ORANGE

Operator's/Parts Manual

2SF24 and 2SF30

Two-Section, Folding Drill

1986-1993

Great Plains
Manufacturing, Inc.
P.O. Box 5060 • Salina, Kansas 67402-5060

Read the operator's manual entirely. When you see this symbol, the subsequent instructions and warnings are serious - follow without exception. Your life and the lives of others depend on it!

Great Plains

155-015M

Your Great Plains 2-Section Solid Stand Folding Drill is designed to give you many years of dependable service. This manual has been prepared to instruct you in the safe and efficient operation of this machine. Read and study it thoroughly. Follow all instructions and service procedures carefully.

The parts on your 2-Section Solid Stand Folding Drill have been specially designed and should only be replaced with genuine Great Plains parts. Therefore; should your drill require replacements parts, purchase them from your Great Plains Dealer.

Space has been provided below for you to record your model number and serial number of your drill. Be sure to bring this information with you to your dealer when ordering parts or attachments for your drill.

The following signal symbol and words should be clearly understood! When seen in this manual or on your equipment, this symbol and words will alert you to the seriousness of a situation. They should not be ignored or taken lightly.

The **SAFETY ALERT SYMBOL** indicates that there is a potential hazard to personal safety involved and extra safety precautions must be taken. When you see this symbol, be alert and carefully read the message that follows it. In addition to design and configuration of equipment; hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training of personnel involved in the operation, transport, maintenance and storage of equipment.

DANGER: Indicates an imminently hazardous situation which, if not avoided, **will** result in death or serious injury This signal word is limited to the most extreme situations.

WARNING: Indicates a potentially hazardous situation which, if not avoided, **could** result in death or serious injury.

CAUTION: Indicates a potentially hazardous situation which, if not avoided, **may** result in minor or moderate injury. It may also be used to alert against unsafe practices.

Thank you for buying a GREAT PLAINS 2-Section Solid Stand Folding Drill.

SERIAL NUMBER _____

MODEL NUMBER _____

DATE PURCHASED _____

TABLE OF CONTENTS

PARTS DRAWINGS

24' AND 30' TWO SECTION FOLDING DRILL ASSEMBLY INSTRUCTIONS

1. Read "Safety Rules" on Page 24 before assembling drill.
2. Set the tongue approximately 21" off the ground in a horizontal position with stable blocking for support.
3. Raise the main frame up keeping the side members horizontal. Position the main frame over the tongue and lower into position.
4. Secure tongue to main frame with six 1" x 2 1/2" long bolts, lockwashers and nuts as shown on Page 30.
5. Attach the tongue screw jack, Page 27, and remove blocking so the unit is sitting on the ground.
6. Remove the safety wires from each hydraulic cylinder rod clevis between the tires.
7. Slide the hydraulic hoses from the mainframe through the tongue and pull them out at the tractor end. Attach tractor male couplers to the hydraulic hoses.
8. Hook tractor up to the tongue and plug hydraulic connectors into the tractor. With tractor running at an idle speed charge the drill hydraulic system. (Be sure your tractor has plenty of hydraulic fluid. This system requires approximately 3.3 gallons.) When your drill frame raises for the first time, one lift cylinder will extend fully before the other one begins to move. Once the first cylinder is fully extended continue to hold your tractor valve in the same position for at least 60 seconds after the second lift cylinder has fully extended. The reason for the uneveness of raising for the first time is because your drill is equipped with master and slave rephasing cylinders. Raise and lower the frame several times to be sure there is no binding or problems with your lift system. Refer to "Tractor Hook-Up" on Page 5 for additional information.
9. Attach the gauge wheel turnbuckle to the gauge wheel arm on each drill and then mount the wheel and tire.
10. Position the two drill boxes in line, end to end, with the end chain drive sprockets outboard and approximately 3" between the drill boxes. 8" Row spacing and narrower drills will have 8" spacing at disks between boxes.
11. Using the tractor, back the drill main frame up to the center of the two drill boxes. When getting close, position the posts on each side of the main frame so the face of the post mounting angles are towards the drill frames. Attach the post to the drill frames using eight 5/8" x 3 1/2" x 5" long u-bolts, lockwashers and nuts as shown on page 34. With the u-bolts left loose, slide the drill frames inward so that the lugs welded to the drill frames are up tight against the post angles. Tighten all the nuts on the u-bolts.
12. Attach frame adjustment link from the drill frame to the pivot post using the clevis pin with hairpin cotters as shown on page 34. Pin to pin centers should be approximately 37".
13. Locate center line of drill transport stabilizer frame at 90" from the inside edge of the drill boxes. Using 5/8" u-bolts, lockwashers and nuts, mount to box frame as illustrated on page 27.
14. Adjust clevis end of pull bars so that the distance from the center line to center line of pull bar pin holes are approximately 134 1/4".
15. Mount pull bars to drill transport stabilizer frames and tongue slide as shown on page 27. With the tongue slide in the back position against its stop, adjust pull bar lengths so drills are in line with one another and parallel to the back edge of the main frame.
16. Extend the main lift cylinders and place the transport lock pins (2) in the transport position through the hole in the main frame side tube as shown in Fig. 6, Page 6.
17. Fold the drill making sure that the tongue pull bar slide moves smoothly up the tongue. When drill boxes are almost folded in, stop and adjust the post-frame adjustment links on each box so that the tang on each drill transport stabilizer frame lines up with the nest on the front of the main frame. Fold drill completely closed. Refer to Fig. 9 & 10, Page 7.
18. With pull bar slide forward on the tongue and drill folded completely, position the pull bar lock pin across the top of the tongue slide as shown in Fig. 7, Page 6. Adjust the transport lock bolt on top and front of tongue up against lock pin with 1/16" clearance and lock the jam nut. This pin prevents the drill from unfolding when in transport. DO NOT LOWER DRILL WHILE IN FOLDED POSITION.
19. Check to see that all nuts are tightened. See the "Nut & Bolt Torquing Chart" on Page 4 for torque specifications.

OPERATING CHECK LIST

Before operating your drill for the first time, make sure you have checked the following items:

1. Read all the "Hook-up" and "Operating Instructions".
2. Check tire pressure. Proper inflation is listed below.
3. Inspect the feeder cups for foreign matter.
4. Rotate each gauge wheel to see that the drive system is operating smoothly.
5. Set seed rate. For calibrating seed rate, see Page 12.
6. Inspect the fertilizer agitator for foreign matter.
7. Set fertilizer rate.
8. Check disk opener scrapers for proper adjustment in order for disk blades to rotate freely.
9. Lubricate the drill as needed.
10. Read and follow the "Field Operations" and "Safety Rules" carefully.
11. Inspect seed and fertilizer tubes.
12. Check the machine initially and periodically for loose bolts, pins, and chains.
13. Check for leaks in the hydraulic system.

NUT & BOLT TORQUING CHART

This chart is based on torque requirements in foot pounds for grade 5 bolts.

BOLT DIAMETER	MINIMUM TORQUE	MAXIMUM TORQUE
1/4"	9	11
5/16"	17	20
3/8"	35	42
7/16"	54	64
1/2"	80	96
9/16"	110	132
5/8"	150	180
3/4"	270	324
7/8"	400	480
1"	580	696
1 1/8"	800	880
1 1/4"	1120	1240
1 3/8"	1460	1680
1 1/2"	1940	2200

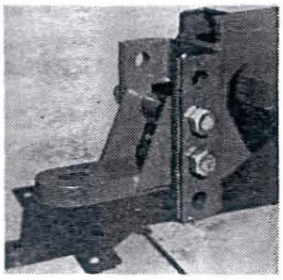
NOTE: Torque requirements listed above do not apply to self-locking nuts. For self-locking nuts increase torque requirements listed above by 15%.

TIRE INFLATION CHART

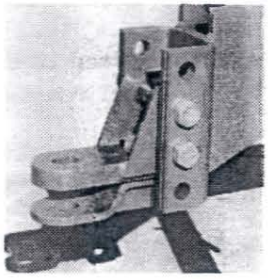
TIRE SIZE	INFLATION PSI
7.50 x 20" 4 Ply Drill Rib	28
9.5L x 15" 6 Ply Rib Implement	32
9.5L x 15" 8 Ply Rib Implement	44
9.5L x 15" 12 Ply Rib Implement	60
11L x 15" 6 Ply Rib implement	28
11L x 15" 12 Ply Rib Implement	52
12.5L x 15" 8 Ply Rib Implement	36
16.5L x 16.1" 10 Ply Rib Implement	36

TRACTOR HOOK-UP

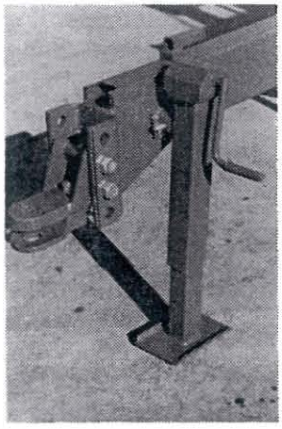
1. The combination hitch can be used as either a single strap or clevis hitch as shown in fig. 1 and 2. Remove lower strap when hooking up to a clevis type tractor drawbar. Spacers between the drawbar and hitch may be added to eliminate some of the movement of the tongue caused from positive to negative tongue weight. CAUTION: THIS DRILL HAS BOTH POSITIVE AND NEGATIVE TONGUE WEIGHT. NEVER UNHOOK FROM TRACTOR WITH BOXES UNFOLDED AND RAISED OFF THE GROUND. Two sizes of hitches are available: The small hole hitch with or without the hammer strap (1 1/4" maximum pin diameter and the large hole hitch without a hammer strap (up to 1 1/2" diameter pin). The small hole hitch is sold as standard equipment. The mounting holes in the hitch have been offset so the hitch can be turned over and bolted on in three different positions giving you six different hitch heights for both the single and the clevis type. On the clevis type hitch, always mount the thinner strap on the bottom. CARE SHOULD BE TAKEN WHEN SETTING HITCH SO TONGUE OF DRILL IS PARALLEL TO GROUND WHEN DRILL IS IN PLANTING POSITION. Use tongue jack to level tongue, then find closest setting of hitch to match your tractor drawbar height.



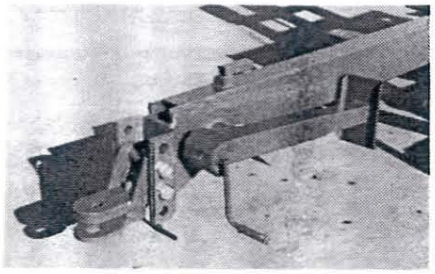
Single Strap Hitch
Fig. 1



Clevis Hitch
Fig. 2



Vertical Position
Fig. 3



Transport Position
Fig. 4

2. The tongue jack makes it possible to raise or lower the hitch (after it has been properly adjusted to tractor) for tractor unhooking and reconnecting. Always return jack to its horizontal storage position by by rotating 90 degrees to back of machine and repinning before transporting drill.

HYDRAULIC HOOK-UP

This Folding Drill is equipped with rephasing type hydraulic lift cylinders that require a special procedure for bleeding air from the hydraulic system. If your dealer has not already prepared the cylinders for transport use, read the following information carefully. The rephasing cylinders will not function properly if this bleeding procedure is not followed. DO NOT crack hose fittings in order to bleed cylinders.

NOTE: Check the hydraulic fluid level in the tractor reservoir and fill to the proper level before starting this procedure. If the bleeding process is performed with a low reservoir supply, there is a chance of drawing air into the system. System capacity is approximately 3.3. gallons.

1. If required, raise your drill 1" in order to extend your lift cylinders a little. Loosen the jam nuts on top of the transport vertical tubes and screw the adjustment screw in until it bottoms. Lower the drill until the cylinders become loose.

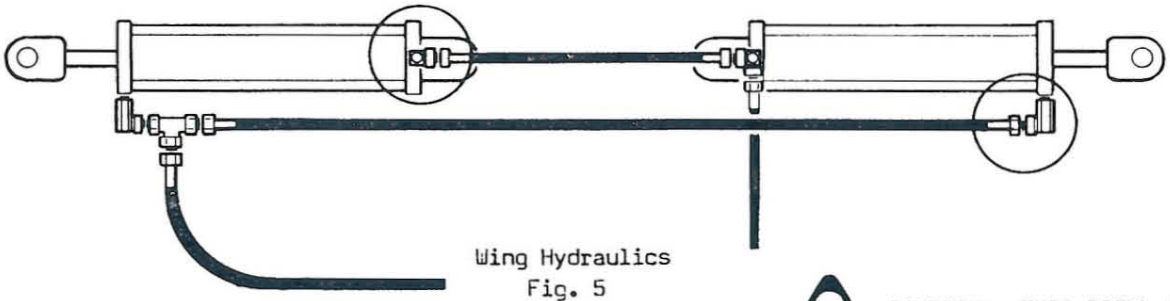
HYDRAULIC HOOK-UP (CON'T.)

2. Unpin the cylinders from the main frame and turn the cylinders upside down to a position where the rod end is higher than the base end. Support the cylinders in a safe location. One transport tire may have to be removed in order to unpin the master cylinder.
3. Start the tractor and run the engine at idle. With the rod end of the cylinders higher than the base end, hydraulically extend the cylinders and hold the tractor control lever in position for sixty seconds after the cylinders have extended to their maximum stroke.
4. Hydraulically retract the cylinders, then repeat the extending procedure several more times until both cylinders are free of air and operate together.
5. Repin the cylinders to the main frame, rod end down. If air is trapped in either cylinder, the affected cylinder will have a spongy, erratic movement and the machine will not raise evenly. Refill the tractor hydraulic fluid reservoir to its proper level.

NOTE: After drill is raised, a slight settling will occur due to the action of the rephasing cylinders.

6. If the wing cylinders do not operate properly, clean out small orifice hole in fittings circled on wing cylinder illustration (fig.5).

IMPORTANT: When using sealant on pipe threads, the friction between the threads is reduced, therefore be certain not to over tighten causing damage to the cylinders, valves, or fittings.



Wing Hydraulics
Fig. 5

TRANSPORTING

CAUTION: THIS DRILL SHOULD NEVER BE PULLED FASTER THAN 20 MILES PER HOUR.

Before transporting the drill, you should always check the following items:

1. To prevent possible damage in case of hydraulic failure during transport, ALWAYS insert safety lock pins when transporting (fig. 6).
2. Check to be sure the pull-bar transport lock pin is in position as shown in figure 7 to insure boxes will not open during transport.
3. Check to see if you have the required air pressure in your tires. Proper inflation is listed on Page 4.
4. When in transport, use accessory lights and devices for adequate warning to operators of other vehicles, and use safety hitch chain. Comply with all Federal, State and Local Laws when traveling on public roads.

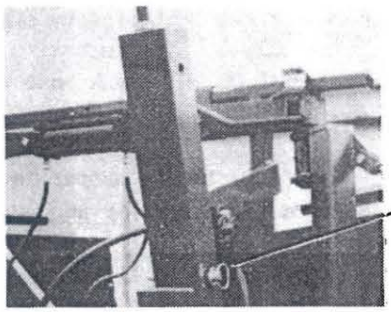


Fig. 6

Pins in Transport Position

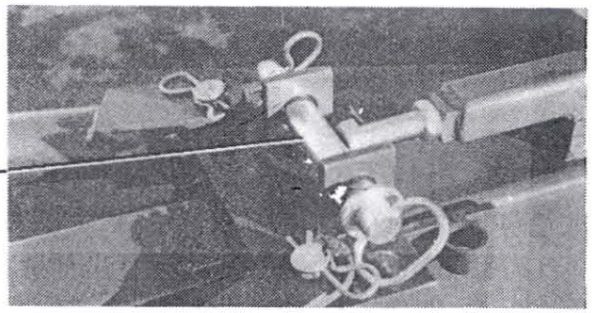


Fig. 7

UNFOLDING

1. Remove pin from pull-bar transport lock (fig.7). This must always be used when transporting the drill in folded position.
2. Unfold boxes using hydraulic cylinders. Do this very slowly and carefully. Serious damage could occur if done fast and carelessly. Folding and unfolding is best achieved on level ground.
3. Apply hydraulic pressure to the raising and lowering system. Raising the drill may be required to free up the transport lock pins in the vertical tubes for removal (fig. 6). Place pins into storage position (fig. 8).

Pins in Storage Position

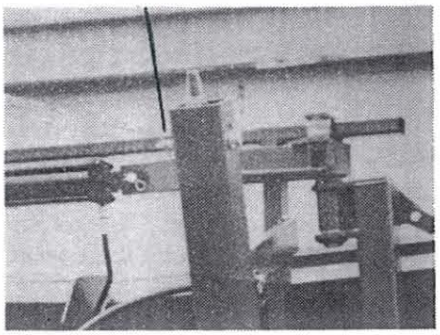
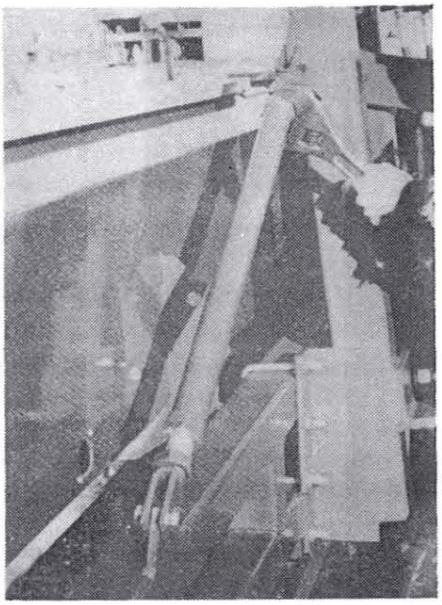


Fig. 8

FOLDING

1. To fold the drill, reverse the order of the unfolding instructions. Be sure all transport devices as shown in figures 6 and 7 are in place before transporting.
2. When folding the drill, the drill transport stabilizer frame should line up with the nest on the front of the main frame (fig. 10). If they scrape the wing on the tongue, the boxes can be raised or lowered by adjusting the wing adjustment clevis (fig. 9).

CAUTION: DO NOT LOWER DRILL WHILE IN FOLDED POSITION



Wing Adjustment Clevis
Fig. 9

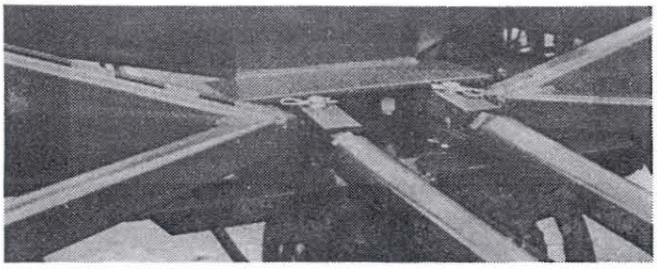
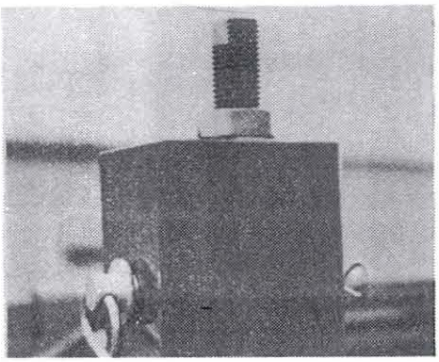


Fig. 10

DRILL ADJUSTMENTS

Unfold the drill on a level seedbed typical to your planting soil conditions.

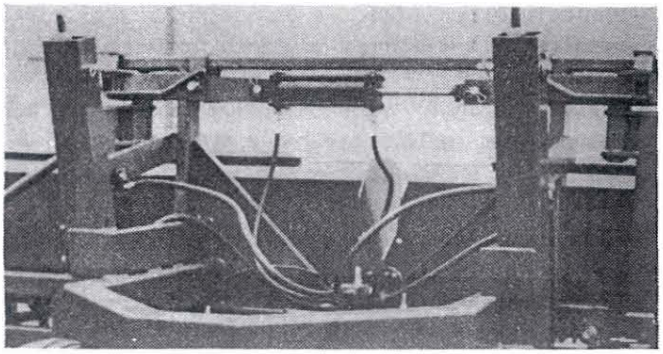
At the top of both vertical tubes on the transport frame is a threaded stud and jam nut (fig. 11.) Make sure both studs have approximately the same length of threads extending above the jam nut (approximately 3 inches) for most planting conditions. Adjustments may be required.



Threaded Stud
Fig. 11

DRILL ADJUSTMENTS (CON'T.)

PUT THE TRANSPORT PINS IN STORAGE POSITION (fig. 8). Slowly lower the drill until it is on the ground and the top slide cylinder is fully extended (fig. 12). Pull the drill forward a few feet to make sure that the transport and the gauge wheel tires have equal firm contact with the soil.

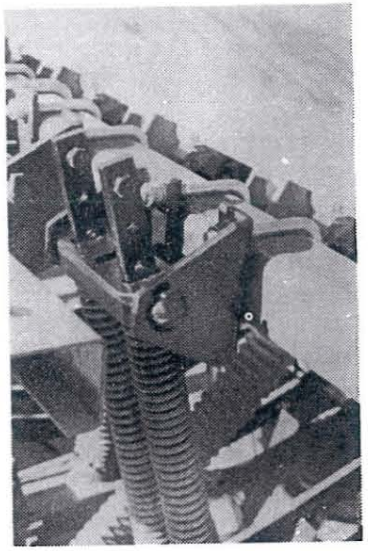


Top Slide Cylinder
Fig. 12

LEVELING THE DRILL

The opener spring rods located along the back of the drill boxes are indicators of the level of the drill because they show the amount of down-pressure exerted on the disk openers and press wheels. A level drill will have equal opener down-pressure from end to end. Check the spring rod cross bolts at the top of the spring rods to see that they are all extended about 2 inches above their spring rod castings (fig. 13). This is a general dimension and may vary with the spring down-pressure you require for different soil conditions and planting depths (See Opener Depth Adjustments). If you require more downward float of your openers you may want to increase this dimension. Keep in mind when this dimension is increased your upward motion is decreased, limiting the vertical travel of the openers for running over rocks and other foreign objects. CAUTION: IF YOUR OPENERS' VERTICAL TRAVEL IS DECREASED, CONSIDERABLE DAMAGE WILL OCCUR TO YOUR OPENERS.

If all the spring rods along the drill extend the same distance above their castings, the drill is level and you should tighten down the threaded studs as described in "Transport Wheel Adjustments for Leveling and Depth" on Page 9. If the spring rod extensions vary in length, the drill can be leveled with transport wheel and gauge wheel adjustments. These are described on Page 9.

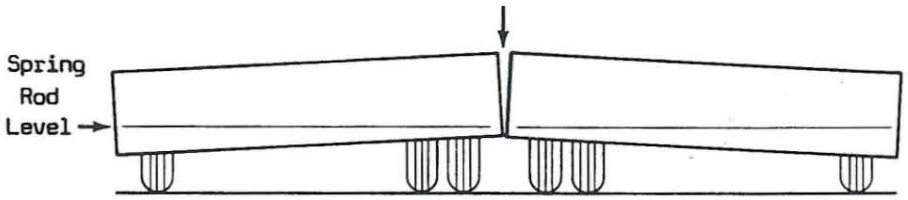


Opener Spring Rods
Fig. 13

TRANSPORT WHEEL ADJUSTMENTS FOR LEVELING DRILL

When leveling your drill, opener spring rods near the center of the drill that extend higher above their spring rod castings than desired can be adjusted by raising the transport frame. This is done by raising the drill with the hydraulic lift cylinders. Spring rods near the center that don't extend high enough are adjusted by lowering the transport frame by retracting the cylinders. ONCE THE SPRING RODS ARE AT THE DESIRED SETTING, screw the threaded studs on top of the vertical tubes (fig. 11) down as far as possible and secure them with the jam nuts. This adjustment will stop the lift cylinder travel at the same point each time the boxes are lowered for drilling and assures accurate seed depth control.

NOTE: If it is noticed that one drill box spring rod extension is different from the other drill box at the center of your drill this is a sign that your lift hydraulic master and slave cylinders are out of sequence with one another. In order to get them back in sequence simply raise your drill all the way up and hold your tractor hydraulic control valve lever on for a few seconds. Now lower your drill and both cylinders will be in sequence with one another and your two drill boxes should be at the same level again.

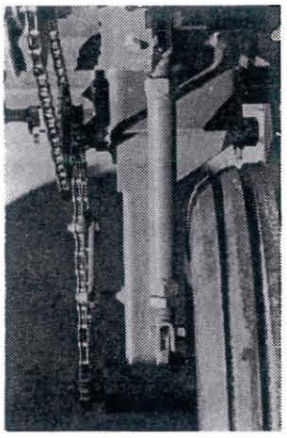


Adjustments at the main lift cylinders will level the center of the drill with the ends.

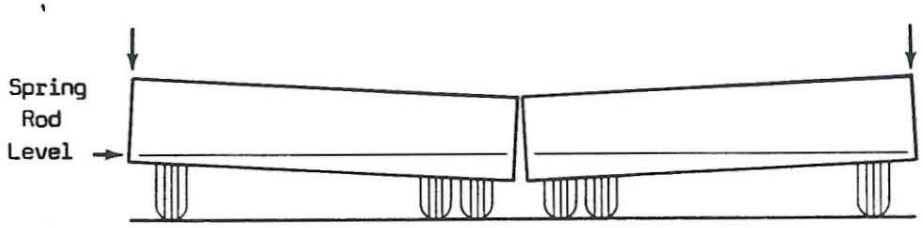
GAUGE WHEEL ADJUSTMENTS FOR LEVELING DRILL

The openers near the outside of the drill are adjusted by raising or lowering the gauge wheels.

Raise the drill out of the ground and loosen the jam nut located near the bottom clevis of the gauge wheel turnbuckle (fig. 14). This turnbuckle is threaded to allow easy gauge wheel adjustment. By lengthening the turbuckle the gauge wheel is lowered, causing less spring rod extension through the spring rod casting By shortening the turnbuckle the gauge wheel is raised, causing less spring rod to protrude through the spring rod casting. After adjusting, be sure the turnbuckle on both gauge wheel arms have the same pin center dimensions.



