate the source of trouble and indicate the proper remedy.

When the clutch loses it's torque, refer to the Warner Service Manual furnished in addition to this manual.

NOTE – THE BRUSHES MUST BE KEPT IN PROPER ALIGNMENT AND CONTACT WITH THE COLLECTOR RINGS TO ENSURE EFFICIENT FEEDER CLUTCH OPERATION.

TRACTION CLUTCH (Refers to Figure G-11)

The traction clutch is a spring loaded, normally engaged type. When the clutch brake pedal is depressed, brake fluid from the master cylinder applies pressure to the static "O" ring switch, which energizes the clutch solenoid valve. Hydraulic fluid applies pressure to the clutch actuator cylinder, disengaging the clutch.

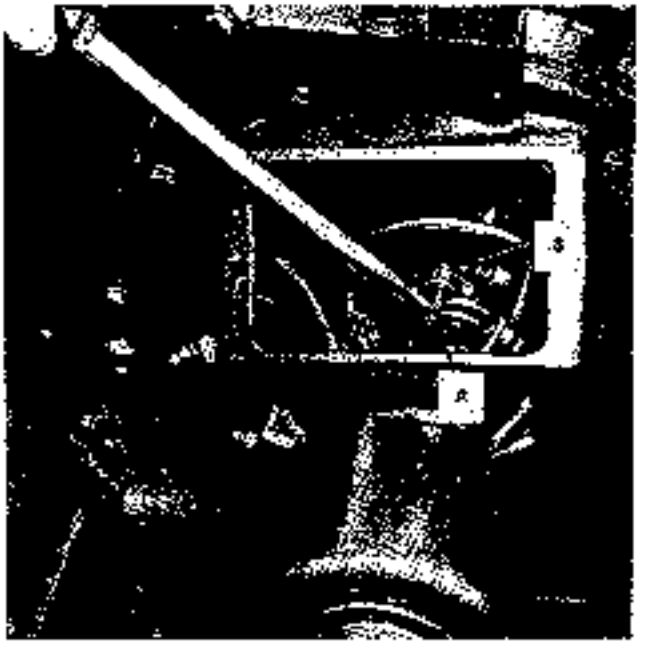

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FIGURE G-10 – Master Clutch

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FIGURE G-11 – Traction Clutch

Clutch wear reduces running clearance between the throw-out bearing and actuator. When all clearance is used, it will be necessary to install a new clutch disc.

Running clearance between the throw-out bearing and clutch actuator on new clutch unit or disc installations is .040 to .060.

POWER STEERING

The power steering needs no maintenance and adjustment other than periodic inspection for leaks.

If a loss of steering is experienced with the machine, and other hydraulically operated components function properly, check steering relief valve. This valve, which is pre-set at 1500 PSI, may have a small foreign particle lodged between the ball and its seat keeping the valve open.

Hard steering is a good indication of an internal leak in either the cylinder or an orbital valve.

SELF ADJUSTING BRAKES

A schedule for the cleaning, inspection, and lubrication of brake equipment should be established by the operator on the basis of past experience and severity of operation.

Brakes should be cleaned, inspected, lubricated, and adjusted each time the hubs are removed.

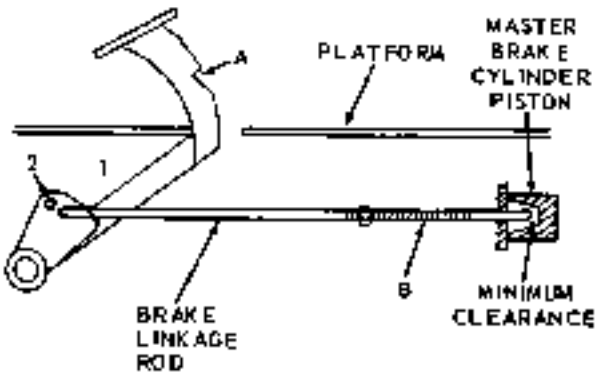

FIGURE G-12 – Brake Linkage Adjustment

BRAKE ADJUSTMENT

Following overhaul or when new linings are installed, the initial adjustment should be carefully made to both properly located the curvature of the lining to the drum and to obtain the proper clearance. Adjust shoes at final assembly of brake to .008 clearance between lining and drum at anchor end, and .015 at adjusting end.

NOTE – Normally it will not be necessary to readjust the clearance between lining and drum at anchor end. If for some reason it is necessary torque lock nut to 300 ± 25 foot pounds. (Refer to Figure G-13).

BRAKE LINKAGE ROD ADJUSTMENT (Refers to Figure G-12.)

TO ADJUST:

Adjust length (B) until brake linkage rod touches master cylinder piston. Back off 1/8 turn and tighten lock nut.

NOTE – Mark (A) should always be below platform with brakes applied.

Brake Stop Touches Platform When Depressed.

A. Change brake linkage rod from hole (1) to hole (2).
B. Remove brake stop.
C. Follow adjusting procedure above to readjust length of linkage rod.
D. Check for air in brake system and brake clearance. When brake pedal touches platform, with linkage in (2) hole, reline or replace brakes. NOTE – When relining or replacing brakes, return rod to (1) hole and re-adjust.

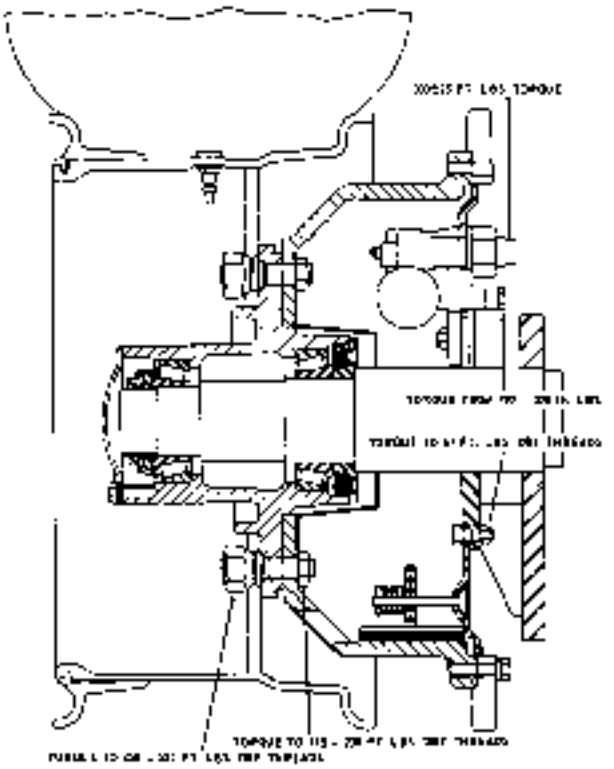

FIGURE G-13 – Wheel Assembly

WHEEL ASSEMBLY (Refer to Figure G-13).

When changing tires or repairing wheel assemblies, tighten nuts to torque recommended in Figure G-13. A periodic check should be established for the lug nuts on the wheel. (450–500 FT. LBS.)

HYDRO-FLATION

Hydro-flate tires at any time more traction is desired. For instance, when operating on a heavy track coat and tire slippage is experienced. The added weight of hydro-flation will enable the tire to cut through the tack coat and obtain traction on the old surface.

Tires are factory hydro-flated with 390 pounds calcium chloride per tire, or a total of 780 pounds on the drive axle is added.

HYDRO-FLATING

Tires are equipped with valves to facilitate hydro-flation and may be hydro-flated in the field at any farm implement dealer or at most tire outlets.

AMOUNT:	Calcium Chloride	115.5 lbs.
	Water	274.5 lbs. = 33 gals.
		390 lbs. Per Tire
SOLUTION:	Mixed at rate of 3.5 lbs. (no more) of calcium chloride to 1 gal. water, safe to 30 below zero.	

CAUTION: Pour Calcium Chloride into water - Never water into chloride.

FILLING:	Allow to cool to atmospheric temperature. Fill with solution by gravity or pressure as desired up to 3/4 full, no more, which is the level of valve in upper position.
AIR PRESSURE:	55 PSI Earthmover Tires 75 PSI Rock Rib Tires

ELECTRICAL COMPONENTS

Adjustment to electrical components is limited to adjustments required for proper actuation of the feeder reverse cut-out micro-switch and the static "O" ring switch (180 PSI).

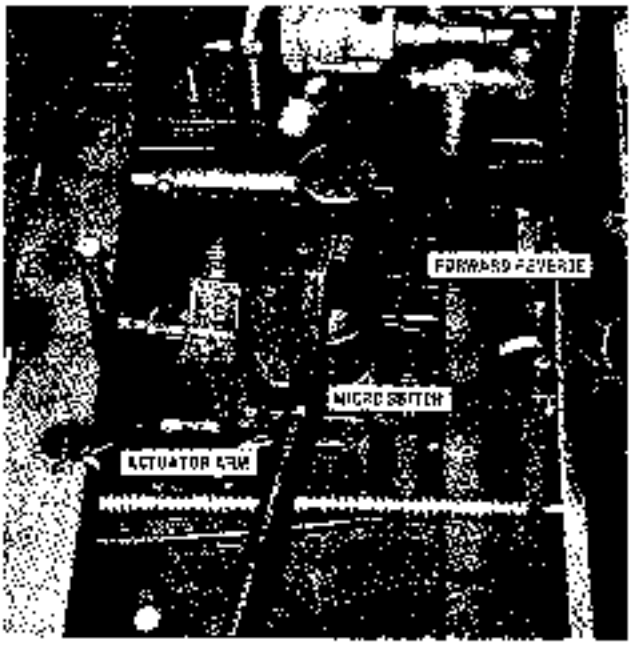

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FIGURE G-14 – Feeder Reverse Cut-Out Micro-Switch

FEEDER REVERSE CUT-OUT MICRO-SWITCH (Refer to Figure G-14.)

This switch is mounted on a bracket on the primary transmission, under the decking to the left of the engine. This normally open contact switch is actuated by an adjustable striker disc on the forward reverse linkage rod, Figure 14, when the rod is in the forward position. The striker disk must be adjusted on the threaded linkage rod so the switch actuator lever does not "bottom out" on the switch body when the linkage rod is in maximum forward position.

HYDRAULIC SYSTEM (Refer to Figure G-16).

The hydraulic system operates the screed hoist, basket dump, screed drive motor and steering.

IMPORTANT – The oil level should be checked frequently. Keep oil clean and free of dust and sludge, as well as water. The tank filler has a breather screen and filter screen. Keep these screens clean.

The relief valves, basket dump valve, screed hoist valve, clutch valve and screed drive are located behind the two cover plates, located directly above the feeder tunnel.

The basket and screed hoist relief valve, Figure G-16, is set at 1800 PSI. The screed relief valve, Figure G-16, is set at 1250 PSI. Both valves have plugs in manifold for installing a pressure gauge. Traction clutch valve 500 PSI internal relief. (Refer to Figure G-16).

The screed drive motor, mounted on the screed unit, Figure G-24, has a plugged reducer bushing for installing a pressure gauge. The operating oil pressure at the motor should be 600–900 psi. When this pressure exceeds 1250 psi., the relief valve opens, allowing the oil to by-pass to tank.

The hydraulic system holds approximately 29 gallons of hydraulic oil.

To obtain pressure check on the screed motor, read the gauge the instant the motor is starting from a dead stop. (Once the motor picks up speed, the pressure drops to 600–900 psi.)

HYDRAULIC OIL TANK (Refer to Figure G-17).

The hydraulic oil tank is located under the hinged door on the master control station side of the machine. Located on the tank is the high and low level cocks.

NOTE – The strainer should be removed and cleaned each time the hydraulic oil is changed. This will increase the life of the pump, motor, valves and cylinders and maintain an efficient operating hydraulic system.

HYDRAULIC OIL FILTER AND STRAINER (Refer to Figures G-15 & G-16).

There is one filter and one (sump type) strainer in the hydraulic system. The strainer is mounted inside the hydraulic tank and strains the oil from the tank before being pumped. This strainer has a cleanable element. The

filter is mounted along side the hydraulic tank on the left side. (See Figure G-16). This filter filters all the oil returning to the tank. This micron filter has a replaceable element, which should be changed after 25 to 50 hours operation of the new Finisher and again after 100 hrs. The regular change interval of 300 to 500 hours can then be established.

TO CLEAN WASHABLE TYPE STRAINER (Refer to Figure G-17).

1. Clean all dirt and dust from top of tank.
2. Remove cover plate, being careful not to damage gasket. Cover hole in tank to prevent foreign material from entering while strainer is being cleaned.
3. Unscrew strainer from suction line and remove end cap. Slide strainer enclosure off element.
4. Thoroughly clean and rinse strainer element and replace unit.
5. Reassemble strainer element and replace unit in tank. Be sure cover plate is sealed and tight.

HYDRAULIC PUMP (Refer to Figure G-20)

The double unit hydraulic pump is driven from the forward shaft of the primary transmission. The screed supply unit (cap end) of the pump has an 8 gallon ring delivering 10.5 GPM at 1800 RPM., while the S-B-S (Screed-

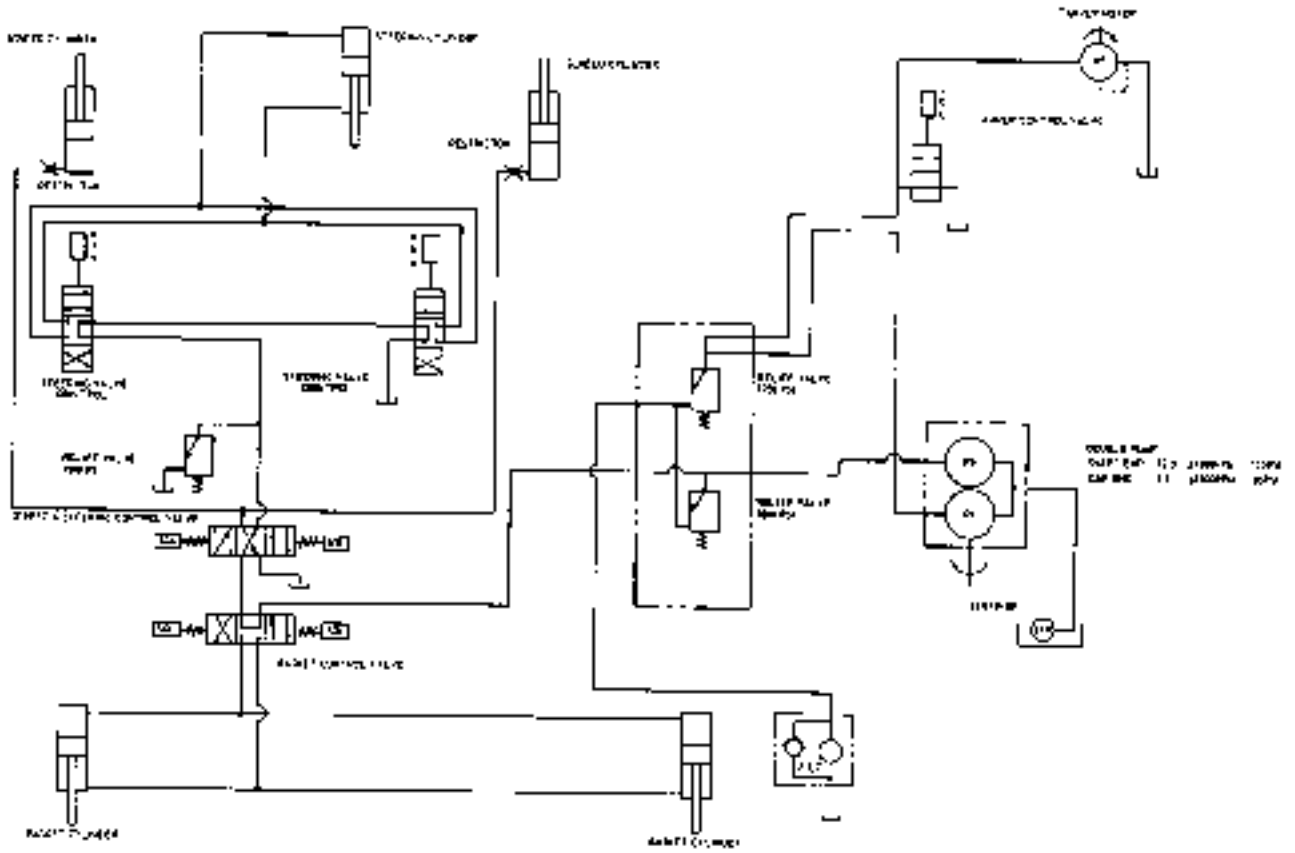

FIGURE G-16 – Hydraulic System Schematic Drawing

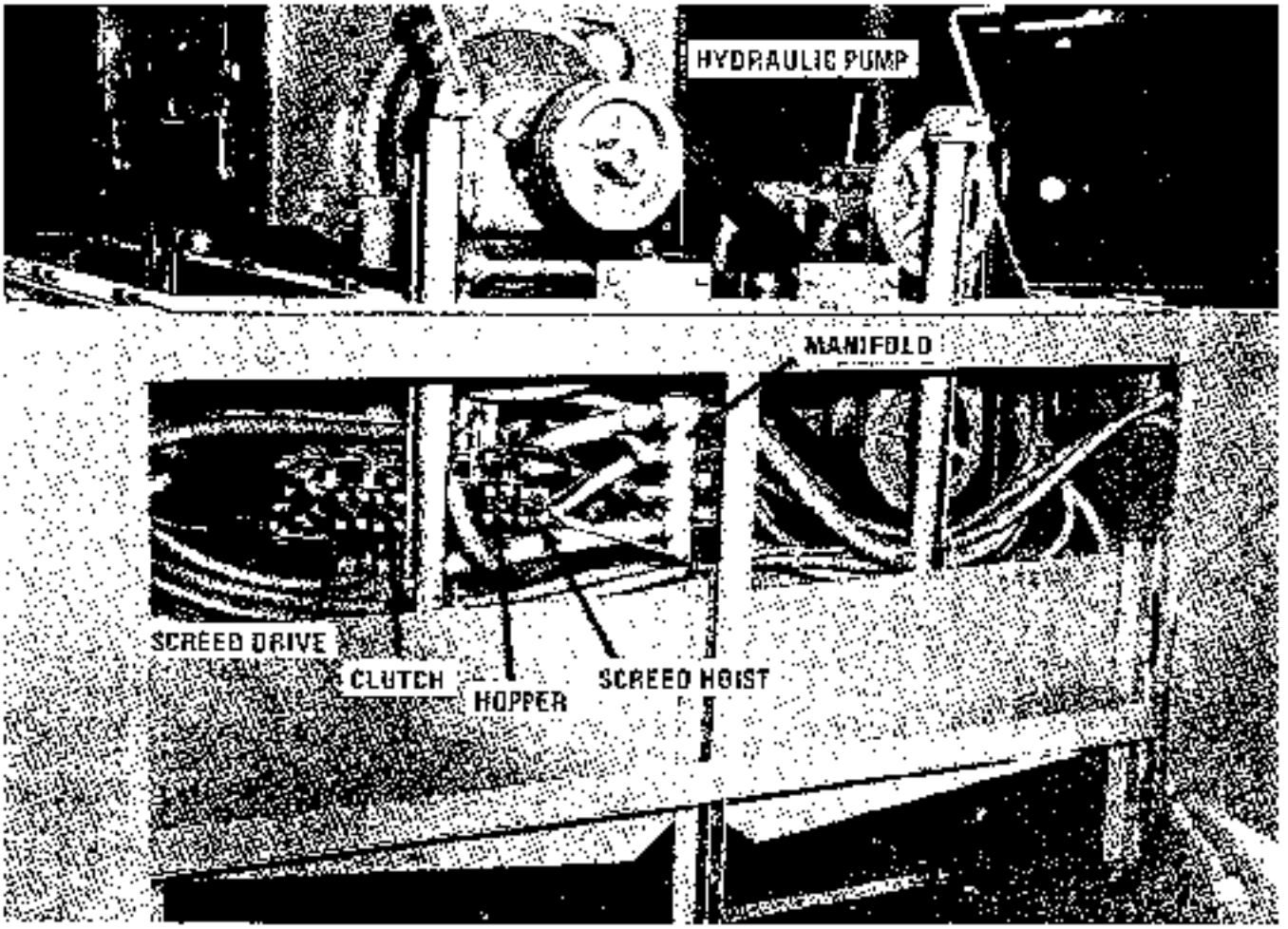

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FIGURE G-16 — Hydraulic System

Basket-Steering) supply unit (shaft end) has a 5 gallon ring delivering 7.0 GPM at 1800 RPM. The engine master clutch must be engaged to supply turning motion to the pump.

IMPORTANT – DO NOT RUN PUMP WITHOUT OIL

Field repair to the pump is not advised. If a pump is proven to be defective, contact your Dealer for authorization to return it to the factory for replacement.

Loss of hydraulic pressure or a heating, chattering pump will probably be due to lack of oil, clogged strainer or filter element, or a dirty breather cap on the tank. Sometimes foam in the oil system, due to air, can cause lack of pressure.

REPLACING PUMP

Failure of a hydraulic pump, due to filter neglect or other reasons, results in further contamination of the hydraulic fluid.

The following procedure must be used when replacing a hydraulic pump on above machines, to prevent damage and

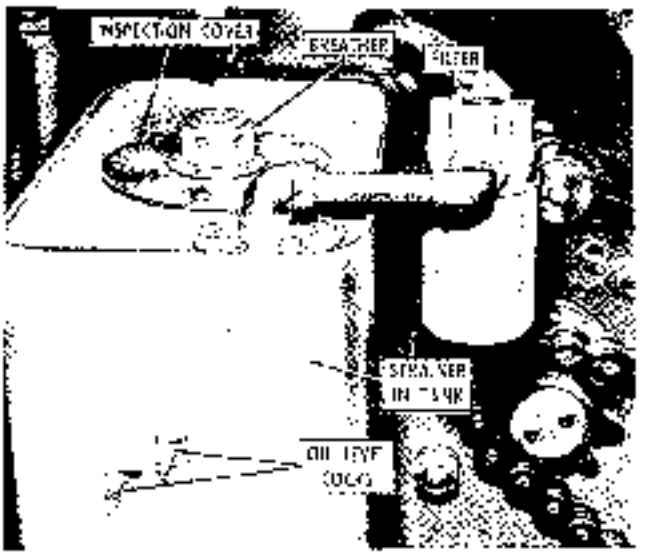

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FIGURE G-17 — Hydraulic Oil Tank

failure of the replacement pump, and to qualify for warranty consideration from the pump manufacturers.

1. Drain and flush hydraulic reservoir.
2. Flush suction line to hydraulic pump.
3. Remove washable strainer from tank and clean thoroughly.
4. Remove and replace micronic line filter.
5. Refill hydraulic reservoir with new hydraulic oil.
6. Prime hydraulic pump with new hydraulic oil.
7. Change micronic line filter after 1 day of operation.

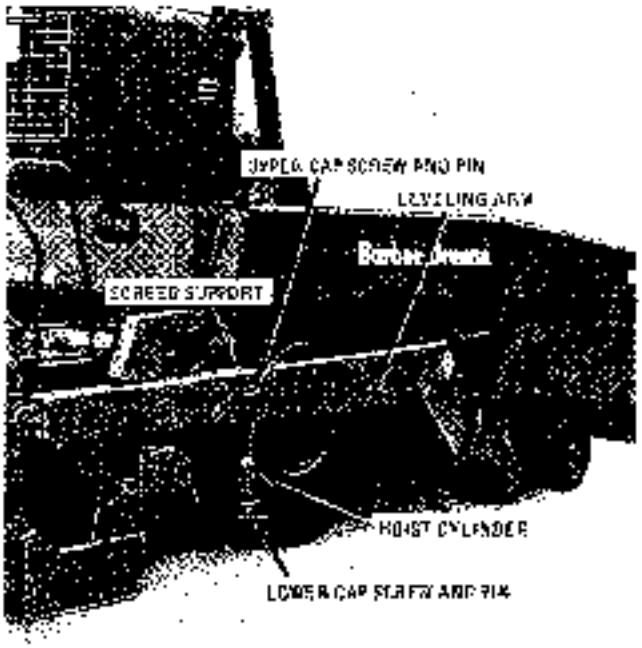

FIGURE G-18 – Screed Hoist Cylinder

HYDRAULIC CYLINDERS (Refer to Figures G-18 & G-20).

There are six hydraulic cylinders on the SB-41 Finisher, two single acting for the screed hoist, two double acting for the basket dump, one double acting cylinder for the steering and one single acting cylinder for clutch.

The only maintenance necessary on the steering and basket dump cylinders is adjustment of stuffing box nut and replacement of packing in stuffing box and piston, when necessary.

The only maintenance required on the screed hoist and clutch cylinders is the replacement of the piston packing, when necessary.

TO REPLACE PACKING:

NOTE – ALWAYS DIP PACKING IN HYDRAULIC OIL PRIOR TO INSTALLATION.

A. SCREED HOIST CYLINDER (Refer to Fig. G-18 & G-19).

1. Raise screed. Block up screed to prevent lowering.
2. Remove cap screws and retaining pins
3. Remove internal retaining ring (A), and stuffing box, Figure G-19.
4. Inspect bore of cylinder for scoring, rust, and burrs. Very shallow score marks and light rust can be removed by light sanding with fine crocus cloth. Deep scores (1/64" or more) requires having the bore to a surface finish of 12–16 micro-inch finish. This must be accurately performed to maintain bore straightness and ovality tolerances. The refinished bore should not exceed 2,000" diameter.
5. Clamp the cylinder rod in a vise equipped with soft copper jaws to avoid marring of the fine finish of the rod. Remove the capscrew (B) which retains the piston (C) on the end of the rod. Remove the "V" packing from piston. Remove leather back-up washer and "O" ring from piston being careful not to cut or abrade rubber "O" ring. If internal leather back-up washer shows no evidence of being oil soaked, the "O" ring has sealed properly and the backup washers and "O" ring may be replaced carefully (one back-up washer on each side of "O" ring).
   Before assembling "V" packing on piston dip "V" packing in hydraulic oil. Female adapter is positioned first. Carefully assemble one "V" packing at a time, resting each "V" in place with thumb or smooth, round end stick. Male adapter is then put in place over last "V". Slip piston onto end of rod, position large retaining washer, and assemble lock washer and capscrew. Capscrew should be torqued up to 10–15 foot lbs. to seal packing properly. Then capscrew should be backed off approx. 1/8". There should be approx. 1/32" to 1/16" gap between the end of piston and large retaining washer. Add 1/32" shim gaskets (furnished with packing set) until 1/32" to 1/16" gap is obtained. Torque the capscrew to approx. 50 ft. lbs.
6. Dip piston and packing assembly in hydraulic oil, and carefully insert rod into cylinder. Caution must be exercised to prevent damage to the sealing lips of the "V" packings.
7. Replace internal retaining ring (A), Figure G-19.
8. Replace pins (A) and cap screws.

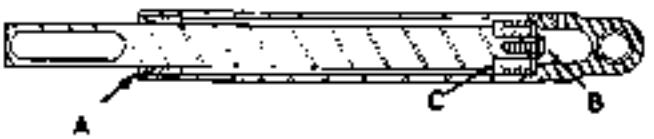

FIGURE G-19 – Screed Hoist Cylinder

B. BASKET DUMP CYLINDER (Refer to Figure G-20).

1. Lower baskets (cylinder extended).
2. Loosen Allen set screw (A).
3. Insert bolt in end of pin (B) and pull pin.

4. Remove back up ring (C), Figure G-21, and slide piston out of cylinder.

STUFFING BOX PACKING (Refer to Figure G-21).

a. Remove nut from end of piston rod.
b. Slide end piston, adapter wear ring, piston "O" ring, and base piston off of piston rod.
c. Slide stuffing box and "O" ring off of piston rod.
d. Remove old packing and install new packing set and seat firmly.

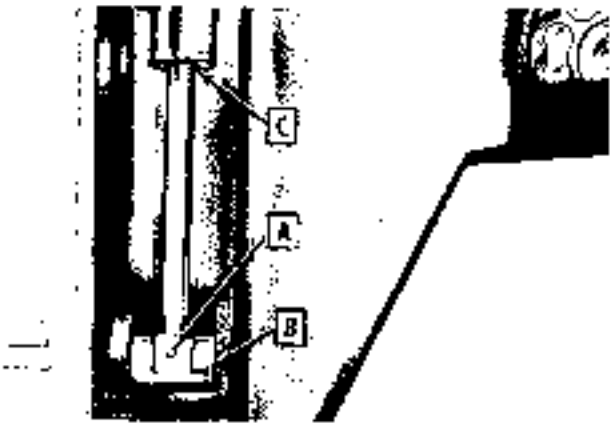

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FIGURE G-20 — Basket Dump Cylinder

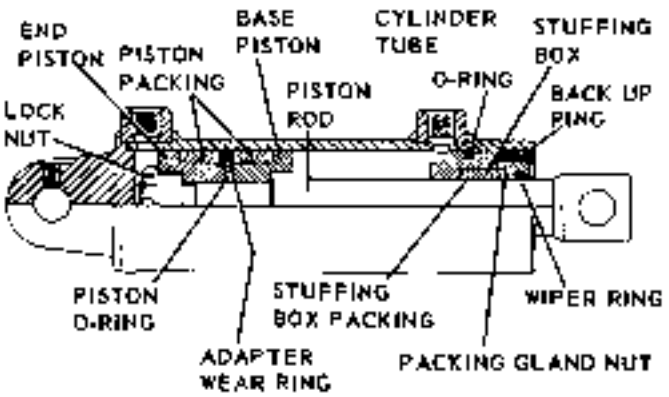

FIGURE G-21 — Basket Dump Cylinder

e. Replace stuffing box and a new "O" ring.
f. Replace base piston and packing, adapter wear ring and piston "O" ring, end piston and packing and the lock nut on the end of the piston rod.
g. Dip piston and packing in hydraulic oil, slide piston assembly into cylinder and replace back up ring, being careful not to cut or abrade sealing lips of "V" packings. Tighten packing gland nut only enough to stop leakage. Do not tighten excessively.

PISTON PACKING (Refer to Figure G-21).

a. Repeat steps 1 thru 4 above.
b. Remove nut from end of piston rod.
c. Slide end piston, adapter wear ring, piston "O" ring and base piston off of piston rod.
d. Install new piston packing on base piston and slide base piston on to piston rod.
e. Install new piston "O" ring and the adapter wear ring.
f. Install new piston packing on end piston and slide end piston on to piston rod.
g. Install lock nut on end of the piston rod.
h. Dip piston and packing in hydraulic oil, slide assembly into cylinder and replace back up ring, being careful not to cut or abrade sealing lips of "V" packings. Tighten packing gland nut only enough to stop leakage. Do not tighten excessively.

TO ADJUST PACKING GLAND NUT.

1. Extend the ram piston to its maximum length, (hopper basket lowered).
2. Tighten packing gland nut slightly.

NOTE — Tighten only as much as needed to stop seepage.

REMOVING STEERING CYLINDER ASSEMBLY (Refer to Figure G-22)

The steering cylinder assembly is located under the hopper end of the machine.

1. Remove cap screw (A) from piston rod end.
2. Remove cotter pin and retainer pin (B) from cylinder end.

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FIGURE G-22 — Steering Cylinder

STUFFING BOX PACKING (Refer to Figure G-23).

Periodically check the piston rod for leakage. If oil is leaking excessively, the stuffing box packing should be replaced rather than adjusting by shims or other means.

REPLACING STUFFING BOX PACKING

1. Remove packing gland nut from piston rod being careful not to damage wiper ring.
2. Remove old packing and clean out stuffing box.
3. Coat new packing with hydraulic oil and install in stuffing box being careful not to damage packing when sliding over threaded end of piston rod.
4. Tighten the gland nut until it stops against the cylinder tube to seat the packing.
5. Back the nut off approximately 1/8" and slowly re-tighten by hand. Resistance should be encountered somewhere between 1/16" and 1/32" from the cylinder tube

ITEM	DESCRIPTION
1	PISTON HALF-SMALL
2	PISTON PACKING
3	BRASS BUSHING
4	PISTON HALF-LARGE
5	CYLINDER TUBE
6	"O" RINGS
7	BACKUP WASHER
8	PACKING GLAND NUT
9	WIPER SEAL
10	PISTON ROD
11	STUFFING BOX PACKING
12	LOCK NUT

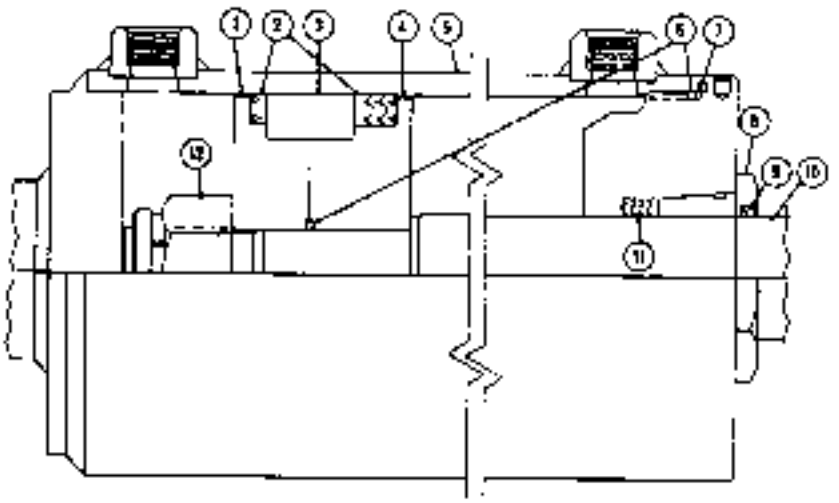


FIGURE G-23 – Steering Cylinder

If no resistance occurs, shims of 1/32" gaskets material should be installed one at a time between the packing and the gland nut until resistance is felt.

6. Tighten the gland nut to the cylinder tube.

REPLACING PISTON PACKING (Refers to Figure G-23).

1. Unscrew stuffing box assembly and pull piston assembly from cylinder tube.
2. Place piston rod in vise.

CAUTION – Use soft copper jaws on vise to protect piston rod from damage.

3. Unscrew piston lock nut and remove piston halves from rod. Remove piston packing set.
4. Remove piston "O" ring. It is always advisable to install a new piston "O" ring when installing new piston packing since this might be leaking also.
5. Put large piston half on rod and assemble three piston packings on this half.
6. Carefully insert new piston "O" ring and brass bearing on piston half.
7. Install one new packing on smaller piston half and place on piston rod.
8. Install lock nut and tighten until piston halves meet.
9. Back the nut off approximately 1/8" and slowly re-tighten by hand. Resistance should be encountered somewhere between 1/16" and 1/32" before the nut stops. If no resistance occurs, shims of 1/32" gasket material should be installed between the packing and the bearing. These shims should be added one at a time until resistance is felt.
10. Tighten locknut.

NOTE – In assembly the assembler must attempt to get a steel to steel fit of the piston halves.

11. Dip piston and packing in hydraulic oil and carefully insert in cylinder.
12. Use hydraulic oil on threads of stuffing box, "O" ring, and back-up washer. This will make it easier to tighten stuffing box and help prevent damage to "O" ring.
13. Tighten stuffing box securely using care to insure that "O" ring and back-up washer are in place.

ORBITROL STEERING VALVE

The only field repairs recommended is the replacing of seals if leakage is detected at the control end of the unit. The disassembly of the control end of the unit only will be required and it is generally advisable to leave the 7 bolted end assembly. If the assembly is proven to be defective, contact your dealer for factory assistance.

SCREED HEATING UNIT

SCREED HEATING UNIT (Refer to Figure G-24).

Two mechanical atomizing burners and a 12 volt D.C. electric driven blower with a switch is used on the Finisher to heat the screed.

The blower motor also drives the burner fuel oil pump. The pump will circulate oil through the relief valve with the burner shut off.

NOTE – DO NOT RUN THE FUEL OIL PUMP DRY.

The two electric burner igniter glow plugs should be inspected periodically for a burned off element.

When starting, use very little, or no air, and allow plug sufficient time to heat up. Too much air will cool glow plug causing difficulty in starting.

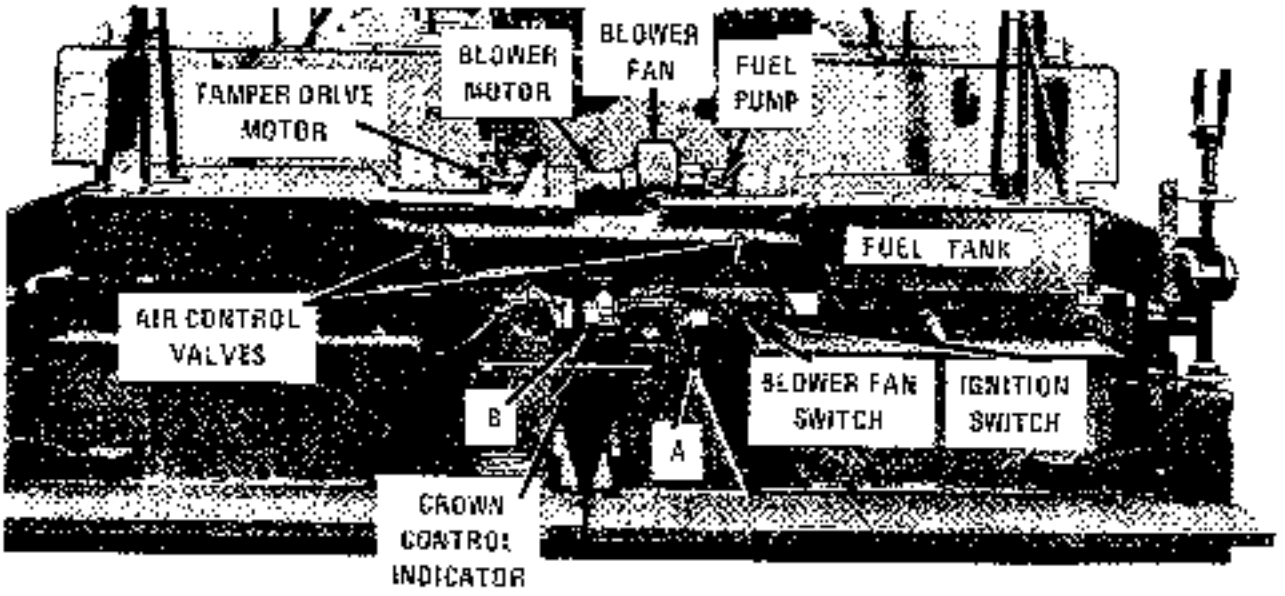
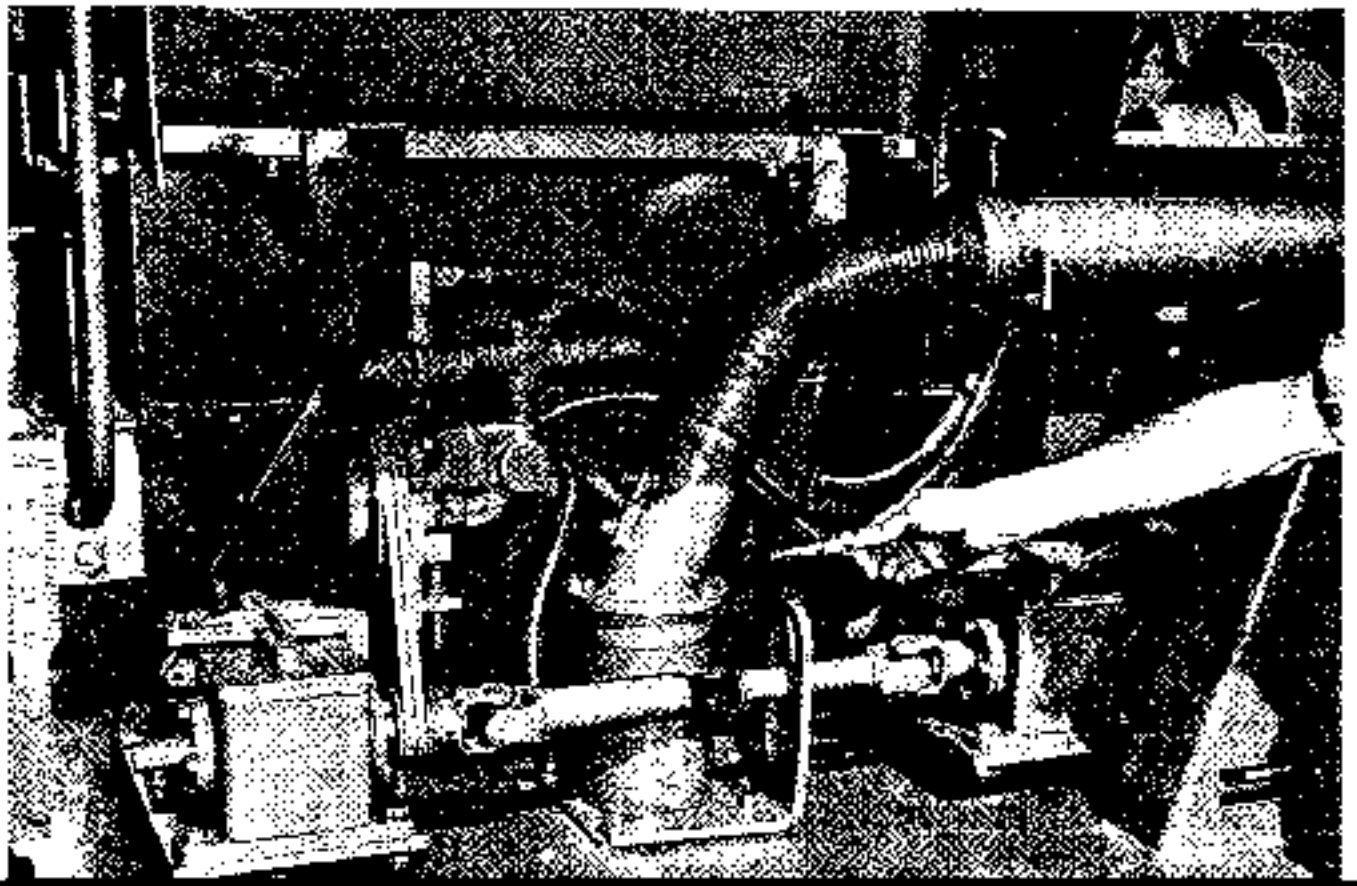


FIGURE G-24 – Screed Heater



TROUBLE SHOOTING GUIDE

TROUBLE	POSSIBLE CAUSE	REMEDY
1. Hoppers Fail to Dump. (Engine running - Master Clutch engaged.)	Depress manual override button on Solenoid Valve. (If hoppers do not dump - check hydraulics. If hoppers dump - check electrical.)	
	HYDRAULIC	
	A. Faulty relief valve or pump.	Raise Screed. If screed fails to raise - check relief valve & pump. 1800 PSI.
	B. Faulty or sticking solenoid valve.	Check torque of solenoid coil bolts. (60 in. pounds.) Clean or replace valve.
	ELECTRICAL	
	A. Open or shorted solenoid coil.	Check continuity, with volt-ohm meter, across coil terminals with wires disconnected. No reading - open - replace coil. Check continuity from terminal to ground. A reading - short - replace coil.
	B. Faulty circuit breaker	Check 6 amp. circuit breaker.
	C. Faulty control switch	Check across switch terminals.
	D. Loose or broken connection	Check for loose or broken connection at terminal strips.
	E. Broken or shorted wire	Check continuity of wires.
2. Hoppers Fail to Lower		Follow same procedure used for Hoppers Fail to Dump.
3. Screed Fails to Raise	(Depress manual override button on Solenoid Valve. If Screed raises - trouble is electrical.)	
	HYDRAULIC	
	A. Faulty relief valve or pump.	Actuate Hoppers. If hoppers fail to operate - check relief valve and pump. 1800 PSI
	B. Faulty or sticking solenoid valve.	Check torque of solenoid coil bolts. (60 in. pounds) Clean or replace.
	ELECTRICAL	
	A. Open or shorted solenoid coil.	Check continuity, with volt-ohm meter, across coil terminals with wires disconnected. No reading - open - replace coil. Check continuity, from terminal to ground. A reading - short - replace coil.
	B. Faulty circuit breaker.	Check 6 amp. breaker across terminals.
	C. Faulty control switch	Check across switch terminals.
	D. Loose or broken connection.	Check for loose or broken connection at terminal strips.
	E. Broken or shorted wire.	Check continuity of wires.