Gauge Wheel Turnbuckle
Fig. 14

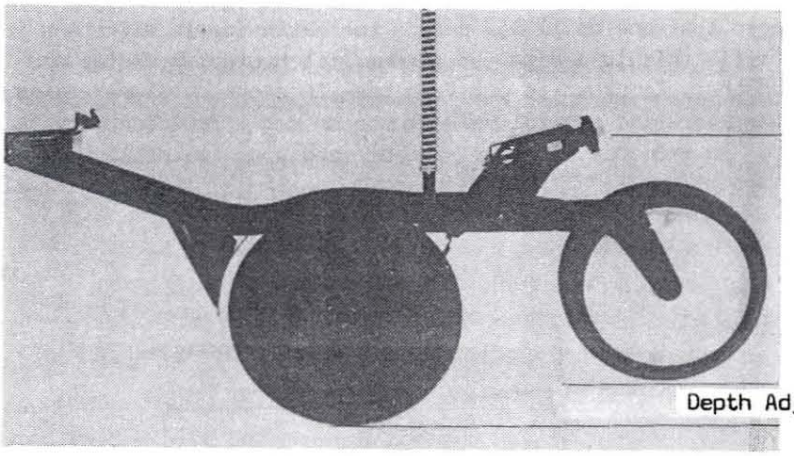


Shortening the gauge wheel turnbuckle will level the ends of the drill with the center.

INDIVIDUAL OPENER ADJUSTMENTS

Press Wheel - Opener Linkage Depth Adjustment

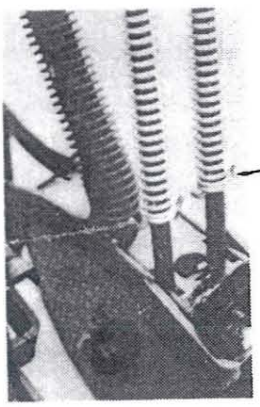
The depth of each opener is controlled by the height of the press wheel. For varying the height of the press wheel which automatically changes the seeding depth of the opener, simply rotate the knob until the seeding depth is correct. A self-locking spring clip holds the knob at your setting to maintain the proper depth.



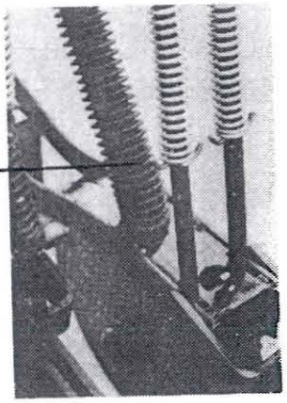
Opener Linkage Depth Adjustment
Fig. 15

Disk Opener
Spring Pressure Setting

Each opener spring can be adjusted for down pressure. This is useful when penetrating hard soil and for planting in tractor tire tracks. To adjust the pressure, remove the "W" clip at the bottom of the spring and place it in a higher hole in the spring rod for more pressure and in a lower hole for less pressure (fig. 16 & 17).



Minimum Pressure
Fig. 16



Maximum Pressure
Fig. 17

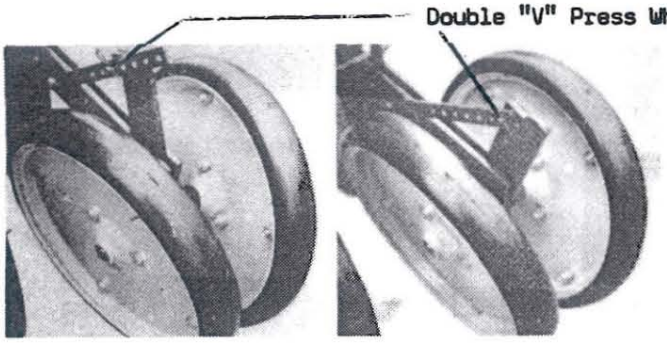


Fig. 18

Fig. 19

The camber angle of the double-V press wheels may be adjusted by removing the angle bar adjustment pin and moving the angle bar. Moving the angle bar forward will cause the press wheels to pull more soil over the seed (fig. 18). Moving the angle bar back will cause the press wheel to pull less soil over the seed (fig. 19).

FIELD OPERATIONS

1. Load seed box with seed. You should use cleaned seed to get the best results. You should always have the drill hitched securely to a tractor before loading.
2. This machine can be transported with a full box of seed. It is best NOT to do this unless necessary because the increased weight does increase the chances for problems on the road. DO NOT exceed 20 miles per hour.
3. Never back up with openers in ground. If you do, check all openers to be sure none are plugged.
4. Never allow anyone to ride on the drill.
5. Maximum drilling speed varies upon soil conditions.
6. If your drill comes equipped with an acremeter it should be mounted to the left gauge wheel axle on the outboard side. It will accumulate the total acres drilled with the machine. In order to find out the acres covered, write down the beginning reading and subtract it from the ending reading for the total acres planted.
7. You can adjust the tension on each disk spring. This is especially useful in applying more pressure pressure in tractor tracks.
8. This drill is NOT designed to be turned sharply. COMPLETELY raise the drill at the end of field and at other sharp turns. If the drill is not completely raised, the lift hydraulics will be out of sequence. See "Hydraulic Hook-Up" on Page 6.
9. Never unhook drill from tractor with boxes unfolded and raised off the ground. Negative tongue weight is present in this position.
10. Make sure that the feed cup adjustment handle on each cup is set the same across the drill.
11. Be sure your gauge wheel tires have proper inflation as listed on Page 4.
12. If you notice excessive cracking on large seeds, adjust all feeder cup door handles to a more open position.

MAINTENANCE AND LUBRICATION

PROPER SERVICING AND ADJUSTMENTS IS THE KEY TO THE LONG LIFE OF ANY FARM IMPLEMENT. WITH CAREFUL AND SYSTEMATIC INSPECTION OF OUR GRAIN DRILL, YOU CAN AVOID COSTLY MAINTENANCE, TIME AND REPAIR.

1. After using your drill for several hours, check all bolts to be sure they are tight.
2. Lubrication - listed below are the items you need to lubricate every 20-25 hours of operation:
   A. Marker body hinges.
   B. Jack shaft bearings.
   C. Feeder cup drive sprocket bearings.
   D. Post top roller shaft.
   E. Box post lower spindles and cross tubes on main frame.
   F. Telescoping axle tube lower roller between transport tires.
3. Before Storing:
   A. Clean and oil all roller chains.
   B. Feeder cup drive sprocket should be oiled in its square bore. Move feeder cup adjustment lever away from the sprocket as far as possible in order to get the oil back into the square.
   C. Oil knob adjustment trunnion lower pivot tube on press wheels.
4. Disk scrapers should be kept properly adjusted.
5. Always maintain 32 lbs. of air pressure in gauge wheel tires and 60 lbs. in the transport tires.

STORAGE

1. Clean the drill as necessary. BE SURE that the seed boxes, fertilizer box, and all feed systems are completely cleaned out before storing.
2. Oil all roller chains.
3. Lubricate drill as indicated in "Maintenance and Lubrication".
4. When storing in transport position, use all locking devices as described on page 5 and take pressure off of the hydraulic cylinders.
5. Apply a light coat of grease to all exposed hydraulic cylinder rods.
6. Feed cup drive sprocket hub should be oiled in its square bore. Squirt oil on the square feed cup shaft and move feed cup adjustment lever back and forth in order to get the oil back into the square. This is most important before putting the machine in storage.
7. Store the drill inside if possible for longer drill life.

SEEDING ADJUSTMENTS

NOTE: SEEDING RATES WILL VARY GREATLY WITH VARIATIONS IN SIZES OF THE SEEDS BEING DRILLED. ALTHOUGH THE SEEDING RATES LISTED IN THIS MANUAL ARE BASED ON AN AVERAGE SEED SIZE, WE RECOMMEND THAT YOU TEST AND ADJUST YOUR DRILL USING THE PROCEDURES LISTED BELOW TO HELP INSURE AN ACCURATE SEEDING RATE.

1. Rotate each gauge wheel to see that feed cups and drive are working properly and are free from foreign matter.

2. To adjust your seeding rate, first you must decide which sprocket arrangement you need (see seeding chart). In order to change sprockets, remove nut in center of double speed change sprocket and turn sprocket over. Loosen the idler arm bolt, put chains on and tighten both bolts. (The lengths of the chains will need to be adjusted in order to make this change.)

3. There are many factors which will affect seeding rates: seed treatment, weight of seed, size of seed, surface condition of seed, and tire configuration, pressure and slippage. Minor adjustments will probably be needed to compensate for the above factors.

4. The pounds-per-acre in the seed charts are based on drills having 9.5L x 15 inch rib implement gauge wheel tires.

5. The large differences in seed size and treatment can cause a wide variation in actual seeding rates. The seed rate charts on the following pages are based on average size seed. This may differ from the seed you are using. Use the seed rate charts as a guide. Set the pounds-per-acre desired at the indicator number for your row spacing and complete the following procedure to calibrate the drill for your specific seed.
   A. Place several pounds of seed over three of the feeder cups at the outboard end of the drill box.
   B. Pull the seed tubes out of these three disk openers.
   C. Raise the drill off the ground. Be sure to insert transport lock pins in slide tubes to prevent injury should hydraulic system allow drill to lower while working around it.
   D. Place a container under the three seed tubes to gather the seed as it is metered.
   E. Rotate the drive gauge wheel until one acre has been tallied on the acremeter. This will be approximately 225 rotations on a 24' drill and approximately 182 rotations on a 30' drill. Be sure to check the three feeder cups to make sure each cup has plenty of seed coming into it.
   F. Weigh the seed which has been metered. Divide by three. This will give you the ounces/pounds metered by each feeder cup. Multiply by the number of openers on your drill to arrive at the total pounds-per-acre your drill would meter at that setting. If this figure is different than desired, set your feed cup adjustment lever accordingly.

   Repeat procedures (a) through (f) on each drill section.

6. You may want to repeat the calibration procedure if the results of your calibration vary greatly from the suggested setting contained in this manual.

Remember: Tire size and field conditions will also affect seeding rates. Be certain that your gauge wheel tires are 9.5L x 15 and that they have the proper inflation. When drilling, check the amount of seed you are using by noting acres drilled, amount of seed added to drill, and level of seed in drill box. If you suspect that you are drilling more or less seed than desired, and you have accurately calibrated the drill to your seed, you may need to adjust the seeding rate slightly to compensate for your field conditions.

NOTE: This drill is equipped with four-position adjustment handles on each feed cup. The highest position is for wheat and other small grain seeds, the second position is for soybeans and other large grain seeds. Should excessive cracking occur to the large seeds, drop the handle to the third position. The wide open position will allow complete clean out of the feed cup. MAKE SURE all adjustment handles are in the same position before drilling.

NOTE: Do not open the cup up to the wide open position with seed in the box unless complete clean out is desired.

SEEDING RATES FOR GREAT PLAINS DRILL

WHEAT (DRIVE TYPE 1)	SEED RATE INDICATOR SETTING NUMBER																				
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Lbs. Per Acre																				
6"	0	11	20	28	37	47	55	65	75	85	96	106	116	129	140	153	161	170	175	184	189
7"	0	10	17	24	32	40	48	56	65	73	83	92	100	111	121	132	140	147	152	159	164
7 1/2"	0	9	16	23	29	37	44	52	60	68	77	85	93	103	112	122	129	138	140	147	152
8"	0	8	15	21	27	34	40	48	55	62	70	78	85	94	103	112	118	124	129	135	139
10"	0	7	12	17	22	28	33	39	45	51	58	64	70	77	84	92	97	102	105	110	114
12"	0	6	10	14	18	23	28	33	37	42	48	53	58	64	70	76	81	85	88	92	95

*Based on 60#/BU.

WHEAT (DRIVE TYPE 2A)	SEED RATE INDICATOR SETTING NUMBER																				
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Lbs. Per Acre																				
6"	0	8	13	19	25	31	37	44	50	57	64	71	78	86	94	102	108	114	117	123	127
7"	0	7	11	16	21	27	32	38	44	49	56	62	67	75	81	89	94	99	102	107	110
7 1/2"	0	6	11	15	20	25	30	35	40	45	52	57	62	69	75	82	86	91	94	99	102
8"	0	6	10	14	18	23	27	32	37	42	47	52	57	63	69	75	79	83	86	90	93
10"	0	5	8	11	15	19	22	26	30	34	39	43	47	52	56	61	65	68	70	74	76
12"	0	4	7	9	12	16	18	22	25	28	32	36	39	43	47	51	54	57	59	62	63

*Based on 60#/BU.

RICE SHORT GRAIN (DRIVE TYPE 1)	SEED RATE INDICATOR SETTING NUMBER																				
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Lbs. Per Acre																				
6"	0	7	13	18	23	30	35	42	46	51	57	62	66	74	83	90	98	103	107	112	115
7"	0	6	11	16	20	26	31	36	39	44	49	54	57	64	72	78	85	90	93	97	100
7 1/2"	0	6	10	14	19	24	28	33	36	41	45	50	53	59	66	72	78	83	85	90	92
8"	0	5	9	13	17	22	26	31	33	37	41	46	49	55	61	66	72	76	78	82	85
10"	0	4	8	11	14	18	21	25	27	31	34	37	40	45	50	54	59	62	64	67	69
12"	0	4	6	9	12	15	18	21	23	25	28	31	33	37	41	45	49	52	53	56	58

RICE SHORT GRAIN (DRIVE TYPE 1A)	SEED RATE INDICATOR SETTING NUMBER																				
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Lbs. Per Acre																				
6"	0	15	26	37	48	61	73	85	93	104	116	128	136	153	169	185	201	212	219	230	237
7"	0	13	23	32	42	53	63	74	81	91	101	111	118	132	147	160	175	184	190	199	205
7 1/2"	0	12	21	30	39	49	58	68	75	84	93	103	109	122	136	148	161	170	175	184	189
8"	0	11	19	27	35	45	53	63	69	77	85	94	100	112	124	136	148	156	161	169	174
10"	0	9	16	22	29	37	44	51	56	63	70	77	81	92	102	111	121	127	132	138	142
12"	0	8	13	19	24	30	36	43	47	52	58	64	68	76	85	93	101	106	110	115	118

RICE LONG GRAIN (DRIVE TYPE 1)	SEED RATE INDICATOR SETTING NUMBER																				
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Lbs. Per Acre																				
6"	0	6	10	15	20	25	29	34	39	44	49	54	58	64	73	79	85	90	93	97	100
7"	0	5	9	13	17	21	25	30	34	38	42	47	50	56	63	69	74	78	81	84	87
7 1/2"	0	5	8	12	16	20	23	28	31	35	39	43	46	51	59	63	68	72	74	78	80
8"	0	4	8	11	14	18	21	25	29	32	36	40	42	47	54	58	63	66	68	71	74
10"	0	4	6	9	12	15	17	21	23	26	29	32	35	39	44	47	51	54	56	58	60
12"	0	3	5	7	10	12	15	17	20	22	24	27	29	32	37	40	43	45	47	49	50

RICE LONG GRAIN (DRIVE TYPE 1A)	SEED RATE INDICATOR SETTING NUMBER																				
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Lbs. Per Acre																				
6"	0	12	21	31	40	50	60	71	80	91	100	111	119	132	150	162	175	185	191	200	206
7"	0	11	19	27	35	44	52	61	69	78	87	96	103	114	130	141	152	160	165	173	179
7 1/2"	0	10	17	25	32	40	48	57	64	72	80	89	95	105	120	130	140	148	153	160	165
8"	0	9	16	23	29	37	44	52	59	66	74	81	87	97	110	119	129	135	140	146	151
10"	0	7	13	18	24	30	36	42	48	54	60	66	71	79	90	97	105	111	115	120	124
12"	0	6	11	15	20	25	30	35	40	45	50	55	59	66	75	81	88	92	95	100	103

BARLEY	SEED RATE INDICATOR SETTING NUMBER																					
(DRIVE TYPE 1)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	
Row Spacing	Lbs. Per Acre																					
6"	0	0	7	14	20	27	33	39	44	50	55	62	68	75	82	88	93	99	102	105	107	
7"	0	0	6	12	18	23	28	34	38	44	48	54	59	65	71	76	81	86	88	91	93	
7 1/2"	0	0	6	11	16	21	26	31	36	40	44	50	55	60	66	70	75	79	81	84	86	
8"	0	0	5	10	15	20	24	28	33	37	40	46	50	55	60	64	68	73	75	77	79	
10"	0	0	4	8	12	16	20	23	27	30	33	37	41	45	49	53	56	59	61	63	64	
12"	0	0	4	7	10	13	16	19	22	25	28	31	34	37	41	44	47	49	51	53	54	

*Based on 46.4#/BU.

OATS OR SAFFLOWER	SEED RATE INDICATOR SETTING NUMBER																					
(DRIVE TYPE 1)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	
Row Spacing	Lbs. Per Acre																					
6"	0	4	8	14	19	25	31	37	44	51	57	64	71	76	83	90	96	102	107	112	116	
7"	0	4	7	12	16	22	27	32	38	44	49	55	61	66	72	78	83	88	93	97	100	
7 1/2"	0	3	7	11	15	20	25	29	35	41	45	51	57	61	67	72	77	81	85	89	93	
8"	0	3	6	10	14	19	23	27	32	37	41	47	52	56	61	66	70	75	78	82	85	
10"	0	3	5	8	11	15	19	22	26	31	34	38	42	46	50	54	58	61	64	67	70	
12"	0	2	4	7	9	13	16	18	22	25	28	32	35	38	42	45	48	51	53	56	58	

*Based on 39#/BU.

RYE	SEED RATE INDICATOR SETTING NUMBER																					
(DRIVE TYPE 2)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	
Row Spacing	Lbs. Per Acre																					
6"	0	3	6	8	11	14	16	18	20	23	25	28	30	33	36	38	40	42	43	46	47	
7"	0	3	5	7	9	12	13	16	18	20	22	24	26	29	31	33	35	36	38	40	41	
7 1/2"	0	3	5	7	9	11	12	14	16	18	20	22	24	27	29	31	32	34	35	36	38	
8"	0	2	4	6	8	10	11	13	15	17	19	20	22	24	26	28	29	31	32	33	34	
10"	0	2	4	5	7	8	9	11	12	14	15	17	18	20	21	23	24	25	26	27	28	
12"	0	2	3	4	5	7	8	9	10	11	13	14	15	17	18	19	20	21	22	23	23	

MILLET	SEED RATE INDICATOR SETTING NUMBER																					
(DRIVE TYPE 2)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	
Row Spacing	Lbs. Per Acre																					
6"	0	3	5	7	10	12	15	18	21	24	26	30	32	36	39	43	47	50	52	53	53	
7"	0	2	4	6	8	11	13	16	18	21	23	26	28	31	34	37	40	43	45	46	46	
7 1/2"	0	2	4	6	8	10	12	14	17	19	21	24	26	29	31	34	37	40	42	42	42	
8"	0	2	3	5	7	9	11	13	15	17	19	22	24	26	29	31	34	36	38	39	39	
10"	0	2	3	4	6	7	9	11	13	14	16	18	19	21	23	26	28	30	31	32	32	
12"	0	1	2	3	5	6	8	9	10	12	13	15	16	18	19	21	23	25	26	26	26	

BUCKWHEAT	SEED RATE INDICATOR SETTING NUMBER																					
(DRIVE TYPE 1)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	
Row Spacing	Lbs. Per Acre																					
6"	0	8	14	20	26	33	40	47	55	62	70	77	85	94	102	111	118	124	128	134	138	
7"	0	7	12	17	22	29	34	40	47	54	61	67	73	81	88	97	102	107	111	116	120	
7 1/2"	0	6	11	16	21	26	32	37	44	50	56	62	68	75	82	89	94	99	102	107	111	
8"	0	6	10	15	19	24	29	34	40	45	51	57	62	69	75	82	86	91	94	98	101	
10"	0	5	8	12	15	20	24	28	33	37	42	46	51	56	61	67	71	74	77	80	83	
12"	0	4	7	10	13	17	20	23	27	31	35	39	42	47	51	56	59	62	64	67	69	

FLAX OR SUDAN	SEED RATE INDICATOR SETTING NUMBER																					
(DRIVE TYPE 2)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	
Row Spacing	Lbs. Per Acre																					
6"	0	2	4	6	9	12	14	16	19	21	24	26	29	32	35	38	42	45	47	47	48	
7"	0	2	3	5	8	10	12	14	16	18	21	23	25	28	30	33	36	39	41	41	41	
7 1/2"	0	2	3	5	7	9	11	13	15	17	19	21	23	26	28	30	33	36	37	38	38	
8"	0	1	3	5	7	9	10	12	14	16	17	19	21	23	26	28	31	33	34	35	35	
10 "	0	1	2	4	5	7	8	10	11	13	14	16	18	19	21	23	25	27	28	28	29	
12"	0	1	2	3	5	6	7	8	9	11	12	13	15	16	17	19	21	22	23	24	24	

SUNFLOWERS	SEED RATE INDICATOR SETTING NUMBER																				
(DRIVE TYPE 2)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Lbs. Per Acre																				
6"	0	0	0	2	3	4	6	8	9	11	14	15	17	19	20	23	24	26	27	28	29
7"	0	0	0	2	3	3	5	7	8	10	12	13	15	16	18	20	21	22	23	24	25
7 1/2"	0	0	0	1	3	3	5	6	8	9	11	12	14	15	16	18	19	21	21	22	23
8"	0	0	0	1	2	3	5	6	7	8	10	11	12	14	15	17	18	19	20	20	21
10"	0	0	0	1	2	3	4	5	6	7	8	9	10	11	12	14	14	15	16	17	17
12"	0	0	0	1	2	2	3	4	5	6	7	8	8	9	10	11	12	13	13	14	14

*Based on 28.9#/BU.

SOYBEANS	SEED RATE INDICATOR SETTING NUMBER																				
(DRIVE TYPE 1)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Lbs. Per Acre																				
6"	0	0	0	0	30	40	55	70	84	98	113	127	140	154	166	176	188	200	204	207	209
7"	0	0	0	0	26	35	48	61	72	85	98	110	122	133	144	153	163	173	177	180	181
7 1/2"	0	0	0	0	24	32	44	56	67	79	91	101	112	123	132	141	150	160	164	166	167
8"	0	0	0	0	22	30	40	51	61	72	83	93	103	113	121	129	138	147	150	152	153
10"	0	0	0	0	18	24	33	42	50	59	68	76	84	92	99	106	113	120	123	124	125
12"	0	0	0	0	15	20	28	35	42	49	57	63	70	77	83	88	94	100	102	104	104

*Based on 59.1#/BU.

SOYBEANS	SEED RATE INDICATOR SETTING NUMBER																				
(DRIVE TYPE 2)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Lbs. Per Acre																				
6"	0	0	0	0	10	13	18	23	27	32	37	41	46	50	54	57	61	65	67	68	68
7"	0	0	0	0	8	11	16	20	24	28	32	36	40	43	47	50	53	57	58	59	59
7 1/2"	0	0	0	0	8	11	14	18	22	26	30	33	37	40	43	46	49	52	53	54	55
8"	0	0	0	0	7	10	13	17	20	24	27	30	34	37	40	42	45	48	49	50	50
10"	0	0	0	0	6	8	11	14	16	19	22	25	27	30	32	34	37	39	40	41	41
12"	0	0	0	0	5	7	9	11	14	16	19	21	23	25	27	29	31	33	33	34	34

*Based on 59.1#/BU.

SOYBEANS	SEED RATE INDICATOR SETTING NUMBER																				
(DRIVE TYPE 2A)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Lbs. Per Acre																				
6"	0	0	0	0	20	27	37	47	56	66	76	85	94	103	111	118	126	134	137	139	140
7"	0	0	0	0	17	23	32	41	49	57	66	73	81	89	96	103	110	116	118	121	122
7 1/2"	0	0	0	0	16	22	30	37	45	53	61	68	75	82	89	95	101	107	110	111	112
8"	0	0	0	0	15	20	27	34	41	48	56	62	69	75	82	87	93	98	101	102	103
10"	0	0	0	0	12	16	22	28	34	40	45	51	56	62	67	71	76	80	82	84	84
12"	0	0	0	0	10	14	19	23	28	33	38	42	47	51	56	59	63	67	68	70	70

*Based on 59.1#/BU. Setting the feed cup adj. lever between 50 & 80 allows for optimum seeding of soybeans.

PEAS	SEED RATE INDICATOR SETTING NUMBER																				
(DRIVE TYPE 1)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Lbs. Per Acre																				
6"	0	0	10	26	41	55	70	82	95	110	123	135	150	163	176	189	204	215	227	235	241
7"	0	0	8	23	35	48	61	71	82	96	107	117	130	141	152	164	177	186	197	204	209
7 1/2"	0	0	8	21	33	44	56	66	76	88	99	108	120	130	140	151	163	172	182	188	193
8"	0	0	7	19	30	40	51	60	69	81	90	99	110	120	128	139	149	158	167	172	177
10"	0	0	6	16	24	33	42	49	57	66	74	81	90	98	105	113	122	129	136	141	145
12"	0	0	5	13	20	27	35	41	47	55	62	68	75	82	88	95	102	107	114	118	121

PINTO BEANS	SEED RATE INDICATOR SETTING NUMBER																				
(DRIVE TYPE 2)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Lbs. Per Acre																				
6"	0	0	0	4	7	12	16	20	24	28	32	36	41	44	48	53	56	60	63	64	65
7"	0	0	0	3	6	10	14	18	21	24	27	31	35	38	42	46	49	52	55	55	56
7 1/2"	0	0	0	3	6	9	13	16	19	22	25	29	32	35	39	42	45	48	50	51	52
8"	0	0	0	3	5	9	12	15	18	20	23	27	30	32	35	39	41	44	46	47	47
10"	0	0	0	2	4	7	10	12	14	17	19	22	24	27	29	32	34	36	38	38	39
12"	0	0	0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	31	32	32

*Based on 60.35#/BU.

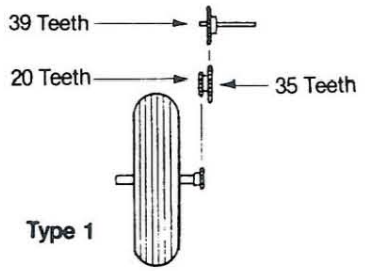
ALFALFA OR RAPE	SEED RATE INDICATOR SETTING NUMBER																					
(DRIVE TYPE 2)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	
Row Spacing	Lbs. Per Acre																					
6"	0	4	6	8	11	14	17	20	23	26	29	32	35	37	40	42	45	47	50	52	54	
7"	0	3	5	7	10	13	15	18	20	23	25	28	30	32	34	37	39	41	43	45	46	
7 1/2"	0	3	5	7	9	12	14	16	18	21	23	26	28	30	32	34	36	38	40	41	43	
8"	0	3	4	6	8	11	13	15	17	19	22	24	26	27	29	31	33	35	36	38	39	
10"	0	2	3	5	7	9	10	12	14	16	18	19	21	22	24	25	27	28	30	31	32	
12"	0	2	3	4	6	7	9	10	12	13	15	16	17	19	20	21	22	24	25	26	27	

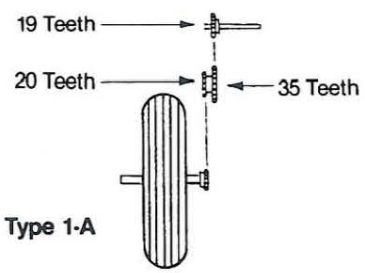
MILO	SEED RATE INDICATOR SETTING NUMBER																					
(DRIVE TYPE 2)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	
Row Spacing	Lbs. Per Acre																					
6"	0	3	5	8	12	15	18	21	24	27	30	34	37	41	45	49	54	57	60	60	61	
7"	0	2	4	7	10	12	15	18	21	24	26	29	32	36	39	42	46	50	52	52	53	
7 1/2"	0	2	4	6	9	11	14	16	19	22	24	27	30	33	36	39	43	46	48	48	49	
8"	0	2	3	6	8	10	13	15	18	20	22	25	27	30	33	36	39	42	44	44	45	
10"	0	2	3	5	7	9	11	12	14	16	18	20	22	25	27	29	32	34	36	36	37	
12"	0	1	2	4	6	7	9	10	12	14	15	17	19	21	22	24	27	29	30	30	30	

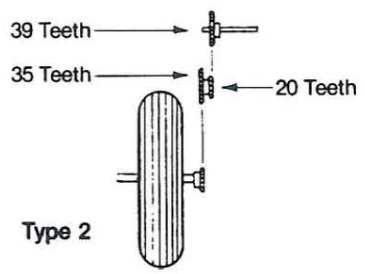
*Based on 62.4#/BU.

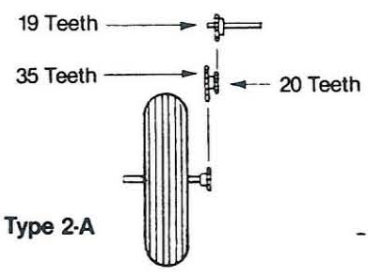
WHEAT GRASS	SEED RATE INDICATOR SETTING NUMBER																					
(DRIVE TYPE 2)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	
Row Spacing	Lbs. Per Acre																					
6"	0	1	2	2	3	4	4	5	6	7	8	9	9	10	11	12	13	14	14	15	15	
7"	0	1	1	2	3	3	4	5	5	6	7	8	8	9	10	11	11	12	12	13	13	
7 1/2"	0	1	1	2	2	3	4	4	5	6	6	7	8	8	9	10	10	11	11	12	12	
8"	0	1	1	2	2	3	3	4	4	5	6	6	7	8	8	9	10	10	10	11	11	
10"	0	1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	9	
12"	0	0	1	1	1	2	2	3	3	3	4	4	5	5	6	6	7	7	7	8	8	

Drive Types:









NOTE: Drive Type 1 = 3 times Type 2
1A = Double Type 1
2A = Double Type 2

GRANULAR FERTILIZER
OPERATING INSTRUCTIONS

The Great Plains fertilizer attachment mounts on the rear of the seed box and has capacity of one cubic foot per linear foot of drill width.

If fertilizer is not being used, remove chain from fertilizer drive sprocket to eliminate wear on the fertilizer drive system.

The application rate of dry granular fertilizer is affected by many factors: fertilizer type and density, relative humidity, and the moisture content of the material itself. Due to these variables, the chart below should be used only to closely approximate the amount of the fertilizer being applied.

FERTILIZER APPLICATION CHART

	INDICATOR SETTING NUMBER																		
Row Spacing	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	Pounds Per Acre																		
6"	15	23	31	48	64	87	109	125	140	168	195	210	225	248	270	295	320	345	369
7"	13	20	26	38	54	74	93	106	119	143	166	179	191	211	230	251	272	293	314
7 1/2"	12	18	24	37	51	68	87	100	112	134	156	168	180	198	216	236	256	276	295
8"	11	17	23	36	48	62	82	84	105	126	146	158	169	186	203	221	240	259	277
10"	9	14	19	29	38	52	66	75	84	101	117	126	135	149	162	177	192	207	221
12"	8	12	16	24	32	44	55	63	70	84	98	105	113	124	135	148	160	173	185

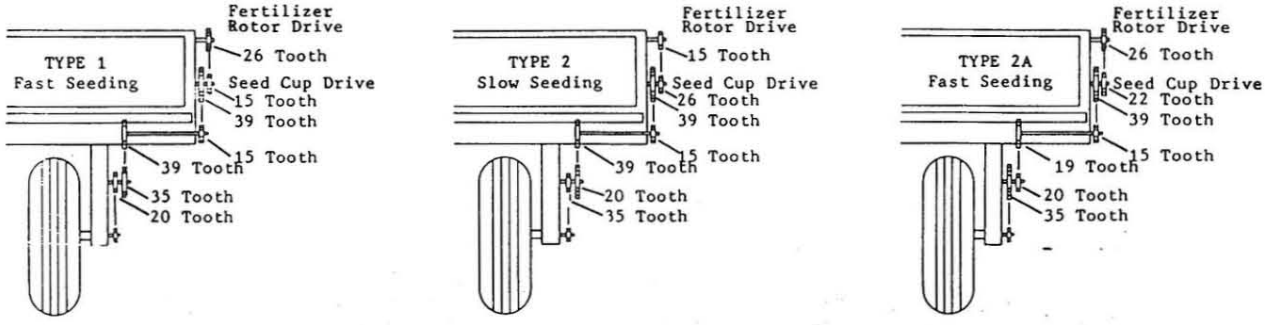
The preceding chart has been computed using fertilizer that has a density of 65 lbs./cubic foot. If you are applying fertilizer that has a density other than this, use the following table:

Density	45	50	55	60	65	70	75	80
Conversion Factor	1.45	1.30	1.20	1.10	1.00	0.93	0.87	0.81

For Example: You're using fertilizer with a 75 lb./cubic foot density and you desire a rate of 100 lbs./acre. Multiply 100 x .87 = 87 lbs. Therefore, use the setting closest to 87 lbs.

SEEDING DRIVE SPEEDS

IMPORTANT: When changing seeding drive speed for faster or slower seeding, the fertilizer drive sprocket must also be changed in order for the fertilizer rotor to maintain consistent speed. The drawings below illustrate the proper sprocket arrangement when using different types of seeding drive speeds.



Sprocket Arrangements

MAINTENANCE

It is recommended that the fertilizer unit be thoroughly cleaned every two or three days during operating season and before putting the drill in storage far an extended period of time.

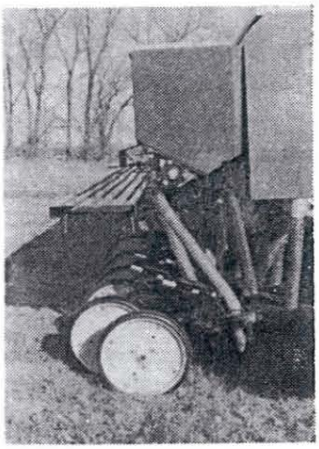
Drop fertilizer tray cover doors by releasing latches on back of box. Using a high pressure water system, thoroughly clean the fertilizer tray, gate openings, and rotor. Rotate gauge wheel to insure cleaning of all fertilizer rotor fins.

The rotor may be removed if excessive build-up occurs. This is accomplished by removing the 3-bolt bearings, felt seal, and cover at the sprocket end of the tray. Loosen the two set screws on the other end of the rotor bearing and slide the rotor out of the tray. Removing the rotor is not necessary unless using the high pressure water system described above does not remove excessive build up.

Note: Fertilizer build up on the rotor will affect the fertilizer application rate.

SHEAR BOLT

A shear bolt is provided on the rotor drive sprocket to prevent rotor damage.



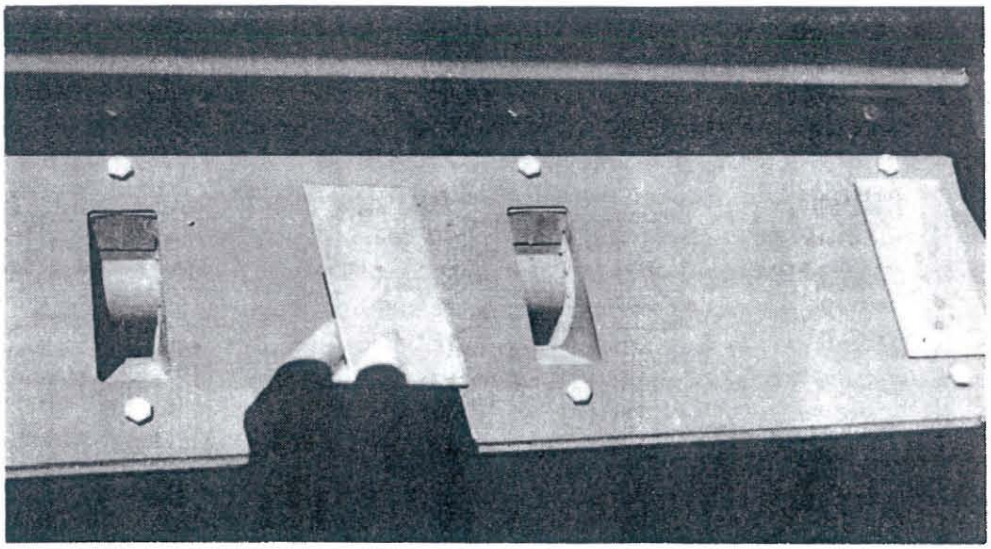
LUBRICATION

Before using the drill each year, apply lubricating oil to the felt seal at each end of the fertilizer tray in order to keep it pliable.

Grease bearings on each end of the tray every 20-25 hours of operation.

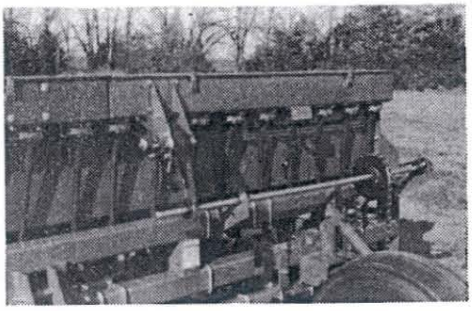
SEED CUP PLUGS

When you desire to block off certain rows to create wider row spacings, you should use Great Plains seed cup plugs which are available to cover seed cups not being used. To install, center plug over opening and push in as shown below. When ordering, specify Part No. 109-009H.



GRASS SEEDER

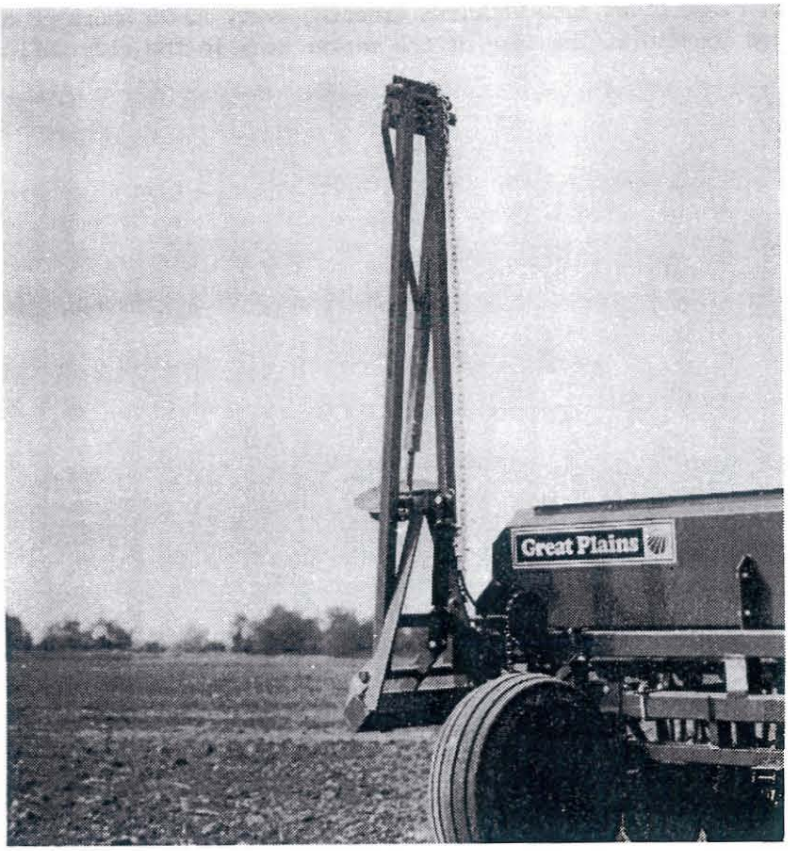
The Great Plains Grass Seeder attachment is designed to seed small amounts of seed with precision. The seed tubes can be positioned to deliver the seed in rows or between rows. See seeding chart on inside of lid on grass seeder box for sprocket arrangements, seeding adjustments, and rates. The drive sprocket arrangement located on the front of the Grass Seeder must correspond with the speed change sprocket arrangement located at the gauge wheel.



MARKERS

DOUBLE ACTING MARKERS
HYDRAULIC LIFT SPEED AND ADJUSTMENTS

Your Double Acting Hydraulic Markers are complete with a selector valve, sequence valve, and speed control valve. These valves are plumbed together in order to give you a single package for selecting the oil flow between the wing box fold circuit and the marker lift circuit. Your marker lift speed is controlled by a needle valve which is mounted in the selector valve. This valve will control the oil flow between your marker cylinders and your tractor when the markers are being raised and lowered. The speed of your markers is varied by turning the knob located on the needle valve. Adjustments may be needed when changing from one tractor to another where the hydraulic systems are different. The sequence valve shifts the oil flow from one marker cylinder to the other. This valve will shift automatically when the tractor hydraulic valve is activated each time either marker needs to be raised.



OPERATION

Unfold your drill and install your pull bar slide lock pin. Shift your double selector valve from the wing fold position to the marker sequence position. Unpin both markers from the transport position. Now activate your tractor hydraulics and one marker will lower and one will remain up. Activate your hydraulics again and both markers will be raised. Activate your hydraulics one more time and the opposite marker will lower.

CAUTION: NEVER ALLOW ANYONE NEAR THE DRILL WHEN CYCLING THE MARKERS!

TRANSPORTING

Your marker is equipped with a transport lock pin located at the top of the main mount frame. When Always pin your markers up before folding drill for transport.

MARKER DISK

The marker disk is to be bolted to the extension tube end plate in the hole closest to the ground. The cutting angle of the disk blade and the distance out from the drill is adjusted by: loosening the two locking bolts at the end of the marker body, rotating the extension tube for proper disk angle, and pushing in and out for the desired mark width out from the drill.

MAINTENANCE AND LUBRICATION

1. The marker arm is attached to the marker body with a 5/16" shear bolt. If excessive force is put on the marker during operation, the shear bolt will break, allowing the marker arm to swing away rather than cause damage to the marker. Should this occur, replace the bolt with a 5/16" x 1" long, Grade 5 bolt ONLY (Great Plains Part No. 802-159C.)

2. The marker body hinge pivot tube requires greasing every 20-25 hours of operation. Each marker has two grease fittings located at the base of the marker body in the side wall of the hinge tubes.

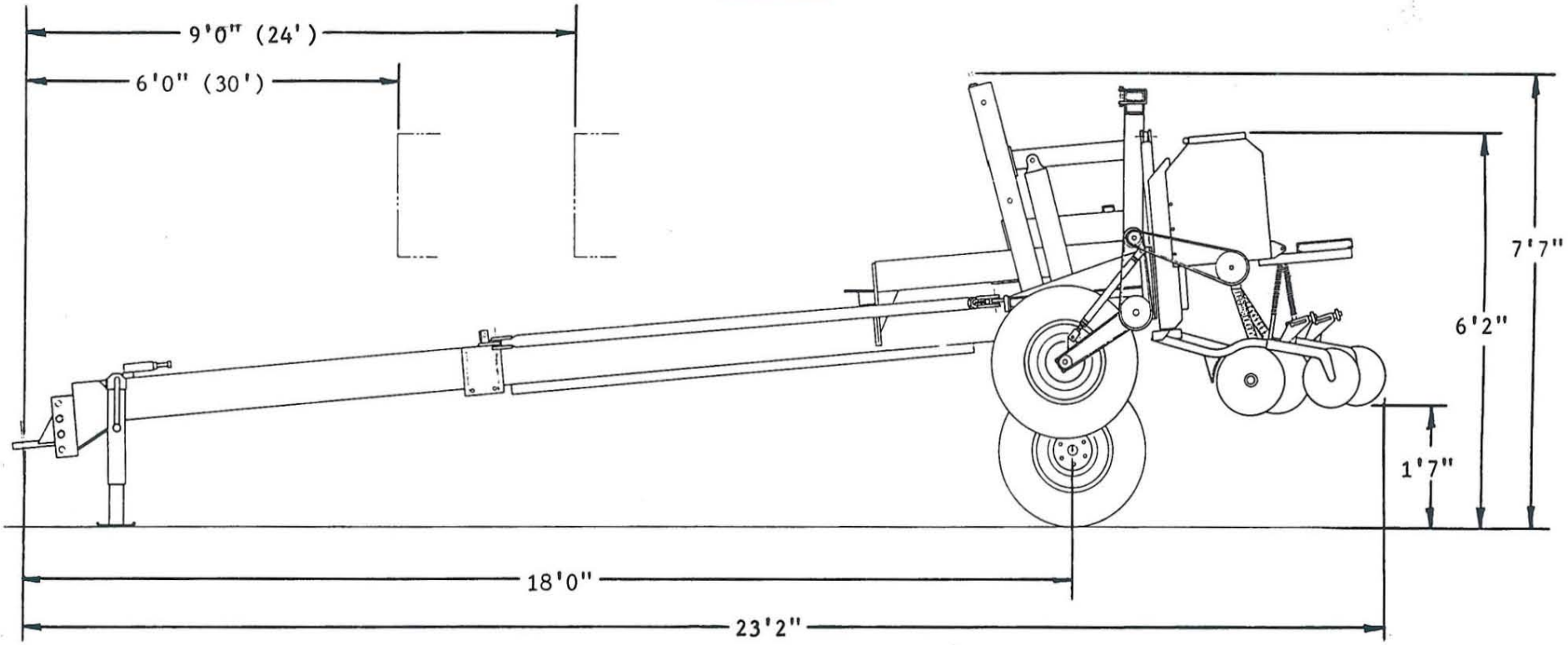
TROUBLE-SHOOTING

PROBLEM	SOLUTION
1. Uneven seed spacing or uneven stand.	a. Check for plugging in feed cups. b. Check to see if seed tubes are plugged. c. Reduce ground speed. d. Check opener disks to see that they turn freely. e. Use faster drive type (see your seed rate chart) and close feed cup flutes to a more narrow position. f. Spring pressure on openers could be improperly adjusted causing openers to not penetrate low spots.
2. Opener disks not turning freely.	a. Check for trash or mud build-up on inside disk scraper. Readjust scraper. b. Check to see if scraper is adjusted too tight and is restricting disk movement. c. Check disk bearings. d. Check opener frame for possible damage. e. If opener disks turn freely by hand but not in field, adjust down pressure on disk opener. f. Check press wheel adjustment for seeding depth.
3. Actual seeding rate is different than desired.	a. Check tire pressure. Proper inflation is listed on Page 4. b. Check tire size. Proper size is 9.5L x 15. c. Seed treatment will affect seeding rate if the chemicals build up in feed cups. Unless cleaned regularly, this build up can cause binding and breakage of the feed shaft. d. Check drive range. See page 12. e. See page 12 for instructions on calculating seed rate.
4. Excessive seed cracking.	a. Change the individual feed cup adjustment handles to the next setting. b. Use slower drive type and open flutes in seed cup to a wider position.
5. Acremeter doesn't measure accurately.	a. Check tire pressure. Proper inflation is listed on Page 4. b. Check tire size. Proper size is 9.5L x 15. c. Check planting operation for excessive overlap or gaps between passes. d. Loose soil conditions and slippage will cause variations in acres registered. e. To check accuracy of acremeter, see section on seeding adjustments. f. Check to be sure your acremeter is for your width of drill.
6. Uneven seeding depth.	a. See depth setting instructions for individual openers and press wheels.
7. Press wheels not compacting the soil as desired.	a. Reset press wheel height, see seeding and press wheel adjustment sections. b. 2 x 13 double "V" press wheel angles may need to be adjusted. c. Down pressure on disk openers is not enough.
8. Grain box not emptying evenly.	a. Certain model drills do not have the same number of feed cups between each divider or bulkhead. The section with the most feed cups will empty sooner. b. Feed cups close to ends of box tend to empty sooner due to amount of seed available. b. Check adjustment levers on each box to see that they are set on the same indicator number.

PROBLEMS	SOLUTIONS
9. Press wheels and openers plugging.	a. Drilling in damp or wet conditions may increase this problem. b. Openers may be moved from a staggered to an in-line position to reduce trash thrown from front openers into rear openers. c. Reduce down pressure on openers. d. Do not back up drill in field, or stop and allow drill to roll backwards with openers in ground. d. If using double "V" press wheels, adjust angle bar.
10. Hydraulic marker functioning improperly.	a. Check all hose fittings and connections for air and oil leaks. b. The chain on the folding marker should be slack when the marker is both fully extended and fully raised. c. Check tractor hydraulic oil level. d. Check all bolts and fasteners. e. Open needle valve, cycle markers slowly and reset needle valve if plugged. f. Double selector valve positioned for wing fold. Shift valve to marker sequence position.
11. Rubber tire depth control wheels becoming packed with mud.	a. Install scrapers. b. Reduce spring tension on openers.
12. Improper folding of drills.	a. Adjust post frame adjusting links as shown on page 7. b. Check hydraulic system for air and oil leaks. c. Clean out small orifice fittings in wing cylinders. See page 6. d. Make sure that the wing boxes unfold to a straight line. Check to see that both pull bars are attached to the boxes at exactly the same distance inboard from the inboard edge of the drill box (90") and that both are exactly the same length.
13. Hydraulic adaptors cracking.	a. JIC fittings do not require high torque. b. Always use liquid pipe sealant when adding or replacing pipe thread hydraulic fittings. Plastic sealant tape can crack fittings and plug hydraulic lines. JIC and O-ring fittings do not require sealant. O-ring fittings require a thin coat of oil on the O-ring.IMPORTANT: When using sealant on pipe threads the friction between the threads is reduced, therefore be certain not to over tighten causing damage to the cylinders, valves, or fittings.
14. Feeder cup sprockets locked up or twisted feeder drive shaft.	a. Check for foreign matter lodged in one or more feed cups. b. Liquid insecticide from seed has dried within the feed cup. Remove the build-up from the turning surfaces. NOTE: Liquid innoculant should be applied with caution and care should be taken to clean the feeder system after drilling treated seeds.
15. Raising and lowering drill is rough and uneven.	a. Lubricate lower rollers of vertical transport tubes located between the transport tires. b. Check hydraulic fittings for leaks. c. Rephasing cylinders not properly bled. See 'Hydraulic Hook-Up' on page 5. When raising drill at end of field the lifting cylinders should be fully extended to insure that they are always rephased. If machine is only raised enough to lift openers out of ground, lift cylinders may eventually get out of sequence and cause uneven seeding depth.

SPECIFICATIONS

DIMENSIONS



GENERAL

ROW SPACING	NO. OF OPENERS 24'	30'	DRILL WEIGHT 24'	30
6"	48	60	7378#	8100#
7"	40	52	7212#	7960#
7 1/2"	38	48	7112#	7836#
8"	36	44	6962#	7648#
10"	28	36	6630#	7232#
12	24	30	6464#	7024#

Weights are based on machines equipped with double disk openers and 2 x 13 single press wheels.

Drill Box Length: 12' (24' Drill)
15' (30' Drill)
Unfolded Drill Width: 24'6" (24' Drill)
30'6" (30' Drill)
Transport Width: 14'
Tire Size: 9.5L x 15
Box Capacity: 2 Bushels/Ft.
Fertilizer Attachment
Capacity: 1 Cubic Ft./Ft.

SAFETY RULES

The safe operation of any machinery is a big concern to farmers and manufacturers. We have designed our Solid Stand Folding Drill with many built-in safety features. However, no one should operate this machine before carefully reading this Owner's Manual.

1. Never permit anyone to ride on or walk beside the Grain Drill when moving.
2. Never permit anyone to ride on tractor when Drill is being moved.
3. Never allow anyone to be near Drill when performing operating functions with the Grain Drill or tractor.
4. Never load Grain Drill without being hooked-up to tractor.
5. Extra care should be taken when transporting with seed in the boxes.
6. Never back Grain Drill up when openers are in ground.
7. Reduce speed when transporting over uneven or rough terrain. Avoid all chuck holes and washboard areas in roads.
8. Reduce speed of tractor when transporting over hills or steep slopes.
9. Always set Grain Drill in field position before lubrication.
10. Do NOT lubricate, adjust or repair the Grain Drill while it is in operation.
11. When in transport, use accessory lights and devices for adequate warning to operators of other vehicles, and use safety chains. Comply with all Federal, State and Local laws when traveling on public roads.
12. Use "Slow Moving Vehicle" emblem for warning vehicles approaching from the rear.
13. Do NOT permit smoking, sparks or an open flame where combustible lubricants or liquids are being used.
14. When using treated grain, avoid direct contact with the seed.
15. When using compressed air to clean Drill, wear safety glasses.
16. When transporting, remember the Drill is wider than your tractor and extreme care must be taken to allow for safe clearance.
17. Never unhook Drill from tractor when negative tongue weight is present.