TROUBLE SHOOTING GUIDE

TROUBLE	POSSIBLE CAUSE	REMEDY
4. Screed Fails to Hold		Follow same procedure used for Screed Fails to Raise.
5. Screed Fails to operate. (Engine running - Master Clutch engaged.)	Depress manual override button on Solenoid Valve. (If screed does not operate - check hydraulic. If screed operates - check electrical.)	
	HYDRAULIC	
	A. Faulty relief valve or pump.	Check pressure, should be 1250 PSI
	B. Faulty screed drive motor.	Check pressure at motor, 600 to 900 PSI
	C. Faulty or sticking solenoid valve.	Check torque of solenoid coil bolts. (60-in. pounds) Clean or replace valve.
	ELECTRICAL	
	A. Open or shorted solenoid coil.	Check continuity, with volt-ohm meter, across coil terminals with wires disconnected. No reading - open - replace coil. Check continuity, from terminal to ground. A reading - short - replace coil.
	B. Faulty pressure switch.	Jumper 32 and 20 in switch. If screed operates - repair or replace switch.
	C. Faulty 7 8 switch.	Check switch actuation. Jumper 30 and 32 on switch. If screed operates - repair or replace switch.
	D. Faulty circuit breaker.	Check 6 amp. circuit breaker across terminals.
	E. Faulty control switch.	Check across switch terminals.
	F. Loose or broken connection.	Check for loose or broken connection at terminal strips.
	G. Broken or shorted wire.	Check continuity of wires.
6. Both Feeders Fail to Operate	A. Reverse cut-out micro switch.	Check for actuation. Jumper 13 and 14 at switch. If feeders operate - repair or replace switch.
	B. Faulty circuit breaker.	Check 15 amp. breaker across terminals.
	C. Loose or broken connection.	Check for loose or broken connection at terminal strips.
	D. Broken or shorted wire.	Check continuity of wires.
7. One Feeder Fails to Operate	A. Fuse	Check individual 10 amp. fuse.
	B. Loose clutch terminal.	Check wire terminal at clutch terminal block.
	C. Brushes.	Check for worn or broken brushes. Check brush contact with collector ring.
	D. Poor ground.	Check ground to brush box.
	E. Faulty control switch.	Check across switch terminals.
	F. Loose or broken connection.	Check continuity of wires.

TROUBLE SHOOTING GUIDE

TROUBLE	POSSIBLE CAUSE	REMEDY
8. Feeder Operates Manually. Not Automatically	A. Auto feeder switch	Check actuation of auto feeder switch. Check for faulty switch.
	B. Loose or broken connection.	Check for loose or broken connection at terminal strips.
	C. Broken or shorted wire.	Check continuity of wires.
9. Traction Clutch Fails to Disengage. (Engine running - Master Clutch engaged.)	Depress manual override button on Solenoid Valve (If clutch remains engaged - check hydraulic If clutch disengages - check electrical.)	
	HYDRAULIC Faulty relief valve, sticking or faulty solenoid valve.	Disconnect hyd. line at clutch cylinder. Install gauge in line. Pressure should be 500 PSI ± 10%. No pressure indicates faulty relief valve or solenoid valve. Repair or replace. Check torque of solenoid coil bolts (60 in. pounds)
	MECHANICAL (500 PSI reading at cylinder indicates mechanical trouble.) Clutch cylinder. Linkage Clutch Clogged hydraulic line.	Check clutch cylinder for binding. Check linkage for binding. Check clutch clearance, .040 to .060. Clogged pressure line to solenoid valve. Repair or replace.
	ELECTRICAL A. Open or shorted solenoid coil.	Check continuity, with volt-ohm meter, across coil terminals with wires disconnected. No reading - open - replace coil. Check continuity from terminal to ground. A reading - short - replace coil.
	B. Parking brake switch out of adjustment or faulty.	Jumper lines 30 and 33 at switch. If clutch disengages - adjust, repair or replace switch.
	C. Faulty screed drive circuit breaker.	Run screed. (Screed and clutch off same breaker.)
	D. Faulty connection.	Check splice for lines 19 and 30.
	E. 24 lockout switch out of adjustment or faulty.	Jumper lines 30 and 32 and depress clutch pedal If clutch disengages - adjust, repair or replace switch
	F. Faulty pressure switch.	Check pressure setting (150) lbs.) Jumper lines 32 and 33 at switch. If clutch disengages - repair, or replace switch, after checking crossover valve.

TROUBLE SHOOTING GUIDE

TROUBLE	POSSIBLE CAUSE	REMEDY
	G. Crossover valve.	Remove filler covers from master cylinders. Depress pedal. Fluid should show no appreciable rise in opposite master cylinder. If it does, replace crossover valve.
10 Traction Clutch Fails to Engage. (Engine running - Master Clutch engaged.)	A. Parking brake.	Should be "off".
	B. Clutch pedal locked.	Release at each station.
	C. Disconnect electric power to clutch solenoid valve. If clutch engages trouble is electrical.	
	HYDRAULIC	
	A. Back pressure at clutch cylinder, with pedal released.	Disconnect hose at cylinder. Should have zero pressure. 50 to 500 PSI pressure indicates clogged filter. Replace. 500 PSI + 10% indicates faulty valve.
	B. Faulty or sticking valve.	Check torque of solenoid coil bolts. (60 in. pounds)
	C. Clutch fails to engage with pedal released and hydraulic hose disconnected.	Check clutch cylinder for binding. Check linkage for binding. Check for worn or broken return spring. Check clutch clearance. .040 to .060.
	ELECTRICAL	
	A. Parking brake switch.	With volt-ohm meter, check line 33 at switch. There should be a zero reading. A reading indicates switch out of adjustment or faulty.
	B. Pressure switch.	With a volt-ohm meter, Check line 33 at switch. There should be a zero reading. A reading indicates switch out of adjustment or faulty.

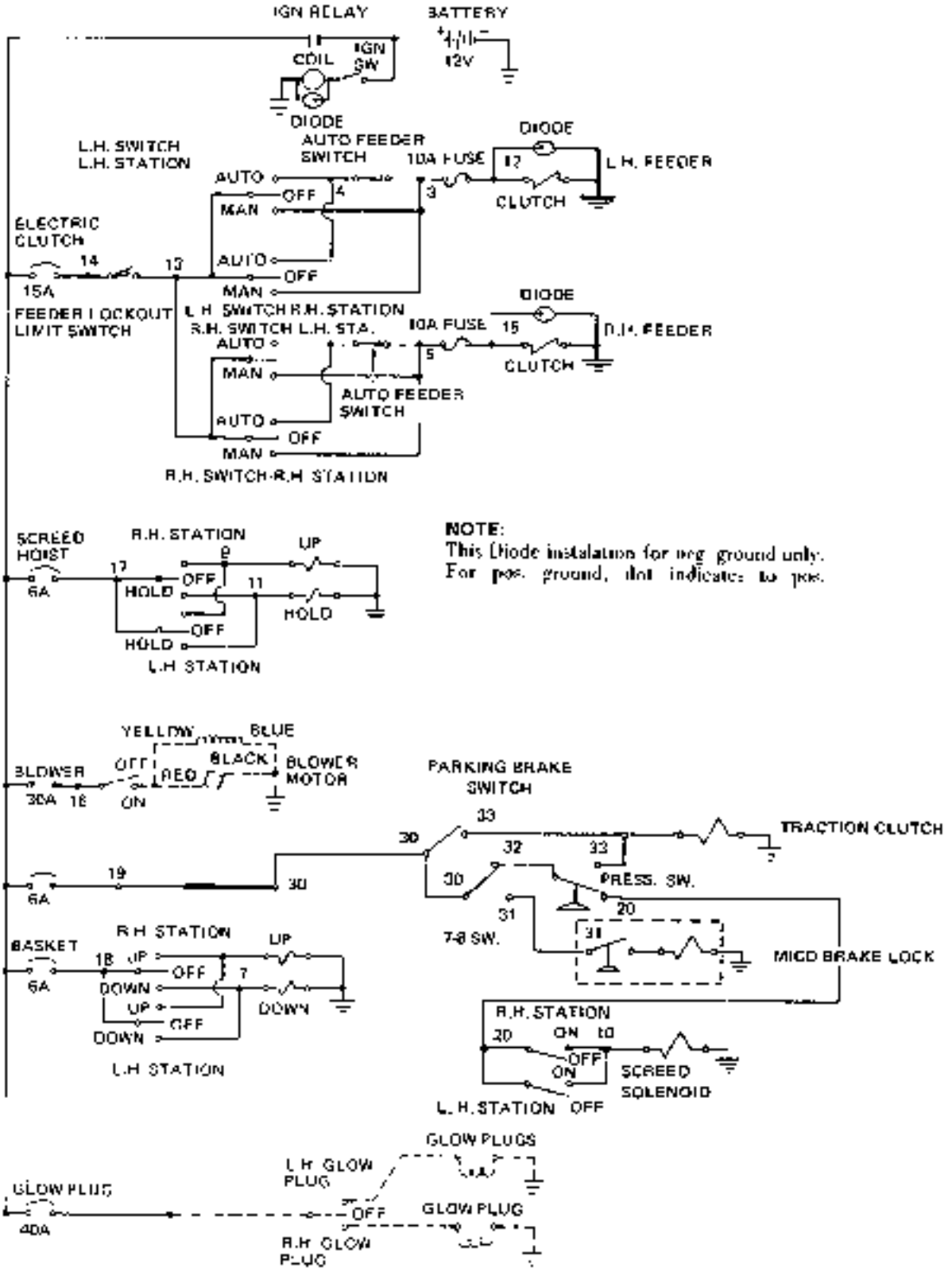


FIGURE G-76 – Electrical Schematic

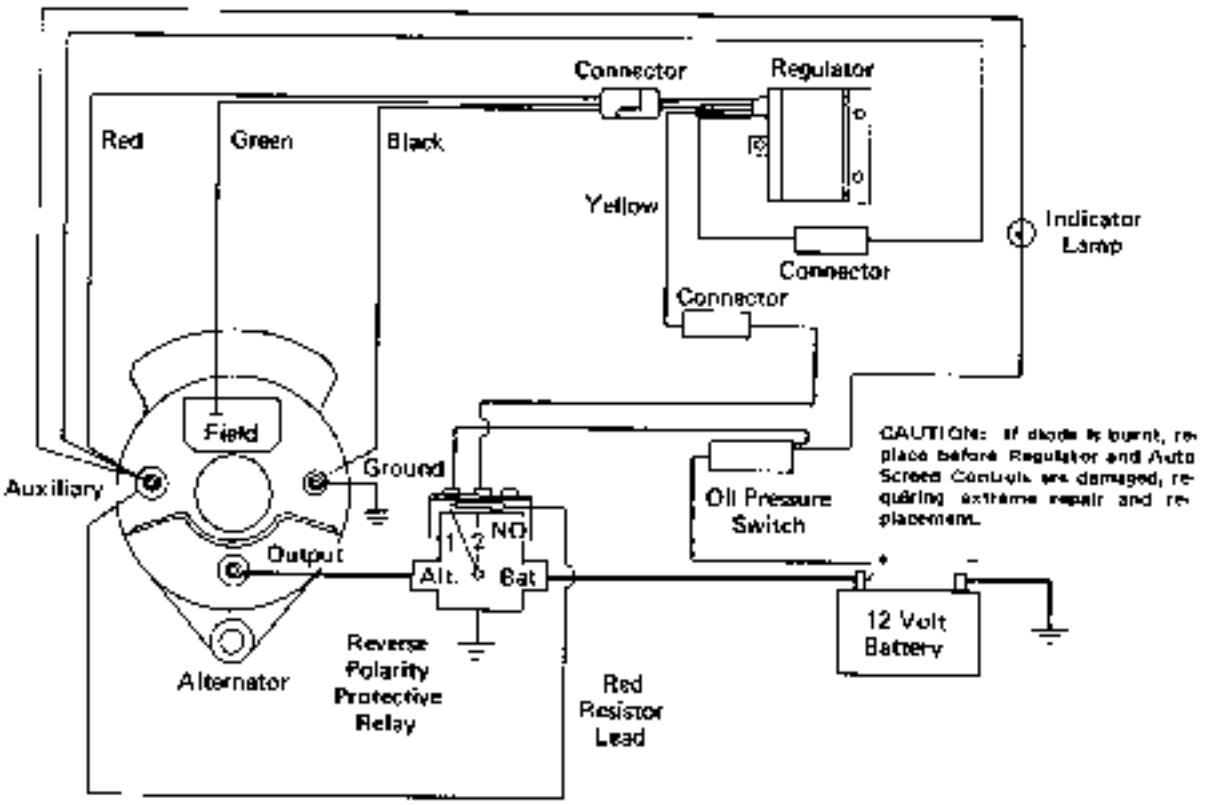


FIGURE G-26A – 12 Volt Alternator (Negative Ground) (International Engine)

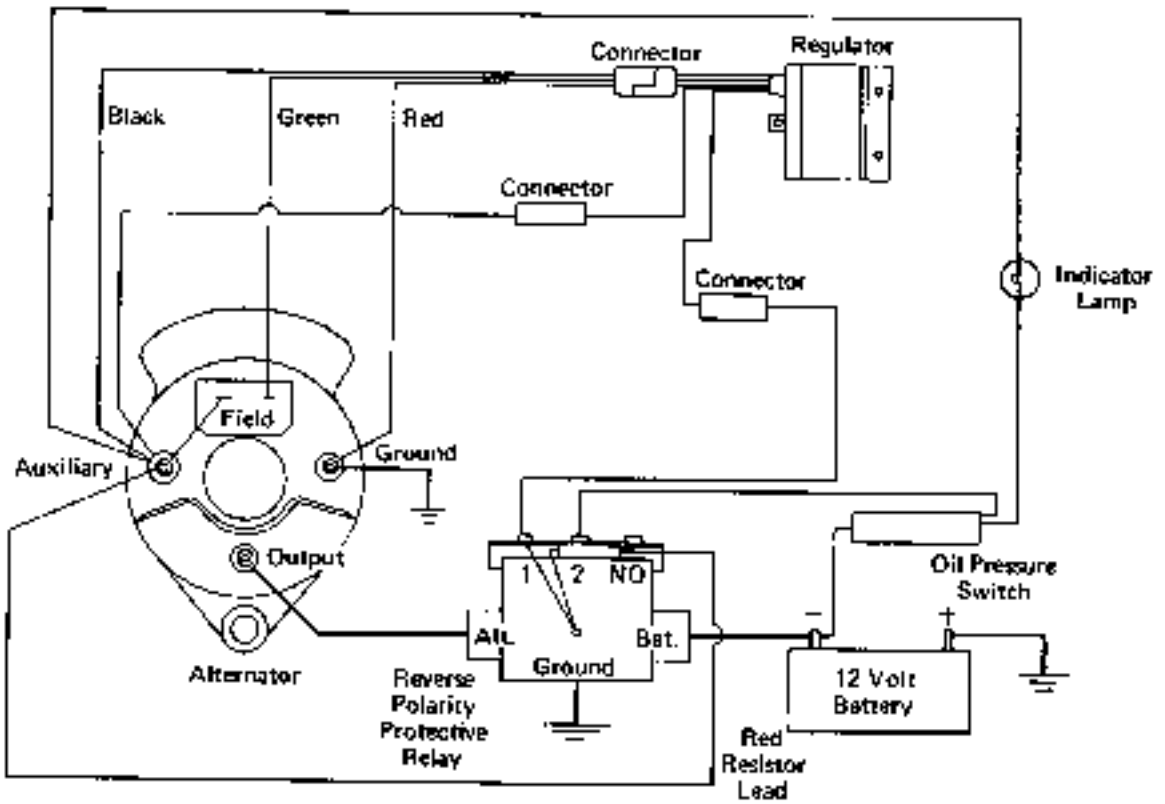


FIGURE G-26B – 12 Volt Alternator (Positive Ground) (GMC Engine)

VIBRATORY SCREED

GENERAL DESCRIPTION

The vibratory screed compacts and smooths the material being laid. Compaction is obtained from screed vibration and screed weight.

PRE-STRIKE OFF AND DEFLECTOR PLATE

The adjustable pre-strike off, located at the leading edge of the screed, meters the material before it reaches the screed plate. The required height of the pre-strike off above the bottom of the screed plate will vary with the different mixes. (Refer to Page H-3.) The pre-strike off can be adjusted while the machine is moving. The adjustment should be made to give a better mat appearance.

NOTE – Although not required for most mixes, the adjustable pre-strike off is furnished as standard equipment. It is required for "tender or critical" mixes.

SCREED PLATES

Each 5' screed plate is bolted to the screed frame with four bolts. The screed crown is adjusted by two vertical crown bolts. These bolts have a chain between them, so that both the front and rear of the screed will adjust at the same time. The leading and trailing edge of the screed may also be crowned independently if so desired.

SCREED HEATERS

The screed is heated by two fuel oil burners. The fuel and air is supplied by an electric motor and pump.

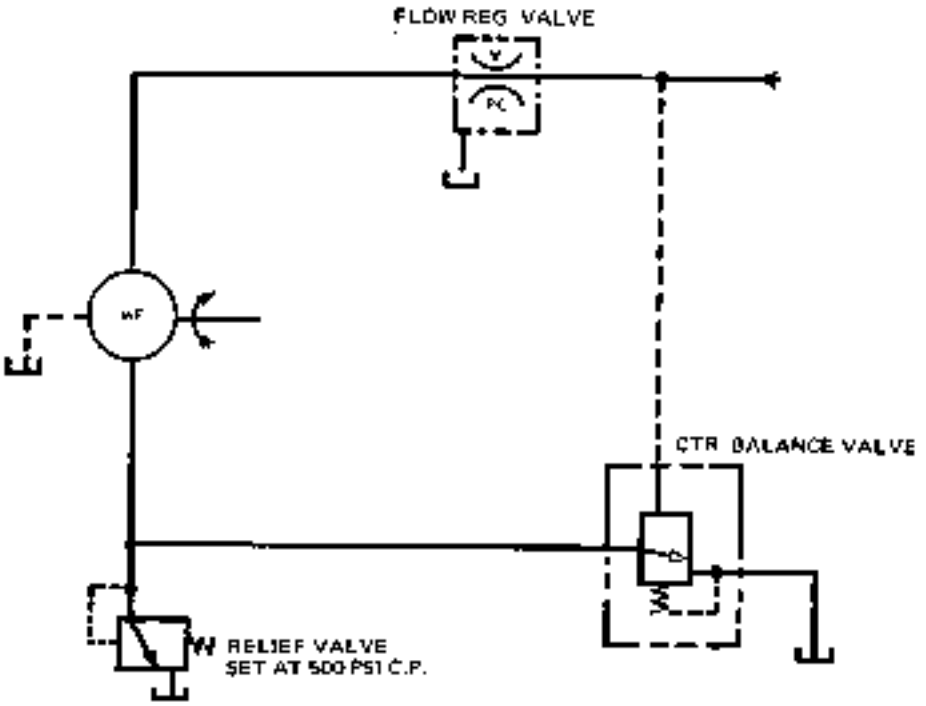
VIBRATORS

There are four interlocked vibrators on the 10' screed. The vibrators are driven by inter-connecting universal drive shafts from the drive vibrator. The main vibrator is driven by V-belts from a hydraulic motor mounted on the screed.

An additional vibrator is used when a two foot extension is installed. The one foot extension does not require a vibrator. Speed of the vibrators is controlled by a flow control valve and operates through a range of 1500 – 4500 RPM.

HYDRAULIC SYSTEM

The fluid for the vibratory system is furnished by the front section of the double hydraulic pump. The hydraulic motor that powers the drive vibrator receives pressure when the solenoid valve is actuated by the toggle switch on either control station. The system relief valve is set at 1250 PSI. The speed of the motor is controlled by the hydraulic flow regulator valve. (This system has a counter-balance valve which will not allow the speed of the motor to exceed the flow of the fluid to the motor.)



HYDRAULIC DIAGRAM

System Components are:

1. 12 GPM at 1800 RPM and 100 PSI, constant delivery pump mounted on tractor unit.
2. Relief valve, set to relieve at 1250 PSI, mounted on the tractor unit.
3. Two way, normally open, poppet type, solenoid operated valve actuating system mounted on hydraulic valve bank.
4. Variable flow regulator valve used to determine vibrator speed mounted on screed unit.
5. Hydraulic motor, constant displacement, gear type, driving vibrators mounted on screed unit.
6. Counter-balance valve used to govern the return line flow from the motor mounted on the screed unit.
7. Relief valve set at 500 PSI mounted on the hydraulic motor return line to protect the motor from peak pressures encountered in stopping the vibrator train.

CIRCULATING PHASE – Applies when no work is being done. Oil flows from the tank, through the strainer, through the pump, through the solenoid valve, and back to the tank.

OPERATING PHASE – Applies when control switch is activated, closing solenoid valve and blocking return port to tank. Oil flows from the tank, through the strainer, through the pump, through the flow regulator valve, through the vibrator drive motor, through the counter-balance valve, through the filter, to the tank.

A pilot line leads from an elbow just before the flow regulator valve to the counter-balance valve. Pressure of the oil through this line unseats a ball in the counter-balance valve, allowing return oil to flow to the tank. If the inertia of the vibrators tends to run the motor faster than oil is being pumped to it, a pressure drop will result. This will seat the ball in the counter-balance valve and block return oil flow, slowing the motor until pressure is again built up in the pilot line.

The speed of the motor is regulated by the flow regulator valve. When this valve is closed, all oil flows directly to the tank. As the valve is opened, oil is fed to the motor to increase the vibrator speed.

RELIEF PHASE – Applies when system pressure reaches 1250 PSI. Relief valve will open, by-passing oil to the tank. See section G of Finisher OSM for checking and setting relief valve pressure.

PREPERATION

COUNTER WEIGHTS

Three sets of weights are provided with each screed unit. The lightest weights are built in the vibrators at the factory and the heavier weights are shipped with the machine for use on special needs.

As a general rule, heaviest weights should be used to provide sufficient amplitude at lower speeds.

On some jobs (thick mats) heaviest weights may be used at higher speeds.

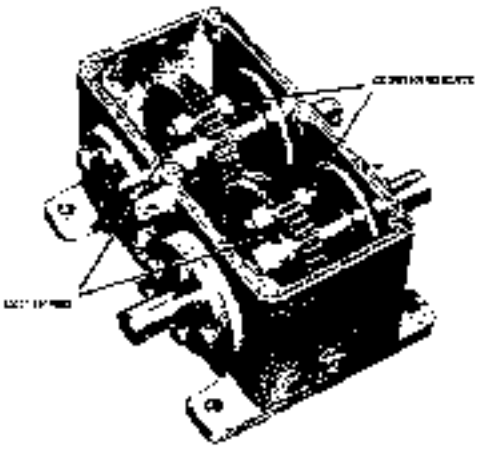


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FIGURE H-1 – Vibrator

TO CHANGE COUNTERWEIGHTS:

1. Loosen single vibrator cover lock nut and remove cover.
2. Remove cotter pins holding weights to gears.
3. Install desired weights to both gears and install new cotter pins. These pins are specially hardened and should not be substituted.

CAUTION – Be sure to install the same size weights to each gear in each vibrator to insure proper operation.

4. Replace cover plate and tighten lock nut.

GENERAL RULE

R.P.M.	Recommended Weights
Over 4000	Minimum or Medium
2000 to 4000	Medium or Heavy
Under 2000	Heavy

VIBRATOR TIMING

Vibrator weights are related in position to the keyway in the drive shaft. To check vibrator timing, turn shafts so that keyway on one vibrator is up, and then check keyways of the other vibrators to see that they are all up. This should be checked when adding an extension vibrator, replacing belts, or changing U-joint. Also, check weights to be sure they are all in same position.

FIGURE H-2

CROWN CONTROL ADJUSTMENT

The crown control adjusts the screed to produce the desired contour of the finished pavement. (Refer to Figure H-2.)

For normal adjustment of the screed the procedure is as follows: (Refer to Figure H-3.)

1. With thickness controls set at neutral position, break chain (A) on the crown adjustment sprockets.

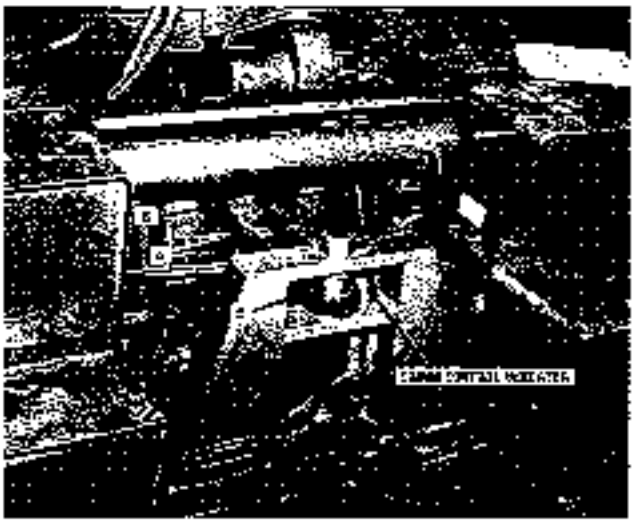

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FIGURE H-3 – Crown Control

2. Then with a tight string or straight edge on both the leading and trailing edge of the screed, turn adjusting nuts on both screws (B) and (C) until both the leading and trailing edges of the screed are in a straight line with the straight edge.
3. Then put 1/8" to 3/16" crown in the leading edge of the screed only.
4. Replace chain (A) on crown adjustment sprockets.

On certain types of dense mixes it may be found necessary to adjust the screed so that all parts of the screed will give a uniform ironing action.

If there is a consistent tearing on the edges of the mat being laid, it is an indication of a lack of material under the edges of the screed. (Refer to Figure H-4.)

To remedy this condition the procedure is as follows:

TO ADJUST SCREED (Refer to Figure H-3.)

1. Break chain (A) Figure H-3, connecting the two sprockets of the crown control.
2. Remove a little of the crown in the leading edge of the screed using only the screw (B). It is best to make this adjustment while the machine is operating so the result can be watched.
3. After adjusting screw (B), replace the chain so that any time the crown has to be changed both the leading and trailing edges of the screed will stay in alignment.

In some cases the center of the mat may show con-

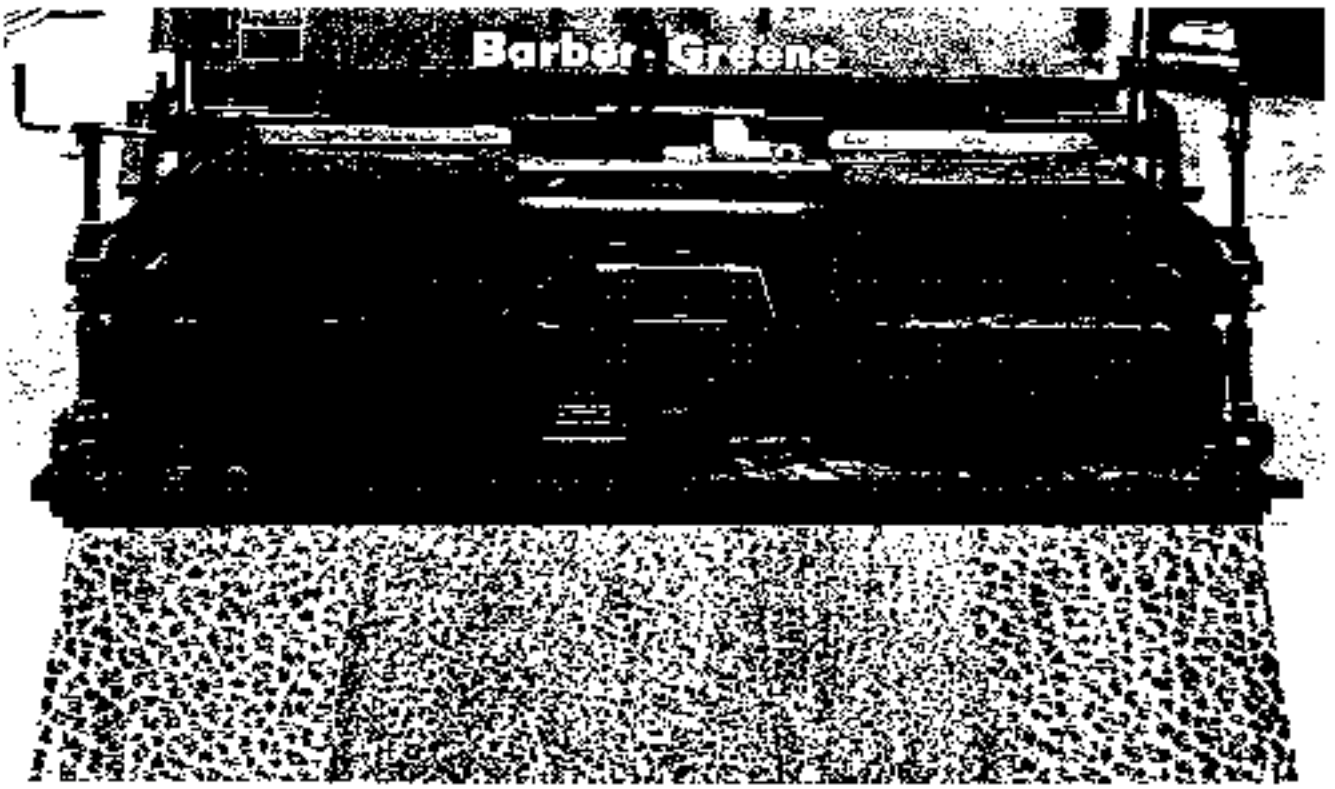

FIGURE H-4

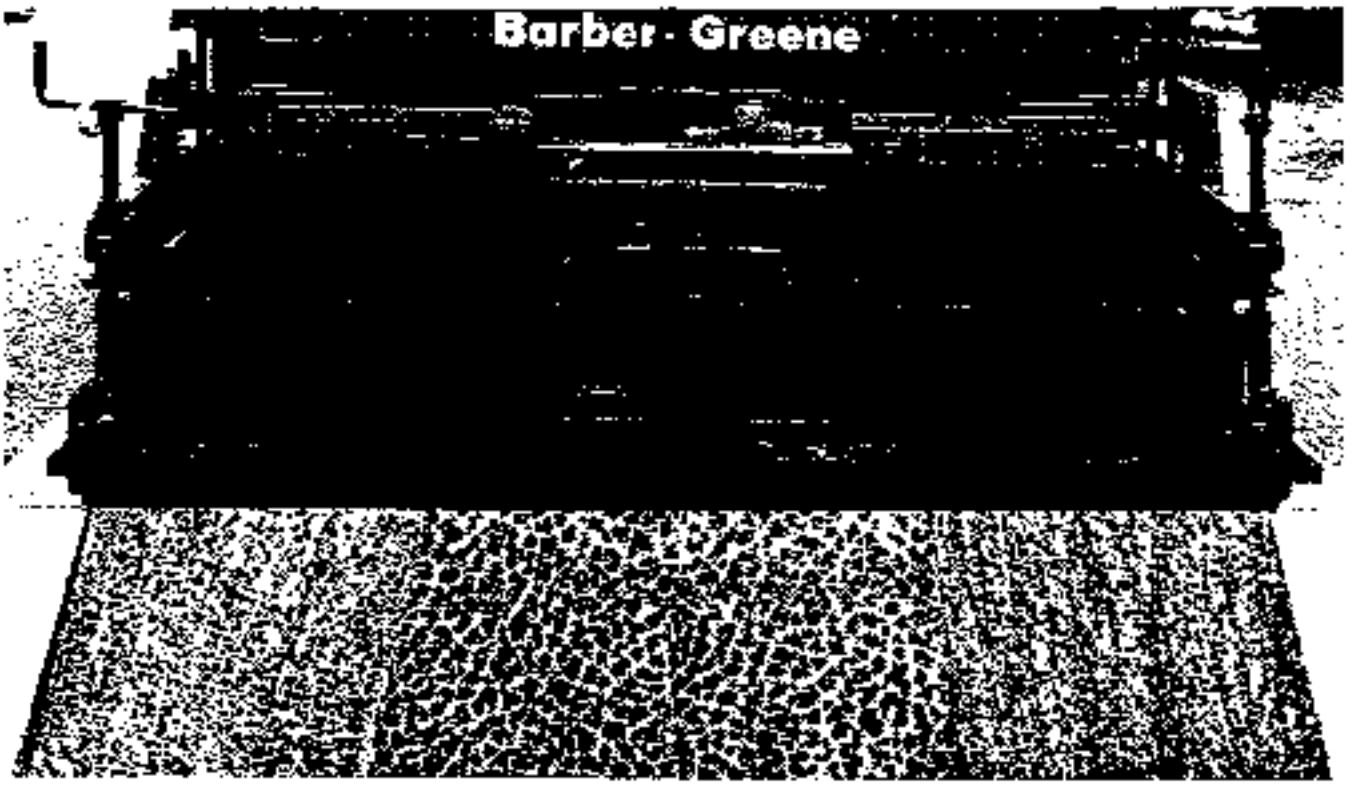

FIGURE H-5

sistent tearing which may indicate a lack of sufficient material under the center of the screed. (Refer to Figure H-5).

To correct this, additional crown must be added to the leading edge of the screed. It is the reverse of the operation described above.

SCREED PLATES (Refer to Figure H-6.)

The screed plate front and trailing edges are identical. Therefore, when wear to the front edges becomes severe, the plates may be reversed before they are replaced.

To reverse the plates:

1. Remove the four vibrators from their mounting plates.
2. Remove the set screw and the mounting plate from each post.

FIGURE H-6 – Screed Plate 4631190

3. Remove the four bolts securing each screed plate to main frame.
4. Disconnect the pre-strike off from the screed plate.
5. Remove the spacer bolts used to secure the pre-strike off to the screed plates and install them on the trailing edge of the screed plates.
6. Raise the screed, reverse the screed plates, and reinstall by reversing the above procedure.

DRIVE V-BELTS (Refer to Figure H-7)

For efficient operation of the vibrators, the drive V-belts must be kept tight.

To tighten V-belts, loosen the two motor mounting bolts and turn adjustment screw under motor moving motor up until the belts vibrate when they are plucked. Tighten motor mounting bolts.

To Replace the V-belts:

1. Loosen the motor mounting bolts and slide the motor down in the take up slots until the belts can be removed from the pulleys.
2. Remove the universal joint hub adjacent to the driven pulley, and remove belts.
3. Install new belts and reconnect U-joint.
4. Retighten belts reversing above procedure to proper tension.

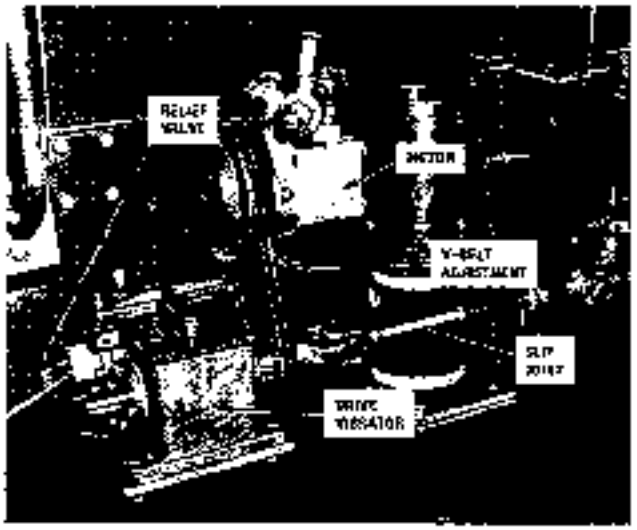

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FIGURE H-7 — Drive Vibrator & Motor

PUTTING MACHINE TO WORK (Refer to Section E of Finisher OSM)

On the initial start up when the action of the vibratng screed on a certain material is unknown, set the vibrator speed at 50% RPM by opening the flow control valve on the screed.

Note the texture and compaction of the mat being laid and adjust vibrator speed until the desired mat appearance is obtained.

In those rare instances when it is necessary to change weights to obtain desired mat (refer to Chart, Page H-2).

TROUBLESOME MIXES

When encountering dense, "critical" mixes, the pre-strike off is needed. Set the strike off about 3/8" above the bottom of the screed plate. Set the vibrator speed at 50%. Make adjustments on the pre-strike off and/or vibrator speed until desired mat is obtained.

Removal of the pre-strike off, when required only part of the time, is unnecessary. It may remain on the machine while working coarse mixes.

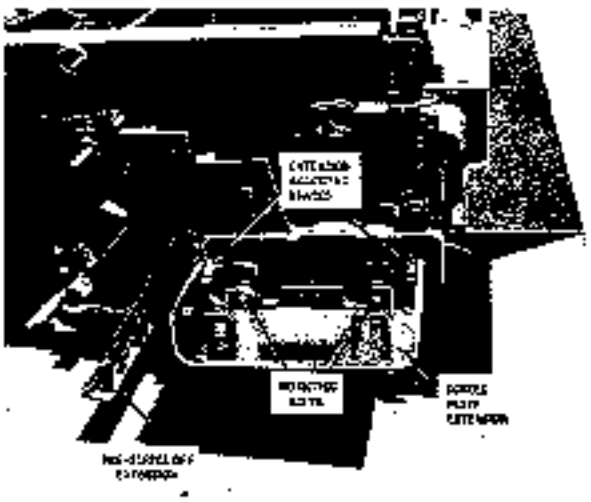

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FIGURE H-8 — One Foot Extension

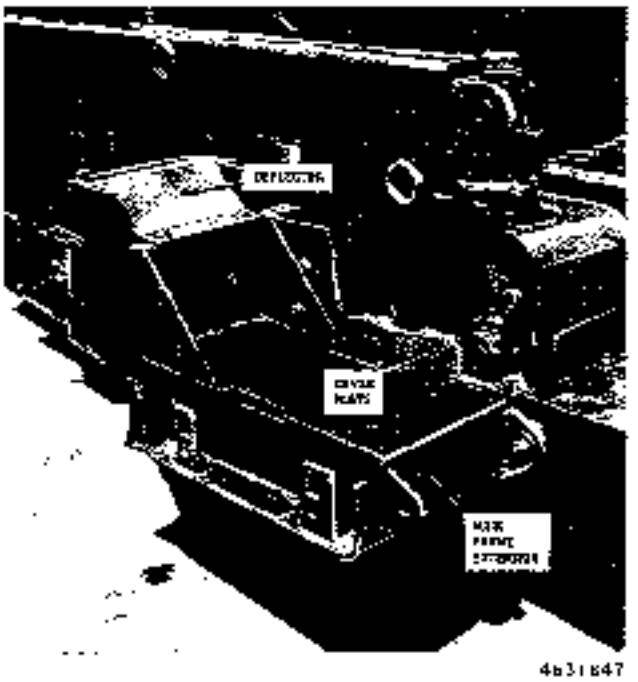

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FIGURE H-9 — One Foot Extension & Deflector

SCREED EXTENSIONS

Six inch, one foot, and two foot extensions are available in kit form so that the screed can be extended from the standard 10' to the recommended 14' with six inch increments. Additional screw extension and additional vibrator will be used with the two foot extension only. The extensions can be installed by starting with the screed plate and working up as shown in the following illustrations.

TO INSTALL SIX INCH AND ONE FOOT EXTENSIONS

1. Raise screed, remove heat chamber end plate, and swing out screed extension adjusting braces.
2. Bolt screed plate extension to main screed plate so that it is as high as it will go. Draw mounting bolts up snug, but not tight.
3. Bolt on pre-strike off extension.
4. Tighten vertical adjusting screws to force extension down until it is flush with the main screed under a straightedge. Tighten lock nuts.
5. Tighten vertical adjusting screws until trailing edge of extension matches trailing edge of screed. Tighten lock nuts and mounting bolts.
6. Bolt extension main frame to screed main frame.
7. Bolt extension deflector to extension main frame.

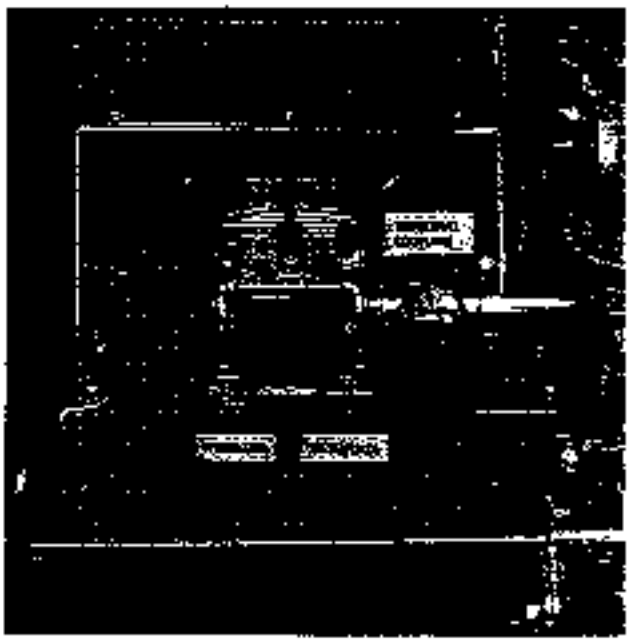

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FIGURE H-10 Two Foot Extension with Vibrator

Extension deflector may be left integral with the main frame extension after the first installation.

8. Install cover plate and heater end plate.

TO INSTALL TWO FOOT EXTENSION:

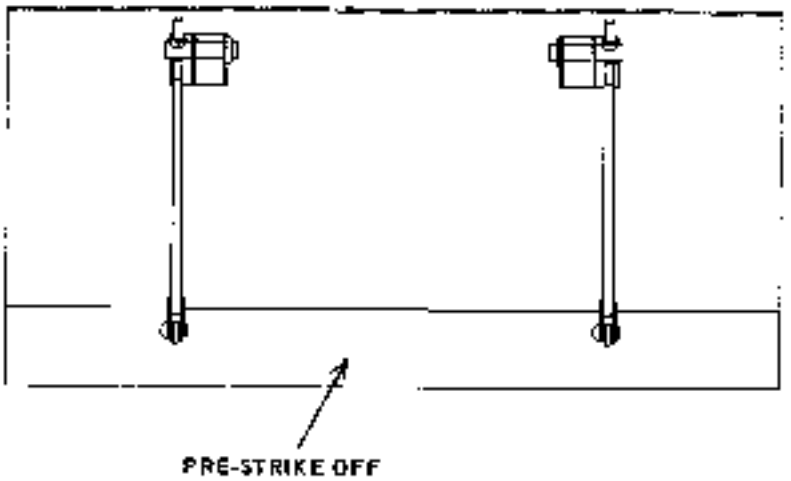
1. Follow steps one through eight above.
2. Remove feeder screw end cap and install screw extension.

IMPORTANT – Be sure to install the correct screw extension as they are right hand and left hand screws.

3. Mount vibrator base plate on screed extension by installing key and bolting plate to pillar.
4. Bolt vibrator to base plate but leave bolts loose.

CAUTION – Be sure the same size weights that are installed in the main screed vibrators are installed in the extension vibrator.

5. Join vibrator line shaft drives together with universal coupling.
6. Turn drive shaft so that the keyways on all the vibrators are pointing up. This is necessary to insure proper phasing of the vibrators.
7. Tighten vibrator hold down bolts.



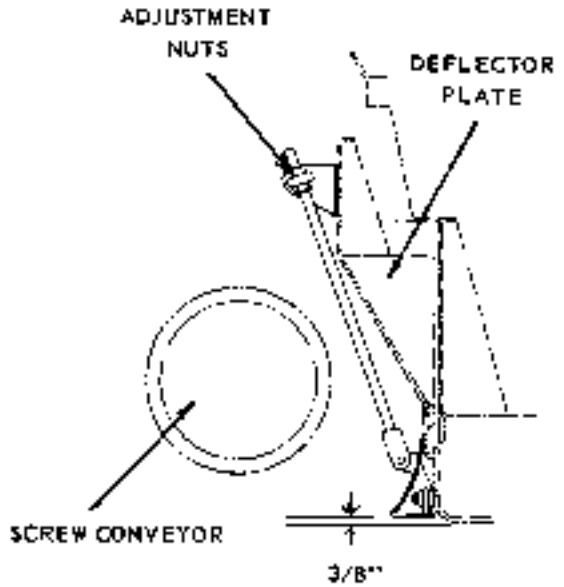


FIGURE H-11 — Pre-strike off Plate Installation

THICKNESS CONTROL SCREW ADJUSTMENT
(Refer to Figure H-12)

A clearance of .003 is recommended for thickness control thrust bearings, (A and B). A clearance greater than .007 could cause mat problems.

ADJUSTMENT CHECK (Refer to Figure H-12)

1. Find slack position of thickness control screw then turn screw clockwise, or up, until pressure is felt.
2. With a feeler gauge, check clearance between thrust bearing (A) and spacer, should be .003.
3. If clearance exceeds .007 an adjustment must be made.

TO ADJUST (Refer to Figure H-12)

1. Loosen set screws C and D, two each.
2. Rotate indicator, on screw thread, until proper clearance is obtained.
3. Turn control screw clockwise, or up, and recheck clearance.
4. When .003 is obtained, tighten set screws C and D.