Warranty

Great Plains Manufacturing, Incorporated warrants to the original purchaser that this grain drill will be free from defects in material and workmanship for a period of one year from the date of original purchase when used as intended and under normal service and conditions. This Warranty is limited to the replacement of any defective part by Great Plains Manufacturing, Incorporated and the installation by the dealer of any such replacement part: provided that any such defective part is returned to Great Plains within thirty (30) days of the failure.

This Warranty does not apply to any part or product which in Great Plains' judgment shall have been misused or damaged by accident or lack of normal maintenance or care, or which has been repaired or altered in a way which adversely affects its performance or reliability, or which has been used for a purpose for which the product is not designed. This Warranty shall not apply if the product is transported at a speed in excess of 20 miles per hour.

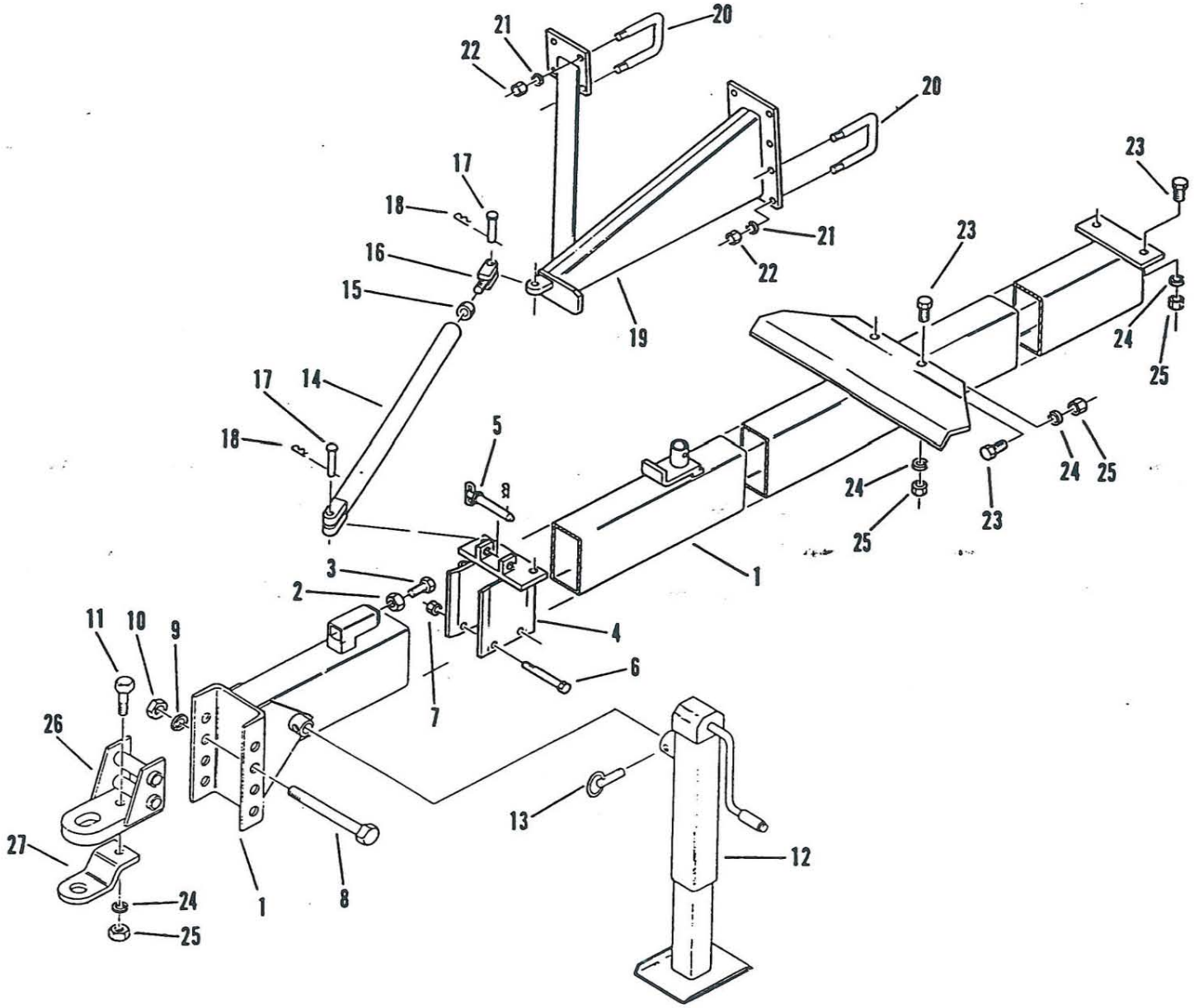
Claims under this Warranty must be made to the dealer which originally sold the product and all warranty adjustments must be made through such dealer. Great Plains reserves the right to make changes in materials or design of the product at any time without notice.

This Warranty shall not be interpreted to render Great Plains liable for damages of any kind, direct, consequential, or contingent, to property. Futhermore, Great Plains shall not be liable for damages resulting from any cause beyond its reasonable control. This Warranty does not extend to loss of crops, losses caused by harvest delays or any expense or loss for labor, supplies, rental machinery or for any other reason.

No other warranty of any kind whatsoever, express or implied, is made with respect to this sale; and all implied warranties of merchantability and fitness for a particular purpose which exceed the obligations set forth in this written warranty are hereby disclaimed and excluded from this sale.

This Warranty is not valid unless registered with Great Plains Manufacturing, Incorporated within 10 days from the date of original purchase.

Great Plains Manufacturing, Inc.
Corporate Office: PO. Box 5060
Salina, Kansas 67402-5060 USA

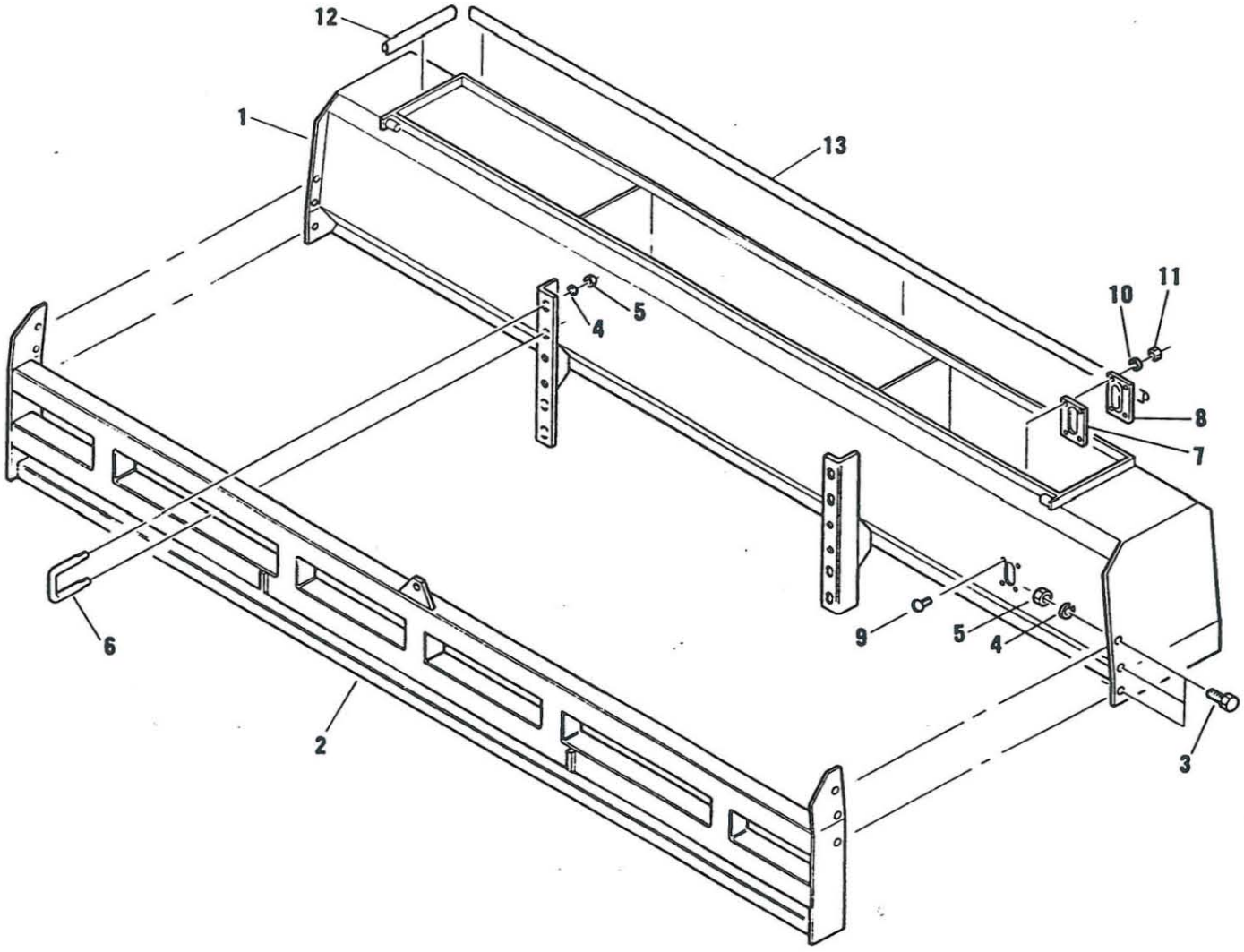


TONGUE & PULL BAR ASSEMBLY

No.	Part No.	Description
1.	154-001H	Tongue Weldment, 24' Drill (shown)
	154-002H	Tongue Weldment, 30' Drill
2.	803-048C	Nut, Jam, 3/4"-10
3.	802-067C	Bolt, Hex, 3/4"-10 x 4" Lg., Full Thread
4.	157-001H	Pull Bar Slide Assembly
5.	805-033C	Tongue Lock Pin W/Hairpin Cotter
6.	802-046C	Bolt, Hex, 1/2"-13 x 5 1/2" Lg.
7.	803-019C	Nut, Lock, 1/2"-13
8.	802-166C	Bolt, Hex, 1 1/4"-7 x 9 1/2" Lg.
9.	804-030C	Lock Washer, 1 1/4"
10.	803-034C	Nut, Hex, 1 1/4"-7

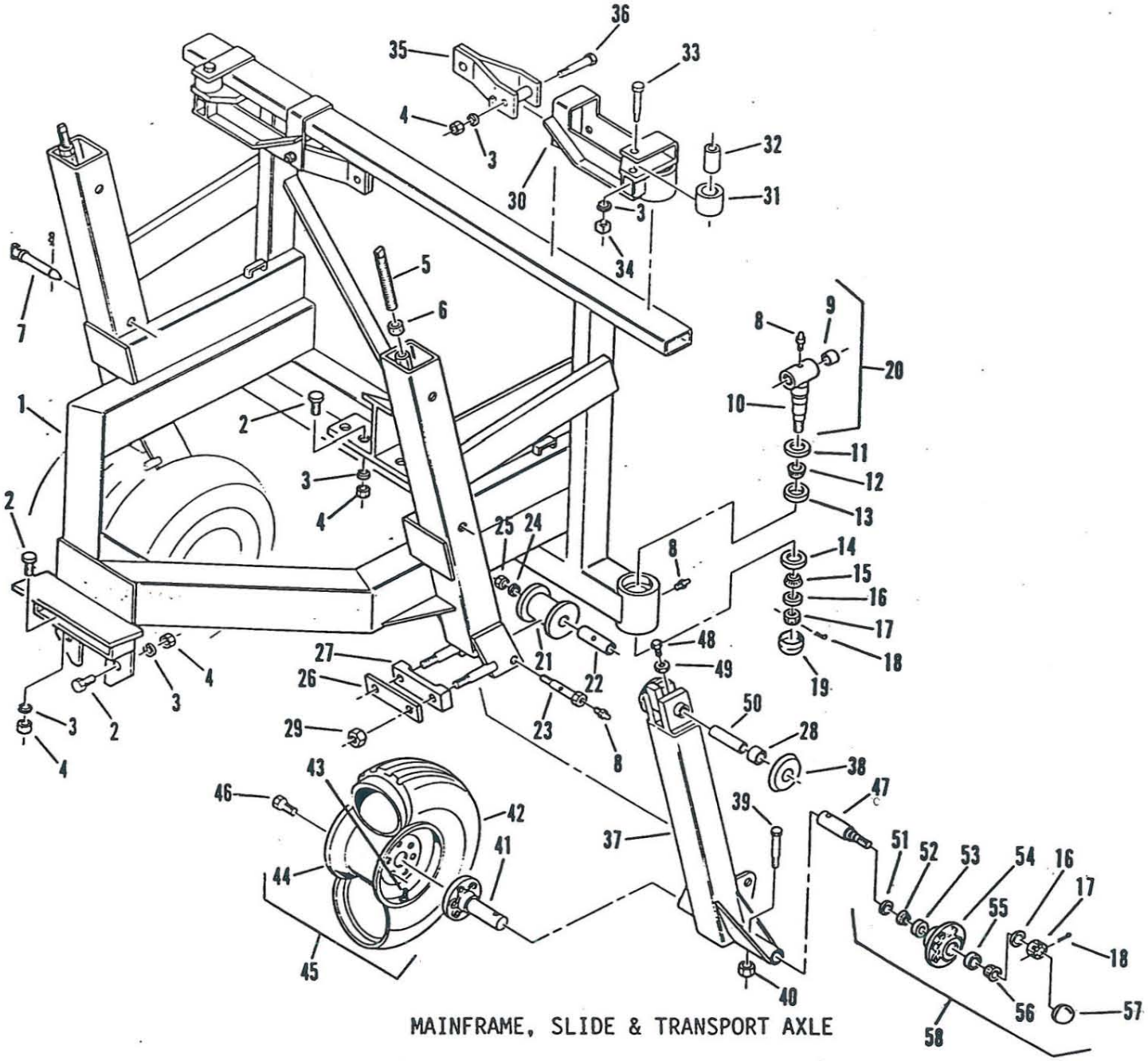
TONGUE & PULL BAR ASSEMBLY (CON'T.)

No.	Part No.	Description
11.	802-169C	Bolt, Hex, 1"-8 x 3 1/2" lg.
12.	890-120C	Screw Jack
13.	805-081C	Jack Pin, 3/4" x 4 3/8"
14.	111-001H	Pull Bar Assembly
15.	803-032C	Nut, Jam, 1 1/4"-7
16.	111-002H	Pull Bar Adjustment Clevis
17.	805-004C	Pull Bar Pin
18.		Hairpin Cotter
19.	157-003H	Transport Stabilizer Frame, Right Hand (Shown)
	157-002H	Transport Stabilizer Frame, Left Hand
20.	806-006C	U-Bolt, 5/8"-11 x 3 1/2" x 5"
21.	804-022C	Lock Washer, 5/8"
22.	803-021C	Nut, Hex, 5/8"-11
23.	802-096C	Bolt, Hex, 1"-8 x 2 1/2" Lg.
24.	804-027C	Lock Washer, 1"
25.	803-031C	Nut, Hex, 1"-8
26.	170-033H	Large Hole Hitch
	170-034H	Small Hole Hitch
27.	170-040H	Lower Hitch
	170-038A	Large Hole Hitch Assembly (Includes 2 Ea. of No's. 8,9, & 10 and 1 Ea. of No. 26)
	170-039A	Small Hole Hitch Assembly (Includes 2 Ea. of No's. 8,9 & 10 and 1 Ea. of No's. 11,24,25,26 & 27)



FRAMES & BOXES

No.	Part No.	Description
1.	118-116H	Box Weldment - 12'
	118-115H	Box Weldment - 15'
2.	158-028H	Frame Weldment - 12'
	158-027H	Frame Weldment - 15'
3.	802-034C	Bolt, Hex, 1/2"-13 x 1 1/4" Lg.
4.	804-015C	Lockwasher, 1/2"
5.	803-020C	Nut, Hex, 1/2"-13
6.	806-002C	U-Bolt, 1/2"-13 x 3 1/2" x 4 1/2" Lg.
7.	816-013C	Sight Gauge Gasket
8.	817-007C	Sight Gauge
9.	801-003C	Screw, Roundhead, #10-24 x 1/2" Lg.
10.	804-004C	Washer, Internal Star, #10
11.	803-001C	Nut, Hex, #10-24
12.	118-155D	Box Lid Seal, End - 10 1/2, All Boxes
13.	118-157D	Box Lid Seal - 117, 12' Box
	118-156D	Box Lid Seal - 79, 15' Box



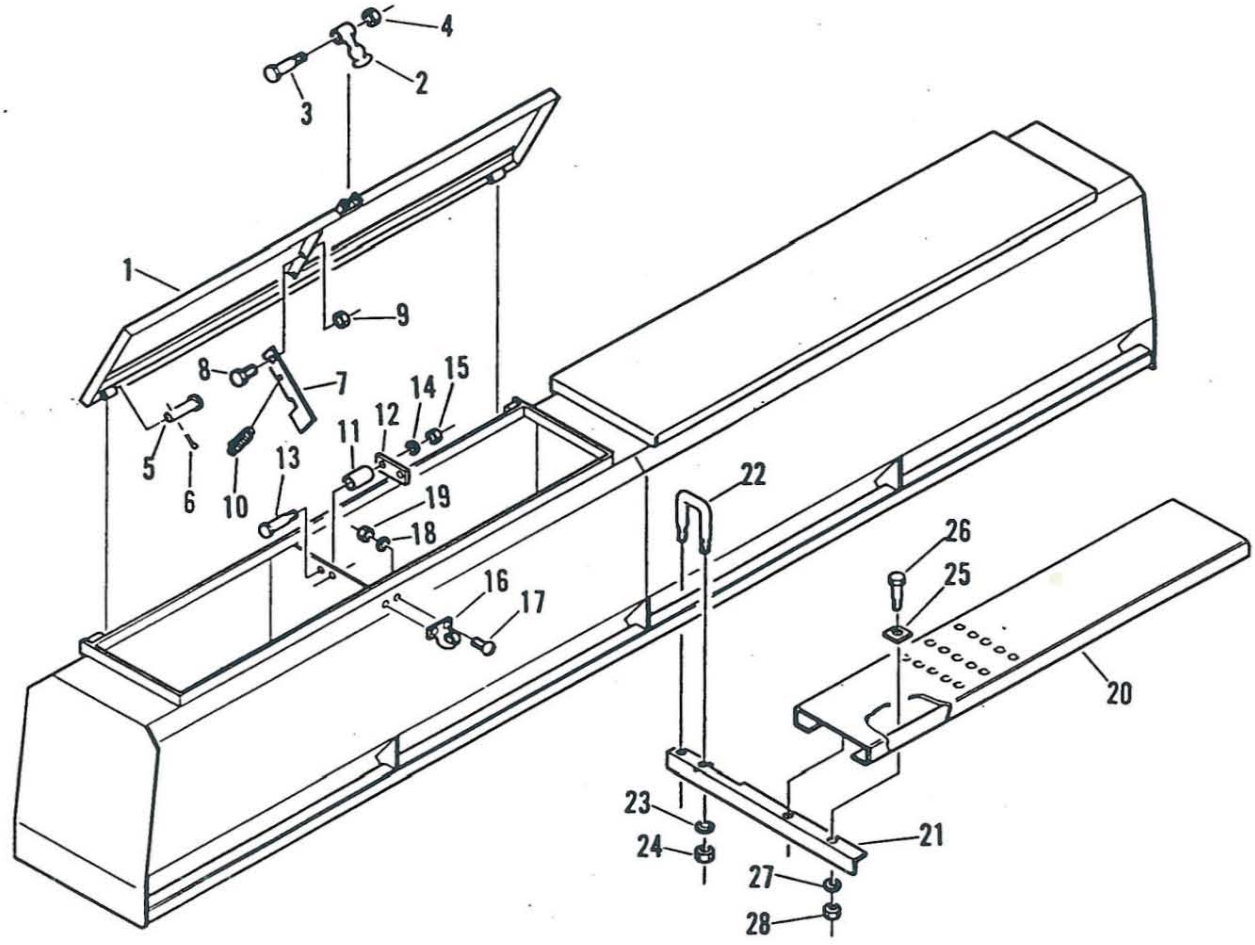
MAINFRAME, SLIDE & TRANSPORT AXLE

No.	Part No.	Description
1.	155-002H	Transport Frame
2.	802-096C	Bolt, Hex, 1"-8 x 2 1/2" Lg.
3.	804-027C	Lock Washer, 1"
4.	803-031C	Nut, Hex, 1"-8
5.	890-050C	Depth Adjustment Stud
	890-105C	Depth Adjustment Stud Hillside Special
6.	803-032C	Jam Nut, Hex, 1 1/4"-7
7.	805-033C	Transport Lock Pin W/Hairpin Cotter
8.	800-001C	Zerk, 1/4"-28 Straight
9.	890-011C	Spindle Pivot Bushing

MAINFRAME, SLIDE & TRANSPORT AXLE (CON'T.)

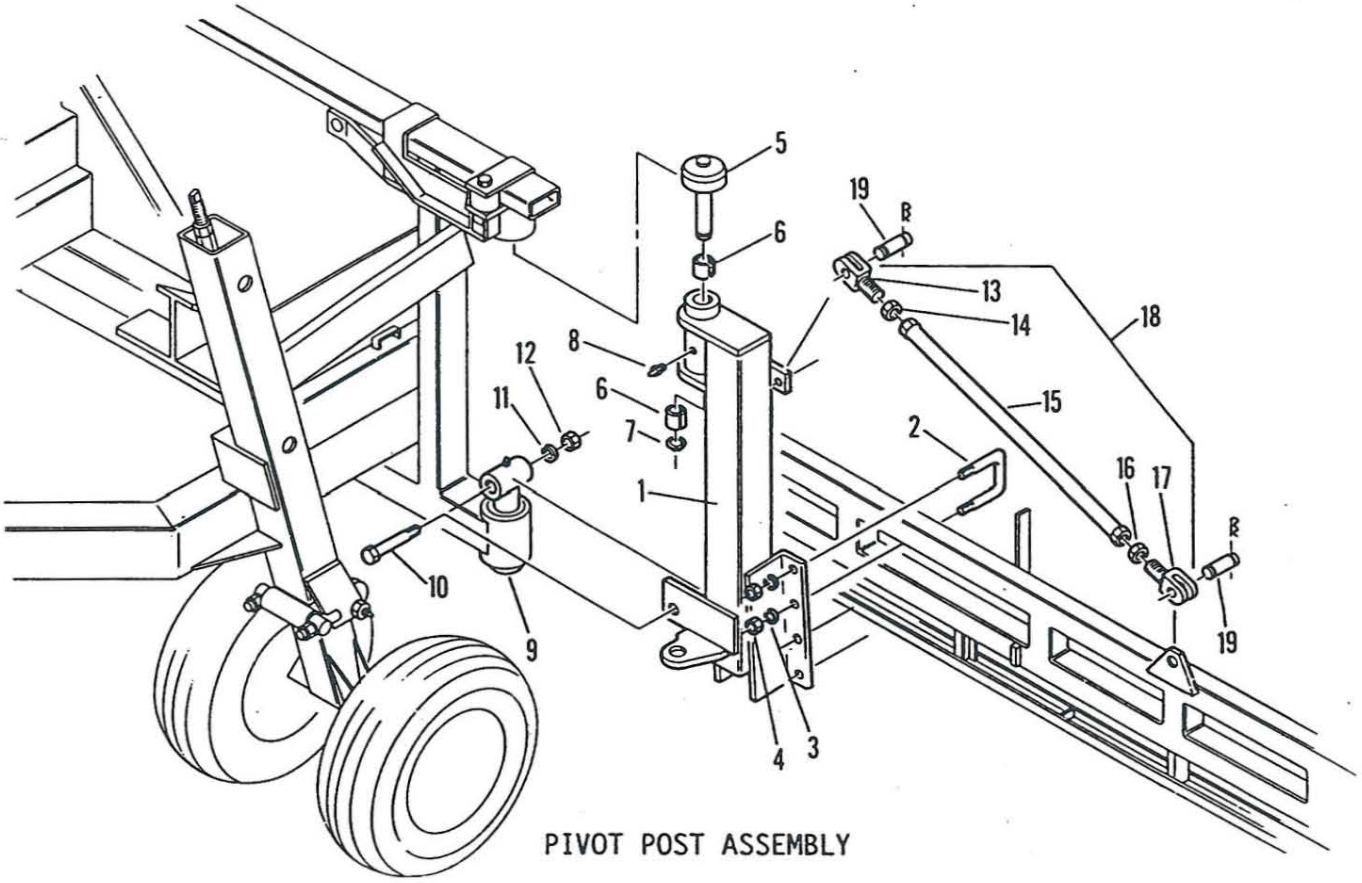
No.	Part No.	Description
10.	156-003H	Post Spindle
11.	816-012C	Post Spindle Seal
12.	822-014C	Post Spindle Top Cone #25590
13.	822-013C	Post Spindle Top Cup #25520
14.	822-015C	Post Spindle Bottom Cup #25821
15.	822-016C	Post Spindle Bottom Cone #25877
16.	804-055C	Washer, Spindle, 7/8"
17.	803-029C	Nut, Slotted Hex, 7/8"-14
18.	805-016C	Cotter Pin, 3/16" x 1 1/4" Lg.
19.	890-032C	Post Spindle Hub Cap
20.	156-002K	Post Spindle Assembly (Includes No's. 8,9 & 10)
21.	155-004H	Lower Roller
22.	155-027D	Lower Roller Bushing
23.	155-026D	Lower Roller Bolt
24.	804-023C	Lock Washer, 3/4"
25.	803-027C	Nut, Hex, 3/4"-10
26.	148-135D	Plastic Block Back Plate
27.	817-031C	Front Block
28.	822-061C	Upper Roller Bearing
29.	803-024C	Nut, Lock, 5/8"-11
30.	156-001H	Slide Frame, Left Hand (Shown)
	156-002H	Slide Frame, Right Hand
31.	156-005D	Slide Roller
32.	156-007D	Slide Roller Spacer Tube
33.	802-098C	Bolt, Hex, 1"-8 x 4 1/2" Lg.
34.	803-045C	Nut, Square, 1"-8
35.	156-004H	Cylinder Arm
36.	802-074C	Bolt, Hex, 1"-8 x 6 1/2" Lg.
37.	155-006H	Inner Slide Tube
38.	155-053D	Upper Roller
39.	802-099C	Bolt, Hex, 1/2"-13 x 3 1/4" Lg.
40.	803-019C	Nut, Lock, 1/2"-13
41.	102-002K	Transport Hub And Spindle Assembly
42.	814-009C	Tire, 9.5 x 15, 12 Ply, Tubeless
43.	816-035C	Valve Stem, TR415 x .625 x 1 1/4" Long
44.	814-008C	Wheel, 15 x 8, 6 Bolt
45.	102-006K	Transport Wheel And Tire Assembly - Tubeless (Includes No's. 42,43 & 44)
46.	802-104C	Lug Bolt, 1/2"-20 x 1" Lg., UNF
47.	201-003D	Single End Spindle, Short
48.	802-014C	Bolt, Hex, 3/8"-16 x 3/4" Lg.
49.	803-012C	Jam Nut, Hex, 3/8"-16
50.	155-054D	Upper Roller Shaft
51.	816-011C	Hub Seal
52.	822-018C	Hub Inner Bearing Cone #LM29749
53.	822-019C	Hub Inner Bearing Cup #LM29710
54.	200-006S	Hub W/Cups (Includes No's. 53 & 55)
55.	822-020C	Hub Outer Bearing Cup #LM67010
56.	822-021C	Hub Outer Bearing Cone #LM67048
57.	200-001D	Hub Grease Cup
58.	200-001S	Hub Package (Includes No's. 51 thru 57,16,17,18 & 6 Ea. Of No. 46)