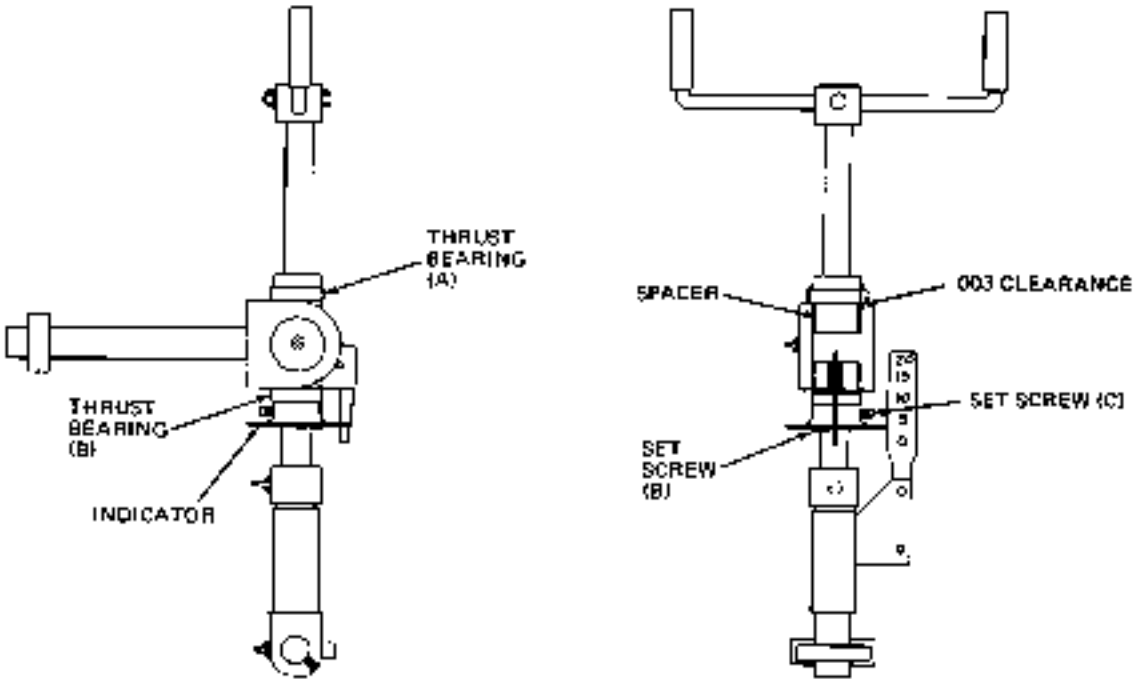


FIGURE H-12 — Thickness Control Screw

TAMPER SCREED

GENERAL DESCRIPTION

TAMPER MECHANISM

The tamper mechanism is made up of the tamper drive, tamper eccentric shaft, tamper frame, tamper bars and deflector plate.

The tamper eccentric shafts are V-belt driven from the hydraulic motor. These shafts produce a 1/8" vertical stroke, at 1500 strokes per minute, to the tamper bars. The tamper bars are synchronized to prevent any variation in vibration. Replaceable tamper bars are bolted to the tamper frames which are connected to the eccentric shafts. The tamper strikes off and compacts the material and the screed plates, immediately behind, complete the smoothing or ironing of the surface.

The curved deflector plate, mounted ahead of the tamper assembly, holds the tamper in correct position, relative to the forward edge of the screed plate, and deflects any excess material back to the spreading screws.

SCREED PLATES, SCREED BURNERS & HOT AIR CHAMBERS

The replaceable screed plates are bolted to the screed frames. The screed plates complete the smoothing or ironing of the finished mat. The screed plates are heated by hot air produced by two burners and heaters. Fuel is supplied to the burners through a flexible hose by an electrically driven pump. Baffles in the air chamber and heating chambers permit even distribution of heat over the full area of the screed. The burners use standard fuel oils and distillates.

CLEANING TAMPER SCREED

When cleaning the tamper screed, run tamper slowly and spray behind the tamper bars and between tamper and deflector plate. If the end plates are taken off while cleaning the machine, it is much easier to get spray into these places.

Once each week the deflector plate and tamper should be swung out away from the screed and all accumulated material removed and the tamper and deflector thoroughly cleaned. (Refer to Figure I-1).

This is done by removing bolts (A), on the turn buckles and swinging the deflector plate and tamper away from the screed. (Refer to Page I-3 for Readjustment of Deflector and Tamper for Proper Clearance.)

CROWN CONTROL (Refer to Figure I-2)

The crown control adjusts the screed to produce the desired contour of the finished pavement.

For normal adjustment of the screed the procedure is as follows: (Refer to Figure I-3)

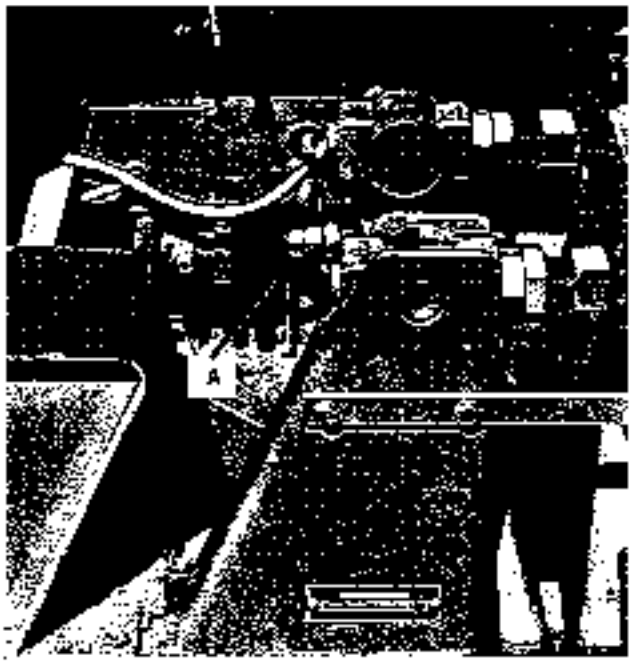


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FIGURE I-1 — Tamper Clearance Adjustment

FIGURE I-2

1. With thickness controls set at neutral position, break chain (A) on the crown adjustment sprockets.
2. Then with a tight string or straight edge on both the leading and trailing edge of the screed, turn adjusting nuts on both screws (B) and (C) until both the leading and trailing edges of the screed are in a straight line with the straight edge.
3. Then put 1/8" to 3/16" crown in the leading edge of the screed only.
4. Replace chain (A) on crown adjustment sprockets. On certain types of dense mixes it may be found necessary to adjust the screed so that all parts of the screed will give a uniform ironing action.

If there is a consistent tearing on the edges of the mat being laid, it is an indication of a lack of material under the edges of the screed. (Refer to Figure I-4)

To remedy this condition the procedure is as follows:

TO ADJUST SCREED (Refer to Figure I-3)

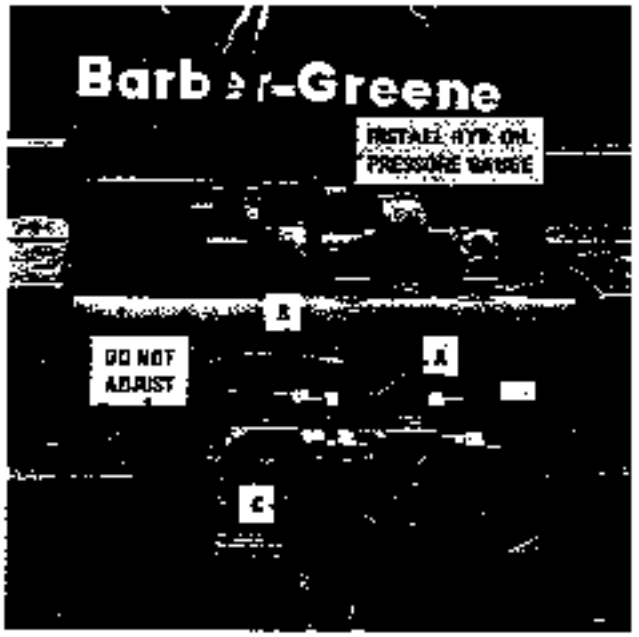

FIGURE I-3 – Screed Crown Adjustment

1. Break chain (A) Figure I-3, connecting the two sprockets of the crown control.
2. Remove a little of the crown in the leading edge of the screed using only the screw (B). It is best to make this adjustment while the machine is operating so the result can be watched.
3. After adjusting screw (B), replace the chain so that any time the crown has to be changed both the leading and trailing edges of the screed will stay in alignment.

In some cases the center of the mat may show consistent tearing which may indicate a lack of sufficient material under the center of the screed. (Refer to Figure I-5)

To correct this, additional crown must be added to the leading edge of the screed. It is the reverse of the operation described above.

MAINTENANCE AND ADJUSTMENT

SCREED UNIT

If the screed unit of the Finisher appears to vibrate excessively, the operator should check the machine immediately and adjustments made.

Excessive vibrations may cause welds or structure members to crack or break loose. If allowed to continue, serve damage to the machine may result.

Three major causes of excessive screed vibrations are:

1. Failure to clean Finisher each day. Excess asphalt should be cleaned off the screed every night and should not be allowed to accumulate and harden. If the surplus asphalt material is allowed to accumulate on the heating chamber and between the tamper and screed, excess vibration may result. If this material is not cleaned out and allowed to harden overnight it may cause chains to break or the tam-

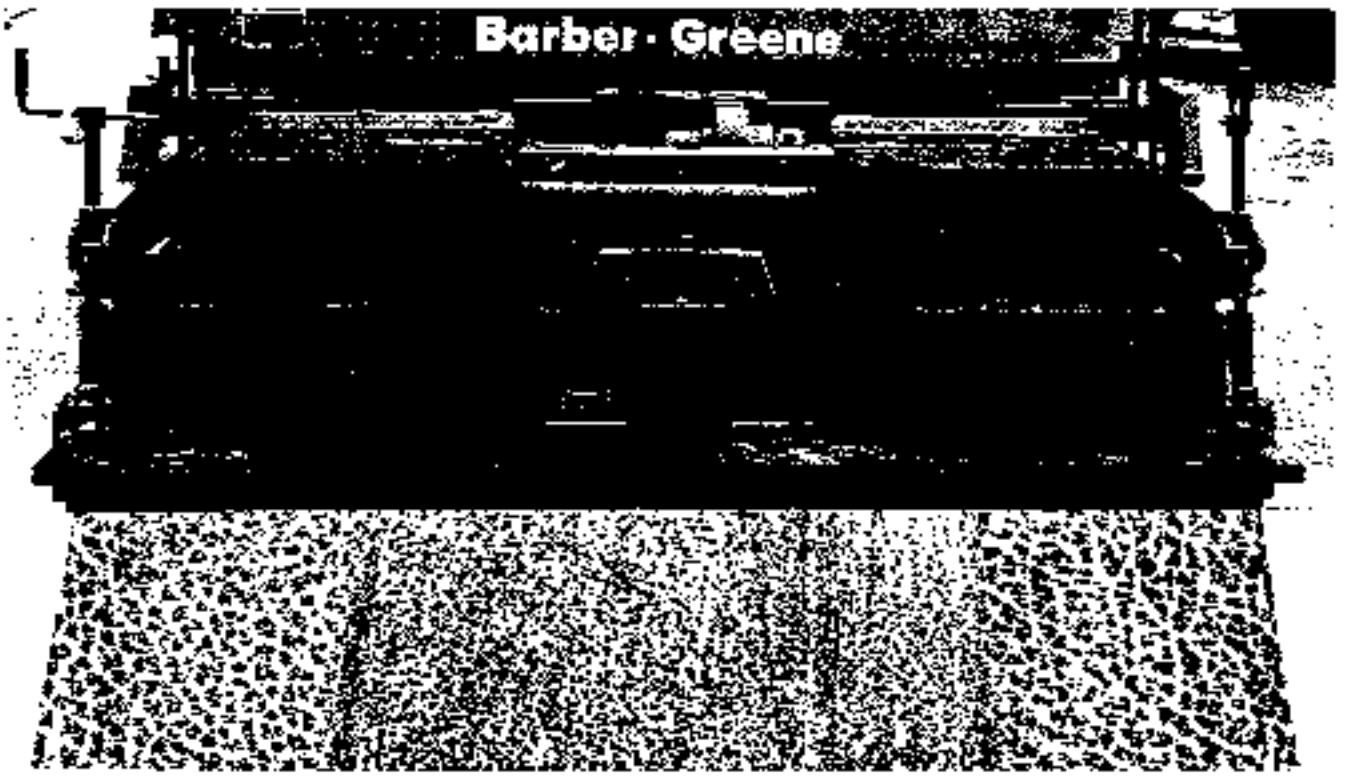

FIGURE I-4

FIGURE I-5

per shaft spring to break when the Finisher is started the next morning. (Refer to Cleaning", Page E-9.)

2. Incorrect Tamper Speed. The tamper shaft speed is 1500 R.P.M. Speeds in excess of 1550 R.P.M. will cause the screed to vibrate excessively. (Refer to Speed Chart, Page G-2.)
3. Incorrect Screed & Tamper Adjustment. If the tamper bar rubs against the screed plate it will cause both the tamper bar and the edge of the screed plate to gall and will set up excessive vibration in the screed unit. The tamper bar should not rub against the leading edge of the screed plate. There should be a clearance of .015" to .018". (See Tamper Adjustment Below.)

TAMPER ADJUSTMENT (Refer to Figure I-6.)

For the best operation of the Finisher a definite relation between the tamper and screed, both vertically and horizontally, must be maintained.

The tamper should be set so at the bottom of the stroke it is approximately 1/64" below the leading edge of the screed.

If the tamper is set too far below the screed, material will build up on the screed immediately behind the tamper, and in some dense mixes cause scuffing.

If the tamper, at the bottom of the stroke, is set above the bottom of the screed, there will be excessive wear on the leading edge of the screed and in some dense mixes will cause a tear in the mat.

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FIGURE I-6 – Tamper Adjustment

A simple "rule of thumb" method for checking this setting is as follows:

With the tamper at the bottom of the stroke, (with keyways in eccentric shafts down), if you can just hook your thumb nail on the bottom edge of the tamper, this is approximately 1/64" or the proper setting.

CAUTION – The tamper positioning adjustment is factory set, do not attempt to adjust. (Refer to Figure I-7.)

TO ADJUST TAMPER VERTICALLY:

1. Turn tamper eccentric shaft, (A) Figure I-7, so that the keyways at the eccentric bearings (B) are down. This puts the tamper at the bottom of the stroke.

2. Loosen bearings hold-down bolts (C) and set wedge Block (D), so that the bottom of the tamper will be 1/64" below the leading edge of the screed (E).
3. Lock wedge block with set screws at each end of blocks.
4. Tighten bearing hold-down bolts (C).

It is also important that the correct relationship between the tamper and screed be maintained horizontally. There must be .015" to .018" clearance between the face of the tamper and the leading edge of the screed, Figure I-7.

If there is too much clearance this will allow fines and asphalt to work up between the tamper and screed, causing excessive wear and a build up of material around the heater housings.

If the tamper is set too tight against the screed, it can cause excessive wear and possible galling of the tamper.

TO ADJUST TAMPER HORIZONTALLY:

1. With the screed unit setting on the "blocks", turn the thickness control screws to "neutral" or the "slack" position.
2. Make certain nuts (A) and (B) Figure I-8 are tightened.
3. Loosen lock nuts (D) and (C) (Caution: Nut (D) left-hand thread and nut (C) right-hand thread).
4. Turn nut (E) to obtain .015"–.018" tamper clearance between tamper bars and leading edge of screed.
5. Check clearance after tightening lock nuts (D) and (C) to make certain tamper clearance is still .015–.018". This setting should be checked periodically and adjustment made if necessary. This is one of the most important, yet commonly neglected, adjustments on the entire machine.

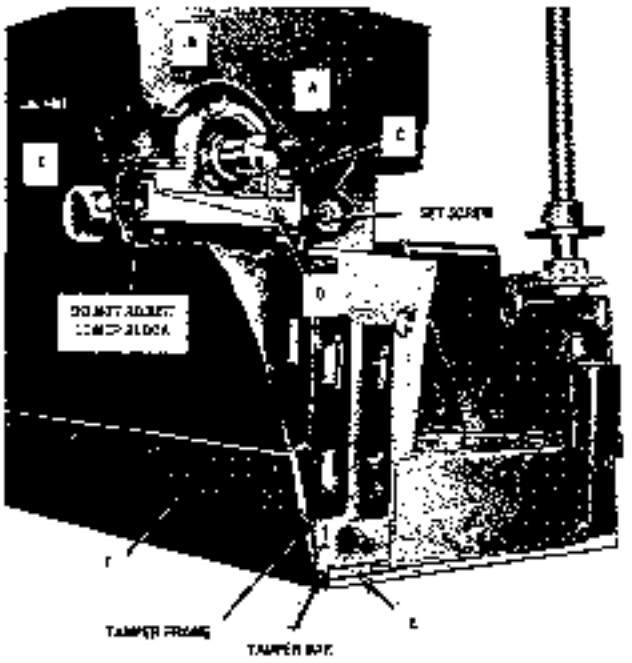

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FIGURE I-7 — Adjusting Tamper

CHANGING TAMPER BARS (Refer to Figure I-7)

Each five foot section of the tamper Figure I-6, is made up of four bars 15" long. Each one of these bars is bolted to the tamper frame, by two long vertical bolts with heads at top of tamper frame.

TO REMOVE TAMPER BARS:

1. Remove bolt (A), Figure I-8, and push the deflector plate away from the tamper bar.

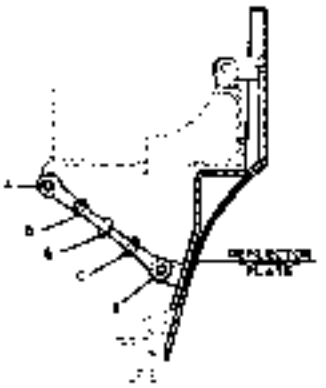

FIGURE I-8

2. Loosen the two bolts holding each tamper bar to the tamper frame. With the bolts loose and deflector clear, the bars will drop to the ground.

TO REPLACE TAMPER BARS:

1. Clean out bolt holes in bars and be sure facing surfaces of both, bars and tamper frame are clean and smooth, so that machined surfaces can be bolted tight against each other.
2. Install each tamper bar section bolting fast to tamper frame.
3. Before tightening bolts, bring deflector plate back tight against tamper bars to assist in aligning bars straight against screed, then tighten bolts.
4. With bolts tight, the four bars on each frame should fit snug against the screed and be flush to a straight edge put along the bottom of the bars.
5. Adjust tamper for correct horizontal and vertical adjustment.

SPRING DRIVE TAMPER ECCENTRIC SHAFT (Refer to Figure I-9)

The two tamper drive shafts are tied together with a spring coupling. This provides a positive drive connection for keeping one shaft in phase with the other, yet allowing the flexibility of crown control and adjustments of tampers.

CAUTION: This spring coupling has a rated load conveying capacity of approximately 23 H.P. and the power required to run the tamper is only 5 H.P. while the spring has a large safety factor, they will break, if the asphalt mix which collects between the tamper and screed is not cleaned out at shutdown. (Refer to "Cleaning" Page E-9.)

TO REPLACE BROKEN SPRINGS: (Refer to Figure I-9)

1. Remove guard
2. Open the crown control as wide as possible, to 2" crown or more.
3. Unscrew set screws in spring drive hub, and move hub on shaft as far away from the spring as possible.
4. Unscrew set screws in driven hub, and move as far away from the spring as possible.
5. Remove broken spring.
6. If the replacement spring is not wired in its compressed position, put spring in a vise and compress it completely. Wrap several turns of No. 20 or No. 18 iron wire around the spring at three evenly spaced points.

CAUTION: Be sure the jaws of the vise are square, as this spring when fully compressed develops about 600 lbs. pressure and could cause considerable damage if it slips out of the vise when under pressure. Do not clips the binding wires until the spring, sheave and hub are in place.

7. Put the spring between the hubs, and in line with shafts.
8. Bring the spring drive hub back to its proper place on the shaft, then enter the prong of the spring into the hole of the hub.
9. Tighten set screws tight to hold hub in place.
10. Move the driven hub, on the other tamper shaft, into place and tighten down set screws.

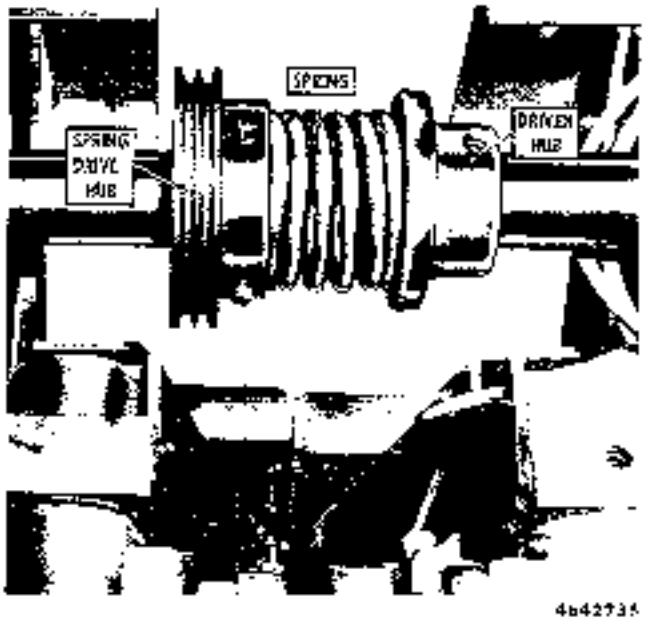

FIGURE I-9 Tamper Eccentric Shaft Drive

11. Align hole in hub for spring prong to enter. When properly aligned one tamper will be in the down position and the tamper on the opposite side will be in the up position.
12. Hold the spring in place with a flat piece of wood so that when the wires are cut the prongs on each end of the spring will enter the holes in the two hubs. Carefully cut the wires holding the spring compressed. If the spring moves when cutting the wires, it may be necessary to use a small bar to force the spring prongs into place.
13. Replace guard.

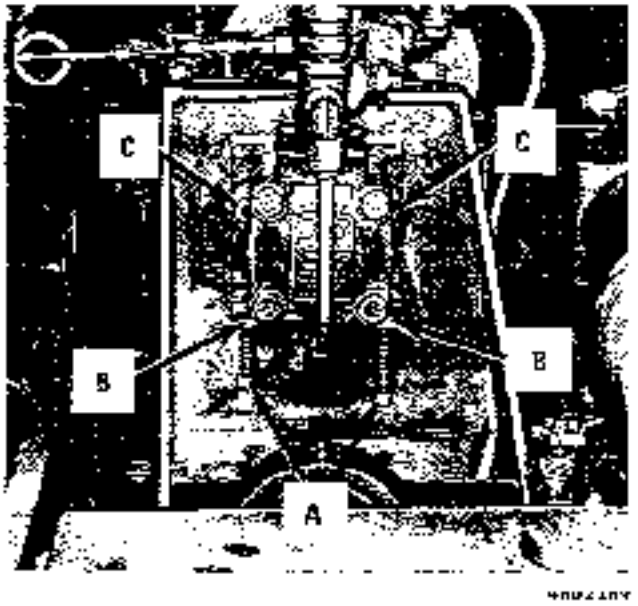

FIGURE I-10 — Tamper Eccentric Shaft Drive Belts

TAMPER ECCENTRIC SHAFT DRIVE BELTS (Refer to Figure I-10)

The tension of the tamper drive V-belts is adjusted by moving the hydraulic motor mounting bracket.

TO ADJUST BELT TENSION:

1. Loosen mounting plate bolts (C).
2. Loosen jam nuts (D) on adjusting bolts (A).
3. Turn adjusting bolts (A), moving hydraulic motor upward until proper belt tension is obtained. Approximately 1/8" mid-belt deflection.
4. Tighten bolts (C) and jam nuts (D).

SCREED PLATES (Refer to Figure I-11)

The screed plates which bolt to the bottom of the screed frame slide on the material which is laid by the Finisher in operation, consequently they are subject to wear.

Some types of mixes will have a more rapid wear rate on these plates than other mixes. A periodic inspection should be made to establish a rate of wear, and interval, when new plates should be installed.

The condition of the screed plates can have a definite effect on the appearance of the finished mat. This is especially true when laying the critical, dense types of mixes, top courses, such as sand and sheet asphalt. This type of operation requires screed plates in good condition to do a good job.

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FIGURE I-11 – Bottom View of Screed Plates

On the coarser mixes, binder and first course jobs, screed plate condition is not as critical to the quality of the finished mat. Screed plates with considerable wear, will successfully lay binder and the open types of mixes.

TO CHECK SCREED PLATES FOR WEAR:

1. Run machine up on blocks, so screed unit is raised above the ground as high as possible to provide working space underneath screed plates.

CAUTION. Block screed for safety to prevent accidental lowering.

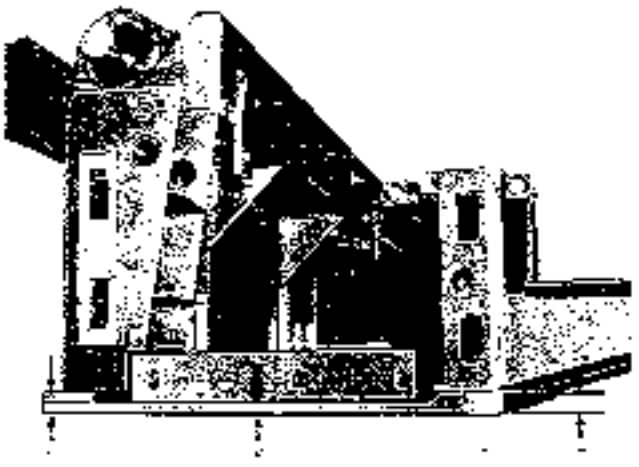

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FIGURE I-12 – End View of Screed Plate

2. With a straight edge, check both screed plates every 12 inches, both lengthwise and crosswise for squareness and true level of surface. Normally the outside edges of both screed plates, at the trailing edge will wear off to a bevel edge from matching joints, and from riding gutters, as when doing city street work. Also the wear at the trailing edge of the screed is always greater than that at the leading edge.
The screed plate is 1/2 inch thick with a 1" x 3" mounting bar welded to the trailing edge and a 1/2" x 3" bar welded to the leading edge. (Refer to Figure I-12.) To check the amount of wear, check the thickness of the trailing edge of the screed, approximately 1 foot in from the outer edge. For example: This thickness started out at 1" and if when checked is found to be 3/4", it means that only 1/4" of the original 1/2" thickness of the screed plate is left.
3. By checking the straight edge as stated above, the relative overall wear of the plates can be determined. The type of mix being layed, application, and quality of the finished mat will determine whether replacement is necessary.

IMPORTANT – Never allow screed plates to wear completely through and keep new plates on hand, available when needed.

NOTE – It is always advisable to install new tamper bars when screed plates are replaced.

4. Occasionally, from expansions due to heat, and the various crown adjustments, the joint (A) Figure I-11, at the hinge section of the screed will open up slightly, and, may or may not, leave a mark in the finished mat. This should be checked periodically and the screed plates kept tight, at the hinged joint (A). The material should be cleaned out of the joint between the plates and the two large bolts (A) Figure I-13, tightened to pull the screed plates tight together. Be sure to lock the nuts on the bolts, by bending over the square plate washer. New bolts (A) are always furnished with each set of new screed plates and should be installed when new screed plates are installed.

TO INSTALL NEW SCREED PLATES:

1. When installing plates, be sure when removing the old plates to keep track of the shims removed from each one of the mounting bolts (B) Figures I-11 and I-13, so they can be replaced on the respective bolts. This will help greatly to give a true surface when installing the new plates.
2. After removing the old screed plates, thoroughly clean all surfaces, dowel pins, etc., of the screed frames to provide a clean, smooth surface.
3. Install the new plates using new hinge bolts (A) Figure I-13. Replace shims, in their respective positions, previously removed from the mounting bolts (B) Figures I-11 and I-13.

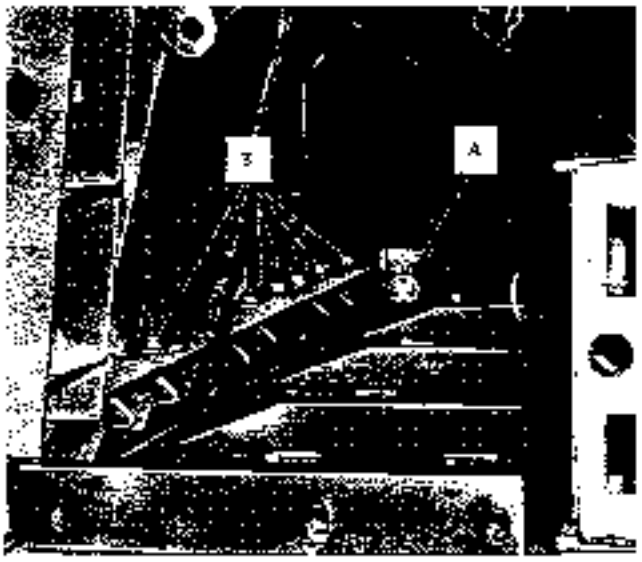

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FIGURE I-13 – Top View of Screed Plate with Hot Air Chamber Removed

4. Using a straight edge check screed plates every 12 inches, both lengthwise and crosswise over the screed surface. It may be necessary to add additional shims, or remove some of the shims, from the mounting bolts to get a true surface. Tighten all bolts securely. Be sure to bend plate washers to lock nuts of hinge plate bolts (A) Figure I-13.
5. Set screed crown for normal adjustment as stated on Page I-1.

ACCESSORY SECTION

The following optional accessories are available for use with the standard Finisher when the application for operation demands.

SCREED EXTENSIONS

The screed extensions, 6 inch and 1 foot, are furnished in kit form consisting of the necessary units to extend spreader screw, deflector plate, tamper bar and screed plate. This will increase laying width from standard 10 foot, to recommend maximum of 14 feet, in 6 inch increments depending on the combination of extensions used.

NOTE – A 1 foot screw extension is used only when using 2 foot of screed extension. A screw extension is not provided when using only 1 foot of screed extensions.

All parts, except the spreader screw extension and the 6" extensions, are interchangeable, right or left.

Installation of both the 6 inch or 1 foot extension is exactly the same. The illustrations show installation of one, 1 foot extension on right hand of machine.

TO INSTALL EXTENSIONS:

1. Remove heater end plate, Figure I-14.
2. Set screed extension, Figure I-15, in place and install "quick-lok" fasteners as shown in Figure I-18, leaving nuts (A) Figure I-18 loose.

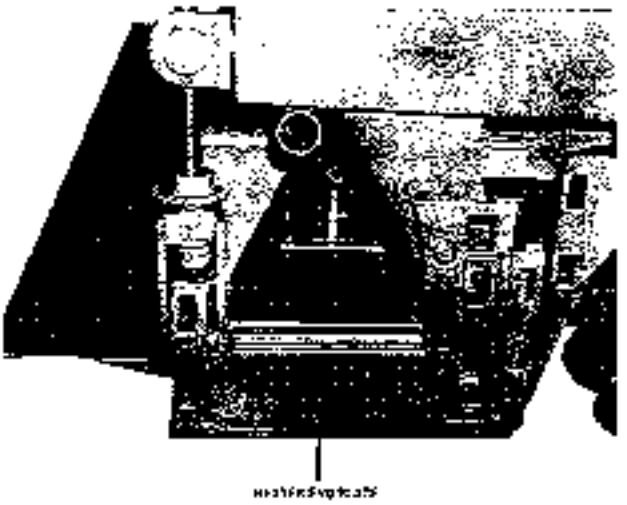

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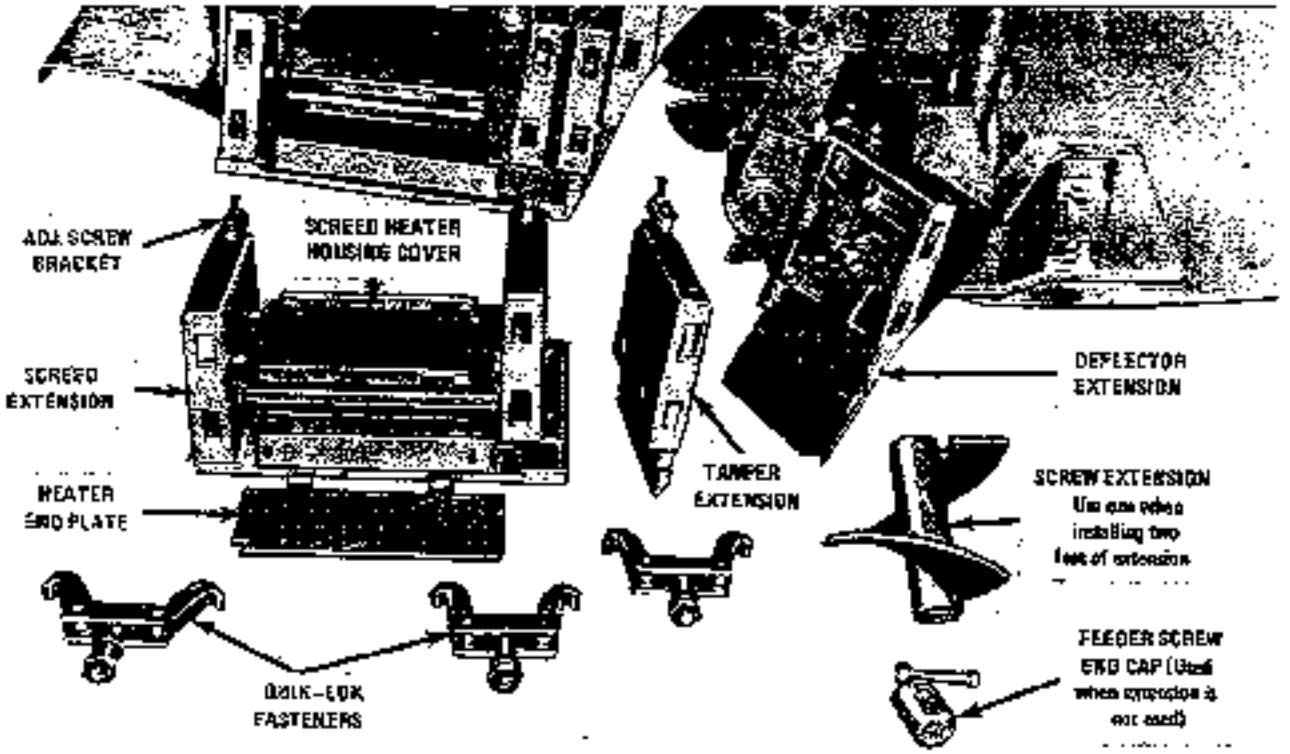
FIGURE I-14 – Screed Extension Installation

3. Bolt adjusting screw brackets, Figure I-15, in place by tightening bolts Figure I-18.
4. With lock nuts loose on bolts (C) Figure I-18, adjust screed extension to screed by using a straight edge under screed and extension joint and turning bolts (C) Figure I-18.
5. When screed extension is square with the screed, tighten lock nuts on bolts (C) and lock nuts (A) on "quick-lok" fastener bolts, Figure I-18.
6. Set tamper extension, Figure I-15, in place and install "quick-lok" fastener, leaving lock nut on fastener bolt loose until the adjusting screw bracket has been installed and tamper squared up.
7. Square up tamper extension with tamper by using a straight edge under tamper bar and extension joint using adjusting bolt.
8. When tamper extension is squared up, tighten lock nuts on adjusting bolt and the "quick lok" fastener bolt.

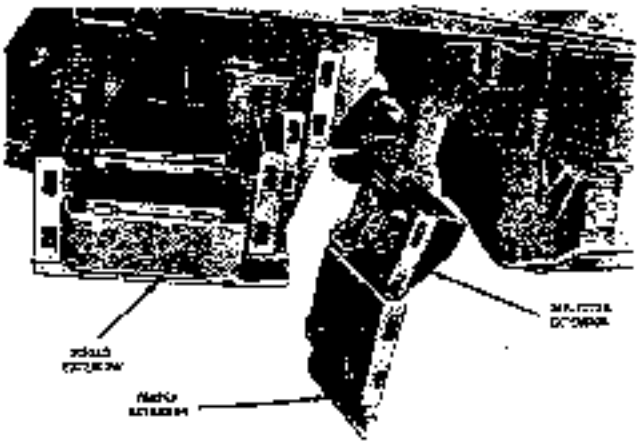
IMPORTANT – Be sure .015" to .018" clearance is maintained between face of tamper and edge of screed.

9. Set Deflector extension, Figure I-15, in place and install "quick-lok" fastener, leaving lock nut on fastener bolt loose until the adjusting screw bracket has been installed and the deflector extension squared up.
10. Square up the deflector extension with deflector by using a straight edge under the deflector and deflector extension joint and using adjusting bolt.
11. Remove feeder screw end cap, Figure I-15, and install screw extension. (Used only with 2 feet of screed extension.)



46143

FIGURE I-15 – 1'-0" Screed Extension Parts Ready for Installation



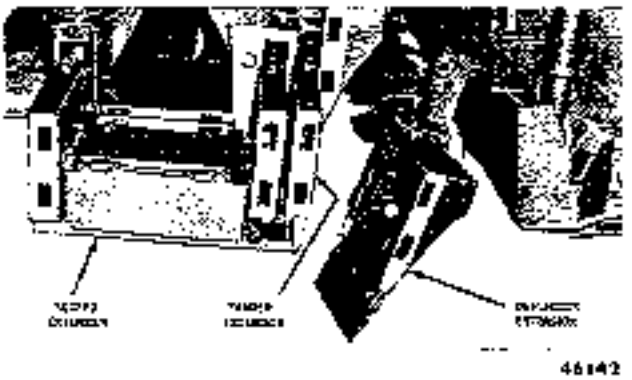
46145

FIGURE I-16 – Screed Extension Installed

IMPORTANT – Be sure to install the correct screw extension as they are not interchangeable, right and left.

12. Install heater end plate, Figure I-18.
13. Add deflector tie rod as shown in Figure I-19.

BEVEL END PLATES (Optional) (Refer to Figure I-20)



46142

FIGURE I-17 – Screed and Tamper Extensions Installed

Bevel end plates are used to bevel the edge of the mat when no joint is to be made. The bevel end plates replace the standard plates when they are to be used.

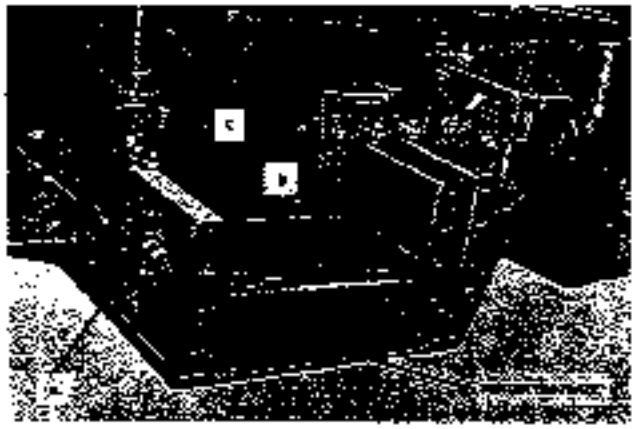
Four different shoes for the bevel end plates are available to lay different thicknesses of mats, namely 1-1/2", 2", and 3 inch. The shoes can be set at any one of three positions: vertical, 30° or 45° bevel.

SA-41 SCREED AND TAMPER EXTENSION ALIGNMENT

When installing screed and tamper extensions, the set screws (A, B, C, & D - Fig. I-21) are used to adjust the extension to the desired height. The quick lock clamps (E-Fig.

I-21) are then tightened securely to prevent the extension from dropping during operation. After the clamps are tight the rear set screw (D) is backed off until the head contacts the metal block welded on the thickness control screw anchor, and the front set screw (C) backed off until it is snug against the cross member of the screed main frame. This prevents the extension from working up during operation.

The clamps and pressure from the material prevents the extension from dropping, and the set screws prevent it from working up.



46141

FIGURE I-18 – 1'-0" Screed, Tamper and Deflector Extensions Installed

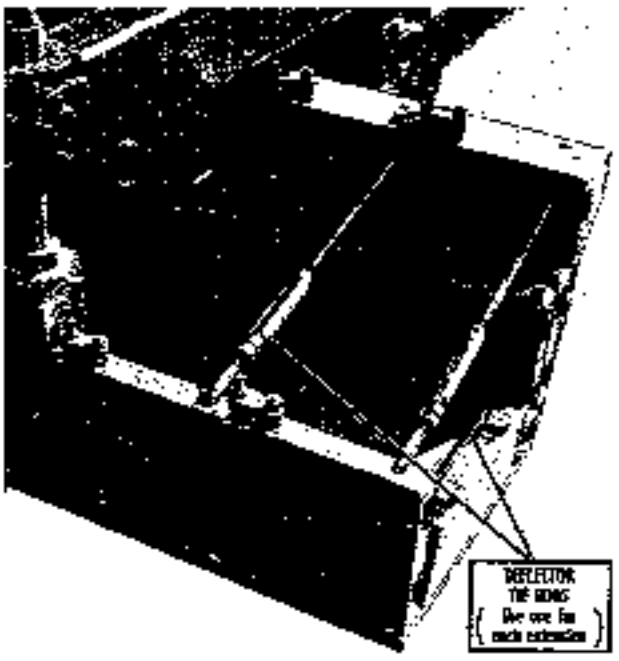


FIGURE I-19 – 2'-0" Extension Installed

4601940

FIGURE I-20 – Bevel End Plate

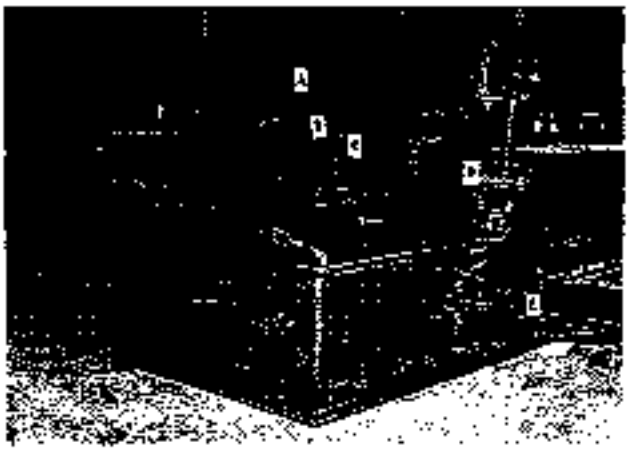


FIGURE I-21 – 2'-0" Extension Installed (Optional)

REPAIR AND OVERHAUL

MAIN TRANSMISSION

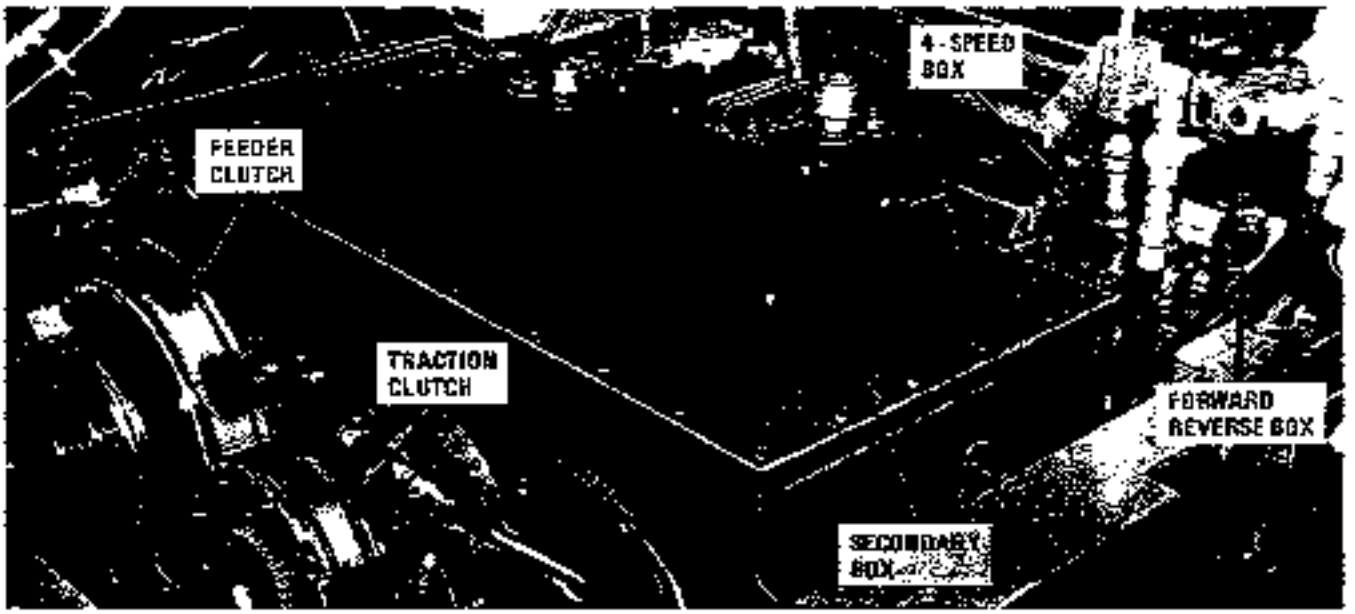


FIGURE J-1 – Main Transmission 4691305

DESCRIPTION.

The main transmission is a 4-speed automotive type incorporating a reverse gear and mounts directly on the 2-speed secondary transmission. Both are totally enclosed, roller bearing type, operating in oil and transmit the power from the engine to the feeders, screw conveyors, and crawlers by chain drive.

TRANSMISSION REMOVAL (Refer to Figure J-1)

A. GENERAL. Both the main and secondary transmissions may be removed as a unit.

B. REMOVAL

1. Remove deck plates over transmissions and panels at drive end to provide access to transmissions and drive.
2. Loosen V-belt drive and remove V-belts from transmission and hydraulic pump sheaves. (Refer to adjustments Section G).
3. Disconnect hydraulic hoses from hydraulic pump and remove hydraulic pump.
4. Remove engine and engine sill.
5. Remove electric feeder clutches. Use puller supplied with tools and spares.
6. Remove main transmission shift lever control and disconnect forward-reverse control at transmission.
7. Slacken wheel drive chain and disconnect universal joints.
8. Attach suitable lifting device to transmission assemblies and remove all mounting bolts.
9. Lift transmission from machine, place on stand or bench for disassembly.

C. DISASSEMBLY (SECONDARY TRANSMISSION)

1. Remove drain plug (2) and drain lubricant from housing. (Refer to Figure J-2).
2. Remove transmission covers (5&6). Remove shifter rods (12&13) and shifter forks (14&15). (Refer to Figure J-2)
3. Remove end caps (37 and 52, Figure J-2) and remove bearings and spur pinion shaft (60, Figure J-3).
4. Remove end caps (69 and 77, Figure J-3) and remove and strip splined shaft (67, Figure J-3).
5. Remove traction clutch brake and traction clutch mounting plate. Strip and remove splined shaft (37).
6. Remove end cap and shims (32 & 33, Figure J-2) and remove shaft (4, Figure J-3). To remove shaft, slide retainer ring (7) toward bevel gear (2). Clamp bevel gear with "C" clamp to transmission wall. Screw threaded puller rod into taped end of shaft, and pull shaft out far enough to remove bevel gear (2). Then remove shaft and helical gear (5).

NOTE: On the assembly of the bevel gear set (2, Figure J-3) the timing marks must be re-aligned.

NOTE: If removal of the 4-speed transmission is required, perform the following:

a. Remove cotter pin and shaft nut (46, Figure J-5) from main shaft (45).
b. Remove bevel gear (2, Figure J-3).
c. Remove bearing cartridge assembly (40-46, Figure J-4) by screwing two push bolts into bearing retainer (43).
d. Remove all remaining mounting bolts.

7. Remove end plug (35, Figure J-2). Strip and remove shaft (28, Figure J-3).
8. Remove end cap (55, Figure J-2). Strip and remove shaft (78, Figure J-3).

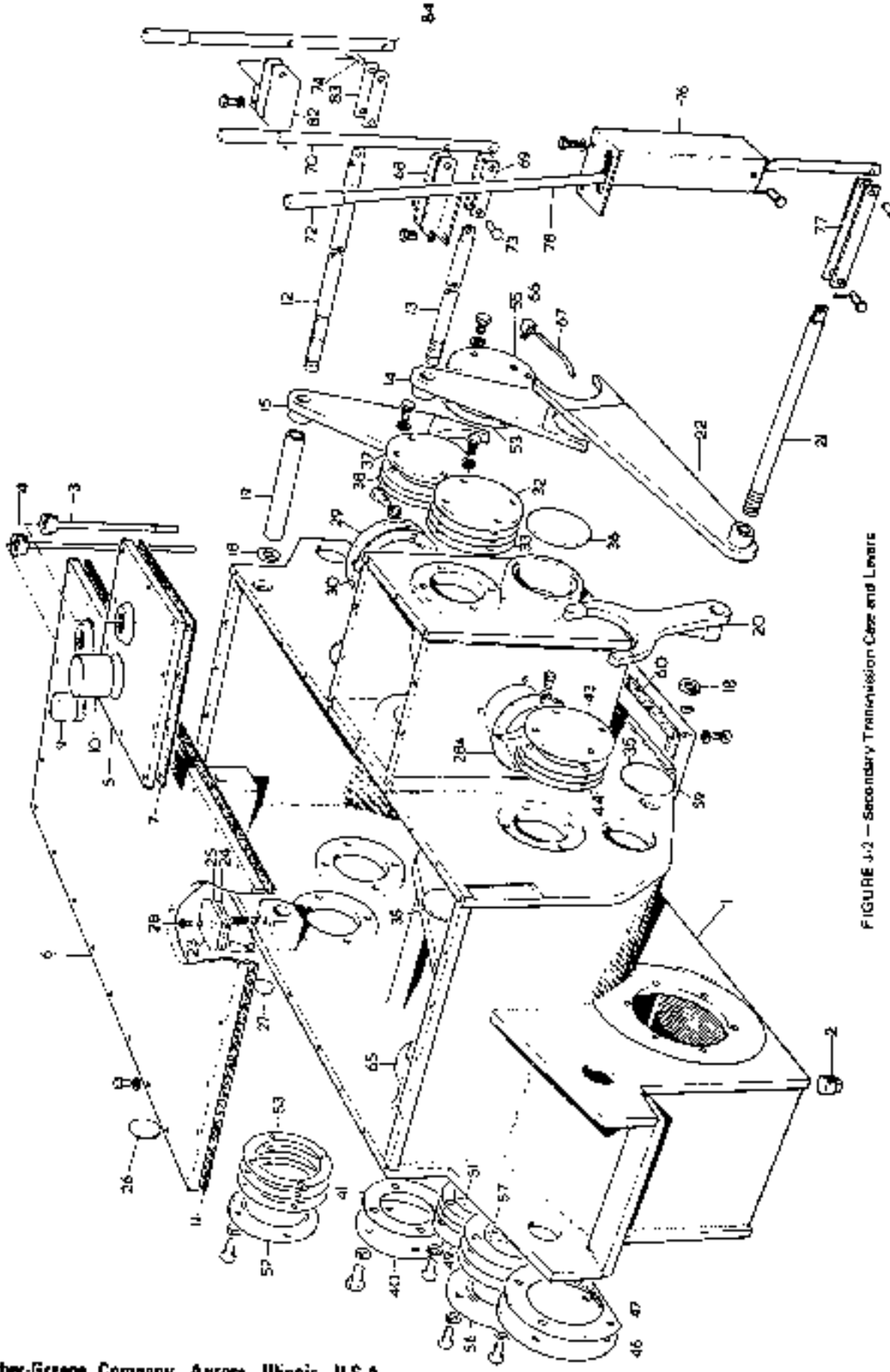


FIGURE J-2 — Secondary Transmission Case and Levers

Parts Book Page	Parts Ref. No.	OSM Item No.	Description	Parts Book Page	Parts Ref. No.	OSM Item No.	Description	Parts Book Page	Parts Ref. No.	OSM Item No.	Description
54	8	1	Housing	54		23	Cover	56	152	52	Bearing Retainer
54	9	2	Drain Plug	54		24	Shim	56	153	53	Shim
54	10	3	Dipstick	54	35	26	Exp. Plug	56	159	55	Bearing Retainer
54	11	4	Dipstick	54	36	27	Exp. Plug	57	267	56	End Cap
54		5	Cover	54	39	28A	Gasket	57	268	57	Shim
54	13	6	Cover	54	46	29	End Cap	58	311	59	Cover
54	14	7	Gasket	54		30	Gasket	58	312	60	Gasket
54	18	9	Breather	55	56	32	End Cap	57	232	65	Bearing Retainer
54	19	10	Breather	55	57	33	Shim	56	161	66	Elbow
54		11	Gasket	55	66	35	Exp. Plug	88	11	68	Bracket
54	21	12	Shifter Rod	55	73	36	Exp. Plug	88	12	69	Link
54		13	Shifter Rod	55	96	37	End Cap	88	13	70	Shift Lever
54	23	14	Shifter Fork	55	97	38	Shim	88	19	73	Pin
54	24	15	Shifter Fork	55	102	40	End Cap	88	20	74	Pin
54	25	16	Steel Ball	55	103	41	Gasket	88	27	76	Bracket
54	26	17	Spring	57	227	43	End Cap	88	28	77	Link
54	27	18	Oil Seal	57	228	44	Shim	88	29	78	Shift Lever
54	28	19	Pipe	57	296	46	End Cap	88	5	82	Bracket
54	29	20	Shifter Fork	57		47	Gasket	88	6	83	Link
54	30	21	Shifter Rod	57	253	49	End Cap	88	7	84	Shift Lever
54	31	22	Shifter Fork	57	256	51	Shim				

FIGURE J-2 – Secondary Transmission (Continued)

9. Remove end plug (36) and retainer plate (18, Figure J-3). Strip and remove shaft (13). Plug (36) will have to be replaced with a new plug.
10. Remove end cap (49, Figure J-2). Strip and remove shaft (88), Figure J-3).
11. Remove end cap (56, Figure J-2). Strip and remove splined shaft (93), Figure J-3).
12. Remove snap rings (107 and 108). Remove end cap (102) and splined shaft (101). See Figure J-3.
13. The no-spin differential is spring loaded and should be held assembled with a 1/4" bolt 7-3/4" long, 1- 1-7/8" OD washers and a wingnut.
14. Disassemble differential housing (118, Figure J-3).

NOTE: Match mark housing before disassembly.

D. CLEAN, INSPECT AND REPAIR

1. Clean all parts in cleaning solvent and dry thoroughly.
2. Inspect transmission case for cracks, breaks, or other damage. Repair or replace any damaged material as necessary.
3. Inspect all gears for cracks, breaks, and chipped, worn or damaged teeth. Replace a damaged or defective gear as necessary.
4. Inspect the bearings, check races for cracks, breaks, excessive wear or other damage. Replace a worn, damaged, or defective bearing as necessary.
5. Inspect all shafts for cracks, breaks, scoring, burrs, or signs of wear. Replace a worn, defective, or damaged shaft as necessary.
6. Inspect shifter rods, shifter forks, springs, and interlock balls, for cracks, distortion, excessive wear, weak spring tension and other damage. Replace damaged or defective parts as necessary.
7. Replace all gaskets, seals and inner races of needle bearings.

E. REASSEMBLY (SECONDARY TRANSMISSION)

1. Bolt no-spin differential housing to spur gear (118) with four bolts and place in gear case. See Figure J-3.
2. Install no-spin differential and bolt housing halves (118) together.

NOTE: Do not remove ¼" bolt holding differential assembly together until housing is bolted.

3. Install shaft (101), end caps (102), seals (109) and snap rings (107 and 108). Shim under end caps for .003 to .005 end play. See Figure J-3.
4. Place helical gear (95) and spur gear (94) in gear case and install splined shaft (93). Shims under end cap (56) for .003 to .005 shaft end play and install new cap (59).
5. Place helical gear (89) in case and install bearings and shaft (88). Shim under end cap (49) for .001 and .003 shaft end play.
6. Install needle bearing (41) in helical pinion shaft (13).
7. Install bearing (26) on helical pinion shaft (13) and place shaft in case with seal (24), helical gear (14), seal (20), See Figure J-3.

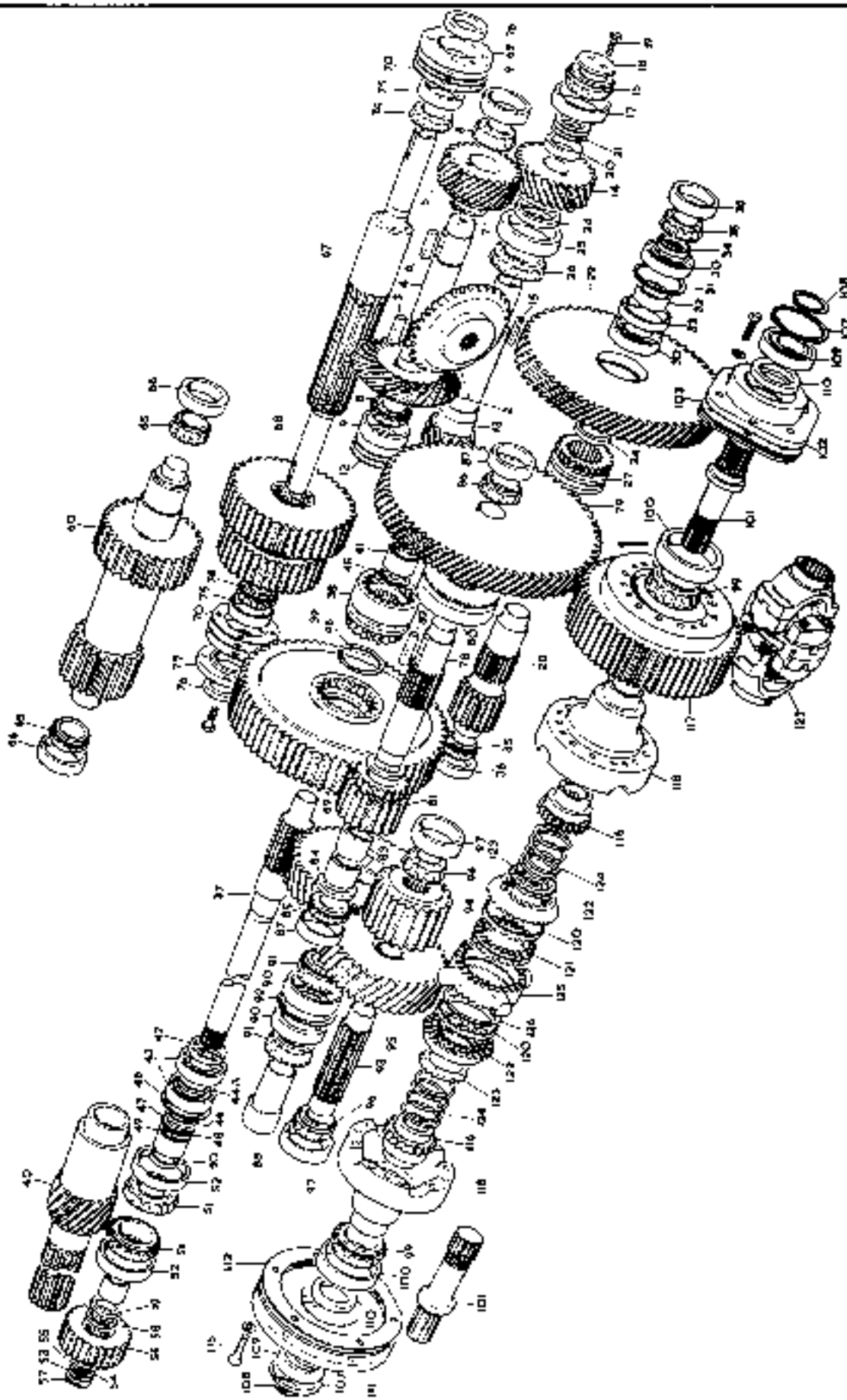


FIGURE J-3 — Secondary Transmission Gears and Shafts

Parts Book Page	Parts Ref. No.	OSM Item No.	Description	Parts Book Page	Parts Ref. No.	OSM Item No.	Description	Parts Book Page	Parts Ref. No.	OSM Item No.	Description
54	48	2	Bevel Gear Set	55	112	42	Spacer	57	225	86	Cone & Roller
54	49	3	Key	55	113	43	Ball Bearing	57	226	87	Cup
54	52	4	Shaft	56	115	44	Spacer	57	248	88	Shaft
54	53	5	Helical Gear	56	114	44A	Spacer	57	249	89	Helical Gear
54	54	6	Key	56	123	45	Retaining Ring	57	250	90	Cup
54	55	7	Retaining Ring	56	116	46	Retaining Ring	57	251	91	Cone & Roller
55	60	8	Cone & Roller	56	117	47	Thrust Race	57	252	92	Retaining Ring
55	61	9	Cup	56	118	48	Thrust Bearing	57	261	93	Splined Shaft
55	69	10	Shim	56	119	49	Roller Bearing	57	262	94	Spur Gear
55	70	13	Helical Pinion Shaft	56	120	50	Oil Seal	57	263	95	Helical Gear
55	71	14	Helical Gear	56	121	51	Cone & Roller	57	264	96	Cone & Roller
55	72	15	Key	56	122	52	Cup	57	265	97	Cup
55	74	16	Cone & Roller	56		53	Shim	57	280	99	Cone & Roller
55	75	17	Cup	56	140	56	Hub	57	281	100	Cup
55	76	18	End Cap	56	143	57	Retaining Ring	57	282	101	Splined Shaft
55	77	19	Capscrew	56	144	58	Thrust Race	57	284	102	Bearing Retainer
55	78	20	Spacer	56	151	60	Spur Pinion Shaft	57	285	103	Shim
55	79	21	Shim	56	157	65	Cone & Rollers	58	289	107	Retaining Ring
55	82	24	Oil Seal	56	158	66	Cup	58	290	108	Retaining Ring
55	83	25	Cup	56	203	67	Splined Shaft	58	291	109	Ball Bearing
55	84	26	Cone & Roller	56	204	68	Gear Cluster	58	292	110	Oil Seal
55	87	27	Gear Clutch	56	213	69	Seal Retainer	58	293	111	Bearing Retainer
55	88	28	Pinion Shaft	56	206	70	Shim	58	294	112	Shim
55	89	29	Helical Gear	56	210	74	Cone & Roller	62	6	116	Side Gear
55	90	30	Bearing	56	211	75	Cup	57	278	117	Spur Gear
55	91	31	Retaining Ring	56	212	76	Oil Seal	57	276	118	Diff. Case
55	92	32	Spacer	56	213	77	Seal Retainer	56	141	119	Needle Bearing
55	93	33	Spacer	56	217	78	Splined Shaft	62	7	120	Holdout Ring
55	94	34	Spacer	56	218	79	Helical Gear	62	3	121	Center Cam
55	100	35	Cone & Roller	56	219	80	Gear Clutch	62	8	122	Cam & Clutch
55	101	36	Cup	57	220	81	Spur Gear	62	4	123	Spring Retainer
55	107	37	Splined Shaft	57	221	82	Key	62	5	124	Spring
55	108	38	Gear Clutch	57	222	83	Needle Bearing	62	2	125	Spider
55	109	39	Spur Gear	57		84	Thrust Race	62	1	126	Snap Ring
55	110	40	Helical Gear	57	224	85	Cone & Roller	87		127	Universal Joint
55	111	41	Roller Bearing								

FIGURE J-3 — Secondary Transmission Gears and Shafts (Continued)

shims, bearings (16) and retainer plate (18). Shim to .003 to .005 end play and install new plug (36, Figure J-2).

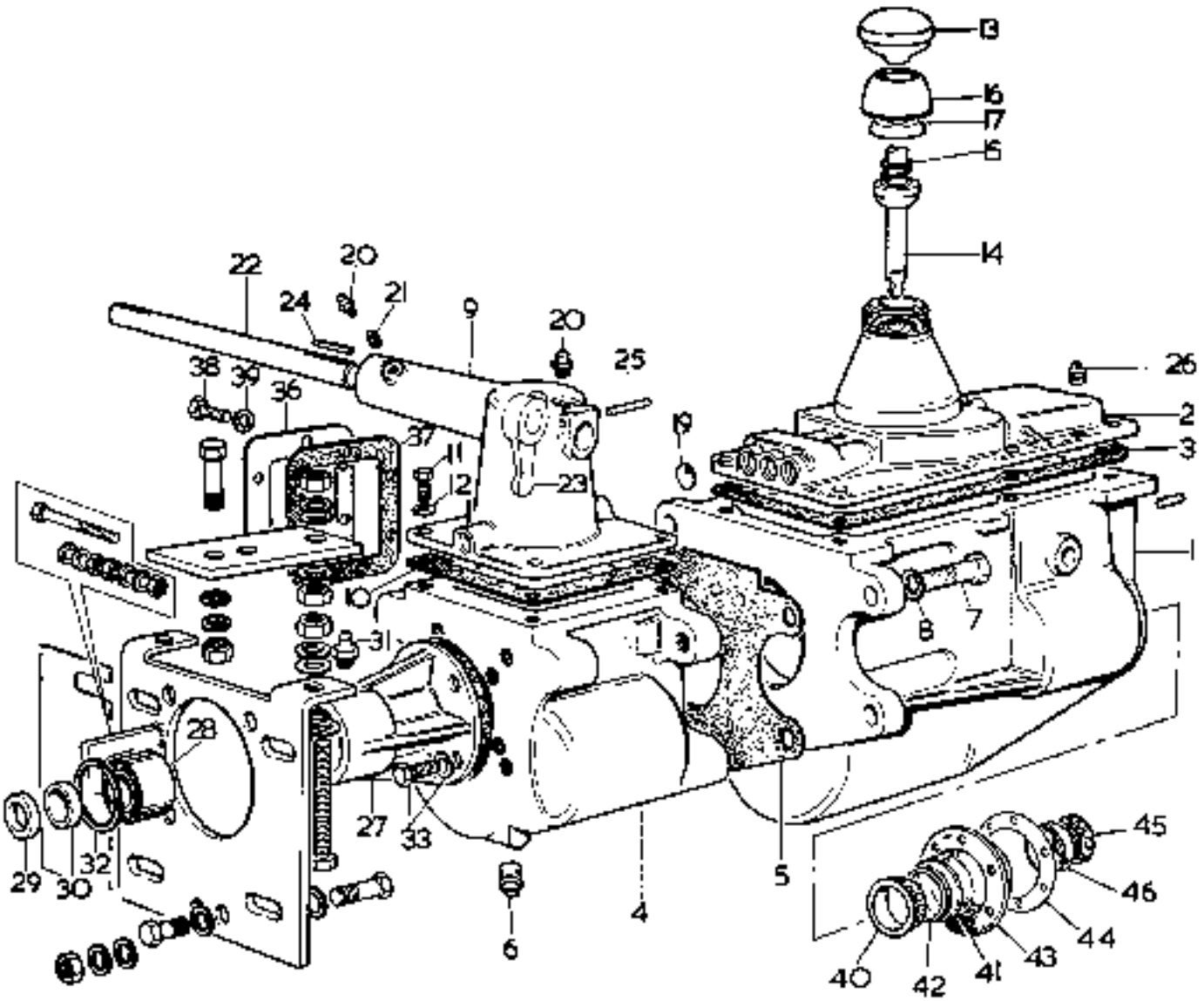
8. Install needle bearing (83) in spur gear (81) and place on shaft (78).
9. Place helical gear (79) in case and install gear clutch (80) and shaft (78). Shim under end cap (37, Figure J-2) for .003 to .005 shaft end play.
10. Install snap ring (31), spacers (32 and 33), and bearings (30) in helical gear (29). See Figure J-3.
11. Install gear clutch (27), pinion shaft (28) in case and install bearings (35). Shim under end cap (55) for .003 to .005 shaft end play.
12. Install shifter forks (20 and 22) and rod (21, Figure J-2)

CAUTION: If shifter ball is dropped in case, it must be removed or severe damage will result.

13. Install 4-speed transmission.

NOTE: 7 o'clock bolt is omitted to provide lubrication level in both boxes.

14. Install bearing (45), Fig. J-4 shims (44) and adapter (43) with bearing cones (41 and 46) installed. See Figure J-4
15. Install bearing spacer (42), bearing (40), bevel pinion (2) and secure with nut (46). Refer to Figure J-5)



Parts Book Page	Part Ref. No.	OSM Item No.	Description
147	42	1	Trans. Case
148	95	2	Cntrl. Housing
148	109	3	Housing Gasket
146	1	4	Rev. Housing
146	3	5	Housing Gasket
146	2	6	Pipe Plug
146	3	7	Bolt
146	3	8	Lockwasher
64	14	9	Cntrl. Housing
147	32	10	Housing Gasket
147	33	11	Bolt
147	34	12	Lockwasher
64		14	Gear Lever
148	114	15	Lever Spring
148	112	16	Housing Cap
148	113	17	Spring Washer
148		18	Fulcrum Ball
148	96	19	Exp. Plug
64	15	20	Lub. Plug
64	16	21	Air Vent
64	17	22	Shifter Shaft
64	19	23	Shift Lever
64	20	24	Key
64	18	25	Roll Pin
64	20	26	Plug
64	6	27	Brng. Retainer
64	7	28	Brng. Ring & Roller
64	9	29	Spacer
64	8	30	Brng. Inner Ring
64	10	31	Vent. Fitting
64	11	32	Ret. Ring
64	60	33	Capscrew
147	46	36	Cover
147	47	37	Cover Gasket
147	48	38	Bolt
147	49	39	Lockwasher
64	92	40	Bearing
64	93	41	Cup
64	97	42	Spacer
64	91	43	Brng. Retainer
64	94	44	Shims
64	98	45	Bearing
64	99	46	Cup

FIGURE J-4 — Forward Reverse and 4-Speed Box

NOTE. Shim between spacer (42) and bearing (40) until there is no appreciable bearing end play. Shim under adapter (43) until there is no appreciable shaft end play.

16. Place helical gear (5) in case and insert shaft (4) part way in gear. Place snap ring (7) on shaft. See Figure J-3
17. Place bearing and bevel gear (2), part of set, and drive shaft (4) into position. Set snap ring (7) in groove and install bearing (8), cone (9) and bearing end cap (32, Figure J-2).

NOTE: Set bevel gear back-lash of .006 to .010 with shims (10, 11 and 12) under bearing cone. Adjust preload of 5-10 lbs. with shims under end cap (32). See Figure J-3.
To adjust preload, set shims until there is no end play, then, remove .003 to .005 shims.

18. Install inner snap ring (46) in spur gear (39) and place gear in case. See Figure J-3.
19. Place spacer (42), bearings (43), spacer (44A) on shaft (37) and install shaft through spur gear (39) and gear clutch (38). See Figure J-3.
20. Install outer snap ring (46) in spur gear (39) and install spacer (44) and needle thrust bearing and race (47 and 48). See Figure J-3.
21. Place needle bearing (49) on shaft (37). Put seal (50) in helical gear (40) and install gear on shaft. See Fig. J-3.
22. Install outer bearing and cone (51 and 52). See Fig. J-3.
23. Install traction clutch assembly. For adjustment of the traction clutch, (Refer to Traction Clutch Adjustment, Section G.)

FORWARD REVERSE & 4–SPEED BOX

A. DISASSEMBLY (Refer to Figure J-4)

1. Place control lever in neutral position and remove capscrews holding transmission cover (2).
2. Remove control housing cap (16) and lift out the control lever assembly.
3. Cut all lockwires and remove the shifter fork lock screws. (See Fig. J-5)
4. Drive center shift rail (7, Figure J-5) toward rear of cover driving out expansion plug. (19, Fig. J-4).
5. Cover poppet spring and ball hole before removing the shift rail to avoid losing ball and spring (11 & 12) which are held in place under tension. Continue this operation removing the balance of shift forks, rails, etc.
6. Remove control tower (9, Figure J-4) and bearing retainer (27).

NOTE: Place oil return hole in retainer toward bottom when reassembling.

7. Reverse shifting fork (3, Figure J-5) must be removed before proceeding with the disassembly
8. Pull main drive gear (17) out through front of case until gear contacts countershaft cluster and remove snap ring (13, Figure J-5).
9. Apply suitable puller and remove main drive gear bearing (14), Figure J-5.
10. Remove bolts attaching reverse housing (4), Figure J-4 and separate the mainshaft (45, Figure J-5) assembly from the main drive gear assembly and lift out through top of case.

NOTE: The mainshaft pilot bearings (34) consist of 16 loose rollers. Some of the rollers will probably fall into the case and can be retrieved by turning the case over. Pilot bearing rollers are slightly larger in diameter than the countershaft roller bearings (58). Note position of the oil baffle (25) on the shaft with the dish side toward gear. See Figure J-5.

11. Remove 3rd and 4th speed synchronizer unit retaining snap ring (26, Figure J-5).

CAUTION- When reassembling be sure synchronizer unit (33) is assembled with the chamferred hub toward the front or toward snap ring (26, Figure J-5).

12. Slide the 3rd and 4th speed synchronizer unit (33), blocking ring and 3rd speed bushed gear (30) from the mainshaft. See Figure J-5
13. Remove 1st and 2nd speed synchronizer unit (41) retaining snap ring (35). When reassembling the synchronizer unit to the mainshaft, the shift fork groove in the sleeve must be placed towards the rear. See Figure J-5.
14. Press the 1st and 2nd speed synchronizer unit, blocking ring (40), and 2nd speed gear (37), from the mainshaft (45). See Figure J-5.
15. Remove snap rings (35), releasing thrust washer (36).
16. To disassemble the 3rd and 4th speed synchronizer unit remove springs (28), located one on each side. Support the hub and remove the sleeve releasing the three shifting plates (29).
17. To disassemble the 1st and 2nd speed synchronizer unit support the hub (44) on a block, wrap a cloth around the unit, and press on the sleeve. The cloth is used to avoid losing poppet springs (11) and balls (12) which are held in place under tension.
18. Remove countershaft (63), reverse idler shaft (47) and lock plate (54). See Figure J-5.
19. Using a brass drift, drive the countershaft (63) free of the transmission case, driving from the front of the countershaft. Opposite end with lock plate.
20. With the countershaft removed, lift the countershaft gear out of the transmission case. Be sure to pick up

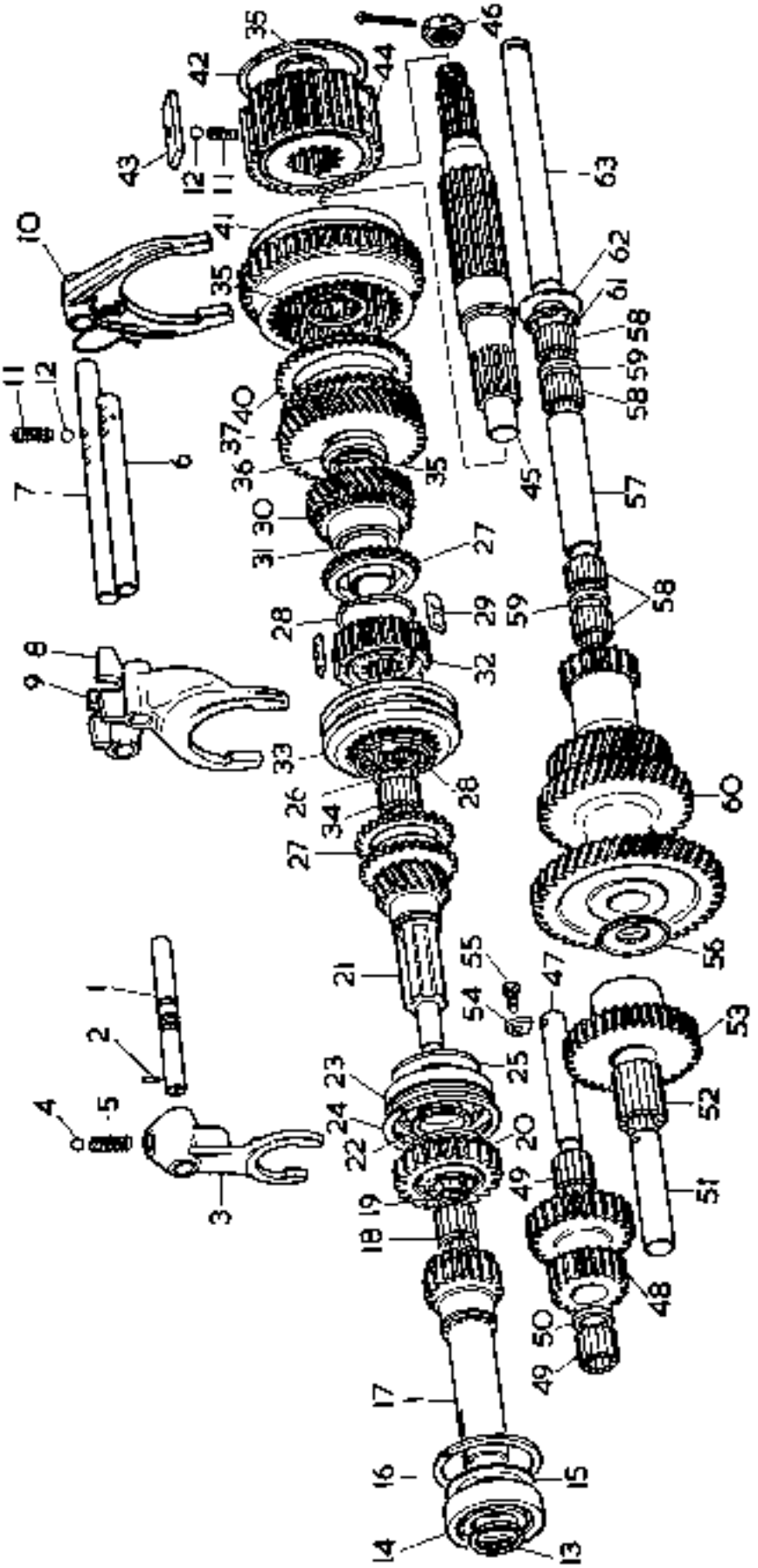


FIGURE J-8 – Forward Reverse 4 - Speed Box (Warner)

Parts Book Page	Part Ref.	OSM Item No.	Description	Parts Book Page	Part Ref.	OSM Item No.	Description	Parts Book Page	Parts Ref. No.	OSM Item No.	Description
146	26	1	Shift Rail	148	89	22	Snap Ring	147	64	44	Clutch Hub
57	63	2	Pin	148	–	23	Bearing	147	52	45	Main Shaft
147	28	3	Shift Fork	148	–	24	Snap Ring	147	75	46	Shaft Nut
147	30	4	Ball	148	89	25	Oil Baffle	147	84	47	Idler Shaft
147	29	5	Spring	147	59	26	Snap Ring	146	7	48	Idler Gear
148	98	6	Shift Rail	147	58	27	Blocking Ring	146	8	49	Bearing
148	99	7	Shift Rail	147	56	28	Spring	146	9	50	Spacer
148	100	8	Shift Fork	147	55	29	Shift Plate	146	11	51	Countershaft
148	102	9	Shift Rail End	147	57	30	Gear	146	5	52	Bearing
148	101	10	Shift Fork	–	–	31	Gear Bushing	146	4	53	Countershaft Gear
148	103	11	Spring	147	53	32	Clutch Hub	146	13	54	Lock Plate
148	108	12	Ball	147	54	33	Clutch Sleeve	146	15	55	Bolt
146	19	13	Snap Ring	148	91	34	Bearing	147	78	56	Thrust Washer
146	18	14	Bearing	147	61	35	Snap Ring	147	77	57	Spacer
146	20	15	Oil Fling	147	60	36	Thrust Washer	147	82	58	Bearing
146	21	16	Snap Ring	147	62	37	Gear	147	81	59	Spacer
146	17	17	Drive Gear	147	69	40	Blocking Ring	147	76	60	Gear
146	22	18	Roller Bearing	147	63	41	Gear	147	79	61	Thrust Washer
146	23	19	Spacer Ring	147	67	42	Ret. Ring	147	80	62	Thrust Washer
146	14	20	Reverse Gear	147	65	43	Shift Plate	147	84	63	Countershaft
148	86	21	Drive Gear								

FIGURE J-5 – Forward Reverse & 4-Speed Box (Warner) (Continued)

bronze thrust washer (56) at front end and steel spacer (61) and thrust washer (62) at rear end from bottom of case.

NOTE: The countershaft gear (60) turns on four sets of roller bearings (58) which are loose in the bore of the gear. There are 22 rollers in each set, totaling 88 bearings. If these rollers should intermingle with the pilot bearing rollers during disassembly remember that the countershaft rollers are slightly smaller than the pilot bearing rollers.

21. Drive the reverse idler gear shaft (47) from the case, using a brass drift and driving from inside the transmission case.
22. Remove needle bearings (49) and spacer (50) from the reverse idler shaft (47).

B. CLEAN, INSPECT AND REPAIR

1. Clean all parts in cleaning solvent and dry thoroughly.
2. Inspect transmission case for cracks, breaks, or other damage. Repair or replace a damaged or defective case as necessary.
3. Inspect all gears for cracks, breaks and chipped, worn or damaged teeth. Replace a damaged or defective gear as necessary.
4. Inspect the bearings, check races for cracks, breaks, excessive wear or other damage. Replace a worn, damaged, or defective bearing as necessary.
5. Inspect all shafts for cracks, breaks, scoring, burrs, or signs of wear. Replace a worn, defective or damaged shaft as necessary.
6. Inspect shifter rods, shifter forks, springs, and interlock balls, for cracks, breaks, distortion, excessive wear, weak spring tension, or other damage. Replace damaged or defective parts as necessary.
7. Replace all gaskets and seals.

C. TRANSMISSION REASSEMBLY

1. Place a special bearing pilot shaft, made of 1-1/8" rod 9-1/2" long, and spacer sleeve (57) in the countershaft gear (60). Large gear end.
2. Allow the pilot shaft to extend out of the gear and insert 22 rollers (58).

NOTE: Dip rollers in transmission lubricant.

3. Next, place one spacer washer (59) over the pilot shaft, and push the shaft and first row of rollers into gear bore far enough to permit insertion of the second row of rollers.
4. Insert second row of rollers.
5. Place outer spacer washer on pilot shaft and push pilot into gear bore flush with end of gear hub.
6. Insert first row of bearing rollers (58) in small end of countershaft gear. Do not push rollers too far into gear.

but let the spacer washer (59) align the rollers and push them deeper into the gear. Install the spacer washer, then insert the second row of rollers.

7. Place the remaining spacer washer on the end of the pilot shaft; then, holding the assembly at each end, press the outer spacer washers to seat all the rollers, spacer sleeve, and spacer washers.
8. Spread a small amount of wheel bearing grease on the bearing spacers washers at each end of pilot shaft. Place thrust washer (61) into position on small end of gear. The grease will help hold the assembly together while installing in the transmission case.
9. Position countershaft forward thrust washer (56) and rear steel spacer washer (62) in transmission case. A small amount of wheel bearing grease will help hold the washer in place while installing the countershaft assembly.
10. Place countershaft gear assembly (60) in case. Start countershaft (63) at rear bore. Push countershaft against the pilot, keep ends of countershaft and pilot in contact while installing countershaft. Let countershaft push pilot shaft out of case.
11. Follow the same procedure as outlined for countershaft bearing reassembly when reassembling idler gear bearings (49) in idler gear (48). Pilot shaft is not required.
12. Place snap ring (35), thrust washer (36) in position on main shaft (45). Slide the second speed gear (37) on the shaft sufficiently to hold the roller bearings in place. Remove the rubber band and complete the reassembly.
13. The mainshaft pilot bearing consists of 16 individual rollers (34). Hold rollers in position on end of the mainshaft (45) by means of a rubber band. Start the mainshaft (45) and main drive gear assemblies together sufficiently to hold rollers in place. Remove rubber band and complete assembly.
14. Assemble 3rd and 4th speed synchronizer by first aligning marks etched on hub (32) and sleeve (33).
15. Place the three shifting plates (29) in position and install retaining springs (28). When reassembling on the main shaft be sure to place chamfered hub toward the front.
16. To reassemble 1st and 2nd speed synchronizer, align marks etched on hub (46) and sleeve (41).
17. Place shifting plate (43), poppet spring (11) and ball (12) in position. Compress the poppet spring and press on the shifting plate until the poppet ball is held in position by the sleeve. Repeat this operation until the three shifting plates, poppet spring and balls are started into the sleeve. Then press down on hub and lift up on sleeve to complete assembly.
18. To complete the reassembly, reverse the above procedure described for disassembly.

TRACTION CLUTCH AND BRAKE ASSEMBLY

A. CLUTCH REMOVAL (Refer to Figure J-6)

1. Remove retaining ring (57, Figure J-3) and shims from end of shaft and pull off splined hub (56) and thrust bearing (58, Figure J-3).
2. Remove retaining ring (30, Figure J-6) and remove clutch assembly from shaft.

B. CLUTCH DISASSEMBLY (Refer to Figure J-6)

1. Disassemble clutch assembly as follows.

CAUTION. Before removing cap screws (1) to dismantle the clutch assembly a suitable clamping device should be devised to hold the cover (3) and spring housing (12) together since they are under tension of springs (8). If this precaution is not taken when removing the cap screws, the springs are apt to jump out and possible injury to personnel could result.

a. Secure clutch assembly to prevent springs from separating clutch when capscrews are removed.
b. Remove capscrews (1) and remove cover and middle disc assembly (4A).
c. Dismantle clutch removing power plate (6), spring seats (7) springs (8), inserts (10), ball (11) and clutch release bearing (9).

C. CLEAN, INSPECT AND REPAIR

1. Clean all parts in cleaning solvent and dry thoroughly.
2. Inspect release bearing for cracks, breaks and excessive wear. Replace a defective bearing.
3. Inspect springs, and spring seats for cracks, breaks, distortion, weak spring tension or other damage. Replace damaged or defective parts as necessary.
4. Inspect balls for cracks, breaks, and other signs of wear. Replace a damaged or defective ball.
5. Inspect power plate and middle disc assembly for general condition and replace defective parts as necessary.

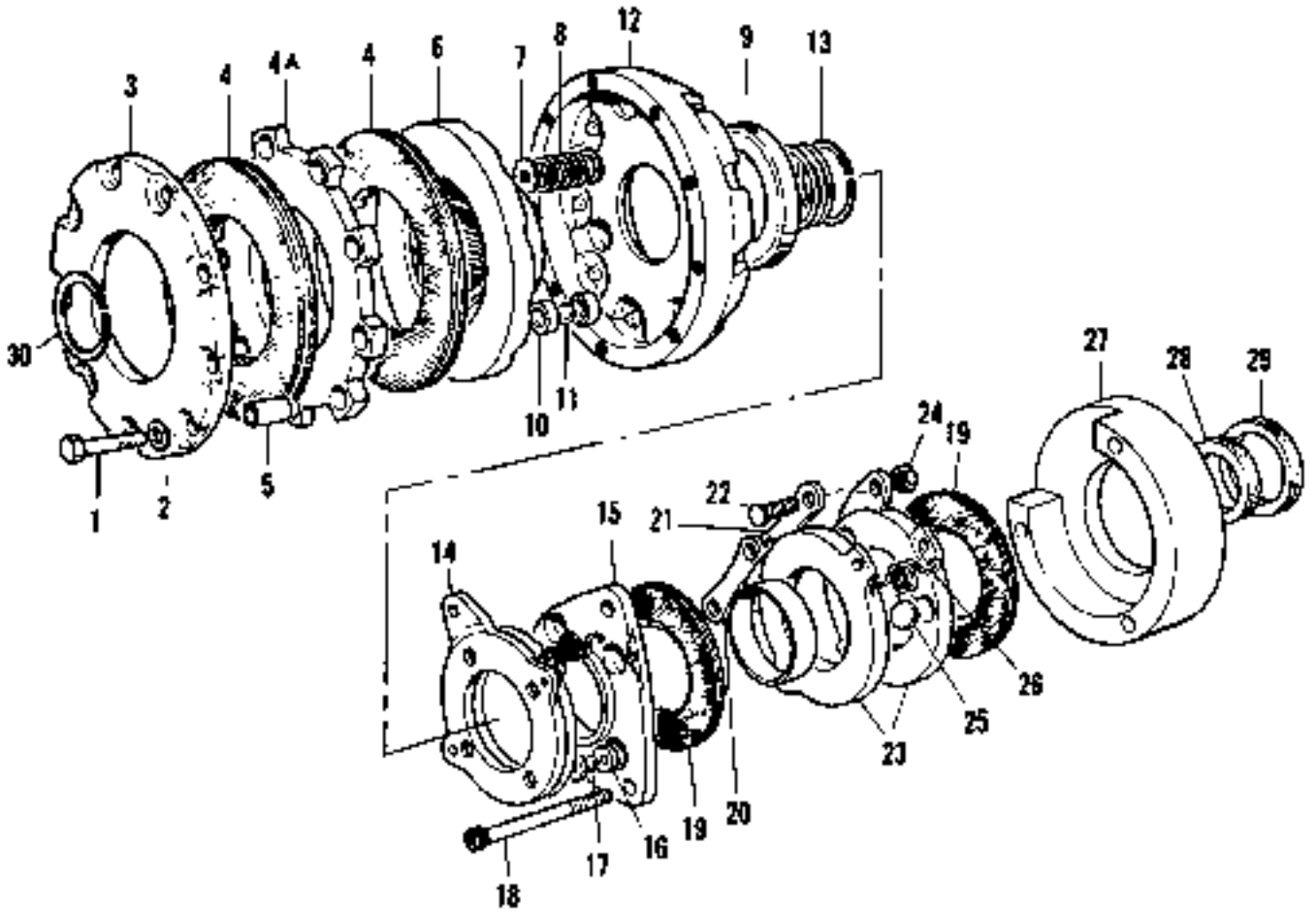
D. REASSEMBLY

1. Reassemble clutch assembly in reverse order of steps (a), (b) and (c) above, using a press or similar device to compress springs to install capscrews securing cover. Balls and inserts, spring and spring seats may be held in alignment with lead wire. Remove all lead wire possible after assembly.
2. Reassemble components on shaft in reverse order of (a) Disassembly, as shown in Figure J-6.