LIDS & STEPS



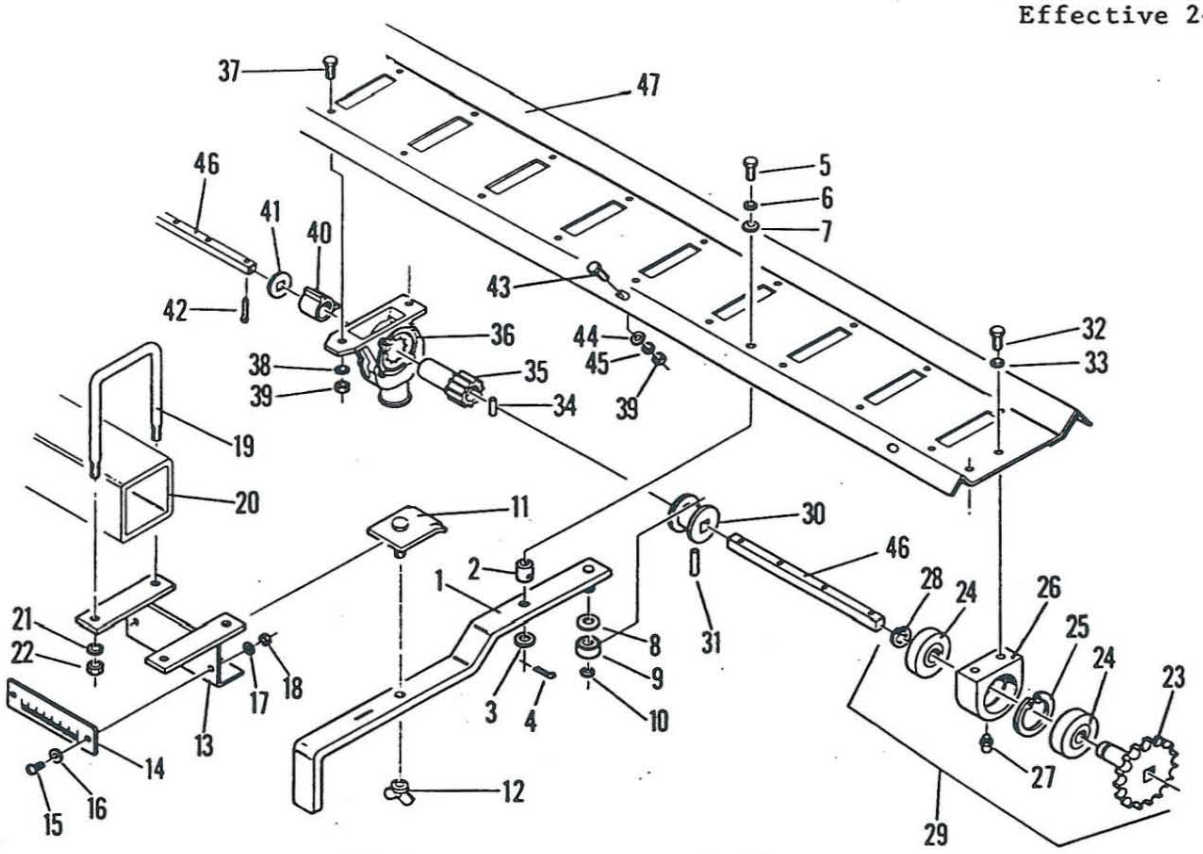
LIDS & STEPS (CON'T.)

No.	Part No.	Description
1.	119-108H	Lid Weldment - 24' Drill
	119-007H	Lid Weldment - 30' Drill
2.	816-008C	Rubber Lid Latch
3.	802-167C	Bolt, Hex, 1/4"-20 x 1 1/2" Lg.
4.	803-007C	Nut, Lock, 1/4"-20, Staked
5.	805-014C	Lid Hinge Pin
6.	805-019C	Cotter Pin, 5/32" x 1" Lg.
7.	119-001H	Lid Latch
8.	802-007C	Bolt, Hex, 5/16"-18 x 3/4" Lg.
9.	803-011C	Nut, Lock, 5/16"-18, Staked
10.	807-001C	Lid Latch Spring
11.	110-016D	Lid Latch Spacer
12.	110-015D	Lid Latch Strap
13.	802-167C	Bolt, Hex, 1/4"-20 x 1 1/2" Lg.
14.	804-006C	Lock Washer, 1/4"
15.	803-006C	Nut, Hex, 1/4"-20
16.	890-016C	Hood Bracket
17.	801-003C	Screw, Machine, #10-24 x 1/2" Lg.
18.	804-005C	Lock Washer, #10 Internal Star
19.	803-001C	Nut, Hex, #10-24
20.	119-106D	Step, 84" - 30' Drill
	119-014D	Step, 120" - 24' Drill
21.	119-108D	Step Angle
22.	806-005C	U-Bolt, 1/2"-13 x 2" x 3" Lg.
23.	804-015C	Lock Washer, 1/2"
24.	803-020C	Nut, Hex, 1/2"-13
25.	119-032D	Step Retainer
26.	802-079C	Bolt, Hex, 3/8"-16 x 1 1/4" Lg.
27.	804-013C	Lock Washer, 3/8"
28.	803-014C	Nut, Hex, 3/8"-16



PIVOT POST ASSEMBLY

No.	Part No.	Description
1.	156-006H	Pivot Post, Left (Shown)
	156-005H	Pivot Post, Right
2.	806-006C	U-Bolt, 5/8"-11 x 3 1/2" x 5" Lg.
3.	804-022C	Lock Washer, 5/8"
4.	803-021C	Nut, Hex, 5/8"-11
5.	156-010H	Roller Shaft
6.	890-051C	Roller Shaft Bushing
7.	800-014C	Roller Shaft Snap Ring
8.	800-001C	Zerk, 1/4"-28, Straight
9.		Post Spindle Assembly (See Transport Axle, Item 20 - Page 31)
10.	802-077C	Bolt, Hex, 1 1/4"-7 x 7" Lg.
11.	804-030C	Lock Washer, 1 1/4"
12.	803-034C	Nut, Hex, 1 1/4"-7
13.	156-014E	Adjustment Link Weldment, Left Hand Thread
14.	803-046C	Jam Nut, Hex, 1 1/4"-7, Left Hand Thread
15.	156-008E	Frame Adjustment Link
16.	803-032C	Jam Nut, Hex, 1 1/4"-7, Right Hand Thread
17.	156-013E	Adjustment Link Weldment, Right Hand Thread
18.	156-015S	Frame Adjustment Link Assembly (Includes No's. 13 thru 17)
19.	805-004C	Clevis Pin



FEEDER CUP CHANNEL ASSEMBLY

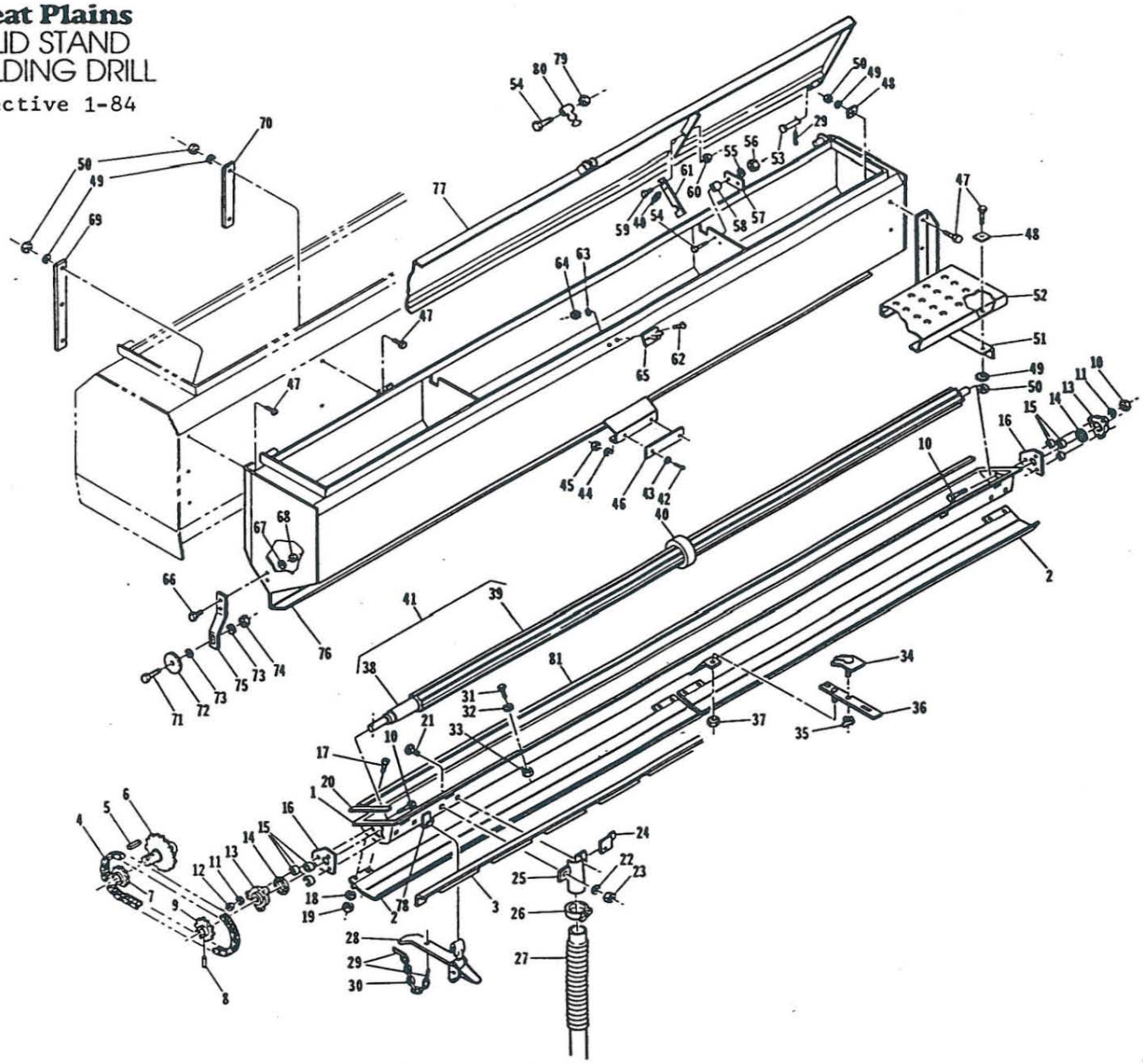
No.	Part No.	Description
1.	120-109H	Seed Rate Adjustment Handle
2.	109-069D	Adjustment Handle Pivot
3.	804-019C	Flat Washer, 5/8" USS
4.	805-016C	Cotter Pin, 3/16" x 1 1/4" Lg.
5.	802-014C	Bolt, Hex, 3/8"-16 x 3/4" Lg.
6.	804-013C	Lock Washer, 3/8"
7.	804-012C	Flatwasher, 3/8" SAE
8.	804-001C	Washer, Adjustment Handle Bearing
9.	822-008C	Adjustment Handle Bearing
10.	800-003C	Adjustment Handle Pin Ring
11.	109-025H	Adjustment Handle Lock
12.	803-016C	Wing Nut, 1/2"-13
13.	120-110H	Seed Rate Gauge Mount
14.	819-005C	Seed Rate Gauge
15.	801-001C	Screw, Round Head, #8-32 x 3/8"Lg., Brass
16.	804-003C	Flat Washer, #8, Brass
17.	804-002C	Lock Washer, #8, Internal Star
18.	803-035C	Nut, Hex, #8-32, Brass
19.	806-002C	U-Bolt, 1/2"-13 x 3 1/2" x 4 1/2" Lg.
20.		Main Frame Upper Tube, 3 1/2" x 3 1/2"
21.	804-015C	Lock Washer, 1/2"
22.	803-020C	Nut, Hex, 1/2"-13
23.	109-002H	Sprocket And Hub Weldment
24.	822-006C	Bearing
25.	800-005C	Snap Ring

FEEDER CUP CHANNEL ASSEMBLY (CON'T.)

No.	Part No.	Description
26.	109-039D	Bearing Housing
27.	800-001C	Zerk, 1/4"-28 Straight
28.	800-004C	Snap Ring
29.	109-003S	Sprocket And Bearing Assembly (Includes No's. 23,25,26,27,28 & 2 Ea. Of No. 24)
30.	109-013H	Spool
31.	805-023C	Roll Pin, 3/16" x 1 1/4" Lg.
32.	802-032C	Bolt, Hex, 1/2"-13 x 3/4" Lg.
33.	804-015C	Lock Washer, 1/2"
34.	805-070C	Feeder Cup Shaft Pin, 3/16"
35.	817-002C	Sprocket, Nylon
36.	817-016C	Feeder Cup Housing
37.	802-078C	Bolt, Hex, 1/4"-20 x 5/8" Lg.
38.	804-052C	Lock Washer, 1/4" External Tooth
39.	803-006C	Nut, Hex, 1/4"-20
40.	817-003C	Sleeve
41.	804-031C	Retaining Washer
42.	805-016C	Cotter Pin, 3/16" x 1 1/4" Lg.
43.	802-004C	Bolt, Hex, 1/4"-20 x 3/4" Lg.
44.	804-007C	Flat Washer, 1/4" SAE
45.	804-006C	Lock Washer, 1/4"
46.	120-103D	Drive Shaft, 6" - 24' Drill, L.H.
	120-109D	Drive Shaft, 6" - 24' Drill, R.H.
	120-100D	Drive Shaft, 6" - 30' Drill, L.H.
	120-119D	Drive Shaft, 6" - 30' Drill, R.H.
	120-104D	Drive Shaft, 7" - 24' Drill, L.H.
	120-110D	Drive Shaft, 7" - 24' Drill, R.H.
	120-101D	Drive Shaft, 7" - 30' Drill, L.H.
	120-120D	Drive Shaft, 7" - 30' Drill, R.H.
	120-105D	Drive Shaft, 7 1/2" - 24' Drill, L.H.
	120-111D	Drive Shaft, 7 1/2" - 24' Drill, R.H.
	120-115D	Drive Shaft, 7 1/2" - 30' Drill, L.H.
	120-121D	Drive Shaft, 7 1/2" - 30' Drill, R.H.
	120-106D	Drive Shaft, 8" - 24' Drill, L.H.
	120-112D	Drive Shaft, 8" - 24' Drill, R.H.
	120-116D	Drive Shaft, 8" - 30' Drill, L.H.
	120-122D	Drive Shaft, 8" - 30' Drill, R.H.
	120-107D	Drive Shaft, 10" - 24' Drill, L.H.
	120-113D	Drive Shaft, 10" - 24' Drill, R.H.
	120-117D	Drive Shaft, 10" - 30' Drill, L.H.
	120-123D	Drive Shaft, 10" - 30' Drill, R.H.
	120-108D	Drive Shaft, 12" - 24' Drill, L.H.
	120-114D	Drive Shaft, 12" - 24' Drill, R.H.
	120-118D	Drive Shaft, 12" - 30' Drill, L.H.
	120-124D	Drive Shaft, 12" - 30' Drill, R.H.
47.	118-121D	Feeder Cup Channel, 6" - 24' Drill, L.H.
	118-127D	Feeder Cup Channel, 6" - 24' Drill, R.H.
	118-101H	Feeder Cup Channel, 6" - 30' Drill, L.H.
	118-108H	Feeder Cup Channel, 6" - 30' Drill, R.H.

FEEDER CUP CHANNEL ASSEMBLY (CON'T.)

No.	Part No.	Description
	118-122D	Feeder Cup Channel, 7" - 24' Drill, L.H.
	118-128D	Feeder Cup Channel, 7" - 24' Drill, R.H.
	118-102H	Feeder Cup Channel, 7" - 30' Drill, L.H.
	118-109H	Feeder Cup Channel, 7" - 30' Drill, R.H.
	118-123D	Feeder Cup Channel, 7 1-2" - 24' Drill, L.H.
	118-129D	Feeder Cup Channel, 7 1/2" - 24' Drill, R.H.
	118-104H	Feeder Cup Channel, 7 1/2" - 30' Drill, L.H.
	118-110H	Feeder Cup Channel, 7 1/2" - 30' Drill, R.H.
	118-124D	Feeder Cup Channel, 8" - 24' Drill, L.H.
	118-130D	Feeder Cup Channel, 8" - 24' Drill, R.H.
	118-105H	Feeder Cup Channel, 8" - 30' Drill, L.H.
	118-111H	Feeder Cup Channel, 8" - 30' Drill, R.H.
	118-125D	Feeder Cup Channel, 10" - 24' Drill, L.H.
	118-131D	Feeder Cup Channel, 10" - 24' Drill, R.H.
	118-106H	Feeder Cup Channel, 10" - 30' Drill, L.H.
	118-112H	Feeder Cup Channel, 10" - 30' Drill, R.H.
	118-126D	Feeder Cup Channel, 12" - 24' Drill, L.H.
	118-132D	Feeder Cup Channel, 12" - 24' Drill, R.H.
	118-107H	Feeder Cup Channel, 12" - 30' Drill, L.H.
	118-113H	Feeder Cup Channel, 12" - 30' Drill, R.H.



24' FERTILIZER ATTACHMENT

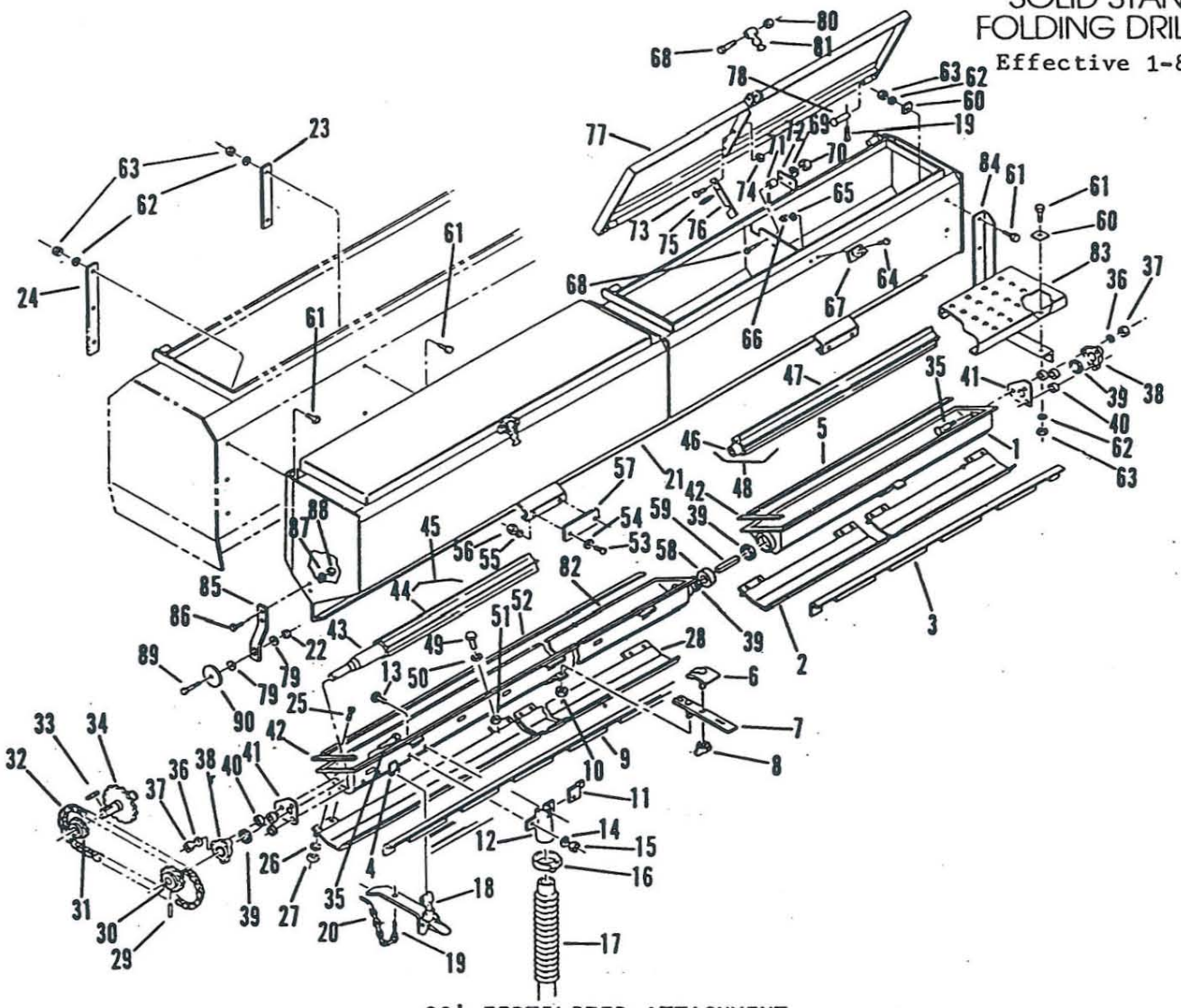
No.	Part No.	Description
1.	142-043E	12'-6" Fertilizer Tray
	142-044E	12'-7" Fertilizer Tray
	142-045E	12'-7 1/2" Fertilizer Tray
	142-046E	12'-8" Fertilizer Tray
	142-047E	12'-10" Fertilizer Tray
	142-048E	12'-12" Fertilizer Tray
2.	142-095E	Clean Out Cover
3.	142-065E	6" Slide
	142-066E	7" Slide
	142-067E	7 1/2" Slide
	142-068E	8" Slide
	142-069E	10" Slide
	142-070E	12" Slide
4.	809-013C	Chain 20-50 x 39 Pitch
5.	123-004D	Key, 1/4" x 1" Lg.
6.	145-006E	Seed/Fertilizer Adapter Hub

24' FERTILIZER ATTACHMENT (CON'T.)

No.	Part No.	Description
7.	808-008C	Sprocket, 15T x 1" Bore
8.	805-029C	Roll Pin, 5/16" x 2 1/4" Lg.
9.	808-007C	Sprocket, 26T x 1" Lg.
10.	802-013C	Bolt, Hex, 5/16"-18 x 1 3/4" Lg.
11.	804-009C	Lock Washer, 5/16"
12.	803-008C	Nut, Hex, 5/16"-18
13.	822-012C	Bearing, 1" Bore x 3 Bolt Flange
14.	890-026C	Felt Tray End Seal
15.	141-084D	Tray Bearing Spacer
16.	141-083D	Fertilizer Tray End Cover Plate
17.	801-010C	Screw, Pan Hd., #10-32 x 3/8" Lg. S.S.
18.	804-032C	Lock Washer, #10 S.S.
19.	803-002C	Nut, Hex, #10-32 S.S.
20.	141-107D	Tray End Flange Seal
21.	802-089C	Bolt, Carriage, 1/4"-20 x 3/4" Lg. S.S.
22.	804-033C	Lock Washer, 1/4" S.S.
23.	803-004C	Nut, Hex, 1/4"-20 S.S.
24.	141-041E	Slide Stop
25.	141-011E	Fertilizer Drop Assembly
26.	800-016C	Fertilizer Hose Upper Clamp
27.	816-003C	Fertilizer Hose
28.	141-116H	Fertilizer Latch Weldment
29.	805-019C	Cotter Pin, 5/32" x 1" Lg.
30.	142-009D	Cover Handle Chain
31.	802-001C	Bolt, Hex, 1/4"-20 x 3/4" S.S.
32.	804-034C	Flat Washer, 1/4" SAE S.S.
33.	803-003C	Nut, Lock, 1/4"-20 S.S.
34.	109-025H	Adjustment Handle Lock Plate
35.	803-016C	Nut, Wing, 1/2"-13
36.	141-013H	Fertilizer Adjustment Handle
37.	803-019C	Nut, Lock, 1/2"-13, Staked
38.	142-082E	Agitator Tube
39.	142-092E	6",7",8",10" & 12" Agitator Fin
	142-093E	7 1/2" Agitator Fin Long
	142-094E	7 1/2" Agitator Fin Short
40.	142-062D	Carrier Bearing
41.	142-089K	6",7",8",10" & 12" Agitator Assembly
	142-090K	7 1/2" Agitator Assembly
42.	801-001C	Screw, #8-32 x 3/8" Lg. Brass
43.	804-003C	Flat Washer, #8 Brass
44.	804-002C	Lock Washer, #8, Internal Star
45.	803-035C	Nut, Hex, #8-32 Brass
46.	819-005C	Adjustment Gauge
47.	802-079C	Bolt, Hex, 3/8"-16 x 1 1/4" Lg.
48.	119-032D	Step Retainer
49.	804-013C	Lock Washer, 3/8"
50.	803-014C	Nut, Hex, 3/8"-16
51.	119-132H	Step Hanger
52.	119-014D	Step
53.	805-014C	Pin, Lid Hinge
54.	802-167C	Bolt, Hex, 1/4"-20 x 1 1/2" Lg.
55.	804-006C	Lock Washer, 1/4"
56.	803-006C	Nut, Hex, 1/4"-20

24' FERTILIZER ATTACHMENT (CON'T.)

No.	Part No.	Description
57.	110-015D	Lid Hinge Strap
58.	110-016D	Lid Hinge Strap Spacer
59.	802-007C	Bolt, Hex, 5/16"-18 x 3/4" Lg.
60.	803-011C	Nut, Lock, 5/16"-18, Staked
61.	119-011H	Lid Latch
62.	801-003C	Screw, Slot Head, #10-24 x 1/2" Lg.
63.	804-004C	Lock Washer, #10, Internal Star
64.	803-001C	Nut, Hex, #10-24
65.	890-016C	Latch Bracket
66.	802-034C	Bolt, Hex, 1/2"-13 x 1 1/4" Lg.
67.	804-015C	Lock Washer, 1/2"
68.	803-020C	Nut, Hex, 1/2"-13
69.	142-035D	Mounting Support
70.	142-036D	Partition Support
71.	802-055C	Bolt, Hex, 5/8"-11 x 2" Lg.
72.	109-064D	Idler Disk
73.	804-019C	Flat Washer, 5/8" USS
74.	803-021C	Nut, Hex, 5/8"-11
75.	142-125D	Idler Bracket
76.	142-041H	12' Fertilizer Box Weldment
77.	119-108H	Box Lid
78.	800-032C	Fertilizer Latch Strike
79.	803-007C	Nut, Lock, 1/4"-20
80.	816-008C	Rubber Lid Latch
81.	142-118D	Tray Seal



30' FERTILIZER ATTACHMENT

No.	Part No.	Description
1.	142-054E	15'-6" Fertilizer Tray Extension
	142-055E	15'-7" Fertilizer Tray Extension
	142-056E	15'-7 1/2" Fertilizer Tray Extension
	142-057E	15'-8" Fertilizer Tray Extension
	142-058E	15'-10" Fertilizer Tray Extension
	142-059E	15'-12" Fertilizer Tray Extension
2.	142-096E	15' Clean Out Cover Long
3.	142-076E	15'-6" Slide Extension
	142-077E	15'-7" Slide Extension
	142-078E	15'-7 1/2" Slide Extension
	142-079E	15'-8" Slide Extension
	142-080E	15'-10" Slide Extension
	142-081E	15'-12" Slide Extension
4.	800-032C	Fertilizer Latch Strike
5.	142-120D	15' Extension Tray Seal
6.	109-025H	Adjustment Handle Lock Plate
7.	141-013H	Fertilizer Adjustment Handle
8.	803-016C	Nut, Wing, 1/2"-13

30' FERTILIZER ATTACHMENT (CON'T.)

No.	Part No.	Description
9.	141-014E	6" Fertilizer Slide
	141-016E	7" Fertilizer Slide
	141-127E	7 1/2" Fertilizer Slide
	141-018E	8" Fertilizer Slide
	141-020E	10" Fertilizer Slide
	141-022E	12" Fertilizer Slide
10.	803-019C	Nut, Lock, 1/2"-13, Staked
11.	141-041E	Slide Stop
12.	141-011E	Fertilizer Drop Assembly
13.	802-089C	Bolt, Carriage, 1/4"-20 x 3/4" Lg. S.S.
14.	804-033C	Lock Washer, 1/4" S.S.
15.	803-004C	Nut, Hex, 1/4"-20 S.S.
16.	800-016C	Fertilizer Upper Hose Clamp
17.	816-003C	Fertilizer Hose
18.	141-116H	Fertilizer Latch Weldment
19.	805-019C	Cotter Pin, 5/32" x 1" Lg.
20.	142-009D	Cover Handle Chain
21.	142-042H	15' Fertilizer Box
22.	803-021C	Nut, Hex, 5/8"-11
23.	142-036D	Partition Support
24.	142-035D	Mounting Support
25.	801-010C	Screw, Pan Head, #10-32 x 3/8" Lg. S.S.
26.	804-032C	Lock Washer, #10 S.S.
27.	803-002C	Nut, Hex, #10-32 S.S.
28.	141-063E	6",7 1/2",10" & 12" Clean Out Cover
	141-064E	7" & 8" Clean Out Cover Long
	141-065E	7" & 8" Clean Out Cover Short
29.	805-029C	Roll Pin, 5/16" x 2 1/4" Lg.
30.	808-007C	Sprocket, 26T x 1" Bore
31.	808-008C	Sprocket, 15T x 1" Bore
32.	809-013C	Chain, 20-50 x 39 Pitch
33.	123-004D	Key, 1/4" x 1" Lg.
34.	145-006E	Seed/Fertilizer Adapter Hub
35.	802-013C	Bolt, Hex, 5/16"-18 x 1 3/4" Lg.
36.	804-009C	Lock Washer, 5/16"
37.	803-008C	Nut, Hex, 5/16"-18
38.	822-012C	Bearing, 1" Bore x 3 Bolt Flange
39.	890-026C	Felt Tray End Seal
40.	141-084D	Tray Bearing Spacer
41.	141-083D	Fertilizer Tray End Cover Plate
42.	141-107D	Tray End Flange Seal
43.	142-005E	Agitator Tube Drive End
	142-126E	Agitator Tube Non-Drive
44.	145-022S	Agitator Fin
45.	142-158K	Agitator Assembly Non-Drive
	145-011K	Agitator Assembly Drive End
46.	142-083E	15' Extension Agitator Tube Non-Drive
	142-125E	15' Extension Agitator Tube Drive End
47.	142-161S	15' Fin Assembly
48.	142-091K	15' Extension Agitator Assembly Non-Drive
	142-160K	15' Extension Agitator Assembly Drive End

30' FERTILIZER ATTACHMENT

No.	Part No.	Description
49.	802-001C	Bolt, Hex, 1/4"-20 x 3/4" Lg. S.S.
50.	804-034C	Flat Washer, 1/4" SAE S.S.
51.	803-003C	Nut, Lock, 1/4"-20 S.S.
52.	141-106D	Tray Seal
53.	801-001C	Screw, #8-32 x 3/8" Lg. Brass
54.	804-003C	Flat Washer, #8 Brass
55.	804-002C	Washer, #8 Internal Star
56.	803-035C	Nut, Hex, #8-32 Brass
57.	819-005C	Adjustment Gauge
58.	142-029D	Center Drive Bushing
59.	142-022D	5/8" Square Center Connector Shaft
60.	119-032D	Step Retainer
61.	802-079C	Bolt, Hex, 3/8"-16 x 1 1/4" Lg.
62.	804-013C	Lock Washer, 3/8"
63.	803-014C	Nut, Hex, 3/8"
64.	801-003C	Screw, Slot Head, #10-24 x 1/2" Lg.
65.	804-004C	Washer, #10 Internal Star
66.	803-001C	Nut, Hex, #10-24
67.	890-016C	Latch Bracket
68.	802-167C	Bolt, Hex, 1/4"-20 x 1 1/2" Lg.
69.	804-006C	Lock Washer, 1/4"
70.	803-006C	Nut, Hex, 1/4"-20
71.	110-016D	Lid Hinge Strap Spacer
72.	110-015D	Lid Hinge Strap
73.	802-007C	Bolt, Hex, 5/16"-18 x 3/4" Lg.
74.	803-011C	Nut, Lock, 5/16-18 Staked
75.	807-001C	Lid Latch Spring
76.	119-001H	Lid Latch
77.	119-007H	Lid Weldment
78.	805-014C	Lid Hinge Pin
79.	804-019C	Flat Washer, 5/8" USS
80.	803-007C	Nut, Lock, 1/4"-20
81.	816-008C	Rubber Lid Latch
82.	142-003E	15'-6" Fertilizer Tray
	142-084E	15'-7" Fertilizer Tray
	142-085E	15'-7 1/2" Fertilizer Tray
	142-086E	15'-8" Fertilizer Tray
	142-087E	15'-10" Fertilizer Tray
	142-088E	15'-12" Fertilizer Tray
83.	119-106D	7' Step
84.	119-132H	Step Hanger
85.	142-125D	Idler Bracket
86.	802-034C	Bolt, Hex, 1/2"-13 x 1 1/4" Lg.
87.	804-015C	Lock Washer, 1/2"
88.	803-020C	Nut, Hex, 1/2"-13
89.	802-055C	Bolt, Hex, 5/8"-11 x 2" Lg.
90.	109-064D	Idler Disk

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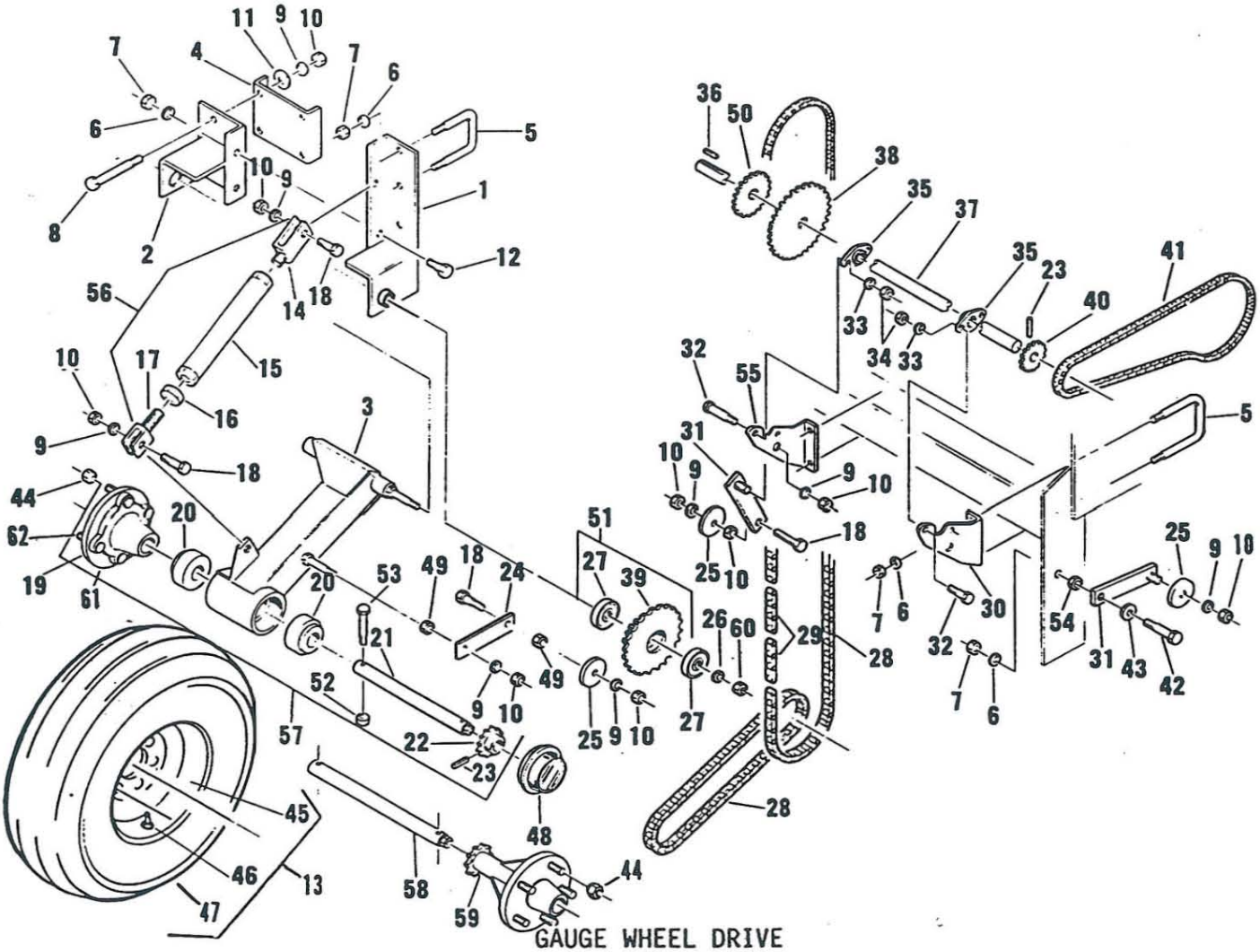

GAUGE WHEEL DRIVE

No.	Part No.	Description
1.	120-041H	Pivot Mounting (Left Hand Side - Shown)
	120-042H	Pivot Mounting (Right Hand Side)
2.	120-043H	Pivot Mounting, Short (Left Hand Side - Shown)
	120-044H	Pivot Mounting, Short (Right Hand Side)
3.	120-069H	Hanger, Gauge Wheel (Left Hand Side - Shown)
	120-070H	Hanger, Gauge Wheel (Right Hand Side)
4.	120-053D	Mounting Channel
5.	806-002C	U-Bolt, 1/2"-13 x 3 1/2" x 4 1/2" Lg., Gr. 2
6.	804-015C	Lock Washer, 1/2"
7.	803-020C	Nut, Hex, 1/2"-13
8.	802-062C	Bolt, Hex, 5/8"-11 x 5" Lg.
9.	804-022C	Lock Washer, 5/8"
10.	803-021C	Nut, Hex, 5/8"-11
11.	804-021C	Flat Washer, 5/8" SAE
12.	802-034C	Bolt, Hex, 1/2"-13 x 1 1/4" Lg.
13.	109-058K	Gauge Wheel Tire And Wheel Assembly (Tubeless) (Includes No's. 45,46 & 47)
14.	120-001E	Upper Gauge Wheel Clevis
15.	120-003E	Gauge Wheel Adjustment Link

GAUGE WHEEL DRIVE (CON'T.)

No.	Part No.	Description
16.	803-032C	Jam Nut, Hex, 1 1/4"-7
17.	120-002E	Lower Gauge Wheel Clevis
18.	802-055C	Bolt, Hex, 5/8"-11 x 2" Lg.
19.	200-012S	Axle Hub (Includes No's. 61 & 62)
20.	822-028C	Gauge Wheel Bearing
21.	120-124H	Axle Shaft - Single
22.	808-002C	Sprocket, #50 x 15T x 1 1/2" Bore
23.	805-029C	Roll Pin, 5/16" x 2 1/4" Lg.
24.	120-035D	Idler Arm
25.	109-064D	Idler Disk
26.	804-023C	Lock Washer, 3/4"
27.	822-043C	Bearing, Speed Change, 3/4" Bore
28.	809-001C	Chain, 20-50 x 37 Pitch
29.	809-012C	Chain, 20-50 x 4 Pitch
30.	120-160D	Bracket, Jackshaft Bearing (Left Hand)
31.	120-020H	Idler Arm
32.	802-012C	Bolt, Hex, 5/16"-18 x 1 1/2" Lg.
33.	804-009C	Lock Washer, 5/16"
34.	803-008C	Nut, Hex, 5/16"-18
35.	822-007C	Bearing, 1" Bore, 2 Bolt Flange
36.	109-031D	Key, 1/4" x 1 1/2" Lg.
37.	120-011D	Jackshaft, 17 3/8" Lg. (
	120-030D	Jackshaft, 31 1/2" Lg. (Optional)
38.	808-003C	Sprocket, 39T x 1" Bore
39.	109-055E	Speed Change Weldment
40.	808-004C	Sprocket, 15T x 1" Bore
41.	809-005C	Chain, 20-50 x 49 Pitch
42.	802-091C	Bolt, Hex, 1/2"-13 x 1 1/2" Lg.
43.	804-016C	Flat Washer, 1/2" SAE
44.	803-017C	Lug Nut, 1/2"-20, - 90 Degree Seat
45.	814-005C	Rim, Wheel, 6 x 15 - 5 Hole
46.	816-035C	Valve Stem
47.	814-026C	Tire, 9.5L x 15 - 6 Ply
48.	890-002C	Acre Counter, 24' Drill
	890-012C	Acre Counter, 30' Drill
49.	803-023C	Jam Nut, Hex, 5/8"-11
50.	808-006C	Sprocket, 19T x 1" Bore
51.	120-145S	Speed Change Hub And Bearing Assembly (Includes No. 39 & 2 Ea. Of No. 27)
52.	803-019C	Nut, Lock, 1/2"-13
53.	802-039C	Bolt, Hex, 1/2"-13 x 3" Lg.
54.	803-036C	Jam Nut, Hex, 1/2"-13
55.	120-159D	Bracket, Jackshaft Bearing (Right Hand)
56.	120-065S	Gauge Wheel Adjustment Link Assembly (Includes No's. 14 thru 17)
57.	120-073K	Gauge Wheel Drive Assembly, Left Hand (Shown)(Includes No's. 1,2,3,6,7,9,10,12,18 thru 25,28,49,51,52,52 & 56)
	120-074K	Gauge Wheel Drive Assembly, Right Hand (Includes No's. 1,2, 3,6,7,9,10,12,18 thru 25,28,49,51,52,53 & 56)
58.	120-126H	Dual Gauge Wheel Axle Shaft
59.	120-080H	Dual Gauge Wheel Hub
60.	803-027C	Nut, Hex, 3/4"-10
61.	200-007D	Gauge Wheel Hub W/Studs
62.	802-135C	Lug Bolt

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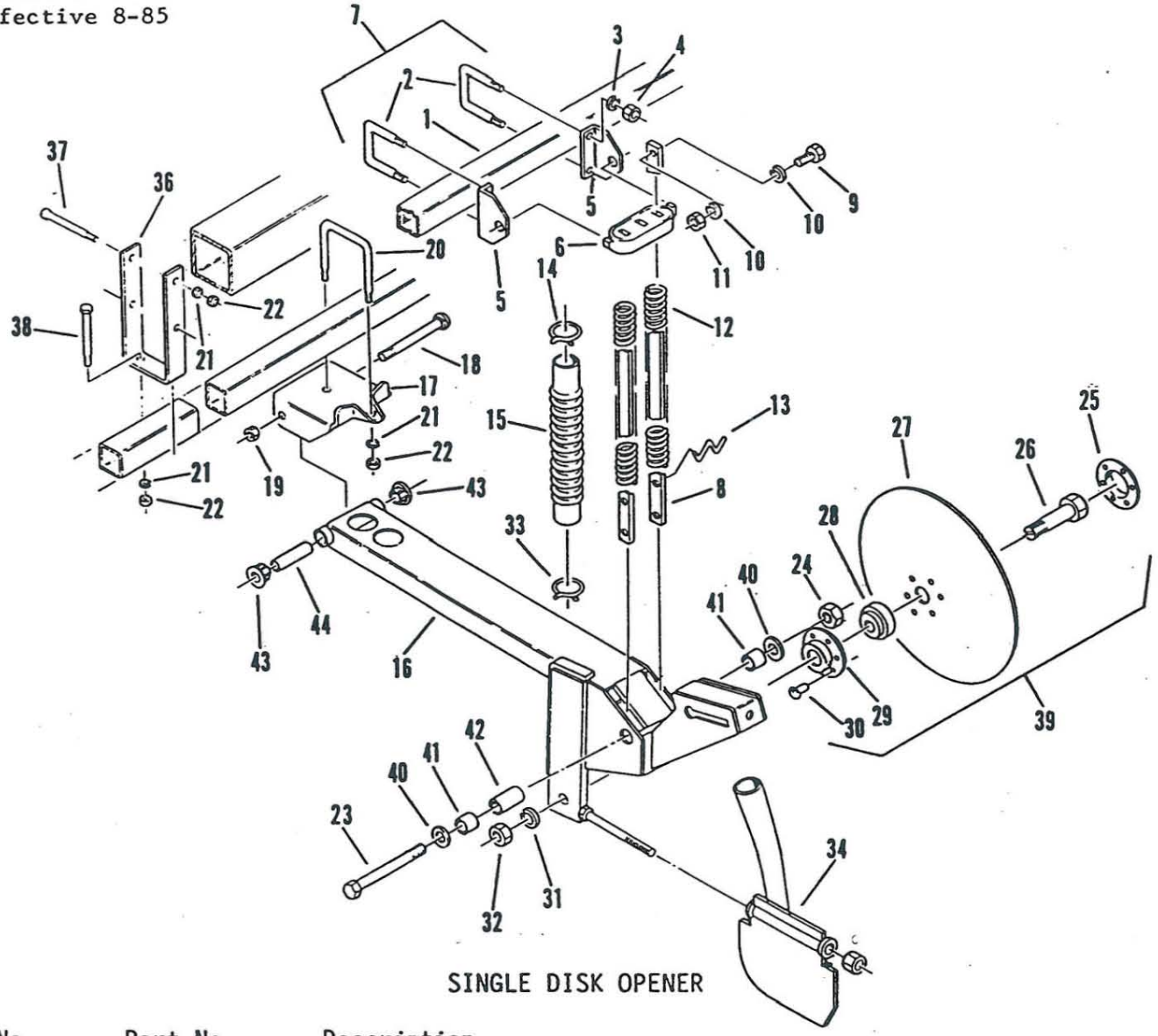
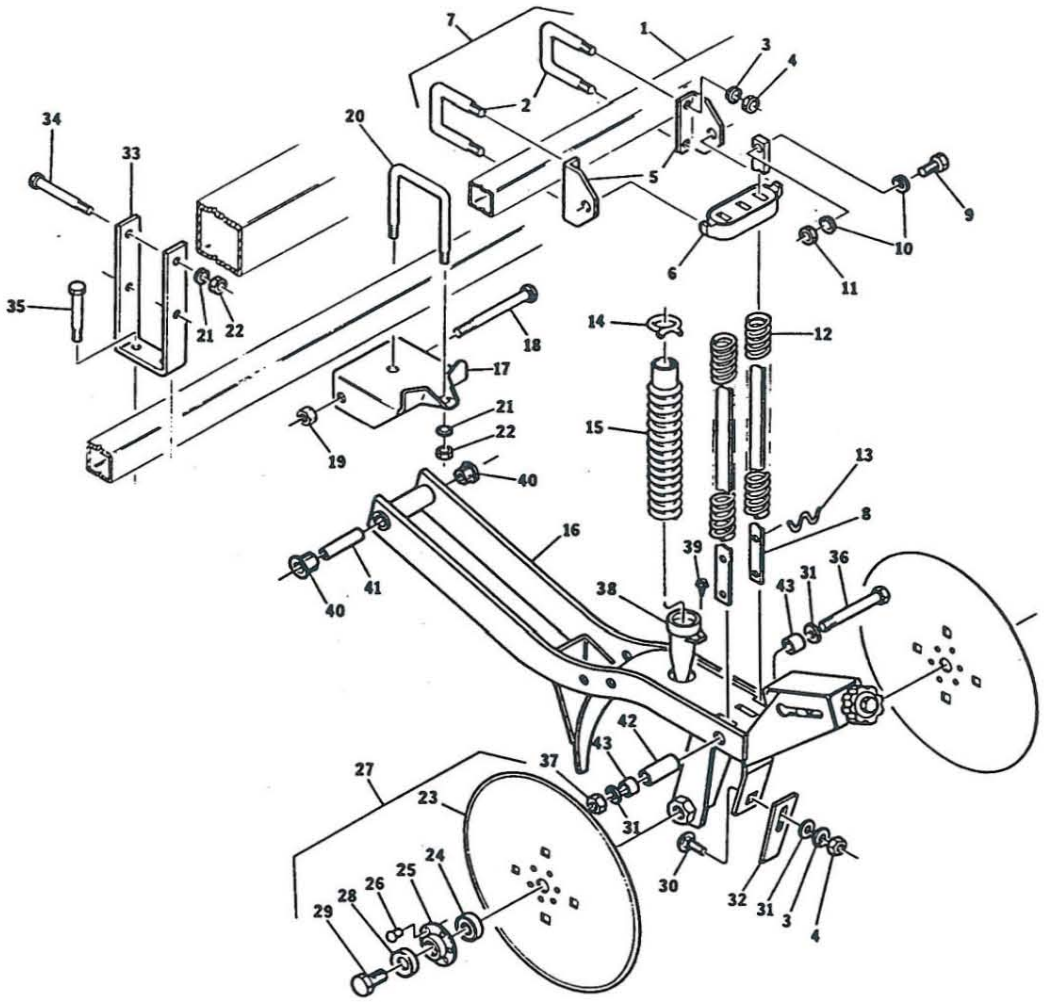


SINGLE DISK OPENER

No.	Part No.	Description
1.		Mounting Tube - Welded To Box
2.	806-004C	U-Bolt, 3/8"-16 x 2" x 2 3/4" Lg.
3.	804-013C	Lock Washer, 3/8"
4.	803-014C	Nut, Hex, 3/8"-16
5.	121-025D	Spring Rod Casting Clip
6.	812-012C	Triple Spring Rod Casting
7.	121-011A	Spring Casting Mounting Assembly (Includes No's. 2,3,4,5 & 6)
8.	121-001D	Double Disk Spring Bar
9.	802-078C	Bolt, Hex, 1/4"-20 x 5/8" Lg.
10.	804-006C	Lock Washer, 1/4"
11.	803-006C	Nut, Hex, 1/4"-20
12.	807-002C	Spring, 16" Lg. x 43 Coils - Standard
	807-013C	Spring, Light Duty - Optional
13.	107-027D	Spring Rod Clip
14.	800-009C	Hose Clamp, #26
15.	816-002C	Seed Tube

SINGLE DISK OPENER (CON'T.)