E. CLUTCH LINING REPLACEMENT (Refer to Figure J-6)

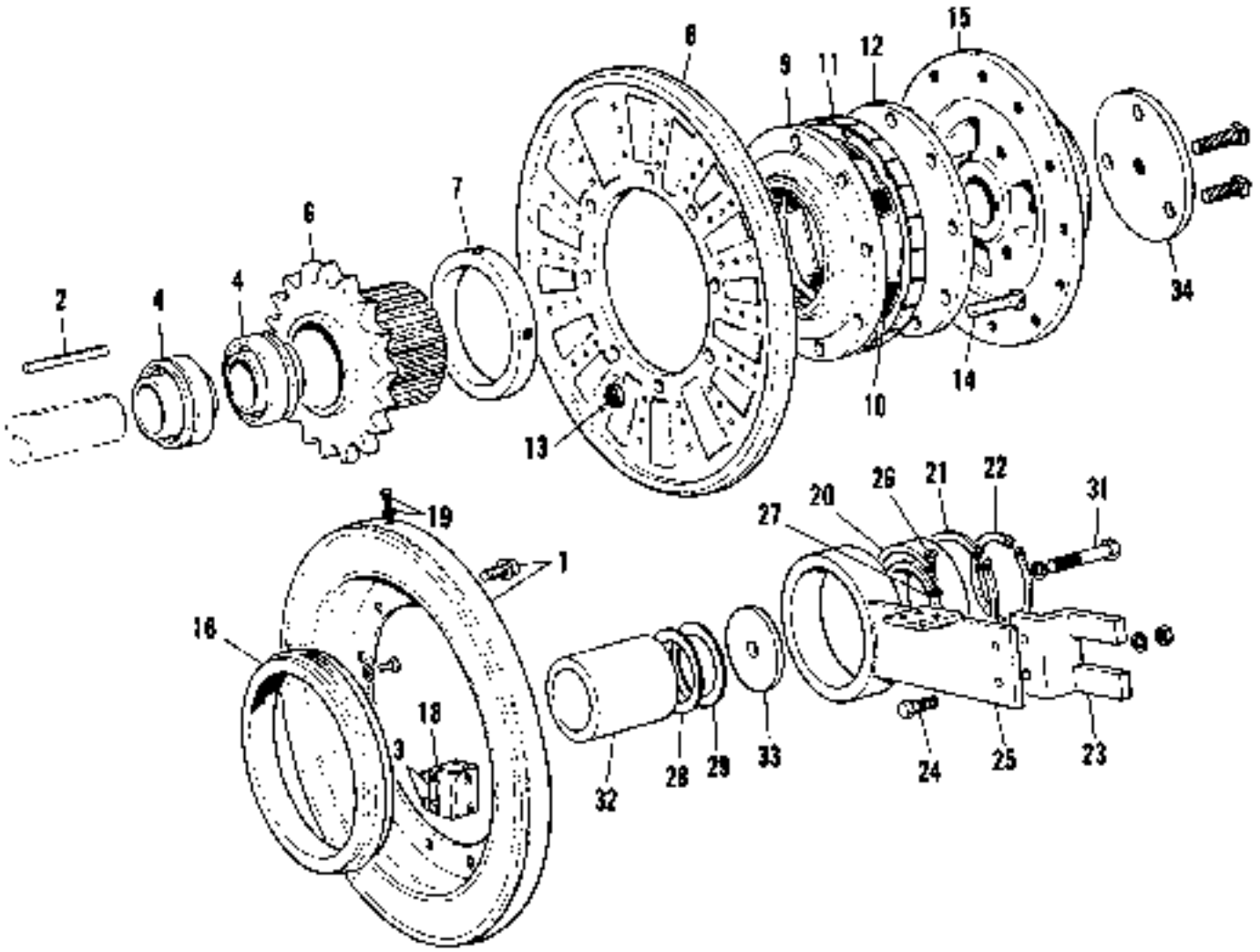
Clutch linings may be replaced without removing clutch assembly from its mounting.

1. Remove capscrews (1) and remove cover (3).
2. Remove spacer (5), middle disc assembly (4), and intermediate disc (4A).
3. Install new, middle and blank discs as required, reversing above sequence for reassembly.
4. Readjust clutch as described in adjustment Section C.



Parts Book Page	Part Ref. No.	OSM Item No.	Description	Parts Book Page	Part Ref. No.	OSM Item No.	Description
61	1	1	Hex. Bolt	138	3	16	Insert
61	2	2	Lockwasher	138	4	17	Ball
61	3	3	Cover	56	130	18	Screw
61	4	4	Middle Disc Assembly	59	2	19	Middle Disc Assembly
61	7	5	Spacer	59	3	20	Yoke Link
61	8	6	Power Plate	59	4	21	Plain Link
61	9	7	Spring Seat	59	5	22	Stud
61	10	8	Spring	59	7	23	Actuating Disc Assembly
61	11	9	Clutch Release Bearing	59	6	24	Nut
61	12	10	Insert	59	8	25	Ball
61	13	11	Ball	59	9	26	Spring
61	14	12	Spring Housing	56	126	27	Housing
56	139	13	Retainer	56	131	28	Oil Seal
138	2	14	Release Plate	56	132	29	Oil Seal
138	1	15	Backing Plate	56	140	30	Retainer Ring

FIGURE J-6 – Traction Clutch



Parts Book Page	Parts Ref. No.	OSM Item No.	Description
76	9	1	Clutch Magnet
74	10	2	Key
76	22	3	Brushes
74	17	4	Bearing
74	20	6	Sprocket Hub
74	16	7	Collar
76	2	8	Armature
76	3	9	Splined Adaptor
76	4	10	Spring
76	4	11	Retaining Ring
76	7	12	Retainer Plate
76	6	13	Locknut
76	5	14	Button Head Screw
74	22	15	Clutch Hub
76	13	16	Collector Ring
76	15	18	Brush Holder

Parts Book Page	Parts Ref. No.	OSM Item No.	Description
76	8	19	Mounting Accessory
74	5	20	Bearing
74	7	21	Retainer Ring
74	6	22	Retainer Ring
74		23	Mounting Plate
74	13	24	Hex. Hd. Capscrew
74	19	25	Brush Holder
74	24	26	Rd. Hd. Screw
74	24	27	Lockwasher
74	27	28	Shim
74	28	29	Shim
74	30	31	Hex. Hd. Capscrew
74	26	32	Spacer
74	29	33	Cap
103		34	Wheel Puller

FIGURE J-7 – Feeder Electric Clutch

F. BRAKE REMOVAL (Refer to Figure J-6)

1. Remove clutch assembly as described previously.
2. Disconnect clutch and brake control from clutch and brake control plate (14).
3. Remove retaining ring (13), socket head setscrews (18), and remove clutch release assembly (15).
4. Remove brake assembly (23) and brake housing (27).

G. DISASSEMBLY

1. Disassemble brake assembly by removing jam nut (24) and extension spring (26).
2. Separate middle disc assembly parts (19) and actuating disc assembly parts.

H. CLEAN, INSPECT AND REPAIR

1. Clean all parts in cleaning solvent and dry thoroughly.
2. Inspect release bearing for cracks, breaks, and excessive wear. Replace a defective bearing.
3. Inspect springs, spring seats, and hardware for cracks, breaks, distortion, weak spring tension or other damage. Replace damaged or defective parts as necessary.
4. Inspect balls for cracks, breaks, and signs of wear. Replace a damaged or defective ball.
5. Inspect power plate, middle disc assembly, and actuating disc assembly for general condition. Replace damaged or defective parts as necessary.

I. REASSEMBLY

1. Reassemble brake assembly in reverse order of disassembly procedure above.
2. Reassemble crawler drive clutch in same manner as described previously.

J. INSTALLATION

1. Install brake housing (27) and brake assembly (23) as shown in figure J-6.
2. Install clutch release assembly (15) and secure with setscrews (18) and retaining ring (13).
3. Connect clutch and brake control to control plate (14).
4. Install clutch assembly and secure with retaining ring (30).
5. Adjust clutch and brake for proper operation as described in adjustment Section G.

FEEDER ELECTRIC CLUTCH (Refer to Figure J-7)

When a Warner Electric Clutch is properly assembled and installed, no further servicing, lubrication or maintenance should be required, throughout the life of the unit. As with any friction-type device, some initial care should be given to wear rate, as minor adjustments in actuation time can sometimes greatly extend the life of the unit.

A normal operating clutch should actuate approximately 6 to 8 times per minute. Refer to "Set Automatic Feeder Control Paddles", Section E.

If the feeder clutch does not operate properly, check the following:

A. TORQUE LOSS

If a clutch slips or loses torque completely, the initial check should be the input voltage to the magnet as follows:

1. Connect a DC voltmeter with a range of 0-15V, or more, directly across the magnet terminal. With the power on a normal reading is 12 volts, although 11.7 to 13 is satisfactory.
   If no voltage is indicated, refer to Electrical Trouble Shooting, Section G.
2. Ohmmeter checks should be made with the power off and the circuit open (to be certain, disconnect one lead to the magnet). Average resistance for the magnet should be 1.4 ohms.
   A very high or infinite resistance reading would indicate an open coil.
   The above checks are normally sufficient.
3. Further checks may be made as follows: A low range ammeter, when connected in series with one magnet lead, will normally indicate approximately 8 amps. These readings are with the power on.
   If any two of the above checks indicate the proper voltage and current is being supplied to the magnet, mechanical parts should be checked to assure that they are in good operating condition and properly installed.

B. MECHANICAL CHECK

1. A normal running clearance is 1/16" between the magnet and armature. To adjust for this clearance, loosen adjusting collar (7, Figure J-7) move armature closer to magnet and lock collar in new position.
2. Wear grooves appear on the armature and magnet surfaces. This is a normal wear condition, and does not impair functioning of the unit. Never machine either the armature or magnet contact surfaces to remove grooves or score marks resulting from wear.
   Remachining the face of a worn armature is not recommended. If a replacement armature is to be used with a used magnet, it is necessary to remachine the worn magnet face. In refacing a magnet: (1) machine only enough material to clean up the complete face of the magnet; (2) hold the face with .005" of parallel with the mounting plate. Normally the magnet and armature, as a mating pair, will wear at the same rate.
   It is the usual recommendation that both components be replaced at the same time.
   The magnet coil has ¼" wear surface, will not have to be changed until the armature touches the sand material of the coil. Refer to Figure J-8.
   The wear rate may be checked by measuring the coil length 1-3/4".
   The combined width of new clutch is 2-13/32". Measurement is with magnet and armature together and measured from back side of magnet mounting flange to back side of armature at top of impression.
3. Loss of torque may be caused by oil or grease accidently reaching the friction surfaces. They may be removed by wiping with a rag dampened with trichlorethylene.

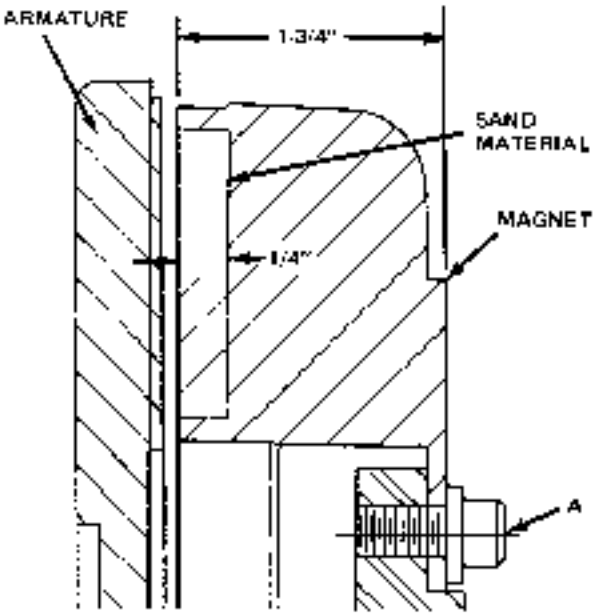


FIGURE J-8 – Magnet Wear

C. TO REMOVE MAGNET FOR CHECK AND CLEANING: (Refer to Figure J-8).

1. Remove brush holder assembly.
2. Remove sprocket head setscrews (A).
3. Pull magnet assembly off.

D. FEEDER CLUTCH REMOVAL (Refer to Figure J-7)

1. Remove deck plates over electric feeder clutches to provide access to transmission and drives.
2. Disconnect feeder drive chain.
3. Remove retaining ring (22) and pull brush holder assembly (25) and bearing (20).
4. Remove bolt (31), plate (33), shims (28 & 29) and spacer (32).
5. With wheel puller (34), pull clutch hub (15) from feeder shaft.
6. Pull armature assembly (Items 8 thru 12) from splined hub sprocket (6).
7. Pull splined hub sprocket (6) and bearing (4) from feeder shaft.

E. SPROCKET AND ARMATURE SUB-ASSEMBLY (Refer to Figure J-7)

1. Remove the set screws from bearing (4).
2. Apply never-seez to the outside of bearing and the inside of the splined hub (6).
3. Drive the outside bearing (nearest the sprocket) into the splined hub using a cylindrical driving tool and a hammer or press. The tool should drive against the outer ring of the bearing. Do *NOT* drive against the inner ring of the bearings or the bearings may be damaged.
4. Turn the splined hub (6) over and support under the sprocket. Do *NOT* rest on the inner ring of the outside bearing.
5. Do not put the inner bearing in at this time.
6. Slip the collar (7) over the splines.
7. Place splined hub sprocket (6) on flat surface. Take the Armature assembly (8 thru 12) and press splined hub through the splined armature adapter (9) and the Auto-Gap spring.

NOTE: Do not strike or drop the assembly on a bench or floor in an attempt to force the Auto-Gap over the splines.

NOTE: Do not hammer or press on the periphery of the armature as this may bend the back plate.

NOTE: Do not grind chamfer on splined hub (6) or apply Never-seez to the splines.

F. MACHINE ASSEMBLY

1. Slide the sprocket and armature sub-assembly and the retaining bearing (4) on the shaft.
2. Wedge blocks behind the sprocket to support in when the remaining bearing is driven into the splined hub. The supports should be large enough so that the inner ring of the bearing near the sprocket is not butted against anything on the shaft. The set screws should *not* be seated.
3. Drive the bearing into the splined hub (6) using a driving tool.
4. Remove the supports, locate the sprocket, and tighten the set screw.
5. Put the key in the shaft and slide the magnet and clutch hub sub-assembly onto the shaft as far as it will go. Tighten the set screws in the hub.
6. Position the collar (7) so that there is a 1/32" gap between the magnet and the armature and also between the armature and the collar.

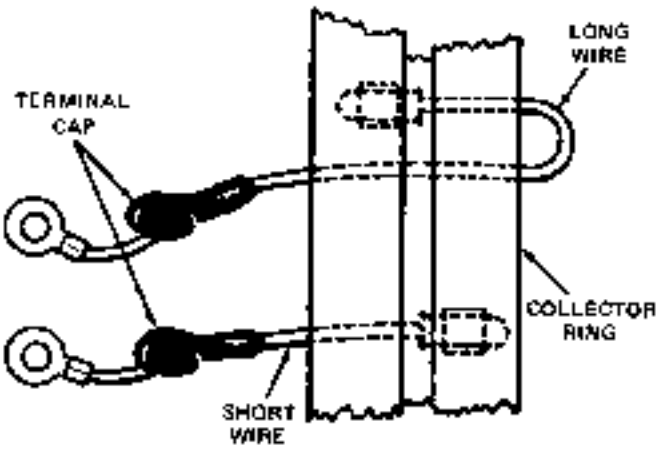
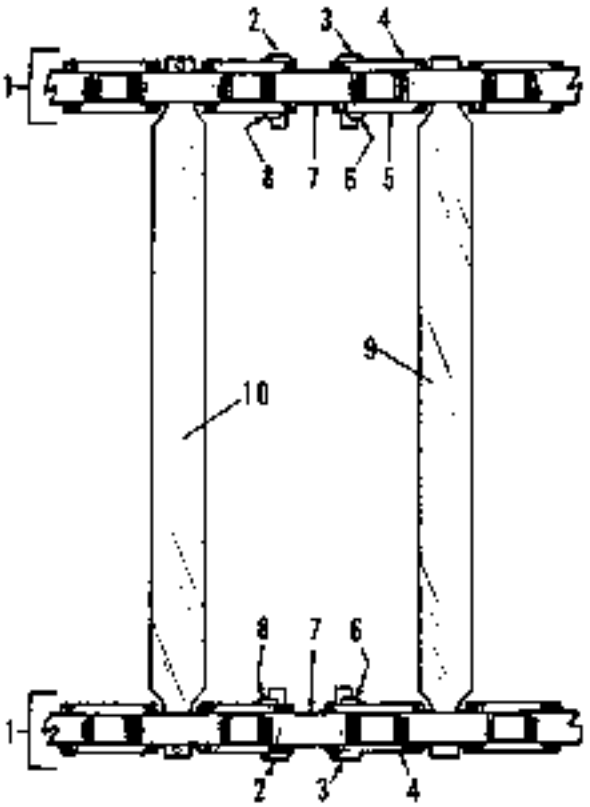


FIGURE J-9

7. Install the brushes on the holder making sure that the brushes run straight on the collector ring.
8. Rotate the brush holder to its proper position and the retaining plate should be installed. This plate should not be jammed tight to its stop or it will preload the bearing.
9. Insert the two collector ring lead wires, through the rubber terminal caps (included with the magnet).
10. Install the wires through the holes in the collector ring and press the bullet-type connectors firmly into place. (See Figure J-9).
11. Line up the mounting holes. Terminal connections on the magnet must be in line with the wires from the collector ring.
12. Secure the magnet to the magnet hub, using Allen head capscrews and lock washers.
13. Secure the lead wires from the collector ring to the magnet terminals, using screws and lockwashers.
14. Pull the rubber terminal caps down over the terminal connections.



1	Chain assembly	7	Link, block
2	Pin, coupler	8	Pin, lock
3	Pin, coupler	9	Flight
4	Bar, side	10	Flight
5	Bar, side	11	Chain assembly
6	Pin, lock	12	Pin, cotter

FIGURE J-10 — Hopper Feeder Chain Assembly

BAR FEEDER AND CHAIN ASSEMBLY

A. This is a special block link chain with bar steel flights (9 and 10, Figure J-10) which are forged at the ends to fit into the cored opening of the block link (7) every 11 inches. Every other flight bar (10) is drilled for a cotter pin (12). The chain links are coupled together with lock pins (6) and (8) so that the chain may be uncoupled at any point in its length.

B. REMOVAL

1. Remove screed unit and run machine up on crawler blocks to obtain working clearance.
2. Release screws on take-up foot shaft (Refer to adjustments Section G) and uncouple chain and bars over the head shaft and remove chain and bar assemblies from hopper.

C. DISASSEMBLY

1. Remove cotters (12, Figure J-10) that hold flight bars (10) in block links (7) and remove flight bars.
2. Burn off end and remove lock pins (6 and 8) from coupler pins (2 and 3) to disassemble chain.

D. CLEAN, INSPECT AND REPAIR

1. Clean all parts with cleaning solvent and dry thoroughly.
2. Inspect all block links, coupler pins and side bars of chain for cracks, breaks, excessive wear or any other damage. Repair or replace any worn or defective parts as necessary.
3. Inspect all flight bars for cracks, breaks, distortion or excessive wear. Repair or replace worn or defective parts as necessary.

E. REASSEMBLY

Reassemble chain and flight bar assemblies as shown by Figure J-10.

F. INSTALLATION

1. Fasten a rope or similar device to one end of the bar feeder chain assembly and pull rope through under hopper drag pan of main frame.
2. With a suitable lifting device suspend the bar feeder chain assembly over the front of the hopper so it can be fed down over the footshaft and on to the tracks for the lower run.

NOTE: When installing bar feeder chain assemblies be sure they are installed so the direction of the chain travel of the foot and head shaft is as shown in Figure G-5, Section G. If chain assemblies are not installed properly, the keeper pins will interfere with the bar flights and be broken.

3. Pull lower run of chain assembly through to the head shaft. Lower to run into hopper and work back through to head shaft and connect chains.
4. Adjust chain assemblies for proper tension (Refer to adjustments, Section G), and install screed unit.

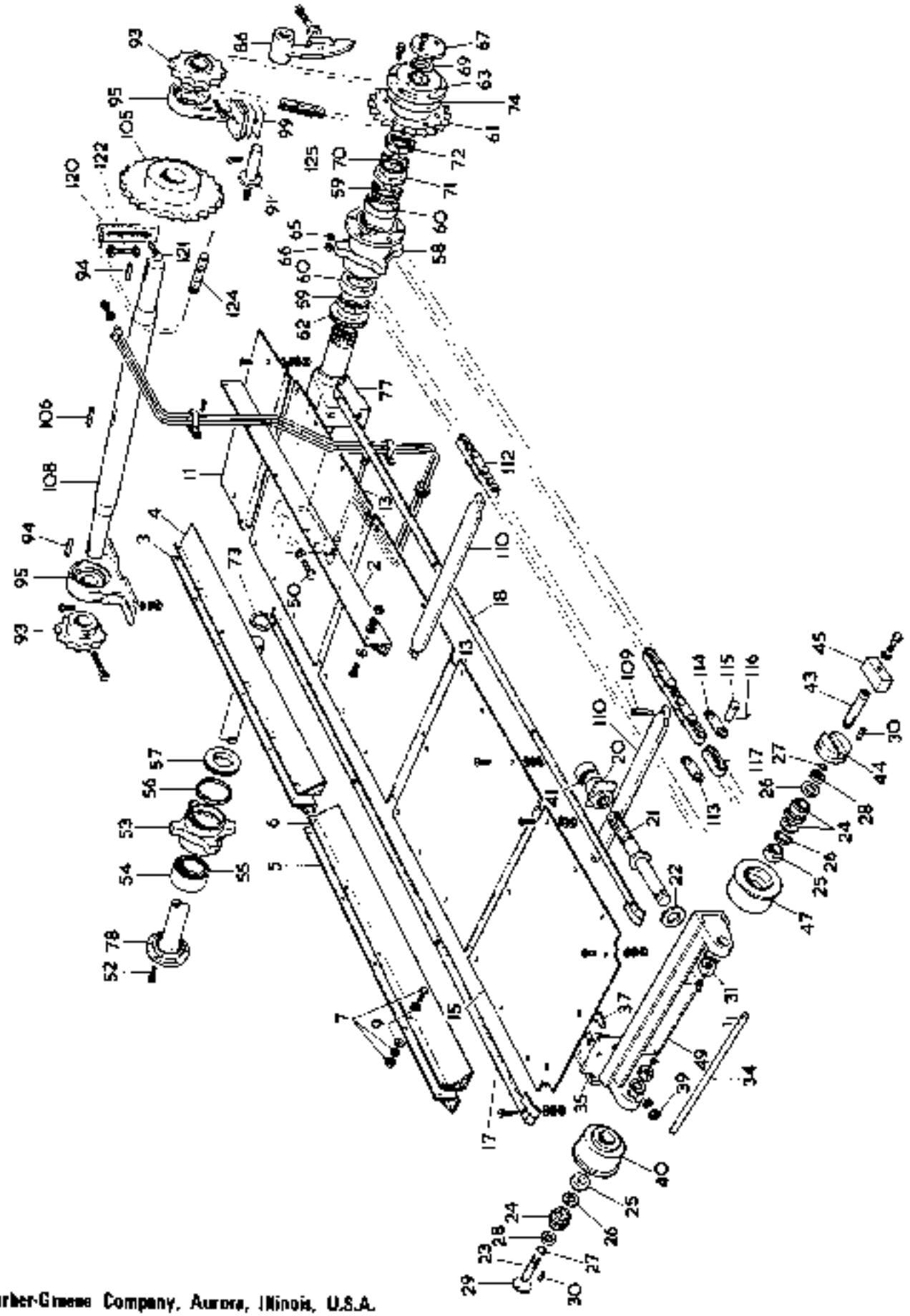


FIGURE J-11 — Feeder and Components

Parts Book Page	Parts Ref. No.	OSM Item No.	Description	Parts Book Page	Parts Ref. No.	OSM Item No.	Description	Parts Book Page	Parts Ref. No.	OSM Item No.	Description
71	–	2	Outer Rear Guard	78	36	40	Roller	80	30	73	Back-Up Ring
71	–	3	Inner Rear Guard	78	37	41	Spacer	80	34	74	Shim
71	–	4	Inner Rear Guard	78	46	43	Shaft	80	40	77	Support
71	–	5	Front Guard	78	47	44	Retainer	80	41	78	Shaft
71	–	6	Front Guard	78	48	45	Key	72	5	86	Take-Up
71	–	11	Rear Drag Pan	78	50	47	Roller	72	24	91	Pin
71	–	13	Inter. Drag Pan	78	38	49	Support	73	6	93	Sprocket
71	–	15	Front Drag Pan	80	2	52	Socket Hd. Capscrew	73	8	94	Key
71	–	17	Wearing Bar	80	5	53	Sprocket	73	9	95	Pillow Block
71	–	18	Wearing Bar	80	6	54	Bearing	73	11	99	Shims
78	1	20	Seat	80	7	55	Bearing	73	26	105	Sprocket
78	2	21	Adjusting Screw	80	8	56	Retaining Ring	73	27	106	Key
78	3	22	Cut Washer	80	9	57	Seal Retainer	73	35	108	Shaft
78	4	23	Shaft	80	10	58	Sprocket	77	1	110	Flight
78	5	24	Bearing Assembly	80	11	59	Cone & Roller	77	3	112	Strand of Chain
78	6	25	Spacer	80	12	60	Cup	77	–	113	Side Bar
78	7	26	Nilos Ring	80	13	61	Sprocket	77	–	114	Side Bar
78	8	27	Snap Ring	80	14	62	Seal Retainer	77	–	115	Coupler Pin
78	9	28	Snap Ring Lock	80	15	63	Splined Hub	77	–	116	Lock Pin
78	10	29	Plug	80	20	67	End Cap	77	–	117	Block Link
78	11	30	Key	80	22	69	Retaining Ring	99	5	120	Take-Up
78	12	31	Hex Nut	80	24	70	Tongued Washer	49	1	124	Chain
78	16	34	Adjusting Rod	80	25	71	Lock Washer	49	2	125	Chain
78	30	35	Guide	80	--	72	Lock Nut				

FIGURE J-11 – Feeder and Components (Continued)

FEEDER HEAD SHAFT ASSEMBLY

A. REMOVAL

1. Remove screed unit and run machine up on crawler blocks to obtain working clearance.
2. Remove bar feeder chair assembly as described previously.
3. Remove guard clip and patch plate below the shaft on the drive sprocket end, and uncouple feeder drive chain.
4. Disconnect grease piping.
5. Remove bolts (50, Figure J-11), which hold assembly to structural frame.

B. DISASSEMBLY, as shown in figure J-11.

C. CLEAN, INSPECT AND REPAIR

1. Clean all parts in cleaning solvent and dry thoroughly.
2. Inspect shafts for cracks, breaks, scoring or excessive wear. Repair or replace worn or defective parts as necessary.
3. Inspect bearings and sprockets for cracks, breaks, or excessive wear. Repair or replace defective or worn parts as necessary.

D. ASSEMBLING FEEDER HEAD SHAFT

1. Clean all parts thoroughly.
2. Install Teflon backup ring (73) on tube assembly (77).
3. Install seal (57) on tube (77). Heat bore of seal and shrink on tube.
4. Install inner bearing ring (55) on tube (77).
5. Install retaining ring (56) and bearing (54) in sprocket (53).
6. Install shaft assembly (78) take care not to damage Teflon retainer (23).
7. Install seal (62) and install bearing (55) on tube (77) also shrink seal (62) on tube.
8. Install bearing cones (60) in sprocket assembly (58).
9. Install sprocket assembly (58).
10. Install bearing (59), lock washer (71) and nut (72).

NOTE: Tighten nut (72) until there is .000 - .002 bearing end play.

11. Install sprocket (61).
12. Assemble splined hub (63) without shims.
13. Pull shaft to right until retaining ring (56) touches seal (57).
14. Measure the distance the inner edge of the groove of the shaft extends out of hub (63).

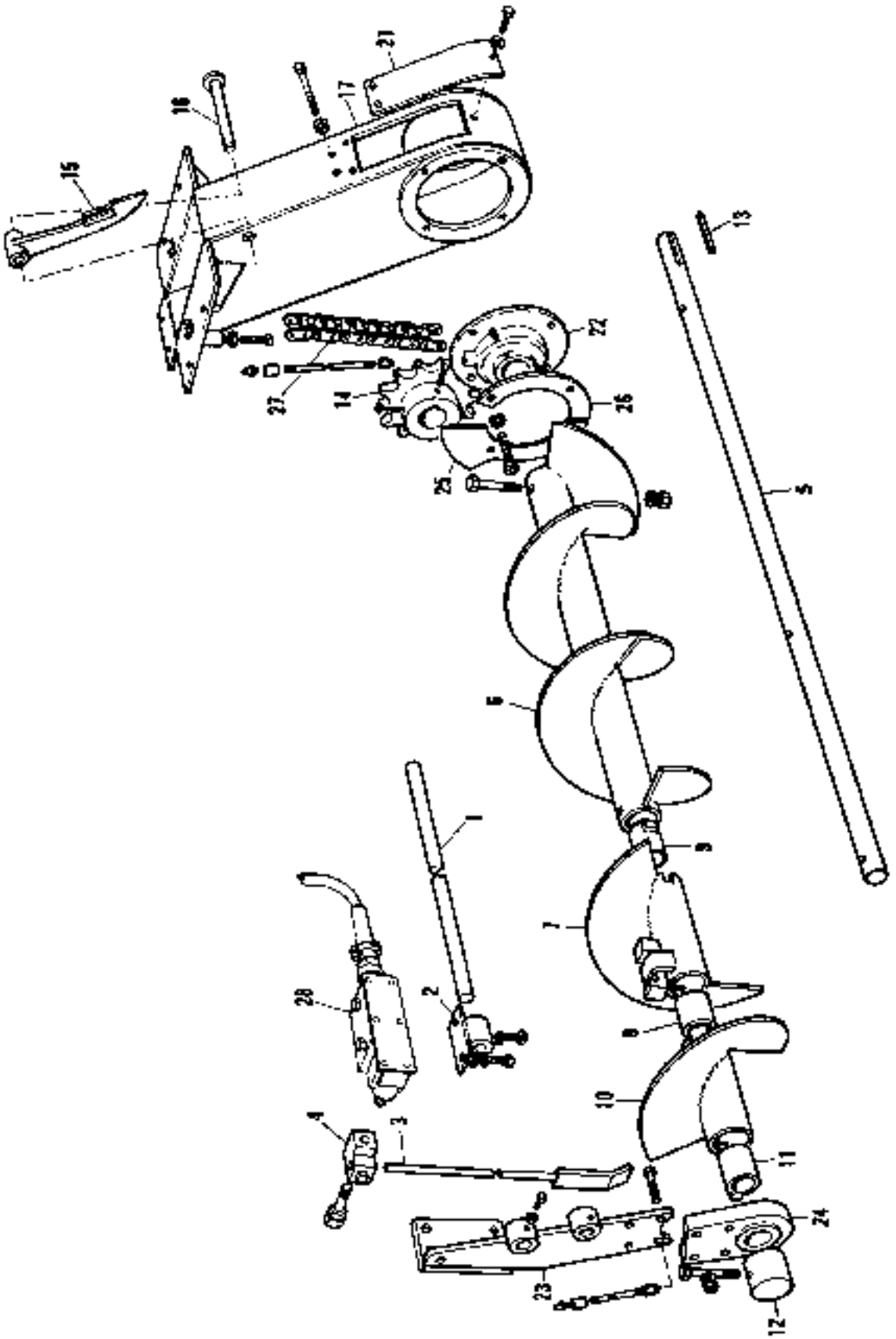


FIGURE J-12 – Screw Conveyor and Drive Assembly

Parts Book Page	Parts Ref No.	OSM Item No.	Description	Parts Book Page	Parts Ref. No.	OSM Item No.	Description	Parts Book Page	Parts Ref. No.	OSM Item No.	Description
68	4	1	Support	90	7	9	Bushing	90	14	17	Support
68	5	2	Bracket	90	8	10	Screw Ay. R.H.	90		21	Cover Plate
68	6	3	Paddle	90	10	11	Bushing	90	15	11	Flngd. Brng.
68	9	4	Lever Hub	90	11	12	Cap Ay.	90	16	23	Brng. Hanger
90	1	5	Shaft	90	13	13	Key	90	18	24	Flngd. Hngr. Brng.
90	2	6	Screw Ay.	90	12	14	Sprocket	90	20	25	Wear Plate
90	4	7	Screw Ay.	72	5	15	Take-Up	90	20	26	Wear Plate
90	6	8	Bushing	72	14	16	Pin	101	9	28	Limit Switch

FIGURE J-12 – Screw Conveyor and Drive Assembly (Continued)

15. Remove hub (63) and shim .020 to .030 less than above measurement.
16. Assemble hub (63).

NOTE: Line up timing marks on hub (63) and sprocket (61).

17. Install retaining ring (69) and end cap (67).

NOTE: There should be .006 to .026 end float. To check end play, place magnetic dial indicator on the outside mounting block and check against the drive chain sprocket.

FEEDER FOOT SHAFT ASSEMBLY

A. REMOVAL.
1. Remove bar feeder and chain assembly as described previously.
2. Remove adjusting rod (34, Figure J-11) and bolts (37). Remove rollers (40 & 47 by removing nuts (31).

B. CLEAN, INSPECT AND REPAIR
1. Clean all parts in cleaning solvent and dry thoroughly.
2. Inspect take-up screws and nuts for cracks, breaks, and condition of threads or other damage. Replace or repair defective parts as necessary.
3. Inspect shaft, rollers and collars for cracks, breaks, excessive wear or other damage. Repair or replace defective parts as necessary.

FEEDER AND SCREW COUNTERSHAFT ASSEMBLY

1. Remove deck plate on main frame to gain access to shafts. Uncouple and couple screw and feeder countershaft drive chain, screw conveyor drive chain, and feeder drive chain.
2. Disassemble shaft assembly as shown by figure J-11, by removing sprockets (93 and 105) and stripping shafts.

B. CLEAN, INSPECT AND REPAIR
1. Clean all parts in cleaning solvent and dry thoroughly.
2. Inspect shaft for cracks, breaks, scoring, or excessive wear. Repair or replace parts as necessary.
3. Inspect bearings and sprockets for blown seals, chipped teeth, cracks, breaks or other damage. Repair or replace defective or worn parts as necessary.

SCREW CONVEYOR AND DRIVE ASSEMBLY

The screw conveyors are made up of one right hand assembly and one left hand each mounted on the right and left hand side of the machine, to operate independently, for spreading material received from the bar feeder across the width of the machine in front of the tamper. The screw conveyors are chain driven from the feeder and screw conveyor countershaft which is chain driven by the feeder and screw drive clutch.

A. REMOVAL
1. Remove screed unit.
2. Remove inspection door (21, Figure J-12). Uncouple and couple screw drive chain.
3. Remove screw conveyor assembly as shown by figure J-12.

B. DISASSEMBLY

Disassemble screw conveyor shaft assembly as shown by Figure J-12, by removing caps (12) and flange bearings (24) and (22) and stripping shafts.

C. CLEAN, INSPECT AND REPAIR
1. Clean all metal parts in cleaning solvent and dry thoroughly.
2. Inspect all mounting hardware for cracks, breaks, damaged threads or other damage. Repair or replace damaged mounting hardware as necessary
3. Inspect shafts for breaks, cracks, scoring or excessive wear. Repair or replace damaged parts as necessary.
4. Inspect sprockets, caps, and paddles for cracks, breaks, and excessive wear or other damage. Repair or replace as necessary.

WHEEL BRAKE ASSEMBLY

The Duo-Servo floating shoe brake is designed for use on heavy duty equipment. The brake is actuated hydraulically by a wheel cylinder. An automatic adjuster mechanism is also incorporated in the brake.

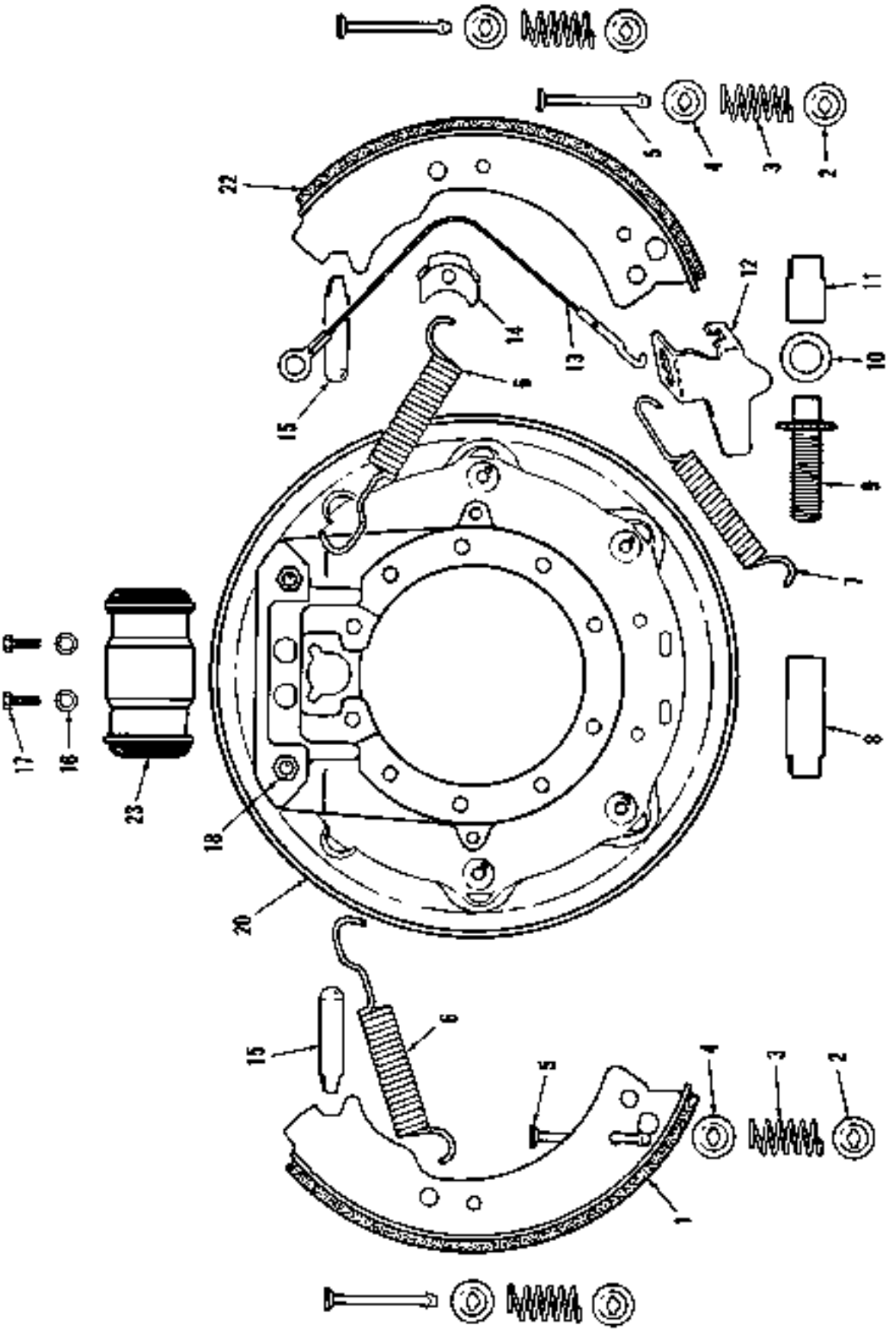


FIGURE J-13 – Brake Assembly

Parts Book Page	Parts Ref. No.	OSM Item No.	Description	Parts Book Page	Parts Ref. No.	OSM Item No.	Description	Parts Book Page	Parts Ref. No.	OSM Item No.	Description
98	2	1	Primary Shoe	98	6	8	Pivot Nut	98	24	15	Link, Wheel Cyl.
98	16	2	Shoe Hold Down Cup	98	4	9	Adj. Screw	98	23	16	Lockwasher- Wheel Cyl.
98	17	3	Shoe Hold Down Spring	98	8	10	Washer- Adj. Screw	98	22	17	Screw, Wheel Cyl.
98	16	4	Shoe Hold Down Cup	98	5	11	Socket	98	19	18	Pin- Return Spring
98	18	5	Pin- Shoe Hold Down	98	9	12	Lever- Auto Adjust	98	1	20	Backing Plate
98	15	6	Spring- Shoe Return	98	10	13	Cable- Auto Adjust	98	3	22	Secondary Shoe
98	14	7	Spring- Adj. Screw	98	11	14	Cable Guide	98	25	23	Wheel Cyl.

FIGURE J-13 – Brake Assembly (Continued)

A. BRAKE REMOVAL

1. Remove Screed and Leveling Arms.
   a. Raise and block up screed to height necessary to disconnect screed hoist cylinders from leveling arms.
   b. Disconnect screed hoist hydraulic cylinders from leveling arms by removing cap screws from retaining pins for each leveling arm.
   c. Remove cap (5) and retaining nut (3) from leveling arm pivot. (Refer to Figure J-21).
   d. Disconnect hydraulic lines to screed.
   e. Disconnect screed heater wires.
   f. Raise leveling arms by prying loose from the pivot pins and turning down thickness control screws on the screed.
   g. Drive tractor forward, clear of leveling arms.
2. Jack up machine and remove wheel and drum. Back off the adjusting screw if interference is encountered between the drum and shoe.
3. To back off adjusting screw, remove the adjusting hole and probe hole covers from backing plate. Insert screwdriver through top hole and push the lever away from the starwheel. Insert a second screwdriver in the bottom hole and engage the teeth of the starwheel. To back off adjusting screw, move the screwdriver toward the axle.
4. To disengage the adjuster, after drum has been removed, grip adjuster cable hook and adjuster lever (12, Figure J-13) and pull lever toward bottom of the secondary shoe (12). Unhook lever from web of secondary shoe.
5. Unhook cable and adjuster spring (7) from lever and remove spring from web of primary shoe (1).
6. Unhook shoe return spring (6) from return spring pins (18). Remove springs from primary and secondary shoe. Separate adjuster cable end fitting from return spring pin and remove cable guide (14) from secondary shoe. Using pliers, push down on the outer cup (2, Figure J-13) on the hold-down pin (5) and rotate cup 90°. Remove the two cups and spring from hold-down pin.
7. Disengage shoes from wheel cylinder connecting links and adjusting screw assembly.
8. Remove socket (11) and washer (10) from adjusting screw (9) and unscrew the adjusting screw from pivot nut (8). The socket end of the adjusting nut is identified "L" for left-hand assembly and "R" for right-hand assembly.
9. If the wheel cylinders are to be serviced, remove the connecting links (15) from the cylinder boots. Refer to "Wheel Cylinder Servicing" section.

B. CLEAN, INSPECT AND REPAIR

1. Brush dirt and lining dust from backing plate, shoe assemblies and inside of drum. Check drum open end for a build up of dirt and rust and scrape off to ease reassembly of drum over brake.
2. Inspect lining for wear. Replace linings that are worn to the rivet heads. Check shoes to see that linings are secure on shoe rims and the web is not distorted at the anchor end. Check anchor end of each shoe web for excess bonelling or roughness. The reinforcement plate, on underside of shoe, must be securely welded to shoe web.
3. Remove all dirt and old lubricant from the threads of the adjusting screw. Check screw for distorted or broken teeth or rough threads.
4. Inspect adjuster cable assembly (13) to make sure cable is securely attached to the end fittings. There should be no slipping at the crimped sections of the fittings. Check cable guide by installing guide in position on web of the secondary shoe. The guide should lay flat against the web surface. The groove for the cable should be parallel to the web surface.

C. BRAKE ASSEMBLY

1. Coat adjusting screw threads with brake lubricant and turn the adjusting screw back into the pivot nut. Coat inside of socket and adjusting screw washer with brake lubricant and assemble parts on end of the adjustment screw. If new lined shoes are to be installed, pre-adjust assembly so that dimension "A", Figure J-14, is 4.960.
2. Coat the backing plate ledges (6 places), upon which shoe rims rest, with brake lubricant.
3. Attach primary and secondary shoes to backing plate as outlined in the following two steps.