No.	Part No.	Description
16.	121-145H	Mounting Arm, Right Hand (Shown)
	121-146H	Mounting Arm, Left Hand
17.	107-120H	Flanged U-Mount Bracket
	121-016H	Flanged U-Mount Bracket - Bedded Irrigation Special
18.	802-121C	Carriage Bolt, 1/2"-13 x 5 1/2 Lg.
19.	803-037C	Serrated Flange Nut, 1/2"-13
20.	806-005C	U-Bolt, 1/2"-13 x 2" x 3" Lg.
21.	804-015C	Lock Washer, 1/2"
22.	803-020C	Nut, Hex, 1/2"-13
23.	802-027C	Bolt, Hex, 3/8"-16 x 4 1/2" Lg.
24.	803-078C	Serrated Flange Nut, 3/8"-16
25.	107-025D	Dust Cover
26.	115-063D	Bolt, Hex, 5/8"-18 x 2 1/4" Lg., Slotted
27.	820-001C	Disk
28.	822-002C	Bearing
29.	107-095D	Bearing Flange
30.	800-011C	Button Head Rivet
31.	804-022C	Lock Washer, 5/8"
32.	803-022C	Nut, Hex, 5/8"-18
33.	800-008C	Hose Clamp, #24
34.	121-014H	Single Disk Scraper Assy., Right Hand (Shown)
	121-015H	Single Disk Scraper Assy., Left Hand
35.	803-024C	Nut, Lock, 5/8"-11
36.	117-116D	Double Disk Mount Tube Bracket
37.	802-045C	Bolt, Hex, 1/2"-13 x 5" Lg.
38.	802-041C	Bolt, Hex, 1/2"-13 x 3 1/2" Lg.
39.	107-008S	Single Disk And Bearing Assembly (Includes No's. 25 thru 29 & 6 Ea. Of No. 30)
40.	804-012C	Flat Washer, 3/8" SAE
41.	121-093D	Spacer Tube, Spring Rod End
42.	121-091D	Spacer Tube, Spring Rod Center
43.	817-028C	Pivot Bushing
44.	121-101D	Pivot Pipe Spacer
	121-150L	Single Disk Row Assembly, Left Front (No's. Not Included - 20,21,22,23,24,36,37,38,40,41 & 42)
	121-151L	Single Disk Row Assembly, Left Rear (No's. Not Included - 20,21,22,23,24,36,37,38,40,41 & 42)
	121-152L	Single Disk Row Assembly, Right Front (No's. Not Included - 20,21,22,23,24,36,37,38,40,41 & 42)
	121-153L	Single Disk Row Assembly, Right Rear (No's. Not Included - 20,21,22,23,24,36,37,38,40,41 & 42)

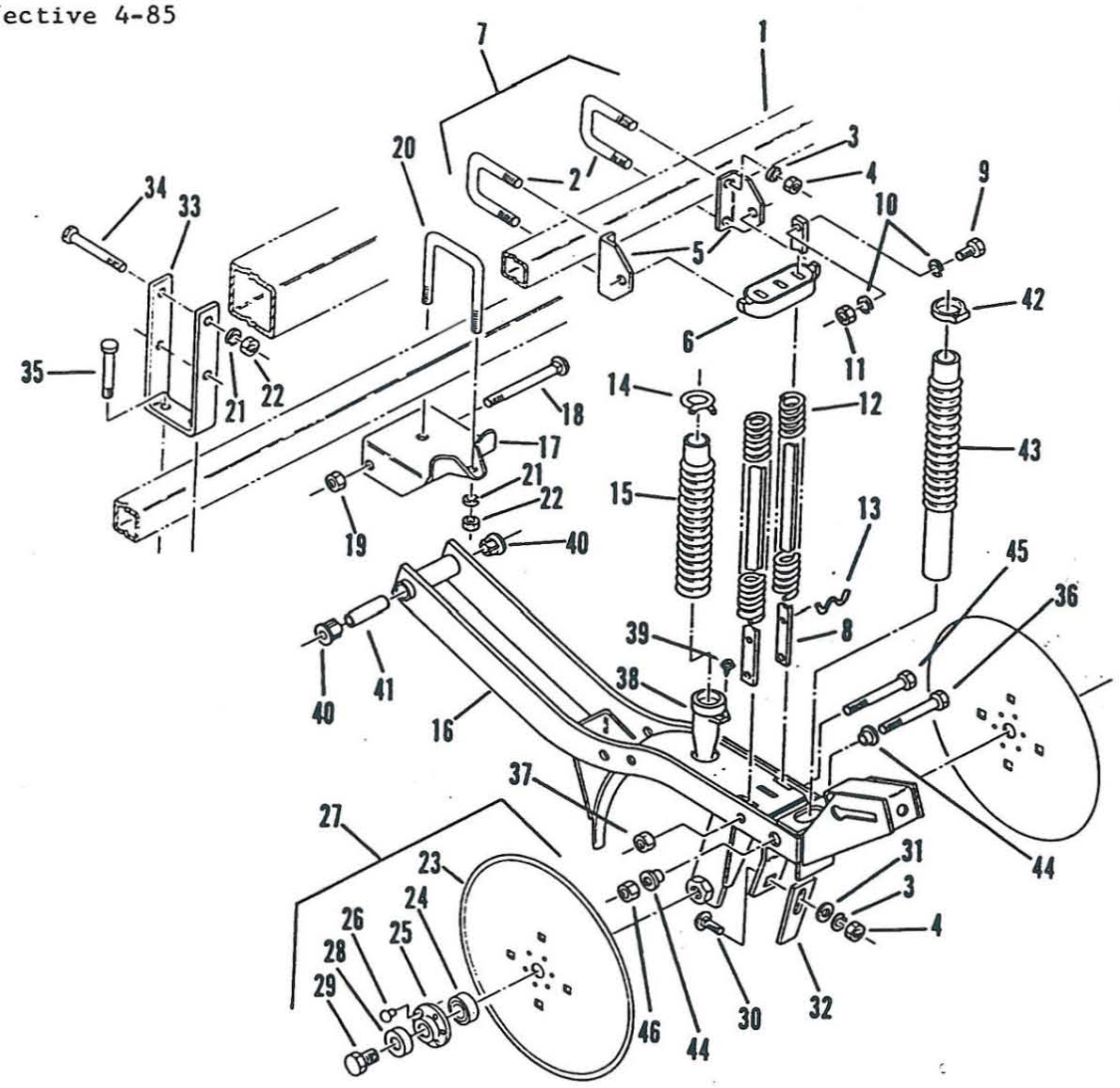


DOUBLE DISK OPENER

No.	Part No.	Description
1.		Mounting Tube - Welded To Box
2.	806-004C	U-Bolt, 3/8"-16 x 2" x 2 3/4" Lg.
3.	804-013C	Lock Washer, 3/8"
4.	803-014C	Nut, Hex, 3/8"-16
5.	121-025D	Spring Rod Casting Clip
6.	812-012C	Triple Spring Rod Casting
7.	121-011A	Spring Mounting Casting Assembly (Includes No's. 2,3,4,5 & 6)
8.	121-001D	Double Disk Spring Bar - Standard
	121-090D	Hillside Spring Bar - Optional
9.	802-078C	Bolt, Hex, 1/4"-20 x 5/8" Lg.
10.	804-006C	Lock Washer, 1/4"
11.	803-006C	Nut, Hex, 1/4"-20
12.	807-028C	Spring, 19 1/2" Lg.
	807-029C	Spring, Light Duty 19 1/2" Lg.
13.	107-027D	Spring Rod "W" Clip
14.	800-009C	Hose Clamp
15.	816-028C	Seed Hose
16.	121-147H	Double Disk Mounting Arm
	121-129H	Mounting Arm W/Extended Bar

DOUBLE DISK OPENER (CON'T.)

No.	Part No.	Description
17.	107-120H	Flanged U-Mount Bracket - Standard
	121-142H	Hillside Double Disk Mounting - Optional
	121-016H	Flanged U-Mount Brkt., Bedded Irrigation Special
	121-017E	Flanged U-Mount Brkt., 7" Stagger Bracket
18.	802-121C	Carriage Bolt, 1/2"-13 x 5 1/2" Lg.
19.	803-037C	Serrated Flange Nut, 1/2"-13
20.	806-005C	U-Bolt, 1/2"-13 x 2" x 3" Lg., Grade 5
21.	804-015C	Lock Washer, 1/2"
22.	803-020C	Nut, Hex, 1/2"-13
23.	820-002C	Disk, Flat
24.	822-003C	Bearing, Double Disk
25.	107-095D	Bearing Flange
26.	800-010C	Button Head Rivet
27.	107-054S	Double Disk Assembly (Includes No's. 23,24 & 25 & 6 Ea. Of No. 26)
28.	107-096D	Bearing Flange Dust Cover
29.	802-102C	Bolt, Hex, 5/8"-11 x 1 1/4" Lg. - Nylock
30.	802-015C	Bolt, Carriage, 3/8"-16 x 1" Lg.
31.	804-012C	Flat Washer, 3/8" SAE
32.	107-075D	Inside Scraper
33.	117-116D	Double Disk Mount Tube Bracket
34.	802-045C	Bolt, Hex, 1/2"-13 x 5" Lg.
35.	802-041C	Bolt, Hex, 1/2"-13 x 3 1/2" Lg.
36.	802-174C	Bolt, Hex, 3/8"-16 x 4 3/4" Lg.
37.	803-078C	Serrated Flange Nut, 3/8"-16
38.	121-085D	Plastic Seed Tube
39.	801-002C	Screw, Socket Head, #10-16 x 3/8" Lg.
40.	817-028C	Pivot Bushing
41.	121-101D	Pivot Pipe Spacer
42.	121-091D	Spacer Tube, Spring Rod Center
43.	121-092D	Spacer Tube, Spring Rod End
	121-148L	Double Disk Row Assembly, Front (No's. Not Included 20,21,22,33,34,35,36 & 37)
	121-149L	Double Disk Row Assembly, Rear (No's. Not Included 20,21,22,33,34,35,36 & 37)

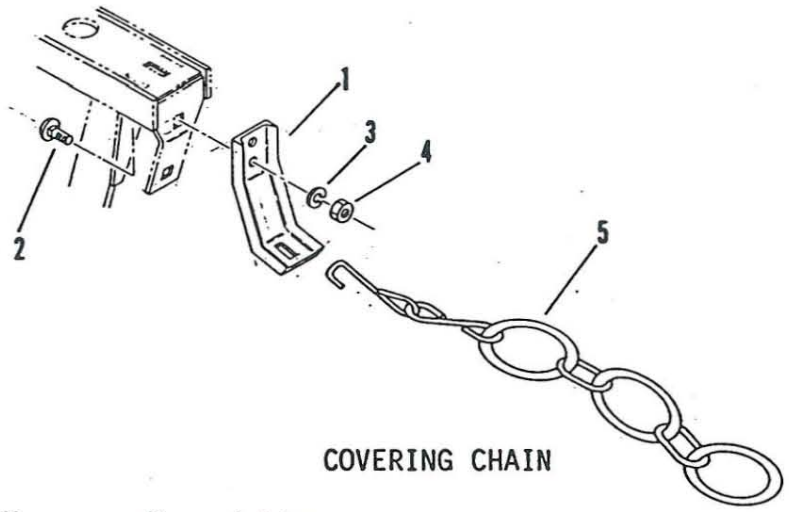


FERTILIZER DOUBLE DISK OPENER

No.	Part No.	Description
1.		Mounting Tube - Welded To Box
2.	806-004C	U-Bolt, 3/8"-16 x 2" x 2 3/4" Lg.
3.	804-013C	Lock Washer, 3/8"
4.	803-014C	Nut, Hex, 3/8"-16
5.	121-025D	Spring Rod Casting Clip
6.	812-012C	Triple Spring Rod Casting
7.	121-011A	Spring Mount Casting Assembly (Includes No's. 2,3,4,5 & 6)
8.	121-001D	Double Spring Rod Bar - Standard
	121-090D	Hillside Spring Bar - Optional
9.	802-078C	Bolt, Hex, 1/4"-20 x 5/8" Lg.
10.	804-006C	Lock Washer, 1/4"
11.	803-006C	Nut, Hex, 1/4"-20
12.	807-002C	Spring, 16" Long x 43 Coils
	807-013C	Spring, Light Duty
13.	107-027D	Spring Rod "W" Clip
14.	800-009C	Hose Clamp
15.	816-028C	Seed Hose
16.	142-328H	Fertilizer Double Disk Mounting Arm

FERTILIZER DOUBLE DISK OPENER (CON'T.)

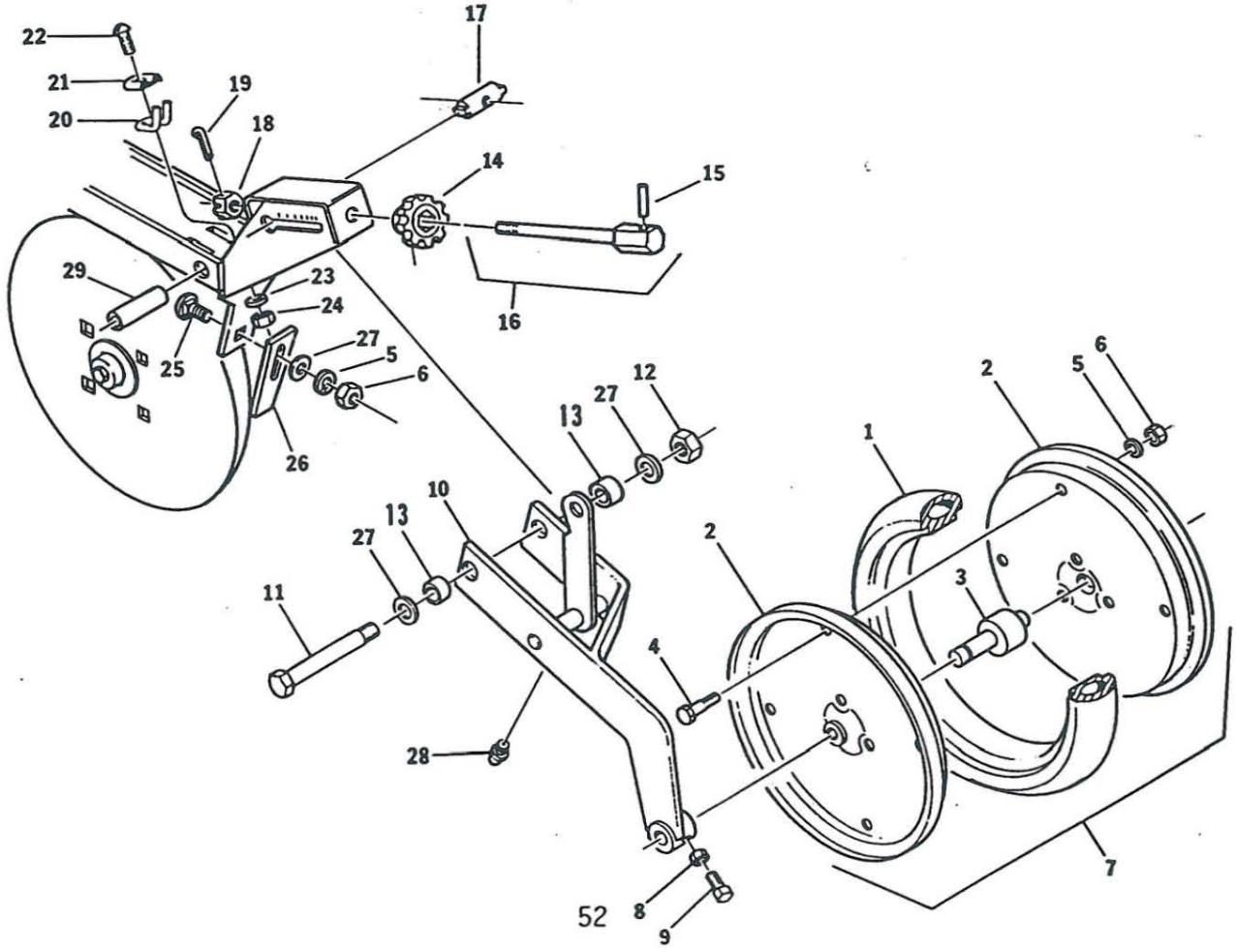
No.	Part No.	Description
17.	107-120H	Flanged U-Mount Bracket - Standard
	121-142H	Hillside Double Disk Mounting - Optional
	121-016H	Flanged U-Mount Bracket - Bedded Irrigation Special
	121-017E	Flanged U-Mount Bracket - 7" Stagger Bracket
18.	802-121C	Bolt, Carriage, 1/2"-13 x 5 1/2" Lg.
19.	803-037C	Serrated Flange Nut, 1/2"-13
20.	806-005C	U-Bolt, 1/2"-13 x 2" x 3" Lg.
21.	804-015C	Lock Washer, 1/2"
22.	803-020C	Nut, Hex, 1/2"-13
23.	820-002C	Disk, Flat
24.	822-003C	Bearing, Double Disk
25.	107-095D	Bearing Flange
26.	800-010C	Button Head Rivet
27.	107-054S	Double Disk Assembly (Includes No's. 23,24,25 & 6 Ea. of No.26)
28.	107-096D	Bearing Flange Dust Cover
29.	802-102C	Bolt, Hex, 5/8"-11 x 1 1/4" Lg. Nylock
30.	802-015C	Bolt, Carriage, 3/8"-16 x 1" Lg.
31.	804-012C	Flat Washer, 3/8" SAE
32.	107-075D	Inside Scraper
33.	117-116D	Double Disk Mount Tube Bracket
34.	802-045C	Bolt, Hex, 1/2"-13 x 5" Lg.
35.	802-041C	Bolt, Hex, 1/2"-13 x 3 1/2" Lg.
36.	802-174C	Bolt, Hex, 3/8"-16 x 4 3/4" Lg.
37.	803-078C	Serrated Flange Nut, 3/8"-16
38.	121-085D	Plastic Seed Tube
39.	801-002C	Screw, Socket Head, #10-16 x 3/8" Lg.
40.	817-028C	Pivot Bushing
41.	121-101D	Pivot Pipe Spacer
42.	800-016C	Upper Fertilizer Hose Clamp
43.	816-003C	Fertilizer Hose
44.	142-129D	Press Wheel Bushing - Double Disk Fertilizer
45.	802-026C	Bolt, Hex, 3/8"-16 x 3 3/4" Lg.
46.	803-013C	Nut, Lock, 3/8"-16
	142-329L	Fertilizer Double Disk Row Assembly, Front (No's. Not Included 20,21,22,33,34,35,36 & 37)
	142-330L	Fertilizer Double Disk Row Assembly, Rear (No's. Not Included 20,21,22,33,34,35,36 & 37)



COVERING CHAIN

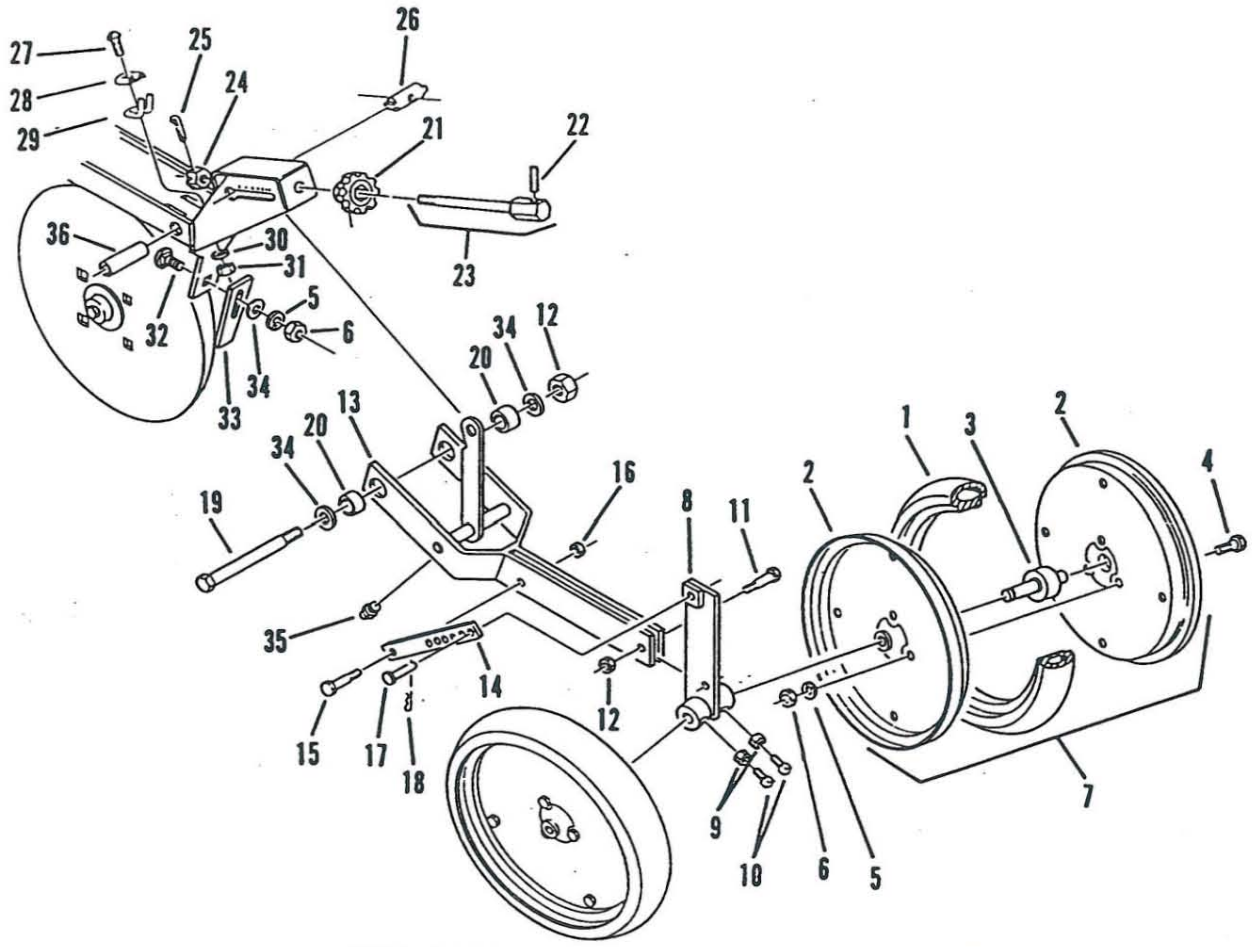
No.	Part No.	Description
1.	122-072D	Drag Chain Mount Channel
2.	802-015C	Bolt, Carriage, 3/8"-16 x 1" Lg.
3.	804-013C	Lock Washer, 3/8"
4.	803-014C	Nut, Hex, 3/8"-16
5.	890-063C	Covering Chain
	122-061A	Covering Chain Kit - Complete

PRESS WHEEL ASSEMBLY - 2 X 13 SINGLE



PRESS WHEEL ASSEMBLY - 2" X 13" SINGLE

No.	Part No.	Description
1.	814-007C	Tire, Rubber, 2" x 13"
2.	814-013C	Rim Half, 13"
3.	822-023C	Press Wheel Bearing
4.	802-014C	Bolt, Hex, 3/8"-16 x 3/4" Lg.
5.	804-013C	Lock Washer, 3/8"
6.	803-014C	Nut, Hex, 3/8"-16
7.	122-002S	Press Wheel Assembly, 2" x 13" (Includes No's. 1 & 3, 2 Ea. Of No. 2 & 7 Ea. Of No's. 4,5 & 6)
8.	803-012C	Jam Nut, Hex, 3/8"-16
9.	801-007C	Set Screw, Square Head, 3/8"-16 x 7/8" Lg.
10.	122-063H	Press Wheel Arm
11.	802-174C	Bolt, Hex, 3/8"-16 x 4 3/4" Lg.
12.	803-078C	Serrated Flange Nut, Hex, 3/8"-16
13.	121-092D	Spacer Tube, Spring Rod End
14.	817-021C	Adjustment Knob
15.	805-073C	Roll Pin, 5/32" x 1" Lg.
16.	122-055S	Screw Adjust Rod Assembly (Includes No. 15)
17.	122-061D	Trunnion Slide
18.	803-069C	Slotted Hex Nut, 7/16"-14
19.	805-064C	Cotter Pin, 7/64" x 1" Lg.
20.	122-066D	Tension Spring
21.	122-065D	Tension Spring Retainer
22.	801-018C	Screw, Round Head, 1/4"-20 x 5/8" Lg.
23.	804-006C	Lock Washer, 1/4"
24.	803-006C	Nut, Hex, 1/4"-20
25.	802-015C	Bolt, Carriage, 3/8"-16 x 1" Lg.
26.	107-075D	Inside Scraper
27.	804-012C	Flat Washer, 3/8" SAE
28.	800-036C	Drive Grease Zerk
29.	121-091D	Spacer Tube, Spring Rod Center
	122-068A	2" x 13" Press Wheel Assembly (No's. Not Included 25 & 26)

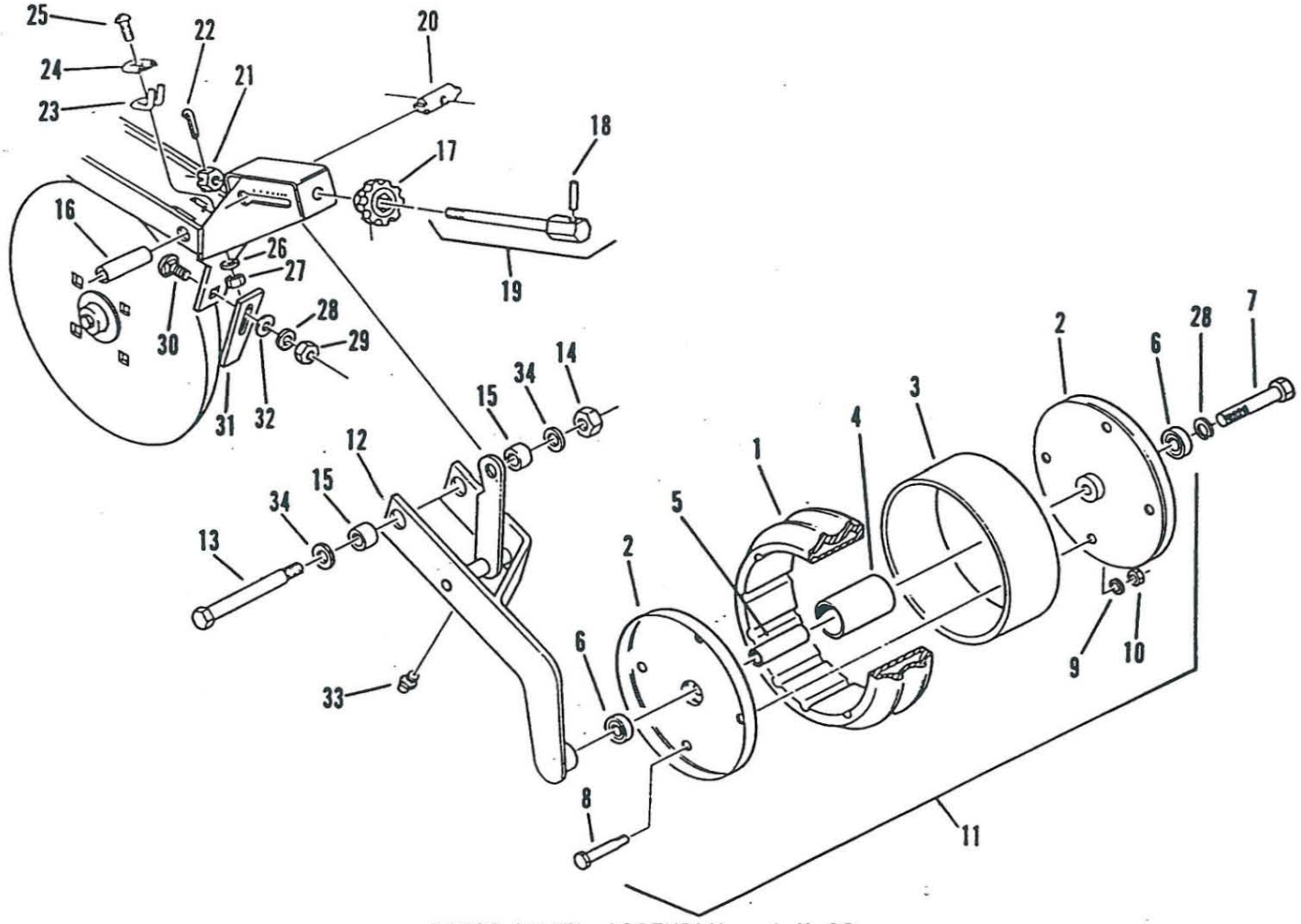


PRESS WHEEL ASSEMBLY - 2 X 13 DOUBLE "V"

No.	Part No.	Description
1.	814-007C	Tire, Rubber, 2" x 13"
2.	814-013C	Rim Half, 13"
3.	822-023C	Press Wheel Bearing
4.	802-014C	Bolt, Hex, 3/8"-16 x 3/4" Lg.
5.	804-013C	Lock Washer, 3/8"
6.	803-014C	Nut, Hex, 3/8"-16
7.	122-002S	Press Wheel Assembly, 2" x 13" (Includes No's. 1 & 3, 2 Ea. Of No. 2 & 7 Ea. Of No's. 4,5 & 6)
8.	122-007H	Angle Bar, Narrow (2 1/8" End To End)
	122-008H	Angle Bar, Wide (3 5/8" End To End)
9.	803-012C	Jam Nut, Hex, 3/8"-16
10.	801-007C	Set Screw, Square Head, 3/8"-16 x 7/8" Lg.
11.	802-022C	Bolt, Hex, 3/8"-16 x 1 1/2" Lg.
12.	803-078C	Serrated Flange Nut, 3/8"-16
13.	122-064H	Press Wheel Arm, 2" x 13" Double "V"
14.	122-021D	Adjustment Bar
15.	802-012C	Bolt, Hex, 5/16"-18 x 1 1/2" Lg.