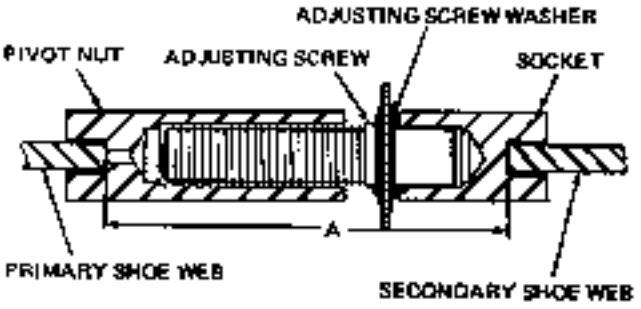


FIGURE J-14 — Adjustment Assembly

NOTE: The secondary shoe is toward the rear of the vehicle. The shoe reinforcement plate, Figure J-15, is toward the backing plate.

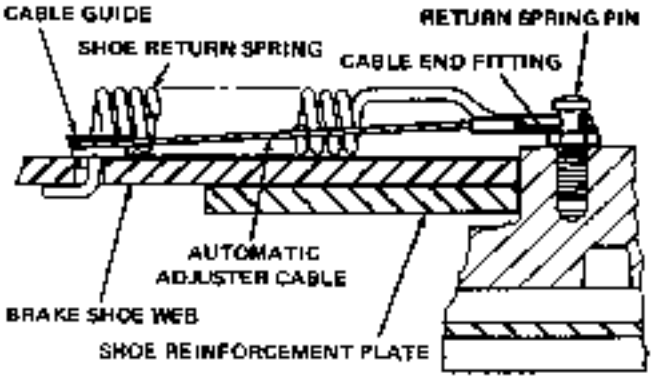


FIGURE J-15 — Adjuster Cable

4. Attach secondary shoe to backing plate using shoe hold-down parts. Engage the shoe web with the notch at end of wheel cylinder link. The hold-down pins are installed from the back side of the backing plate as show in Figure J-16. Over each pin install two cups and the hold-down spring. Press down on outer cup sufficiently to engage the flat end of the pin through the slot and rotate cup 90°.
5. Coat slots of the adjusting screw pivot nut (9, Figure J-13) and socket (11) with lubricant. Install primary shoe in position on the backing plate engaging the slot of the wheel cylinder link with the shoe web. Place adjusting screw assembly in position between the lower ends of the shoes and engage slots with shoe webs. Install two hold-down pins as in step 4.
6. Insert the cable guide, Figure J-15, into the hole in the web of the secondary shoe. Coat cable groove on guide with brake lubricant.
7. Install the automatic adjuster cable around cable guide and place cable end fitting over return spring pin. Orient the cable assembly so that hook at lower end of cable will hook down into the adjuster lever. This applies to both left and right-hand assemblies.

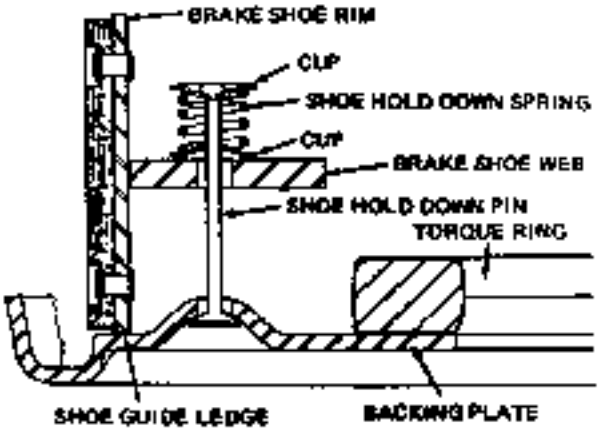


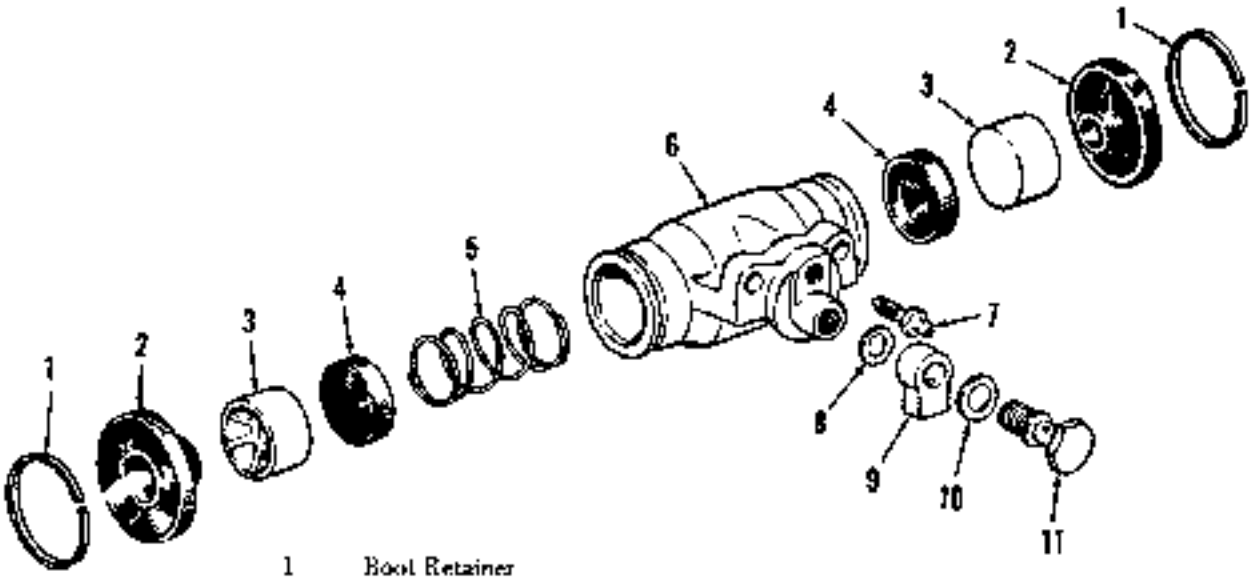
FIGURE J-16 — Shoe Hold-Downs

8. Insert short hook of shoe return spring in hole in cable guide and secondary shoe web as shown in Figure J-15. Hold end of spring down and hook opposite end of spring over return spring pin. The return spring will hold the cable guide in place. Make sure cable guide is down flat against shoe web surface.
9. Install the second return spring between the primary shoe and pin.
10. Insert the short hook of the adjuster spring (7, Figure J-13) into hole at lower end of primary shoe web. Hook opposite end of spring in oblong hole of adjuster lever (12). Also hook adjuster cable in hole in lever. Left-hand lever must be used with left-hand brake.
11. Before installing lever in web of secondary shoe, check adjuster cable to be sure it is in groove of cable guide. To install lever, pull lever toward web of secondary shoe. Engage lever hook with hole in secondary shoe web.
12. Install drum and wheel. Use mallet to knock shoes up or down as necessary to center shoe-ring to drum. Refer to Section G, for bolt torques.
13. After brakes have been serviced, make a road test. If pedal travel is greater than normal, the brakes have not been adjusted close enough to the drum. A series of reverse stops will cause the automatic adjuster to move the shoes closer to the drum.

WHEEL BRAKE CYLINDERS

A. REMOVAL AND DISASSEMBLY

1. Disconnect hydraulic brake line from wheel cylinder. Plug line to prevent loss of fluid and entrance of dirt into system.
2. Remove two screws holding wheel cylinder to backing plate.
3. Remove connecting links from cylinder boots.
4. Expand the boot retaining rings to remove boots from wheel cylinder body.



1	Boot Retainer		
2	Boot - Wheel Cylinder	7	Bleed Screw
3	Piston - Wheel Cylinder	8	Gasket - Inlet Fitting (Inner)
4	Cup - Wheel Cylinder	9	Inlet Fitting
5	Spring - Wheel Cylinder	10	Gasket - Inlet Fitting (Outer)
6	Wheel Cylinder Body	11	Bolt - Inlet Fitting

FIGURE J-17 — Brake Cylinder

5. Remove two pistons, two cups and spring from cylinder bore. To avoid damage to cup sealing lips, do not push cup over fluid inlet port.
6. Carefully clamp cylinder body in a vice and remove bleed screw. (Bleed screw must be free to turn so brake system can be bled after reassembly.)
7. Do not loosen the fitting at inlet port unless it is necessary to replace this part.

B. CLEAN, INSPECT AND REPAIR

Clean metal parts in alcohol or commercial solvent. Use alcohol only on rubber parts. Blow dirt and cleaning fluid out of all recesses, passages and threaded holes.

Inspect finish of cylinder bore for corrosion, scratches and score marks. Remove corrosion spots with a fine grade crocus cloth. If light scratches are found, they can be removed with a fine emery cloth. Remove deep scratches or score marks by honing or replacing the cylinder. Check hydraulic ports for stripped threads and inspect for score marks on hydraulic tube seats and bleed screw seat. Inspect cylinder body for cracks especially around the mounting holes.

Rubber parts should be replaced with new parts. Store cylinder parts in clean area to prevent dirt from entering hydraulic system. *Do not* handle rubber parts with oily or greasy hands.

C. REASSEMBLY

1. Coat bore of cylinder and piston cups with clean brake fluid.
2. Install piston, cups and spring into cylinder body. Refer to Figure J-18. Do not nick lips of cups by pushing them across the inlet port hole.
3. Lubricate boots and install to grooves at end of cylinder body. Install boot retainer rings.
4. Install bleed screw but do not tighten.
5. Hold cylinder spring compressed and install cylinder assembly. Install two mounting bolts and torque from 180 to 200 inch-pounds.
6. Connect brake line and tighten securely to prevent leak.
7. Coat connecting links, Figure J-18, with brake fluid and insert into dust boot. Align slot of link so link will straddle shoe web.
8. Reinstall brake shoes.

NOTE: If wheel cylinder is serviced, the system will have to be bled. The bleeding operation will have to be done before the finisher is road tested.

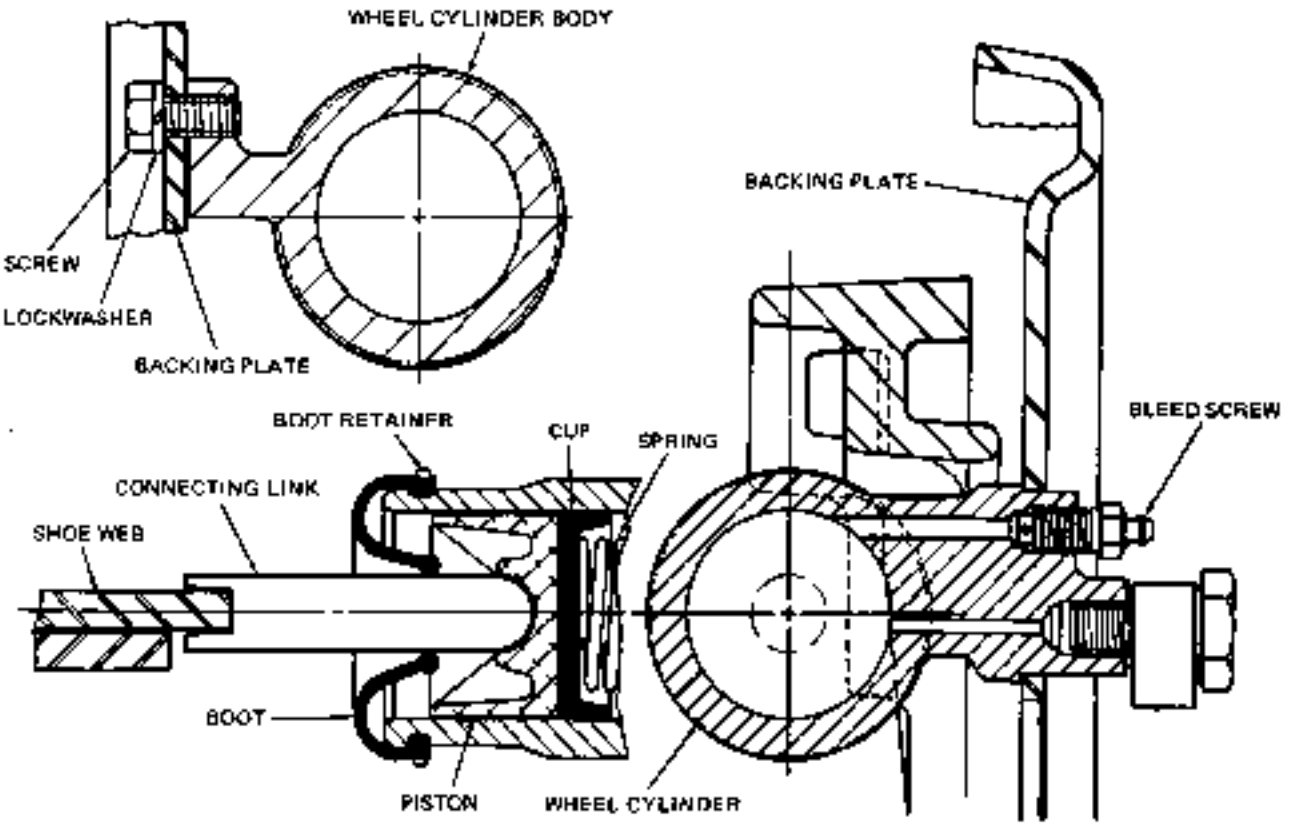


FIGURE J-18 - Cylinder Assembly

SCREED UNIT ASSEMBLY (TAMPER)

The screed unit assembly includes the leveling arms which fasten to, and are pivoted on, the tractor. The screed unit consists of the tamper drive, tamper eccentric shafts, tamper deflectors, thickness control, crown control, screed frames and screed plates.

TAMPER ECCENTRIC SHAFTS

A. REMOVAL

1. Remove guard and release tension on V-belts and remove belts from motor drive pulley. Loosen setscrews and slide hub (32, Figure J-19), over to release tension on spring (43) connecting the two eccentric shafts.
2. Release stop bolt in upper wedge block (37). Remove bearing hold-down bolts (47) and remove tamper from pins (15) and tamper eccentric shaft assembly is free for removal.

CAUTION: Watch spring (43) connecting the two eccentric shafts when removing first shafts as it may still be under tension and may jump out as shaft is removed.

B. DISASSEMBLY

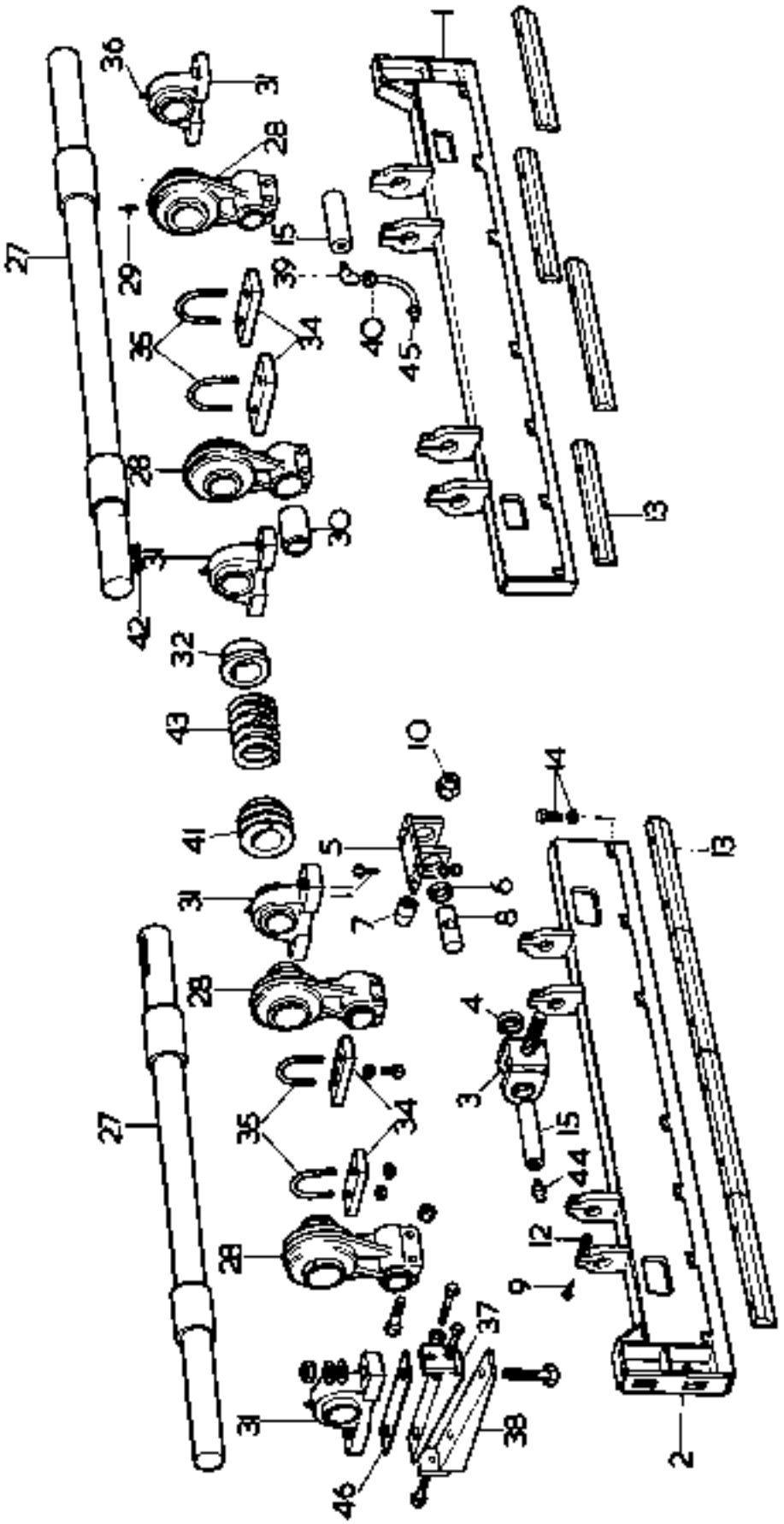
Disassemble eccentric shaft by stripping it down, removing hub (32), drive sheave (41), pillow block bearings (31) and eccentric arms and bearings (28).

C. CLEAN, INSPECT AND REPAIR

1. Clean all parts in cleaning solvent and dry thoroughly.
2. Inspect all mounting hardware for cracks, breaks, damaged threads or other damage. Repair or replace damaged mounting hardware as necessary.
3. Inspect bearings for cracks, breaks, excessive wear, blown grease seals, or other damage. Replace a damaged or defective bearing as necessary.
4. Inspect shafts for cracks, breaks, scoring, burrs, or signs of wear. Replace a worn or defective shaft as necessary.
5. Inspect tamper frame shafts, bushings, and collars for breaks, cracks, excessive wear or other damage. Replace defective or damaged parts as necessary.
6. Inspect drive sheave and drive hub that mate with connecting spring. Inspect connecting spring carefully. Inspect for cracks, breaks, excessive wear, or other damage. Repair or replace damaged or defective parts as necessary.

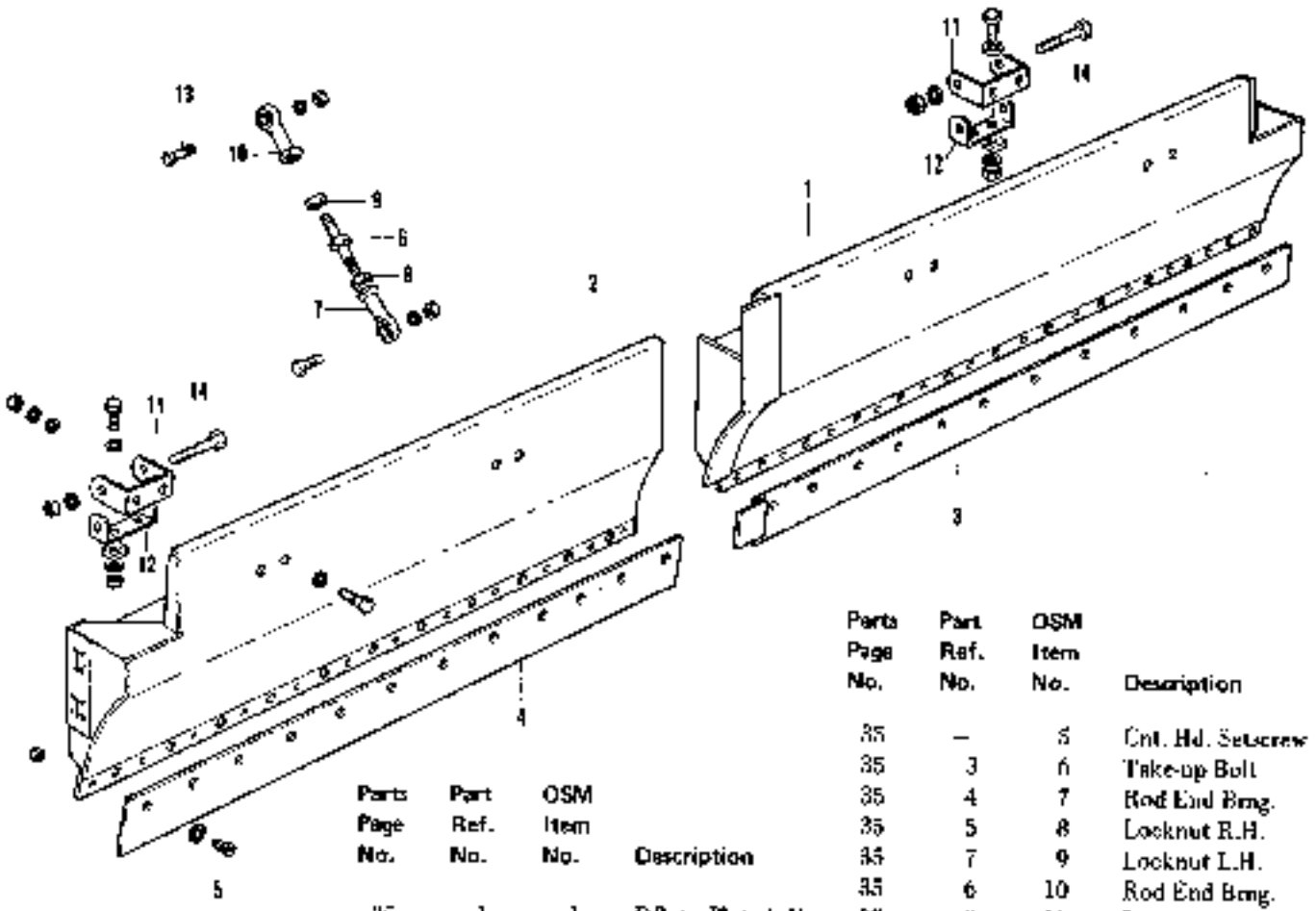
D. REASSEMBLY

Reassemble the eccentric shafts in reverse order of the disassembly above and as shown in Figure J-19.



Parts Page No.	Part Ref. No.	OSM Item No.	Description
9	1	1	Tmpr. Ft. L.H.
9	1	2	Tmpr. Ft. R.H.
9	2	3	Yoke
9	2A	4	Bushing
9	3	5	Support
9	3A	6	Bushing
9	3B	7	Collar
9	5	8	Pin
9	7	9	Bolt
9	9	10	Locknut
9	–	11	Bolt
9	3A	12	Nut
9	–	13	Tmpr. Bar
9	–	14	Bolt
9	7	15	Pin
9	1	27	Eccntr. Shaft
9	9	28	Eccntr. Arm
9	–	29	Lub. Fig.
9	6	30	Bushing
9	10	31	Pillow Block
9	11	32	Bolt
9	15	33	Key
9	–	34	Cntrweight.
9	–	35	U-Bolt
9	–	36	Lub. Fig.
9	3	37	Wedge Block
9	4	38	Wedge Block
9	–	39	Bushing
9	–	40	Pillow Block
9	–	41	Bolt
9	13	42	Key
9	14	43	Spring
9	–	44	Lub. Fig.
9	–	45	Nipple
9	–	46	Shim
9		47	Bolt

FIGURE J-19 – Tamper Eccentric Shafts



Parts Page No.	Part Ref. No.	OSM Item No.	Description
35	1	1	Dflctr. Plate L.H.
35	1A	2	Dflctr. Plate R.H.
35	2	3	Dflctr. Blade
35	2A	4	Dflctr. Blade
35	–	5	Cnt. Hd. Setscrew
35	3	6	Take-up Bolt
35	4	7	Rod End Brng.
35	5	8	Locknut R.H.
35	7	9	Locknut L.H.
35	6	10	Rod End Brng.
35	8	11	Pivot Bracket
35	9	12	Pivot Bracket
35	10	13	Bolt
35	11	14	Bolt

FIGURE J-20 – Deflector Plate

E. INSTALLATION

1. Place eccentric shaft assemblies in their proper position on screed unit with V-belts on drive sheave. Install a compressed and wired connecting spring (refer to Section G), then bolt bearings down to frame to hold spring in place before cutting wire.
2. Connect eccentric arm bearings to tamper frame with pins (15, Figure J-19).
3. Adjust tamper, both horizontally and vertically, as directed in adjustment Section G.
4. Install V-belt and guard and adjust belt tension as described in Section G.

TAMPER FRAME AND DEFLECTOR PLATE

A. To install new tamper bars or to adjust tampers and deflector plates refer to adjustments, Section G.

B. REMOVAL AND DISASSEMBLY

1. Remove screed unit from tractor frame by disconnecting and plugging hydraulic lines to tamper drive motor, disconnect electrical lead to screed unit, and remove levering arms from crawler support shaft and drive tractor unit away from screed.
2. Remove deflector plate assemblies (1 and 2, Figure J-20), by removing bolts (13) and (14).
3. Disassemble deflector plates by removing deflector blades (3 and 4) and bracket (12) from plates (1 and 2).
4. Remove tamper frame by removing nuts (10, Figure J-19), and tamper frame shafts (15, Figure J-19), allowing tamper frame assemblies to be removed.
5. Remove tamper bars (3), yoke (3) and bushings (4), Figure J-20.

C. CLEAN, INSPECT AND REPAIR

1. Clean all parts in cleaning solvent and dry thoroughly.
2. Inspect all mounting hardware for cracks, breaks, damaged threads or other damage. Repair or replace damaged mounting hardware as necessary.
3. Inspect link shafts, yokes, bushings, and support bushings for cracks, breaks, excessive wear or other damage.

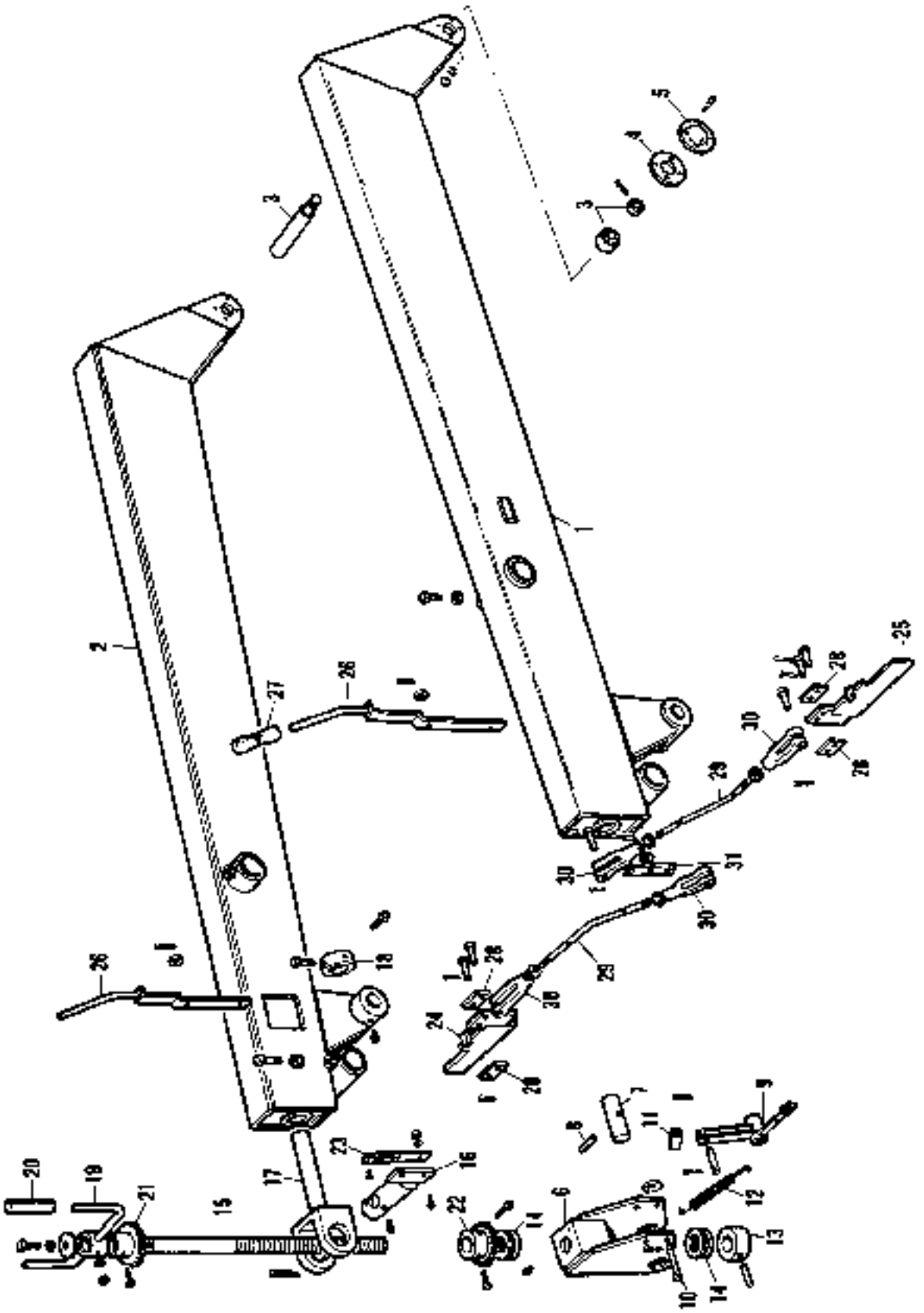


FIGURE J-71 – Leveling Arm and Thickness Control

Parts Page No.	Part Ref. No.	Item No.	Description	Parts Page No.	Part Ref. No.	Item No.	Description	Parts Page No.	Part Ref. No.	Item No.	Description
103	1	1	Lvlng. Arm R.H.	40	6	11	Lock	40	17	21	Dial
103	1	2	Lvlng. Arm L.H.	40	8	12	Ext. Spring	40	20	22	Stop
103		3	Bushing Ay.	40	9	13	Collar	40	16	23	Gauge
103	—	4	Spacer	40	11	14	Thrust Brng.	107	1	24	Travel Spprt.
103	2	5	Cap	41	12	15	Shaft	107	1	25	Travel Spprt.
40	1	6	Yoke	41	13	16	Pin	107	2	26	Shift Lever
40	2	7	Shaft	40	14	17	Yoke	107	3	27	Handle Grip
40	3	8	Shaft	40	15	18	Collar	107	4	28	Link
40	4	9	Pedal	40	18	19	Hand Cntl.	107	6	29	Thrd. Rod
40	5	10	Rivet	40	19	20	Grip	107	7	30	Rod Yoke End
								107	9	31	Crank Arm

FIGURE J-21 – Leveling Arm and Thickness Control (Continued)

Repair or replace damaged parts as necessary.

4. Inspect tamper frames and deflector frame for cracks, breaks, warpage or distortion. Repair or replace damaged or defective parts.
5. Inspect tamper bars and deflectors blades for excessive wear and replace as necessary.

D. REASSEMBLY

1. Reassemble tamper frame assemblies as shown in Figure J-19. For installing tamper bars refer to Section G.
2. Reassemble deflector plate assemblies as shown by Figure J-20.

E. INSTALLATION

1. Install tamper frame assemblies as shown by Figure J-19 and secure with nuts (10) and shafts (15).
2. Install deflector plate assemblies in position as shown by Figure J-20 and secure with bolts (13 and 14).
3. Check tamper for correct horizontal and vertical relationship (refer to adjustment Section G) and adjust if necessary.

LEVELING ARMS

A. The leveling arms connect the tractor unit and screed unit together. The leveling arms fasten to, and are pivoted on, the crawlers.

B. REMOVAL

1. Lower screed assembly on to blocks. Remove caps (5) and nut (3), Figure J-21. Remove and install pins which fasten hydraulic cylinder to leveling arm.
2. Remove collar (10) from thickness control yoke (17), and pin from screed structure. Leveling arm is now free to be removed.

C. CLEAN, INSPECT AND REPAIR

1. Clean all parts in cleaning solvent and dry thoroughly.
2. Inspect leveling arm for cracks, breaks, distortion, warpage, or other damage. Inspect bushing for wear and general condition. Repair and replace damaged parts as necessary.

CROWN CONTROL ASSEMBLY

A. The screed frame is hinged at the bottom by parts (7 thru 11, Figure J-22). Crown adjustment is made by means of the two crown control screws at the top center of the screed. An indicator (17) bolts to screed frame.

B. REMOVAL AND INSTALLATION

1. Uncouple connecting chain (6, Figure J-22).
2. Remove nuts (14). Loosen nuts (15). Turn these nuts back along with adjusters (4). Screws will come out in direction of welded end.
3. Remove bolts to remove crown indicator bar (17).

NOTE: Support screed unit on four wood blocks for this operation.

C. CLEAN, INSPECT AND REPAIR

1. Clean all parts in cleaning solvent and dry thoroughly.
2. Inspect screws and nuts for cracks, breaks, damaged threads or other damage. Repair or replace damaged parts as necessary.
3. Inspect thrust bearings for cracks, breaks, scoring, or other damage. Repair or replace damaged parts as necessary.
4. Inspect sprocket assembly and chain for correct operation cracks, breaks, or excessive wear. Repair or replace damaged or worn parts as necessary.

SCREED UNIT ASSEMBLY (VIBRATORY)

The screed unit assembly includes the leveling arms which fasten to, and are pivoted on, the tractor. The screed unit consists the vibratory boxes, drives, deflectors, thickness controls, crown control, screed frame and screed plates.

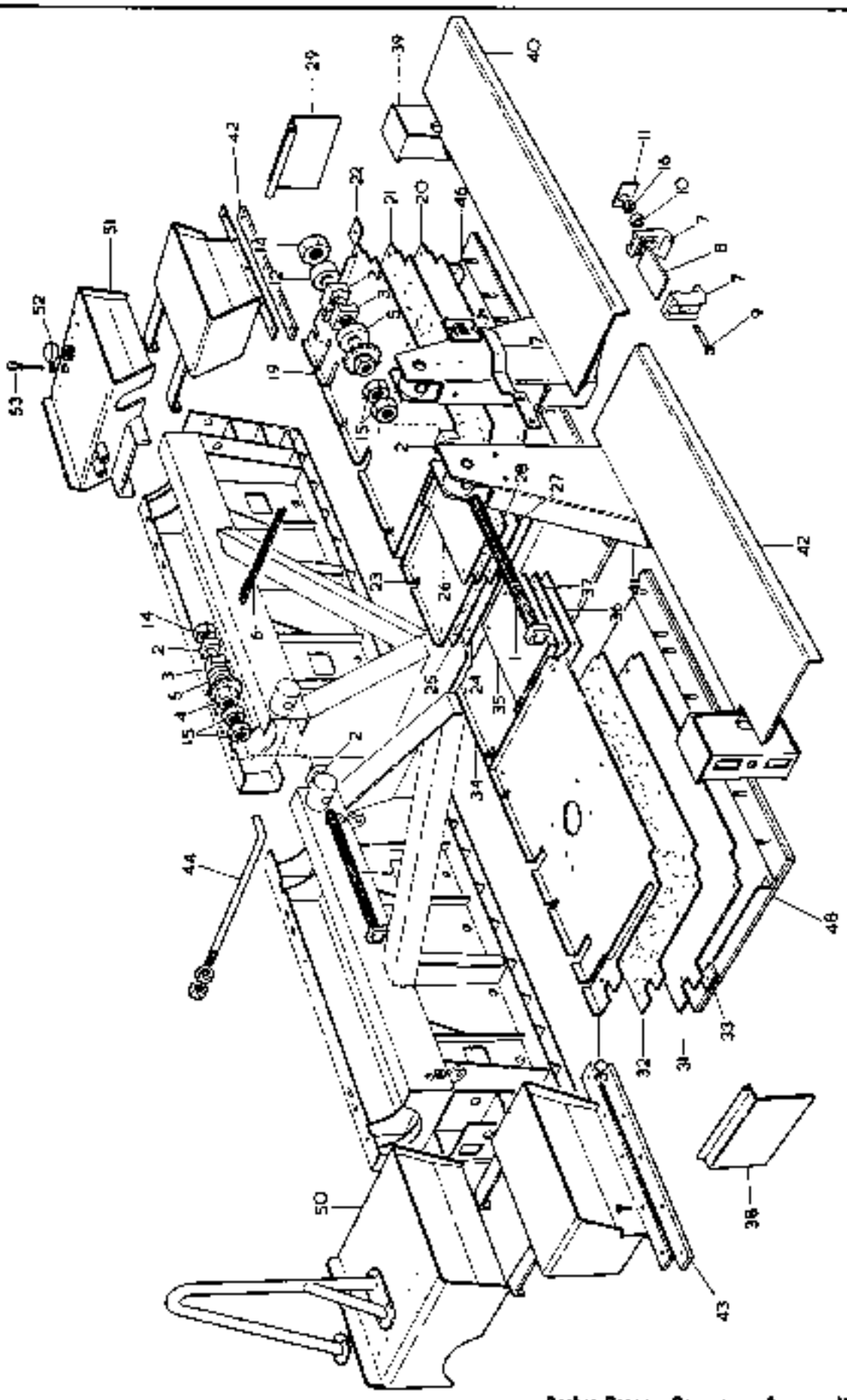


FIGURE J-22 — Screed Assembly — Tamper

Parts Page No.	Part Ref. No.	OSM Item No.	Description	Parts Page No.	Part Ref. No.	OSM Item No.	Description	Parts Page No.	Part Ref. No.	OSM Item No.	Description
35	3	1	Screw	14	1	19	Htr. Cov. Plt. R.H.	15	19	35	Htr. Cov. L.H.
35	4	2	Spcr. Block	14	2	20	Htr. Cov. R.H.	15	20	36	Heat Cover
35	6	3	Spcr. Block	14	3	21	Asbst. Insltn.	15	21	37	Asbst. Insltn.
35	7	4	Sprocket	14	4	22	Clamp	15	22	38	End Cov. L.H.
35	8	5	Thrust Brng.	14	5	23	Htr. Cov. Plt. R.H.	–	–	39	Screed R. E. Spprt. R.H.
35	11	6	Rllr. Chain	14	6	24	Cov. Plt. R.H.	–	–	40	Screed Step L.H.
35	12	7	Clamp Plate	14	7	25	Asbst. Insltn.	–	–	41	Screed R. E. Spprt. L.H.
35	13	8	Keeper Bar	15	8	26	Htr. Cov. Plt. R.H.	–	–	42	Screed Step R.H.
35	14	9	Bolt	15	8	27	Heat Cover	–	–	43	Packing Bar
35	15	10	Collar	15	10	28	Asbst. Insltn.	–	–	44	Tie Rod
35	16	11	Nut Lock	15	11	29	End Cov. R.H.	18	–	46	Screed Plate Ay. R.H.
35	18	12	Collar	15	12	30	Htr. Cov. Plt. L.H.	18	–	48	Screed Plate Ay. L.H.
35	10	14	Nut	15	13	31	Heat Cov. L.H.	–	–	50	Step
35	9	15	Locknut	15	14	32	Asbts. Insit.	–	–	51	Tank
35	17	16	Nut	15	15	33	Clamp	–	–	52	Filler Cap
35	1	17	Indicator	15	16	34	Htr. Cov. Pl. L.H.	–	–	53	Dipstick

FIGURE J-22 – Screed Assembly – Tamper (Continued)

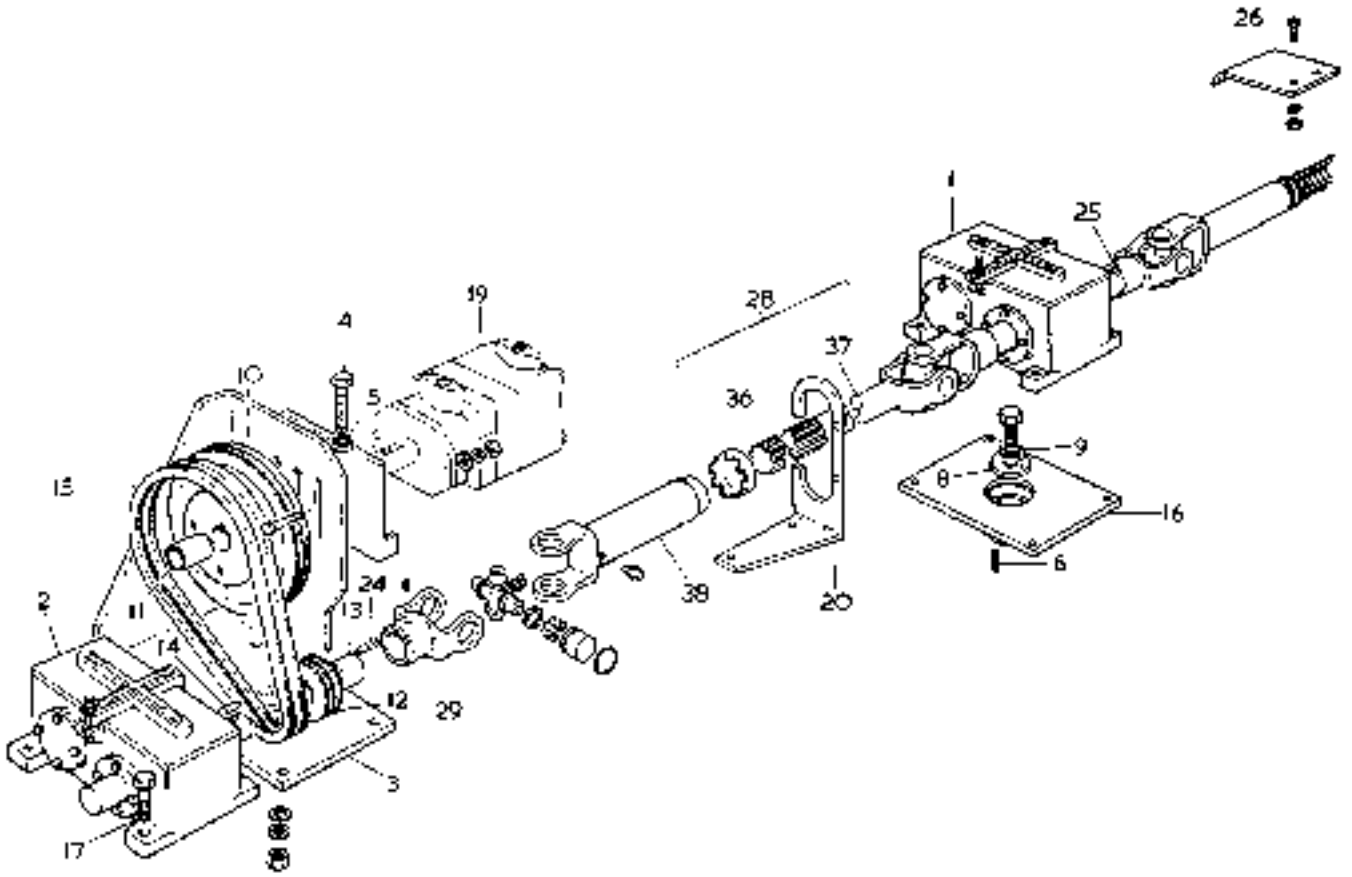
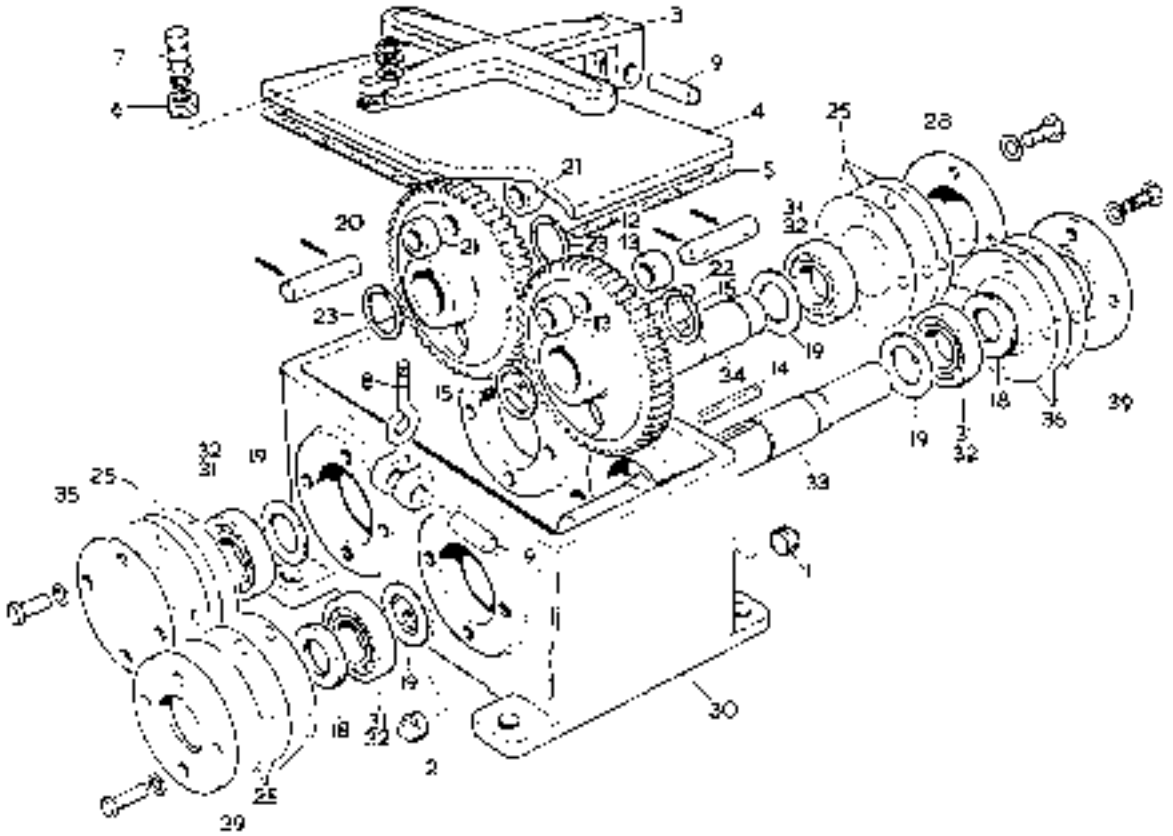


FIGURE J-23 – Vibrator Boxes and Drives

Parts Book Page	Parts Ref. No.	OSM Item No.	Description
16	5	1	Vibrator (Driven)
16	6	2	Vibrator (Driving)
16	10	3	Vibrator Mount
16	11	4	Setscrew
16	12	5	Jam Nut
16	14	6	Key
16	16	8	Washer
16	17	9	Roll Pin
16	19	10	Sheave
16	–	11	Bushing
16	22	12	Sheave
16	–	13	Bushing
16	–	14	Key
16	26	15	V-Belt
16	–	16	Vibrator Mount
16	–	17	Hex. Hd. Bolt
19	24	19	Hydraulic Motor
16	–	20	Shaft Guard
16	–	24	Key
16	–	25	Key
16	–	26	Guard
16	32	28	U-Joint
27	1	29	Plain Yoke
27	4	–	Joint Repair Kit
27	3	36	Dust Cap Group
27	5	37	Yoke & Splined Shaft
27	2	38	Slip Yoke & Tube Assembly

FIGURE J-23 - Vibrator Boxes and Drives (Continued)



Parts Book Page	Parts Ref. No.	OSM Item No.	Description
18	4	1	Plug
18	5	2	Magnetic Drain Plug
18	8	3	Clamp
18	9	4	Cover
18	10	5	Gasket
18	11	6	Plug
18	12	7	Air Vent
18	17	8	Eye Bolt
18	18	9	Roll Pin
18	24	12	Spur Gear
18	25	13	Ecc. Weight
18	27	14	Key
18	28	15	Retaining Ring
18	37	18	Oil Seal
18	38	19	Thrust Race
18	49	20	Spur Gear
18	50	21	Ecc. Weight
18	52	22	Key
18	53	23	Retaining Ring
18	57	25	Shim
18	60	28	End Cap
18	70	30	Gear Housing
18	76	31	Cup
18	77	32	Cone & Roller
18	79	33	Shaft
18	80	34	Shaft
18	81	35	End Cap
18	87	36	Shim
18	85	39	Seal Retainer
6	–	13	Ecc. Weight

FIGURE J-24 — Vibrator Box

VIBRATORY BOXES

A. REMOVAL (Refer to Figure J-23)

1. Release tension on V-belts and remove belts from motor drive pulley.
2. Remove setscrews from U-joints.
3. Remove four mounting bolts (17) and remove box.

B. DISASSEMBLY (Refer to Figure J-24)

1. Remove drain plug (2) and drain lubricant from housing.
2. Loosen nut on clamp (3) and remove cover.
3. Remove end caps (29) and bearings (31 and 32) and thrust bearings (19).
4. Remove retaining ring (15) and remove shaft (33) and spur gear (12).
5. Remove end caps (28 and 35), bearings (31 and 32) and thrust bearing (19).
6. Remove retaining ring (23) and remove shaft (34) and spur gear (20).

C. CLEAN, INSPECT AND REPAIR

1. Clean all parts in cleaning solvent and dry thoroughly.
2. Inspect case for cracks, breaks, or other damage. Repair or replace material as necessary.
3. Inspect all gears for cracks, breaks, and chipped, worn or damaged teeth. Replace a damaged or defective gear as necessary.
4. Inspect the bearings, check races for cracks, breaks, excessive wear or other damage. Replace a worn, damaged, or defective bearing as necessary.
5. Inspect all shafts for cracks, breaks, scoring, burrs, or signs of wear. Replace a worn, defective, or damaged shaft as necessary.

D. REASSEMBLY (Refer to Figure J-24)

1. Place spur gear (20) in case and install key (22), retaining ring (23), and shaft (34).
2. Install thrust bearing, bearing cups (31), roller bearings (32), shims (25), and end caps (28 and 35).

NOTE: Adjust bearing end play for .001 to .003 with shims (25).

---

3. Follow above procedure for installing shaft (33) and spur gear (12).
4. Reinstall vibrator box, U-joints, and V-belts. Refer to Section II, for timing and V-belt adjustment.

SCREED PLATES (Refer to Figure J-25)

A. REMOVAL

1. Remove vibrator boxes as described under "Vibrator Box Removal".
2. Remove bolt holding vibrator mount (16, Figure J-24) to screed plate.
3. Remove nuts (23, Figure J-24) holding screed plate (17) to screed frame (52).
4. Remove bolts (15) and clamp plates (13) holding screed plates together.

B. CLEAN, INSPECT AND REPAIR

1. Clean all parts in cleaning solvent and dry thoroughly.
2. Inspect for cracks, breaks, or other damage. Repair or replace damaged material as necessary.
3. Inspect cover (53) and insulation (54) for excessive burning and pitting.

C. REASSEMBLY

1. Join the screeds together with clamps (13) and bolts (15) and check with straight edge.

NOTE: When installing new screed plates always use new clamping bolts (15).

---

2. Bolt screed plates to main frame.
3. Install mounting plates (16).
4. Install vibrator boxes, U-joint and V-belts. Refer to Section II, for timing and V-belts adjustment.
5. If plates are convex or concave, at the point where they are joined together, remove with compression screw (49).

CROWN CONTROL ASSEMBLY

The screed is hinged at the bottom by parts (13, 16, 18 and 19). Crown adjustment is made by means of the two crown control screws at the top center of the screed frame. A crown indicator (7) is bolted to the frame.

A. REMOVAL AND INSTALLATION

1. Uncouple connecting chain (5, Figure J-25).
2. Remove nut (6), bearing (3) and crown adjustment screw (1 and 2).
3. Remove bolts and remove crown indicator bar (7).

NOTE: Support screed unit on four blocks for this operation.

B. CLEAN, INSPECT AND REPAIR

1. Clean all parts in cleaning solvent and dry thoroughly.
2. Inspect screws and nuts for cracks, breaks, damaged threads or other damage. Repair or replace damaged parts as necessary.
3. Inspect thrust bearings for cracks, breaks, scoring, or other damage. Repair or replace damaged parts as necessary.
4. Inspect sprocket and chain for correct operation cracks, breaks, or excessive wear. Repair or replace damaged or worn parts as necessary.

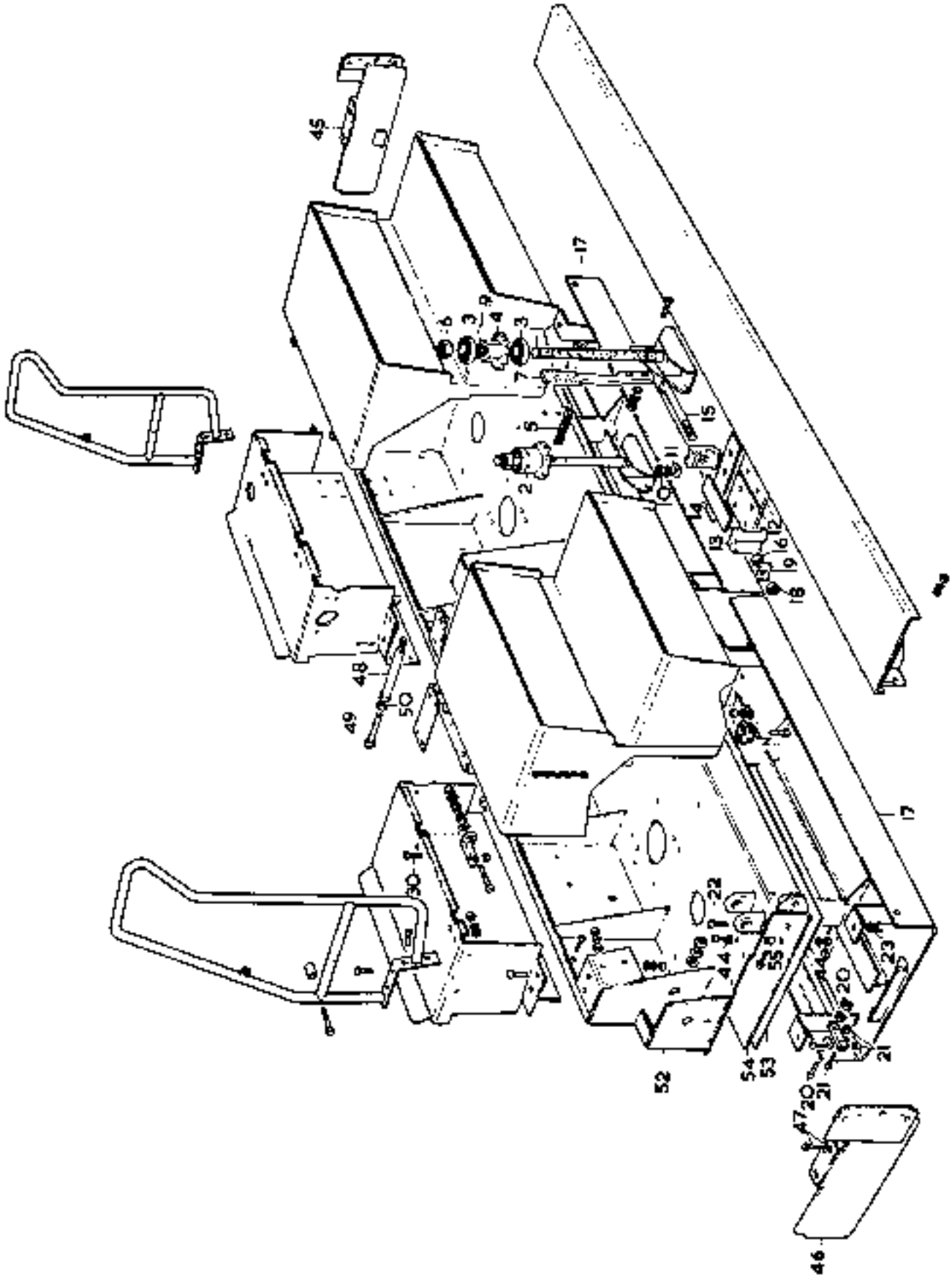


FIGURE J-35 — Screed Assembly – Vibratory

Parts Book Page	Parts Ref. No.	OSM Item No.	Description	Parts Book Page	Parts Ref. No.	OSM Item No.	Description	Parts Book Page	Parts Ref. No.	OSM Item No.	Description
5	4	1	Crown Adjustment	14	12	15	Sq. Hd. Mach. Bolt	9	17	44	Hex. Hd. Capscrew
5	6	2	Crown Adjustment	14	13	16	Collar	9	–	45	End Cover Plate
5	8	3	Thrust Bearing	14	14	–	Lock Nut	9	–	46	End Cover Plate
5	10	4	Nut Sprocket	14	3	17	Screed Plate	9	9	47	Hex. Hd. Capscrew
5	12	5	Chain	14	15	18	Hex. Nut	9	20	48	Compression Spacer
5	14	6	Nut	14	16	19	Hold Down	9	21	49	Compression Screw
5	18	7	Crown Indicator	14	–	20	Flat Hd. Screw	9	22	50	Jam Nut
5	–	9	Shim	14	–	–	Jam Nut	9	4	52	Main Frame
14	7	10	Hex. Nut	14	18	21	Sq. Hd. Setscrew	9	13	53	Cover
14	9	12	Tie Plate	14			Jam Nut	9	14	54	Insulation
14	10	13	Clamp Plate	14	19	22	Hex. Hd. Capscrew	9	16	55	Pipe
14	11	14	Keeper Plate	14	20	23	Hex. Nut				

FIGURE J-25 – Screed Assembly – Vibratory (Continued)

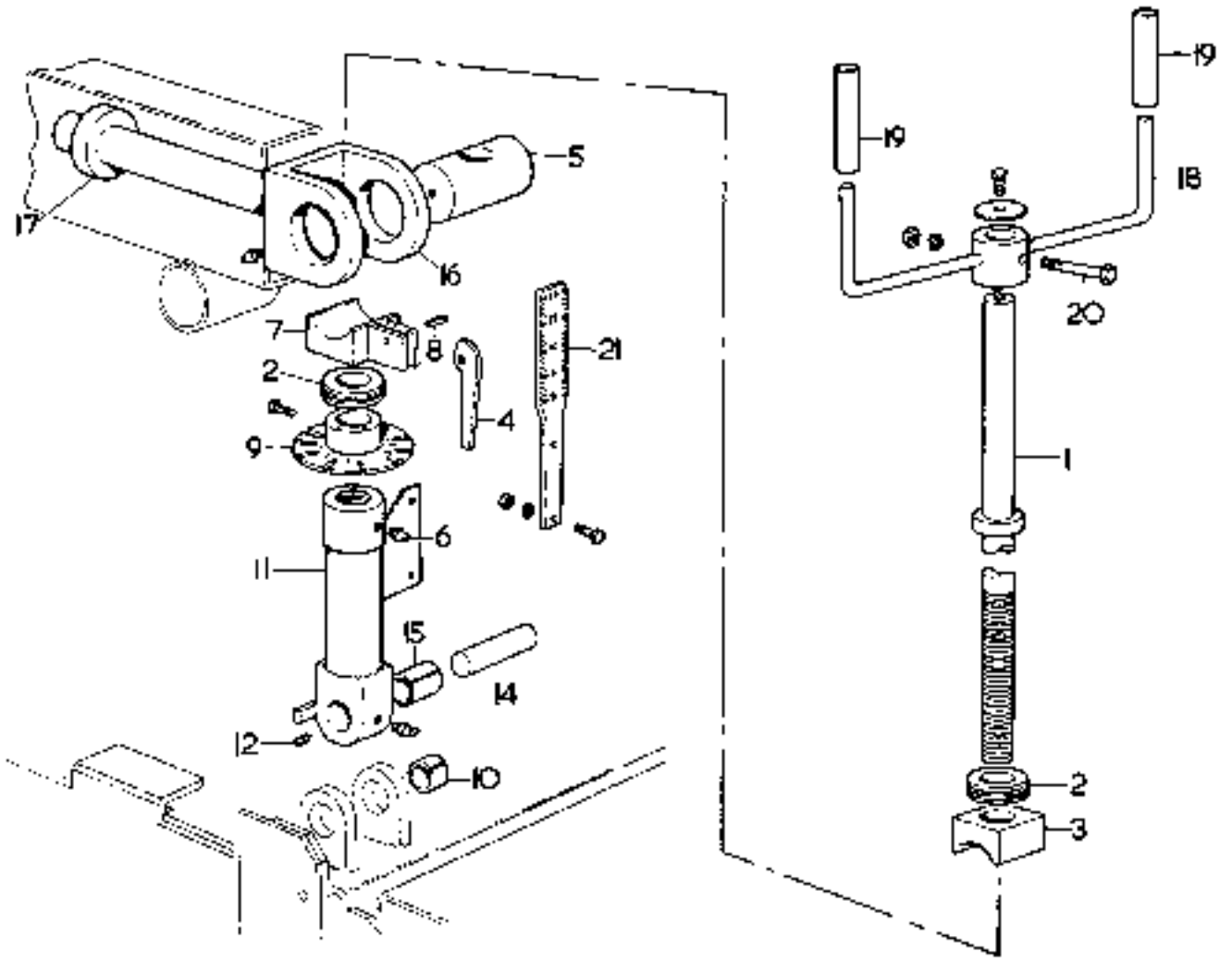


FIGURE J-26 – Thickness Control – Vibratory

Parts Book Page	Parts Ref. No.	OSM Item No.	Description	Parts Book Page	Parts Ref. No.	OSM Item No.	Description
15	2	1	Screw Shaft	15	17	11	Body
15	4	2	Thrust Bearing	15	20	12	Setscrew
15	6	3	Spacer	15	25	14	Pin
15	8	4	Stop	15	26	15	Sleeve
15	10	5	Yoke Shaft	15	29	16	Yoke
15	12	7	Spacer	15	30	17	Collar
15	13	8	Roll Pin	15	33	18	Hand Control
15	15	9	Indicator	15	34	19	Grip
15	16	10	Bushing	15	37	21	Gauge

FIGURE J-26 – Thickness Control – Vibratory (Continued)

HEATING SYSTEM

The heating system consists of burner fuel pump, blower, burners, combustion chambers, hot air chambers and necessary pipe and connections to make up fuel lines.

BURNER EQUIPMENT ASSEMBLY

A. REMOVAL AND DISASSEMBLY

1. Remove fuel lines and burner piping (Figure J-27).
2. Remove motor (7), blower (6), fuel pump (17), and support. Refer to Burner Fuel Pump below for disassembly.
3. Disconnect air ducts (11), remove blast tubes (12) and combustion chambers (2).

B. CLEAN, INSPECT AND REPAIR

1. Clean all metal parts in cleaning solvent and dry thoroughly.
2. Inspect fuel lines, hoses and piping, fittings and connections for cracks, breaks, or other damage. Repair or replace damaged or defective parts as necessary.
3. Inspect air ducts, blast tubes and combustion chamber for general condition. Since the blast tubes and combustion chambers are subject to direct flame and high temperatures, rust and deterioration is rapid. Replace or repair defective parts as necessary.

C. REASSEMBLY AND INSTALLATION

Reassemble and install burner and fuel system by reversing procedures described for removal and disassembly.

SCREED HEATING CHAMBER

A. REMOVAL AND DISASSEMBLY

1. Remove blast tube (12, Figure J-27) and combustion chamber (2).
2. Remove screed heating chambers by removing attaching hardware. Remove bolts and separate cover plate (30), cover (31) and asbestos insulator (32), Figure J-22.

B. CLEAN, INSPECT AND REPAIR

1. Clean all metal parts in cleaning solvent and dry thoroughly.
2. Inspect all parts for general condition. Since the heating chambers are subject to direct flame, and high temperatures, rust and deterioration is rapid. Replace and repair parts as necessary.

C. REASSEMBLY AND INSTALLATION

Reassemble and install heating chambers in reverse order of procedure described for removal and disassembly above.

BURNER FUEL PUMP ASSEMBLY

A. DISASSEMBLY

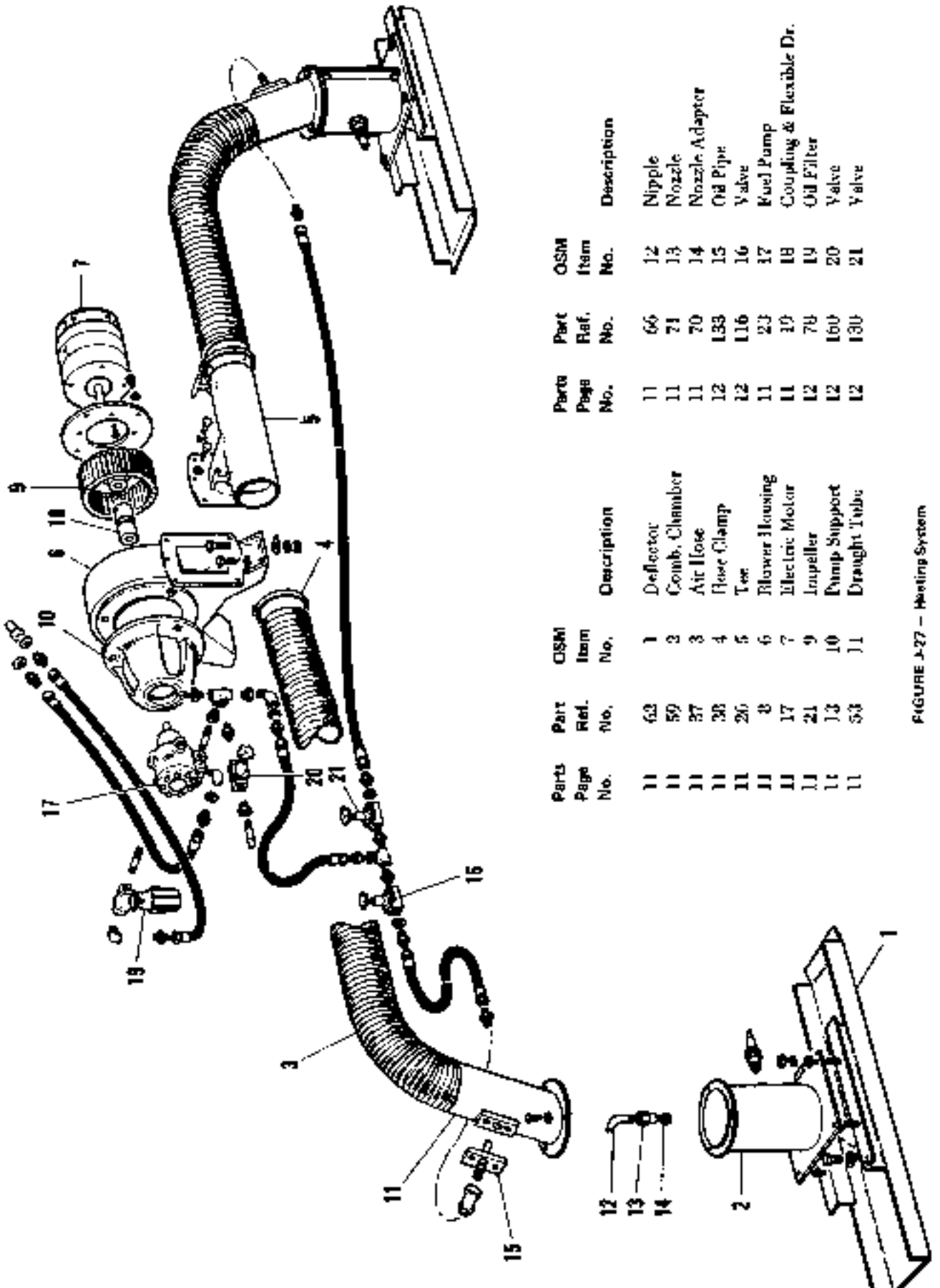
Disassemble burner fuel pump as shown by Figure J-28.

B. CLEAN, INSPECT AND REPAIR.

1. Clean all metal parts in cleaning solvent and dry thoroughly.
2. Inspect pump body, cover spacer, and cover for cracks, breaks or signs of damage. Replace defective parts.
3. Inspect strainer for holes or bent or damaged condition. Inspect shaft, piston, sleeve and pump body bore for nicks, burrs or signs of excessive wear. Replace damaged or defective parts.
4. Inspect pressure spring and seal springs for cracks, breaks or signs of weakness. Inspect plugs cap nuts, and port openings for stripped or damaged threads. Replace defective or damaged parts.
5. It is advisable to install new seals and gaskets when rebuilding pump.

C. PRESSURE ADJUSTMENT

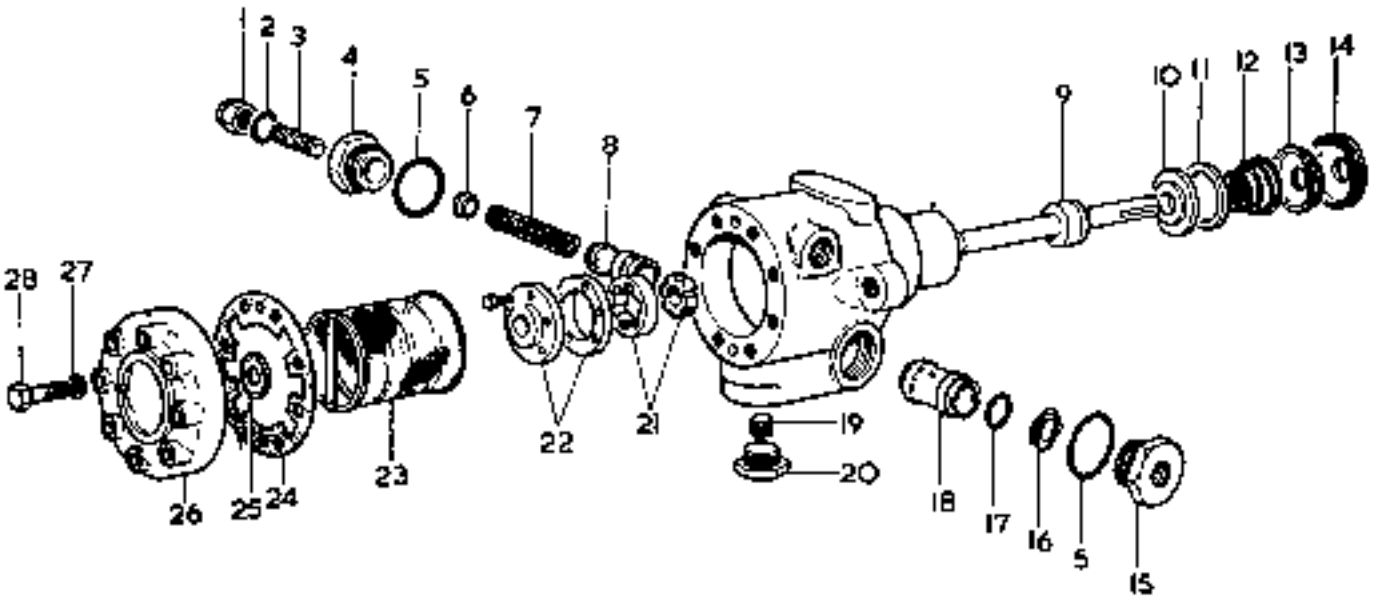
After pump has been reassembled, and before installing on machine, adjust pump pressure relief valve to by-pass at 140 to 145 PSI.



Parts Page No.	Part Ref. No.	OSHI Item No.	Description
11	62	1	Deflector
11	59	3	Comb. Chamber
11	37	3	Air Hose
11	38	4	Hose Clamp
11	26	5	Tee
11	8	6	Blower Housing
11	17	7	Electric Motor
11	21	9	Impeller
11	13	10	Pump Support
11	58	11	Draught Tube

Parts Page No.	Part Ref. No.	OSHI Item No.	Description
11	66	12	Nipple
11	71	13	Nozzle
11	70	14	Nozzle Adapter
12	133	15	Oil Pipe
12	116	16	Valve
11	23	17	Fuel Pump
11	19	18	Coupling & Flexible Dr.
12	78	19	Oil Filter
12	160	20	Valve
12	130	21	Valve

FIGURE J-27 – Heating System



Parts Page No.	Part Ref. No.	OSM Item No.	Description	Parts Page No.	Part Ref. No.	OSM Item No.	Description
13	1	1	Cap Nut	13	12	15	Nozzle Plug Ay.
13	2	2	Cap Gasket	13	11	16	Sleeve Ret.
13	3	3	Pres. Adjust. Screw	13	10	17	"O" Ring
13	4	4	End Plug	13	9	18	Piston Sleeve
13	5	5	Plug Gasket	13	25	19	By-Pass Plug
13	6	6	Spring Seat	13	29	20	Inrk. & Ret. Plug
13	7	7	Pres. Adjust. Spring	–	–	21	Gear Set
13	8	8	Piston Ay.	–	–	22	Gear Housing
13	18	9	Shaft Ay.	13	20	23	Strainer
13	17	10	Seal Ay.	13	21	24	Cov. & Spcr. Gasket
13	16	11	Washer	13	28	25	Anti-Bum Wafer
13	15	12	Seal Spring	13	22	26	Cover
13	14	13	Seal Cap	13	23	27	Screw Gasket
13	13	14	Seal Cap	13	24	28	Cover Screw

FIGURE J-28 – Fuel Pump

HYDRAULIC RELIEF VALVE BARBER GREENE P/N 12060

Adjustment and replacement of Relief Valve used in hydraulic valve banks on SA & SB41 Finishers.

A. BLOCK DISASSEMBLY:

1. Remove end cap opposite gauge port end.
2. Remove end cap gauge port end.
3. Remove Stop, "O" Ring and Spring from gauge port end.
4. Remove relief valve by pushing it out through the gauge port end.

B. RELIEF VALVE CHECK OUT:

1. Check to see if needle valve is seated properly. This is accomplished by pressing in on needle and letting it return to its original seated position.
2. Blow through the needle end of relief valve. If you can blow through the valve, the needle has not seated and the valve will have to be disassembled.

If you cannot blow through valve, the valve is okay and can be assembled back into the block.

C. RELIEF VALVE DISASSEMBLY:

NOTE: This is only necessary when you can blow through valve.

1. Before removing Allen Head Set Screw, *read the following.*

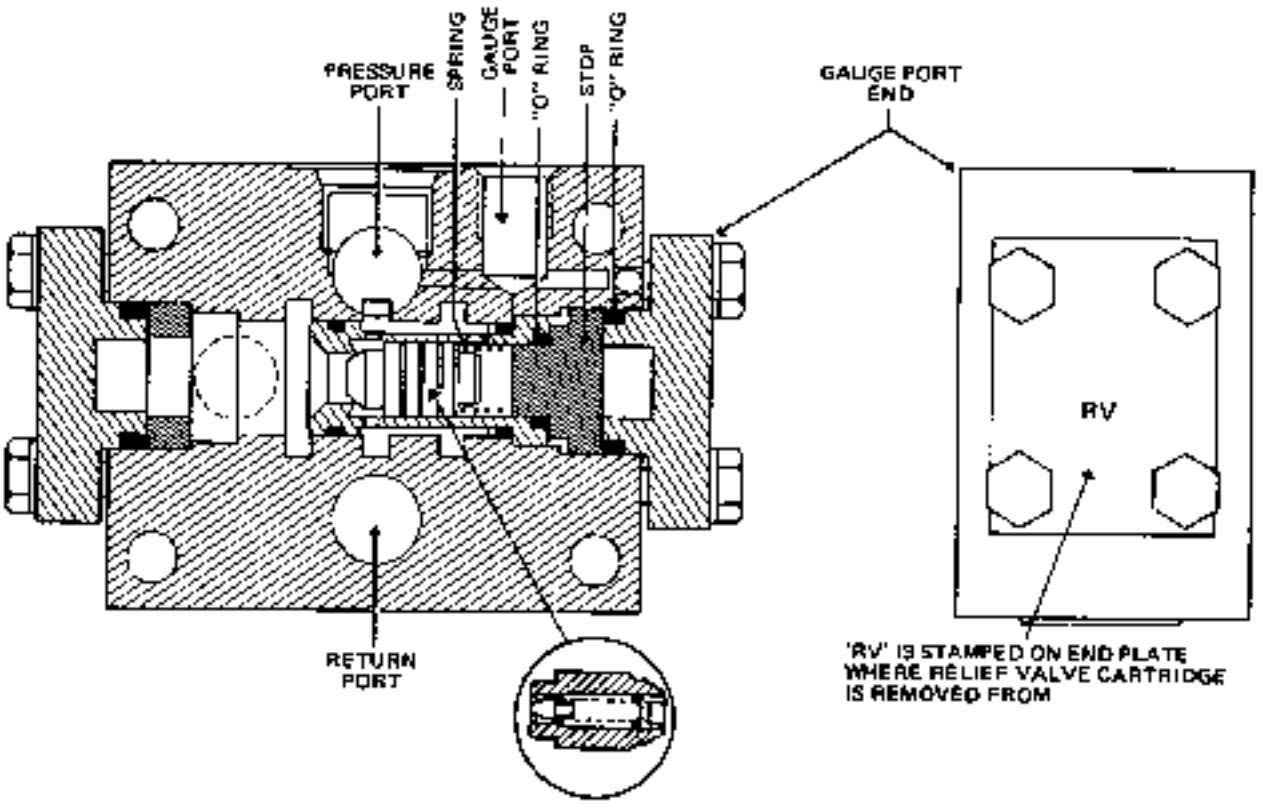


FIGURE J-29 — Barber Greene P/N 12D60

NOTE: Set screw should be replaced in its original position. When removing, be sure to count revolutions for reassembly purpose. Each 360° turn of set screw changes PSI of relief valve 1000 PSI.

Turn set screw in to increase pressure.
Turn set screw out to decrease pressure.

2. Remove Allen head set screw.
3. Remove spring and needle.
4. Clean and inspect parts for contamination.
5. Reassemble valve in reverse order, paying particular attention to cleanliness.
6. Before installing unit into block, check valve by blowing into needle end.
7. Valve block can then be reassembled in reverse as described in section A.

CAUTION: When reinstalling stem, be sure it is lined up properly.

SOLENOID VALVE WITH RELIEF
BARBER GREENE P/Ns 12D59, 12F28, 12F29 & 12F88

Adjustment and replacement of Relief Valve used in hydraulic valve banks on SA & SB41 Finishers.

A. SOLENOID VALVE DISASSEMBLY:

1. Remove the complete coil assembly by removing the four ⅜" bolts.
2. Remove the stop. This is a tight fit due to the "O" ring. Be careful not to damage the "O" ring and stop. The rod, washer and spring "A" will come out with the stop.
3. Remove ball seat and ball.
4. Remove spring "B" and pull out the valve assembly.

B. RELIEF VALVE CHECK OUT:

1. Check to see if the needle valve is seated properly. This is accomplished by pressing in on needle and letting it return to its original position.
2. Blow through the needle end of relief valve. If you can blow through the valve, the needle has not seated and the valve will have to be disassembled. If you cannot blow through the valve, the valve is okay and can be assembled back into the block.

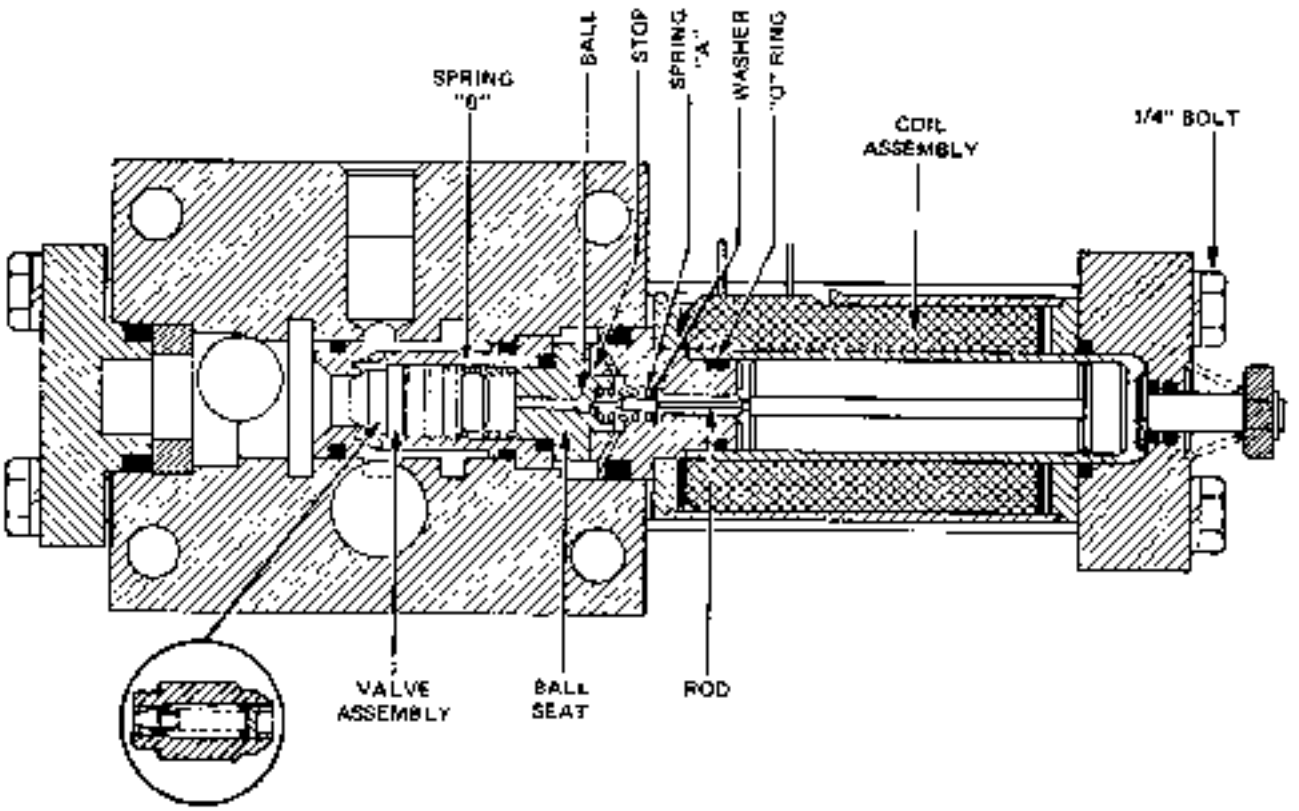


FIGURE J-30 – Solenoid Valve with Relief

C. RELIEF VALVE DISASSEMBLY:

NOTE: This is only necessary when you can blow through valve.

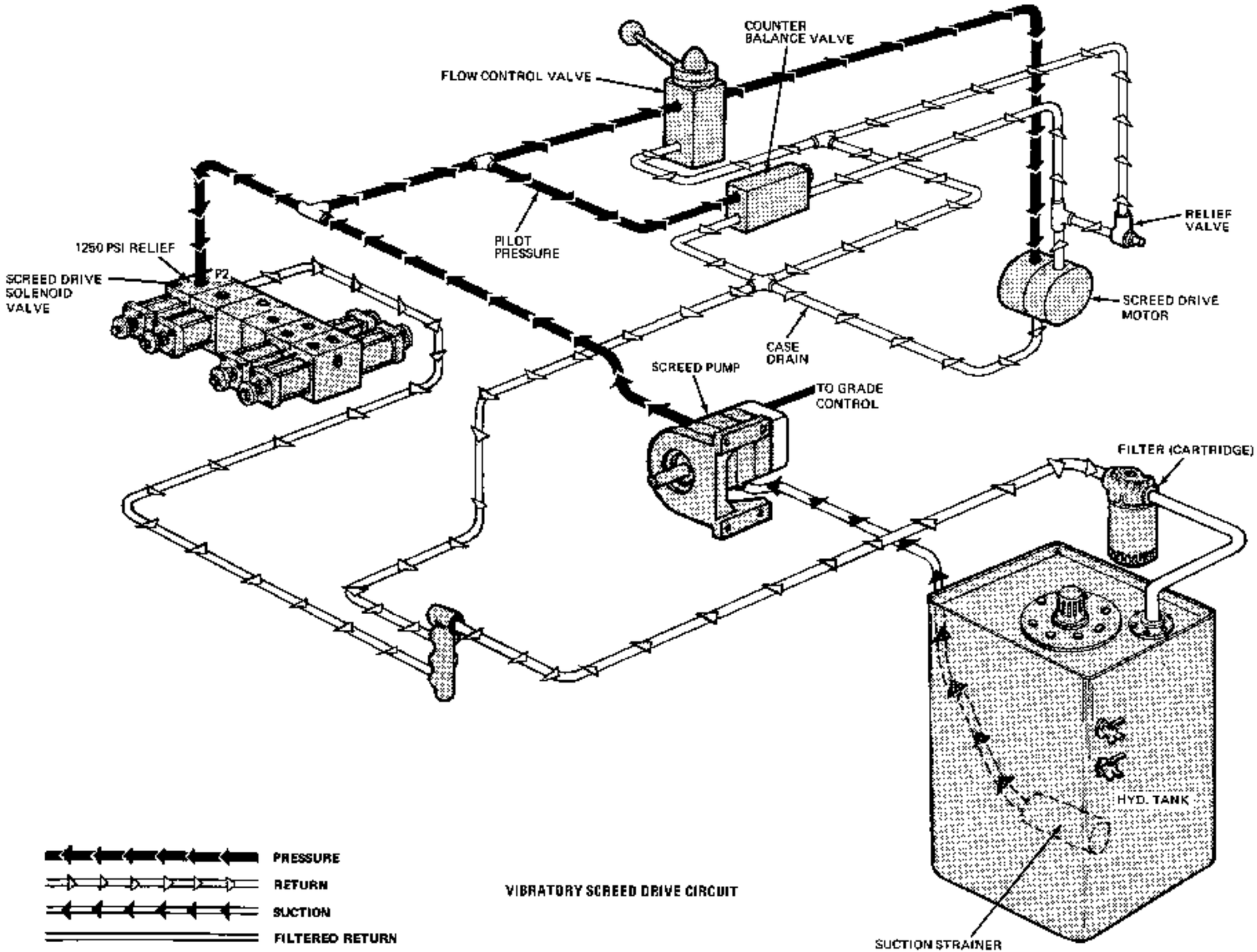
1. Before removing Allen Head Set Screw, *read the following.*

NOTE: Set screw should be replaced in its original position. When removing, be sure to count revolutions for reassembly purpose. Each 360° turn of set screw changes PSI of relief valve 1000 PSI.

Turn set screw in to increase pressure.
Turn set screw out to decrease pressure.

2. Remove Allen head set screw.
3. Remove spring and needle.
4. Clean and inspect parts for contamination.
5. Reassemble valve in reverse order, paying particular attention to cleanliness
6. Before installing unit into block, check valve by blowing into needle end.
7. Solenoid valve can then be reassembled in reverse as described in section A.

NOTE: Torque coil bolts to 55 in. lbs.



VIBRATORY SCREED DRIVE CIRCUIT

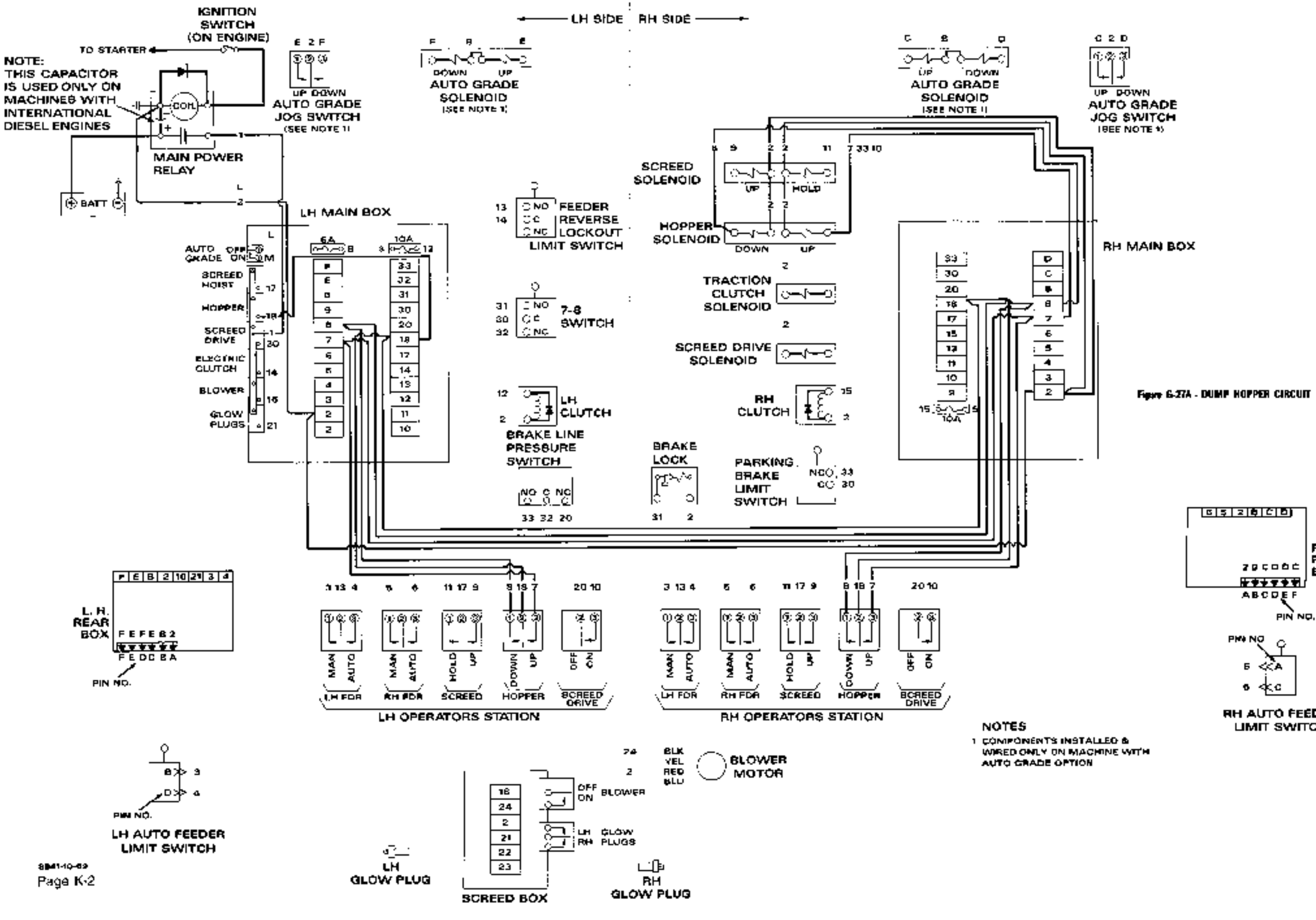


Figure 6-27A - DUMP HOPPER CIRCUIT

NOTES
1 COMPONENTS INSTALLED & WIRED ONLY ON MACHINE WITH AUTO GRADE OPTION

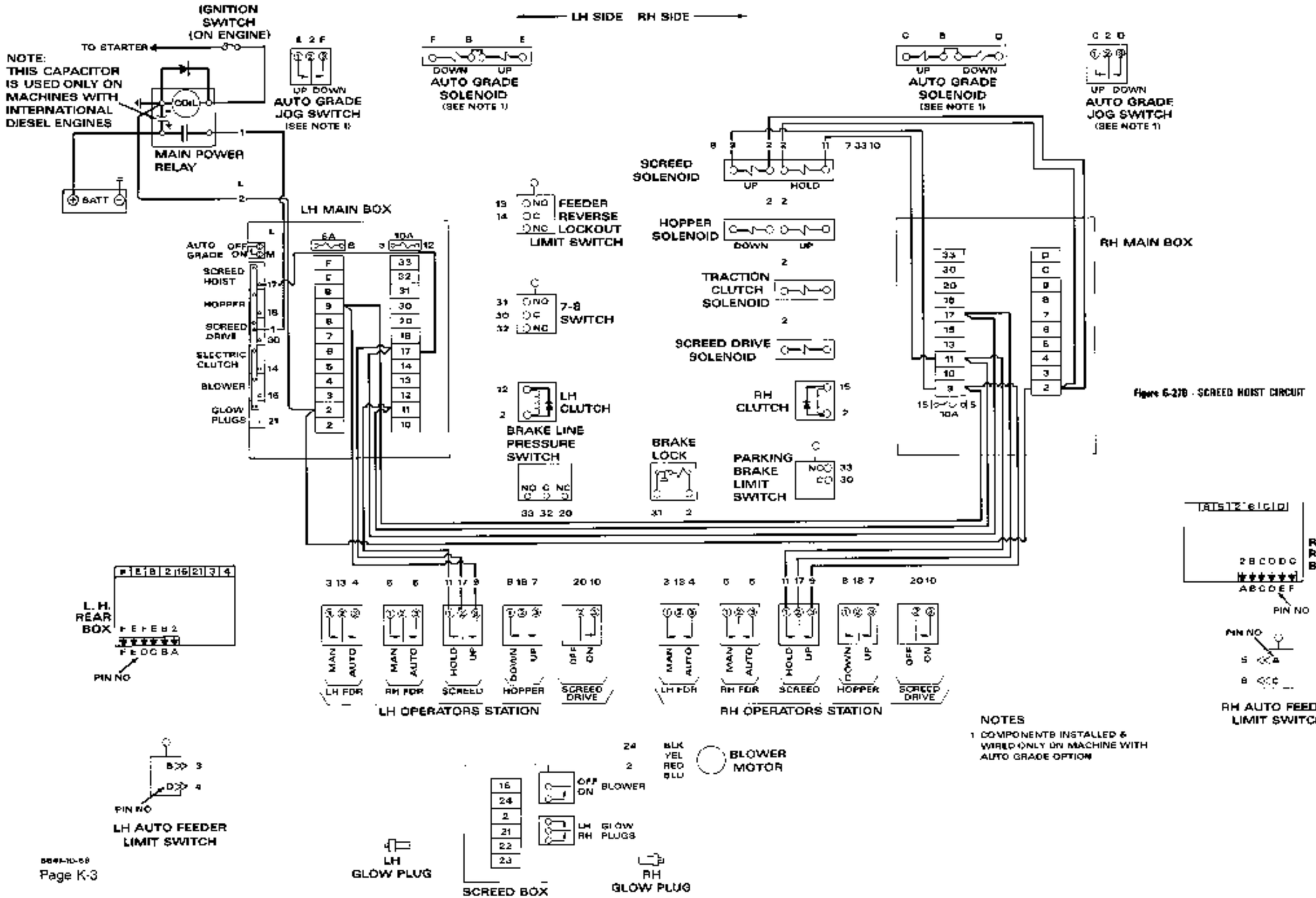


Figure 6-27B - SCREED HOIST CIRCUIT

NOTES

1 COMPONENTS INSTALLED & WIRED ONLY ON MACHINE WITH AUTO GRADE OPTION

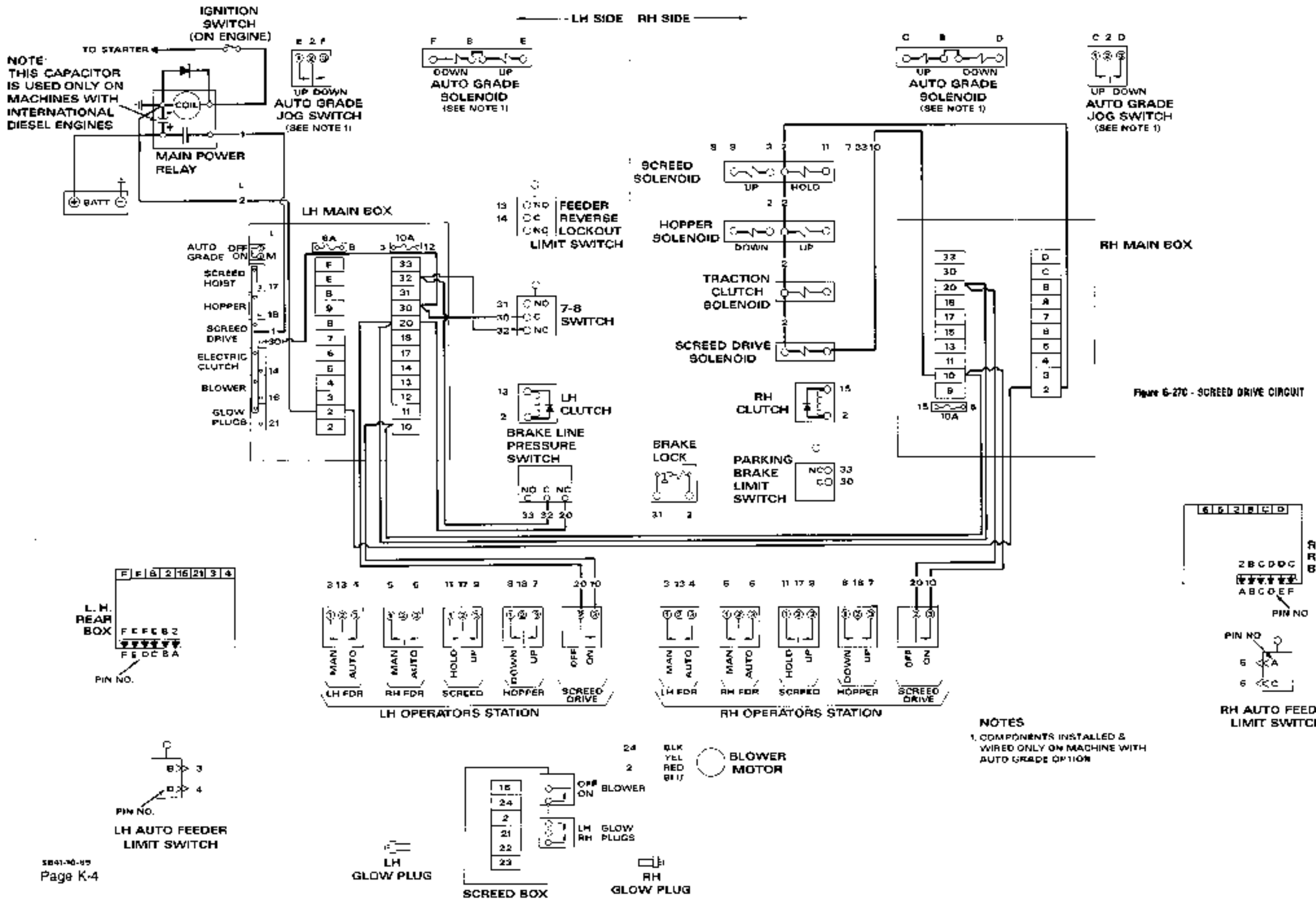


Figure 6-27C - SCREED DRIVE CIRCUIT

NOTES

1. COMPONENTS INSTALLED & WIRED ONLY ON MACHINE WITH AUTO GRADE OPTION

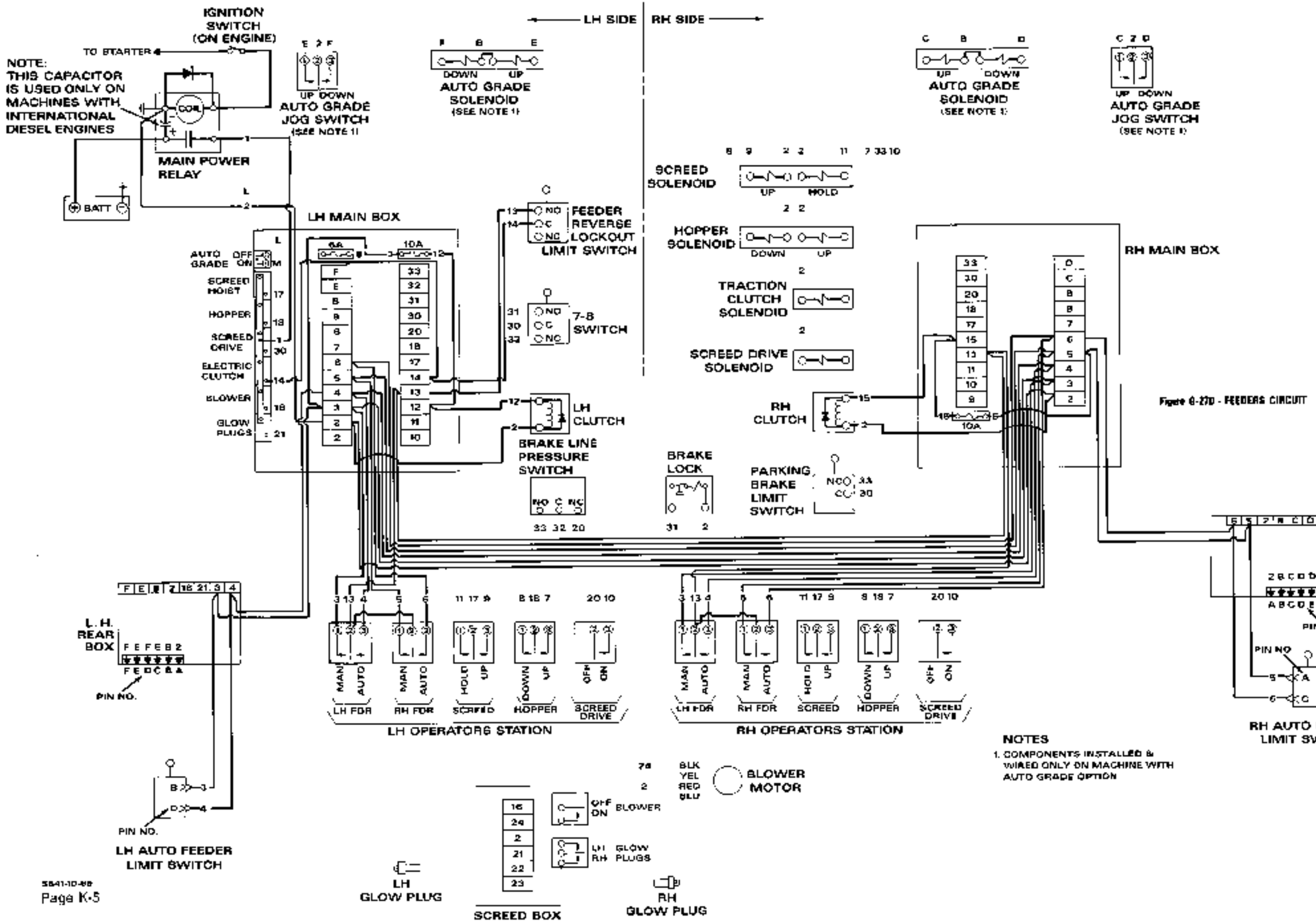


Figure 6-270 - FEEDERS CIRCUIT

NOTES

1. COMPONENTS INSTALLED & WIRED ONLY ON MACHINE WITH AUTO GRADE OPTION

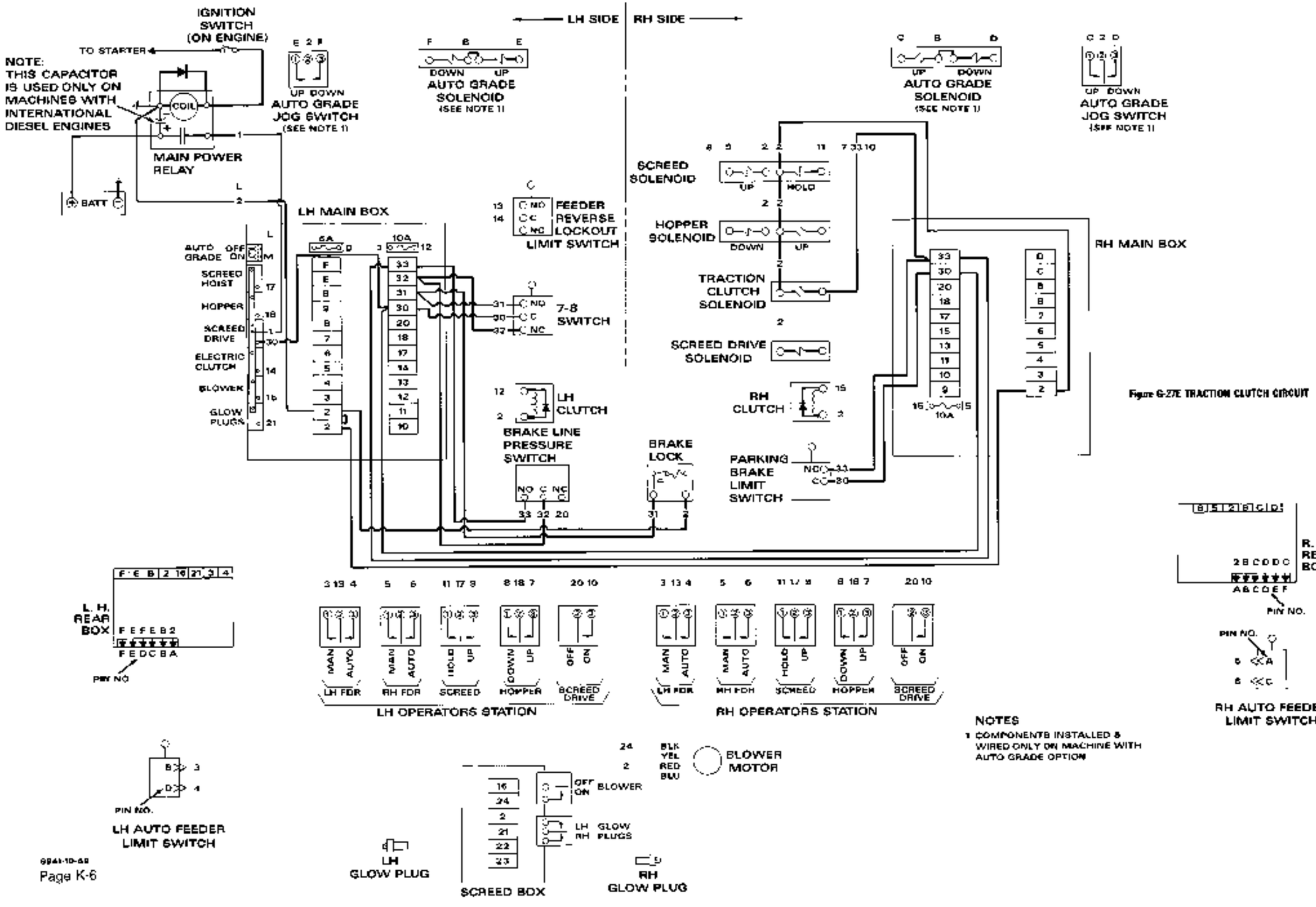


Figure G-27E TRACTION CLUTCH CIRCUIT

NOTES
1 COMPONENTS INSTALLED & WIRED ONLY ON MACHINE WITH AUTO GRADE OPTION

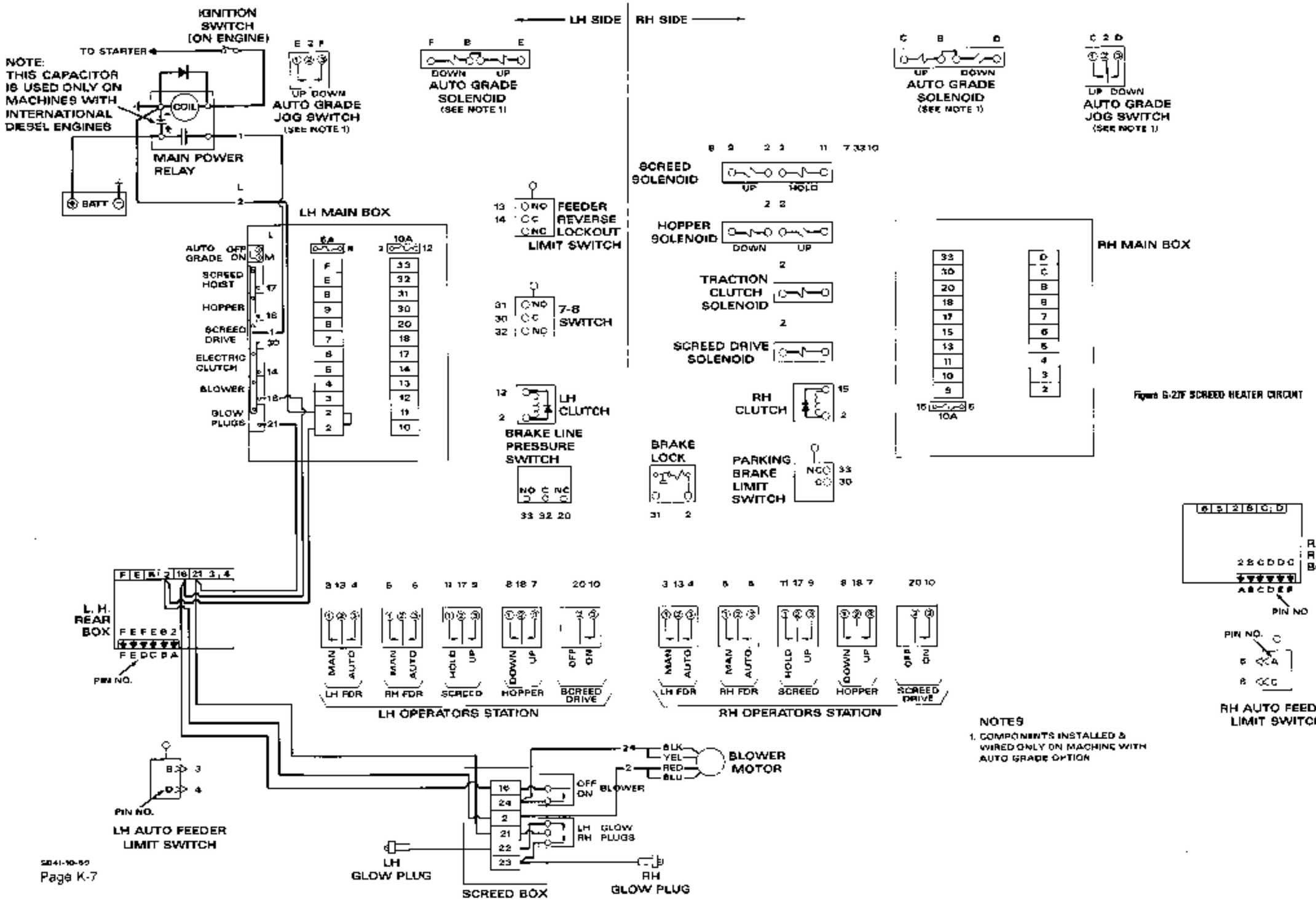


Figure G-27F SCREED HEATER CIRCUIT

NOTES
1. COMPONENTS INSTALLED & WIRED ONLY ON MACHINE WITH AUTO GRADE OPTION

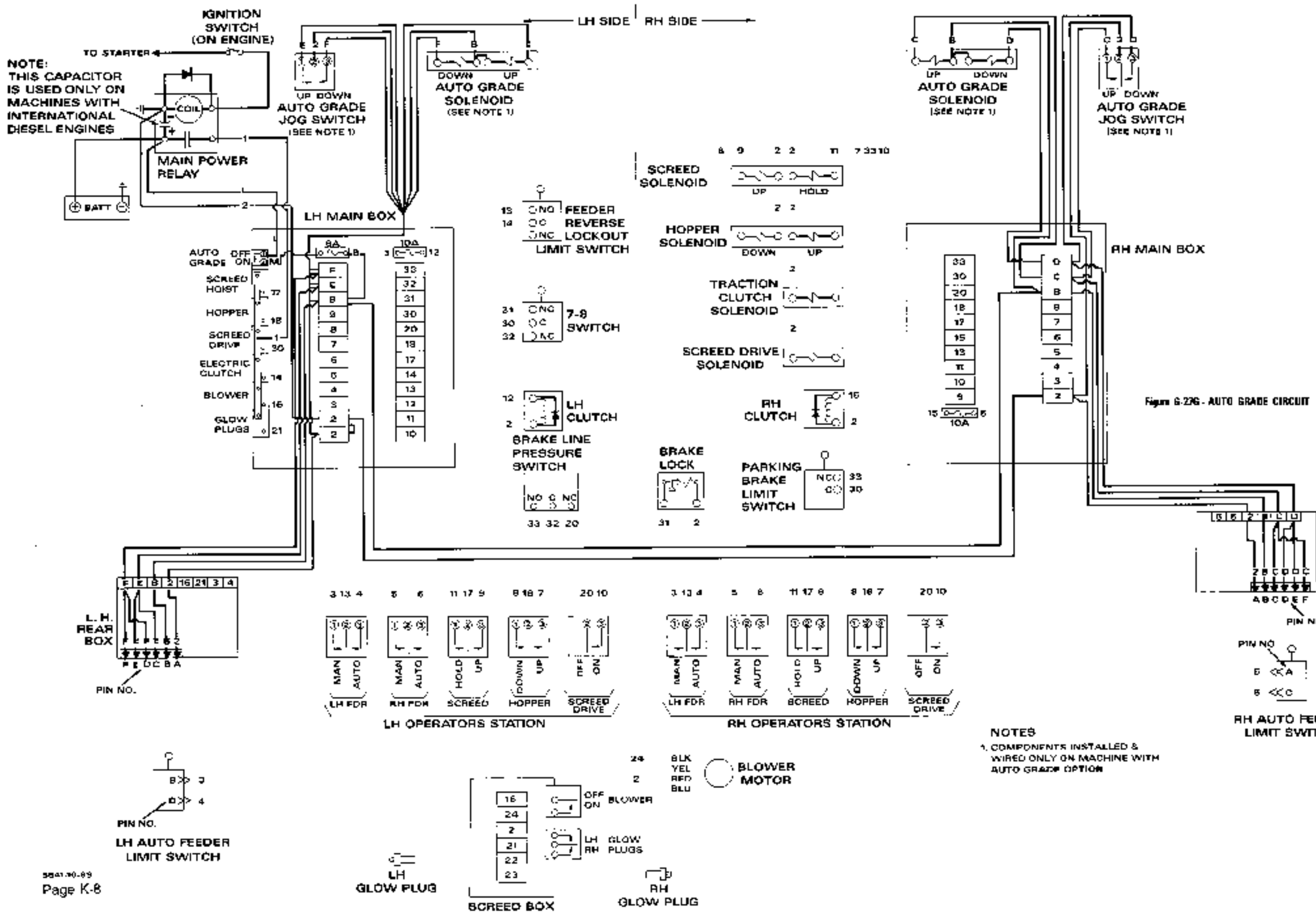


Figure 6-23G - AUTO GRADE CIRCUIT

NOTES

1. COMPONENTS INSTALLED & WIRED ONLY ON MACHINE WITH AUTO GRADE OPTION

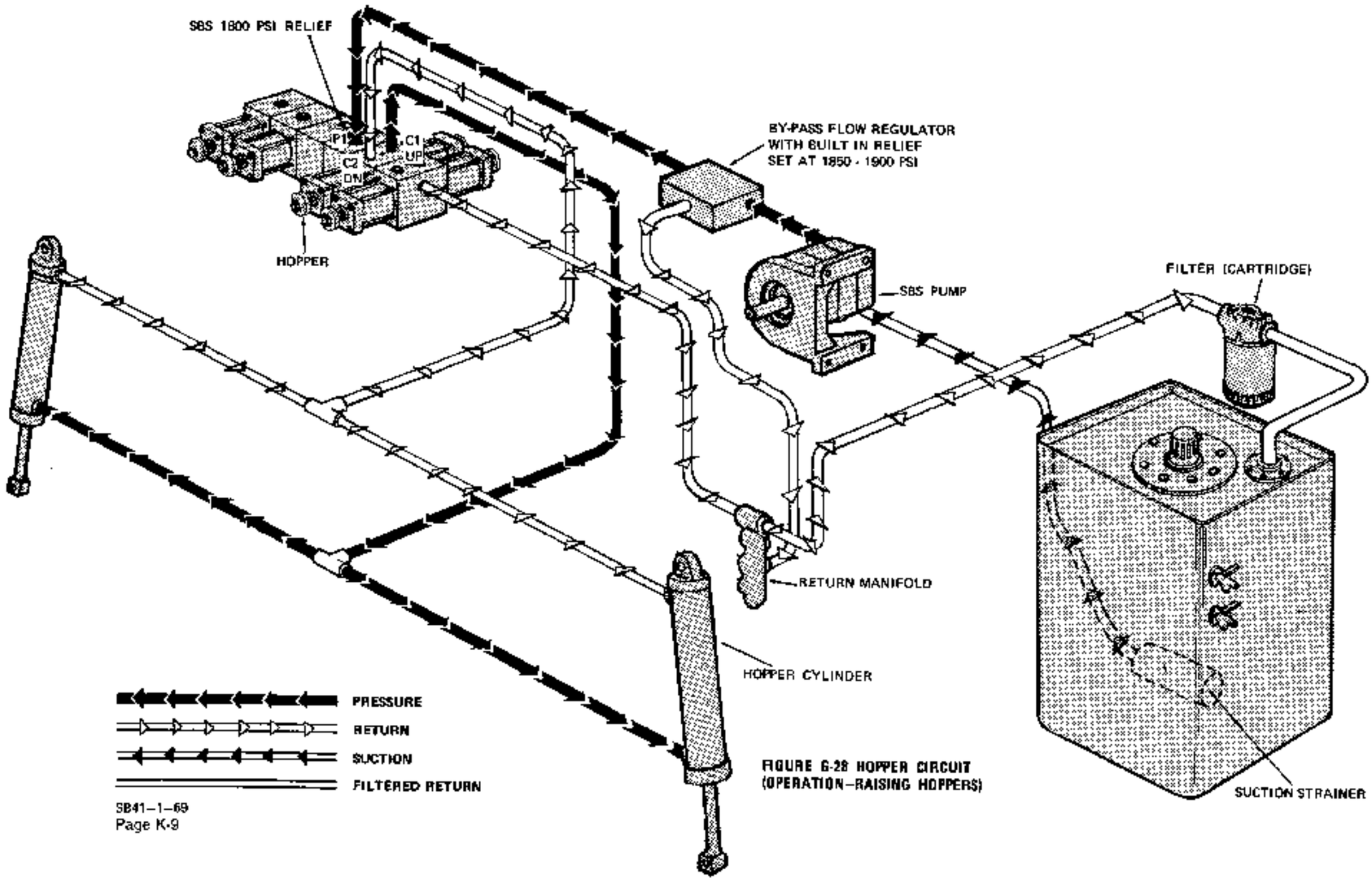
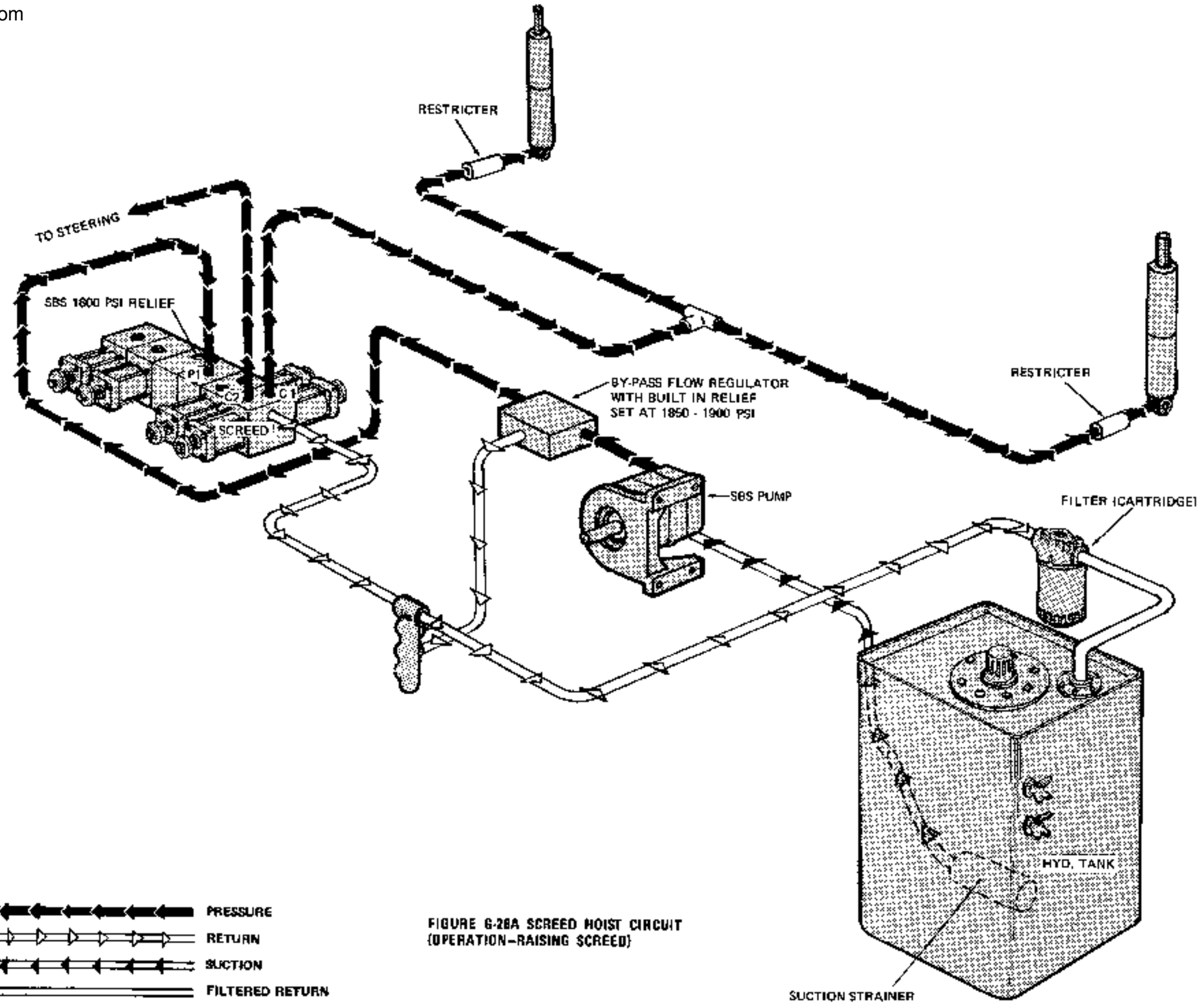


FIGURE 6-28 HOPPER CIRCUIT
(OPERATION–RAISING HOPPERS)



PRESSURE
RETURN
SUCTION
FILTERED RETURN

FIGURE G-28A SCREED HOIST CIRCUIT
(OPERATION–RAISING SCREED)

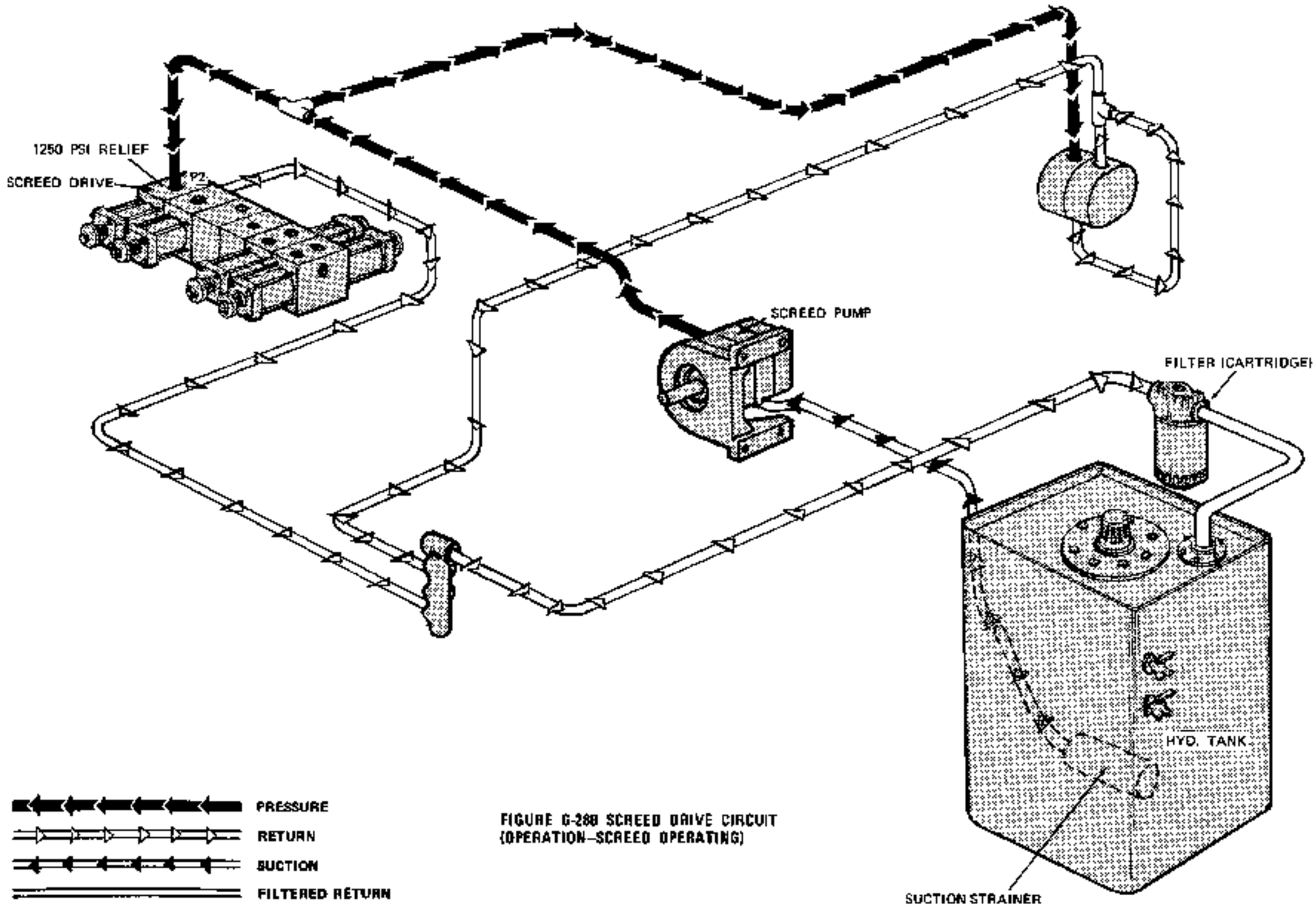
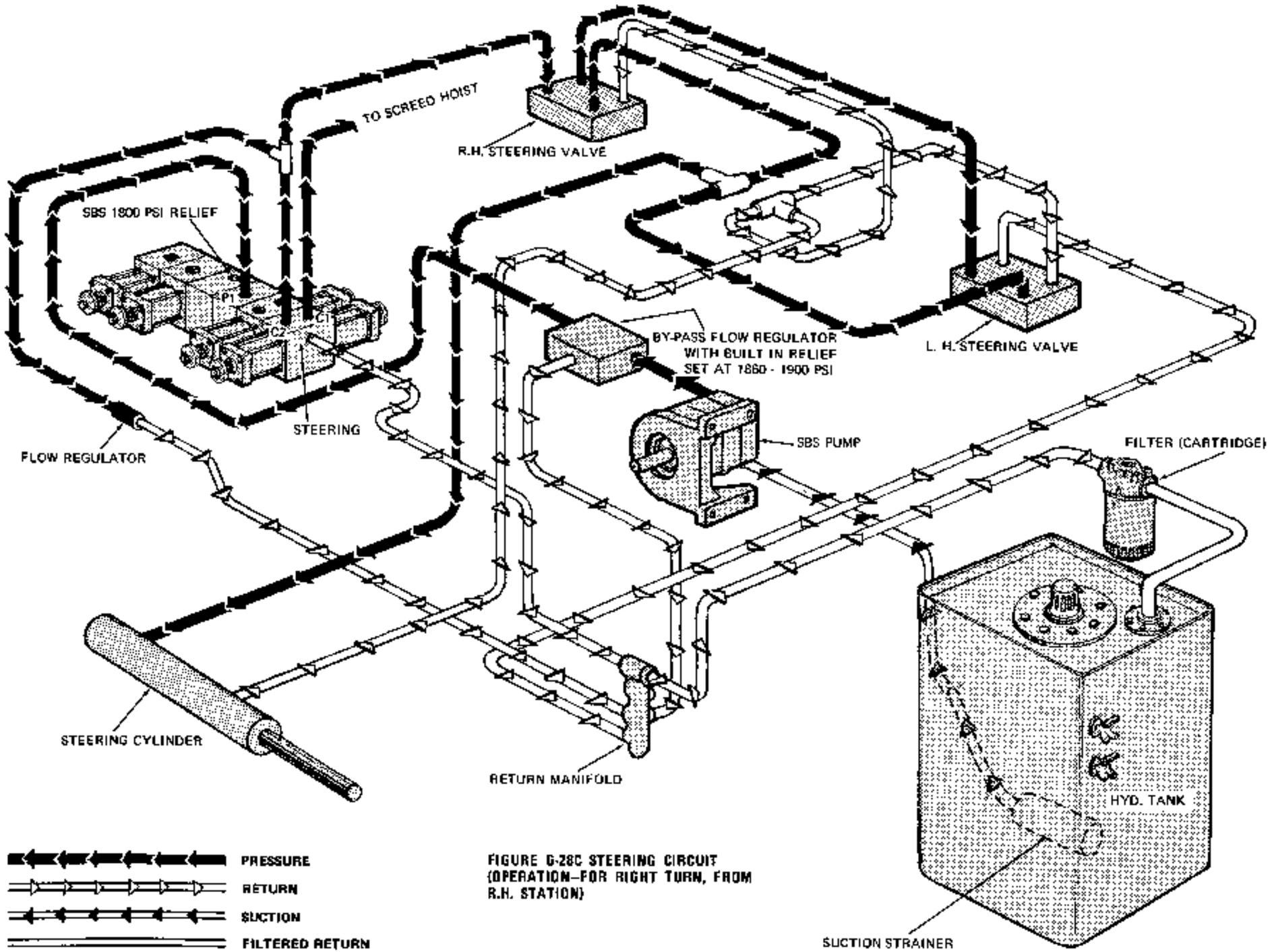
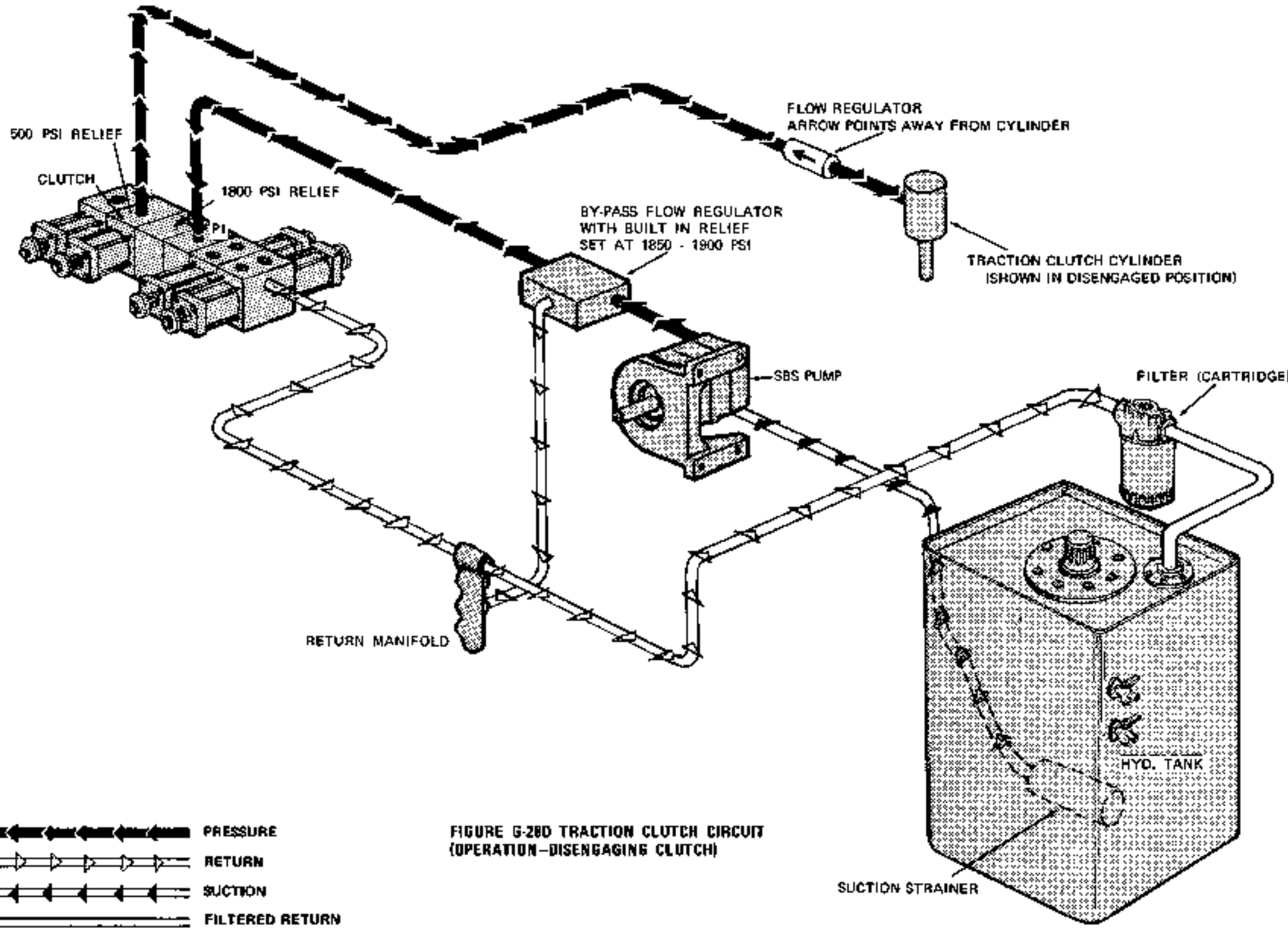


FIGURE G-28B SCREED DRIVE CIRCUIT (OPERATION–SCREED OPERATING)



PRESSURE
RETURN
SUCTION
FILTERED RETURN

FIGURE G-28C STEERING CIRCUIT (OPERATION–FOR RIGHT TURN, FROM R.H. STATION)



PRESSURE
RETURN
SUCTION
FILTERED RETURN

FIGURE G-28D TRACTION CLUTCH CIRCUIT
(OPERATION–DISENGAGING CLUTCH)