PRESS WHEEL ASSEMBLY - 2 X 13 DOUBLE "V" (CON'T.)

No.	Part No.	Description
16.	803-011C	Nut, Lock, 5/16"-18
17.	805-011C	Pin
18.	805-010C	Hairpin Cotter
19.	802-174C	Bolt, Hex, 3/8"-16 x 4 3/4" Lg.
20.	121-093D	Spacer Tube, Spring Rod End
21.	817-021C	Adjustment Knob
22.	805-073C	Roll Pin, 5/32" x 1" Lg.
23.	122-055S	Screw Adjust Rod Assembly (Includes No. 22)
24.	803-069C	Slotted Hex Nut, 7/16"-14
25.	805-064C	Cotter Pin, 7/64" x 1" Lg.
26.	122-061D	Trunnion Slide
27.	801-018C	Screw, Roundhead, 1/4"-20 x 5/8" Lg.
28.	122-065D	Tension Spring Retainer
29.	122-066D	Tension Spring
30.	804-006C	Lock Washer, 1/4"
31.	803-006C	Nut, Hex, 1/4"-20
32.	802-015C	Bolt, Carriage, 3/8"-16 x 1" Lg.
33.	107-075D	Inside Scraper
34.	804-012C	Flat Washer, 3/8" SAE
35.	800-036C	Drive Grease Zerk
36.	121-091D	Spacer Tube, Spring Rod Center
	122-069A	2" x 13" Double "V" Press Wheel Assembly, Wide (No's. Not Included 32 & 33)
	122-070A	2" x 13" Double "V" Press Wheel Assembly, Narrow (No's. Not Included 32 & 33)



PRESS WHEEL ASSEMBLY - 4 X 12

No.	Part No.	Description
1.	814-010C	Tire, Rubber, 4" x 12" V-Groove (Shown)
	814-021C	Tire, Rubber, 4" x 12" Smooth Crown
2.	122-041D	Rim Half, 12"
3.	817-023C	Spacer Ring, 4" x 12" Press Wheel
4.	817-022C	Large Spreader Tube
5.	122-043D	Small Spreader Tube
6.	822-029C	Bearing
7.	802-151C	Bolt, Hex, 5/8"-11 x 4 1/4" Lg.
8.	802-119C	Bolt, Hex, 5/16"-18 x 3 3/4" Lg.
9.	804-009C	Lock Washer, 5/16"
10.	803-008C	Nut, Hex, 5/16"-18
11.	122-033S	Press Wheel Assembly, 4" x 12" V-Groove (Includes No's. 1 thru 6 & 8 thru 10)
	122-039S	Press Wheel Assembly, 4" x 12" Smooth Crown (Includes No's. 1 thru 6 & 8 thru 10)
12.	122-062H	Press Wheel Arm
13.	802-174C	Bolt, Hex, 3/8"-16 x 4 3/4" Lg.
14.	803-078C	Serrated Flange Nut, 3/8"-16
15.	121-092D	Spacer Tube, Spring Rod End

PRESS WHEEL ASSEMBLY - 4 X 12 (CON'T.)

No.	Part No.	Description
16.	121-091D	Spacer tube, Spring Rod Center
17.	817-021C	Adjustment Knob
18.	805-073C	Roll Pin, 5/32" x 1" Lg.
19.	122-055S	Screw Adjust Rod Assembly (Includes No. 18)
20.	122-061D	Trunnion Slide
21.	803-069C	Slotted Hex Nut, 7/16"-14
22.	805-064C	Cotter Pin, 7/64" x 1" Lg.
23.	122-066D	Tension Spring
24.	122-065D	Tension Spring Retainer
25.	801-018C	Screw, Round Head, 1/4"-20 x 5/8" Lg.
26.	804-006C	Lock Washer, 1/4"
27.	803-006C	Nut, Hex, 1/4"-20
28.	804-013C	Lock Washer, 3/8"
29.	803-014C	Nut, Hex, 3/8"-16
30.	802-015C	Bolt, Carriage, 3/8"-16 x 1" Lg.
31.	107-075D	Inside Scraper
32.	804-012C	Flat Washer, 3/8" SAE
33.	800-036C	Drive Grease Zerk
34.	804-022C	Lock Washer, 5/8"
	122-066A	4" x 12" Dual Rib Press Wheel Assembly (No's. Not Included 30 & 31)
	122-067A	4" x 12" Smooth Crown Press Wheel Assembly (No's. Not Included 30 & 31)

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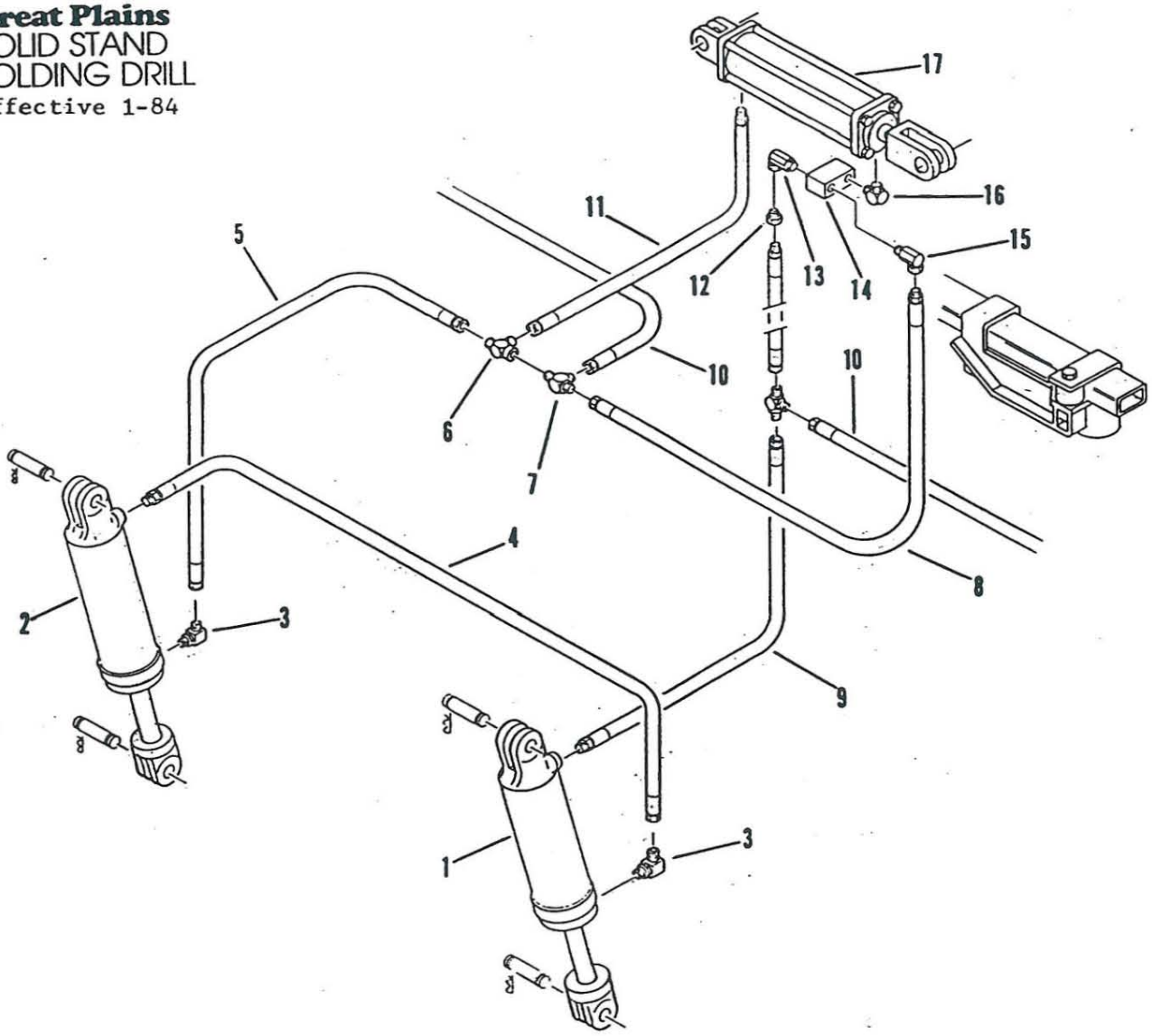
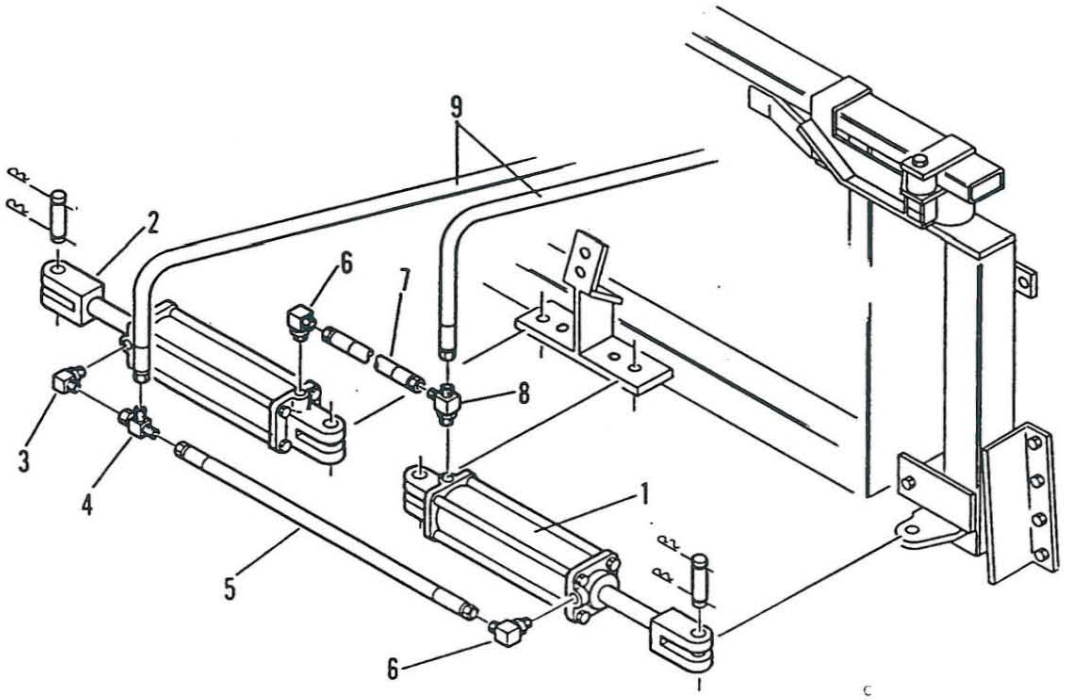


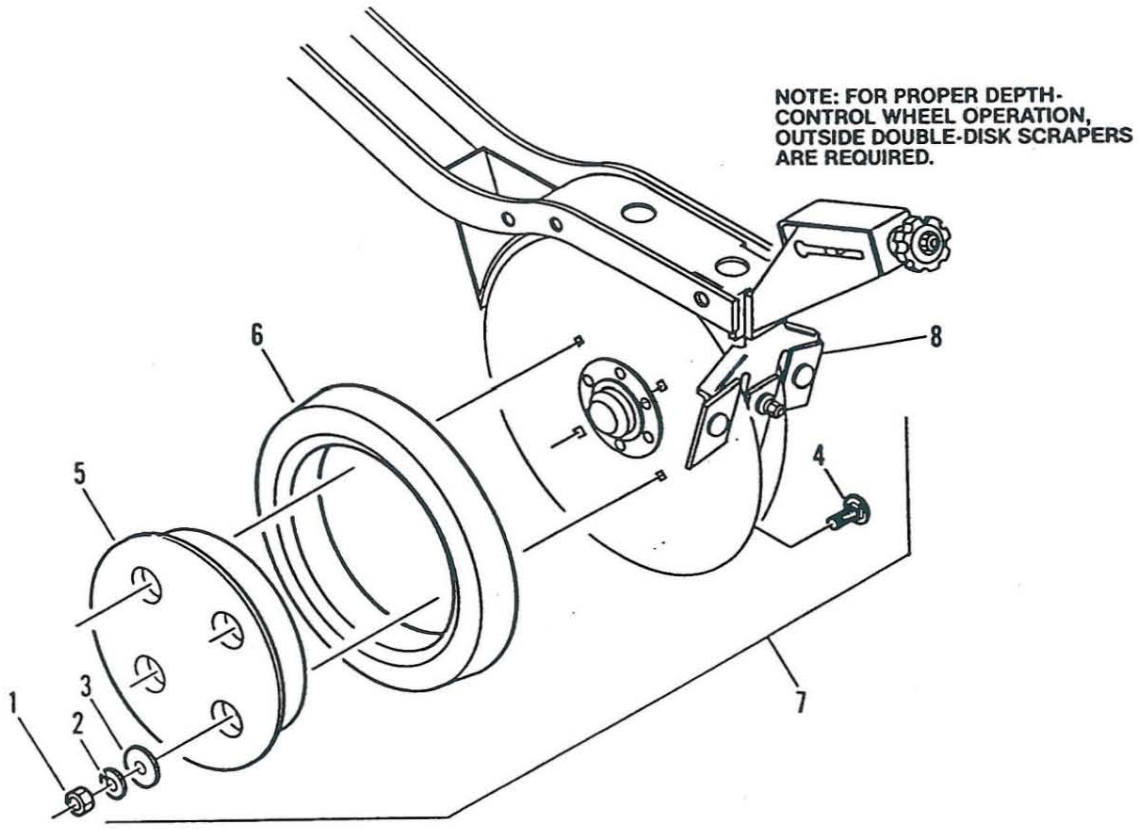
TRANSPORT HYDRAULICS

No.	Part No.	Description
1.	810-028C	Hyd. Rephasing Cyl., 4 1/4" Bore x 20" Stroke
2.	810-029C	Hyd. Rephasing Cyl., 4" Bore x 20" Stroke
3.	811-063C	Fitting, 3/4" O-Ring x 3/4" JIC, 90 Degree
4.	811-054C	Hyd. Hose, 8 JIC F x 8 SAE M, 1/2" x 97" Lg.
5.	811-053C	Hyd. Hose, 8 JIC F, 1/2" x 52" Lg.
6.	811-073C	Fitting, 3/4" Service Tee
7.	811-039C	Fitting, 3/4" M, 37 Degree Flair
8.	811-074C	Hyd. Hose, 3/4" JIC F x 3/8" NPT M, 3/8" x 36" Lg.
9.	811-052C	Hyd. Hose, 8 JIC F x 8 SAE M, 1/2" x 52" Lg.
10.	811-055C	Hyd. Hose, 8 JIC F x 8 NPT M, 1/2" x 292" Lg.
11.	811-051C	Hyd. Hose, 8 JIC F x 8 SAE M, 3/8" x 38" Lg.
12.	811-023C	Fitting, 1/2" M x 3/4" F Pipe
13.	811-008C	Fitting, 1/2" F Elbow Swivel
14.	810-004C	Pilot Check Valve
15.	811-050C	Fitting, 3/8" Swivel x 90 Degree Elbow
16.	811-072C	Fitting, 3/4" M x 1/2" M NPT Elbow
17.	810-020C	Hyd. Cylinder, 4" Bore x 10" Stroke



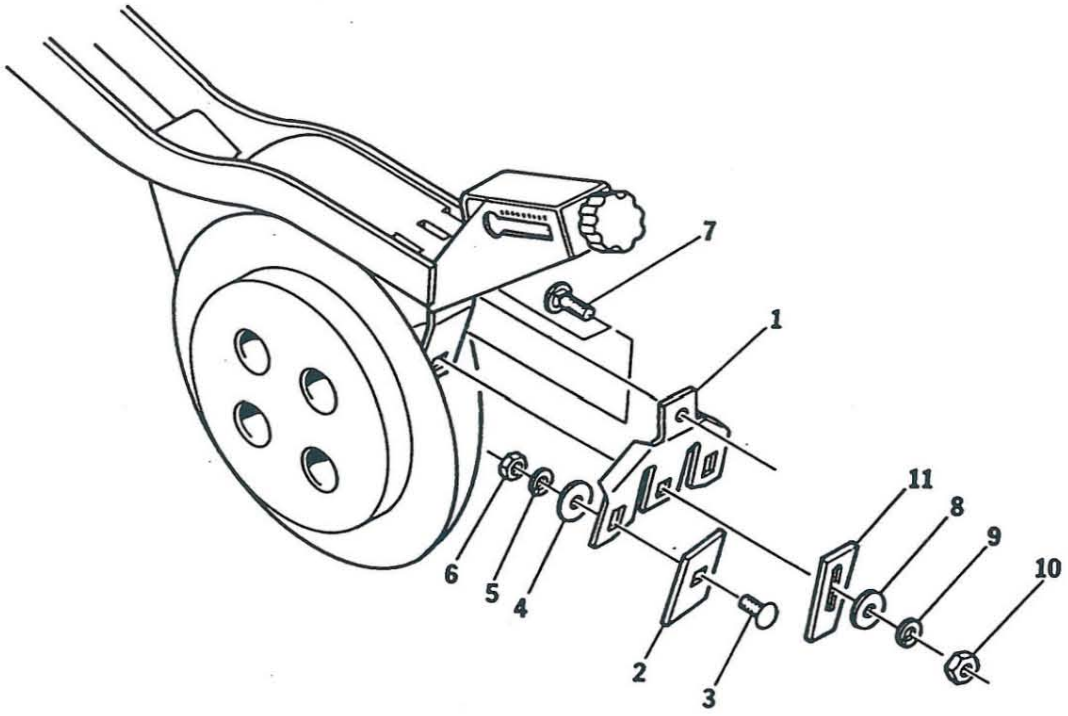
FOLD HYDRAULICS

No.	Part No.	Description
1.	810-022C	Hyd. Cyl., R.H., 2 1/2" Bore x 10" Stroke
2.	810-018C	Hyd. Cyl., L.H., 2 1/2" Bore x 10" Stroke
3.	811-065C	Fitting, 90 Degree, 6 SAE M x 6 JIC M
4.	811-061C	Fitting, 6 Service Tee, MMF
5.	811-056C	Hyd. Hose, 1/4" x 42" Lg.
6.	811-062C	Fitting, 90 Degree, 6 SAE x 6 JIC M, 1/32" Orifice
7.	811-057C	Hyd. Hose, 1/4" x 17" Lg.
8.	811-064C	Fitting, 6 Service Tee, Male
9.	811-058C	Hyd. Hose, 1/4" x 303" Lg.



RUBBER-TIRED DEPTH CONTROL WHEEL

No.	Part No.	Description
1.	803-008C	Nut, Hex, 5/16"-18
2.	804-009C	Lock Washer, 5/16"
3.	804-010C	Flat Washer, 5/16" USS
4.	802-009C	Bolt, Carriage, 5/16"-18 x 1 1/4" Long
5.	817-005C	Plastic Depth Wheel
6.	814-006C	1.38" x 10.25" Rubber Tire
7.	116-018A	Rubber Depth Wheel Assembly (Includes 2 Ea. of No's. 1 thru 4 & No's. 5 & 6.)
8.	116-019A	Double Disk Scraper Assembly



OUTSIDE DOUBLE DISK SCRAPER

No.	Part No.	Description
1.	121-094D	Scraper Mount
2.	116-042D	Outside Scraper Tab
3.	802-092C	Bolt, Carriage, 5/16"-18 x 3/4" Lg.
4.	804-036C	Flat Washer, 5/16" SAE
5.	804-009C	Lock Washer, 5/16"
6.	803-008C	Nut, Hex, 5/16"-18
7.	802-015C	Bolt, Carriage, 3/8"-16 x 1" Lg.
8.	804-012C	Flat Washer, 3/8" SAE
9.	804-013C	Lock Washer, 3/8"
10.	803-014C	Nut, Hex, 3/8"-16
11.	107-075D	Scraper, Inside
	116-019A	Double Disk Scraper Assembly (Includes No's. 1, 2, 3, 4, 5 & 6)

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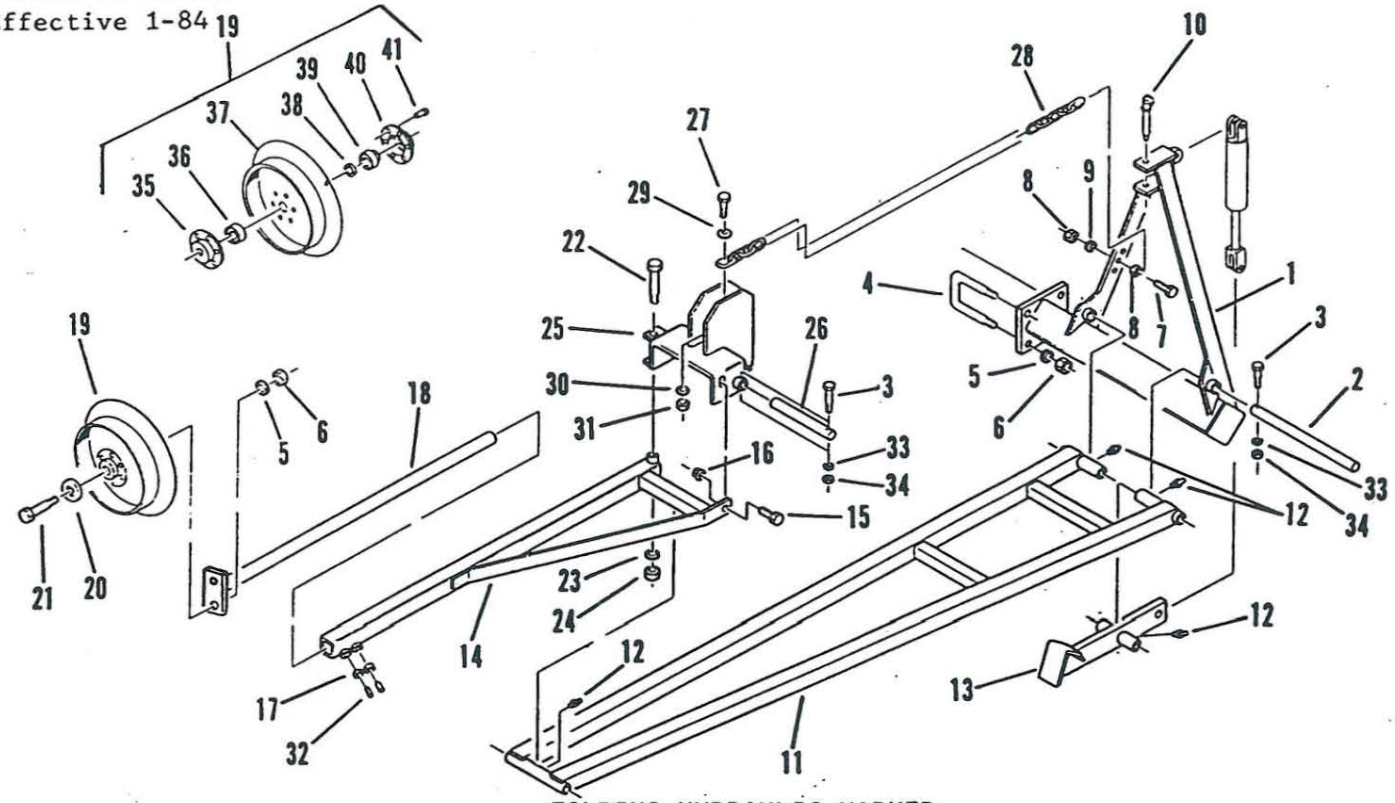
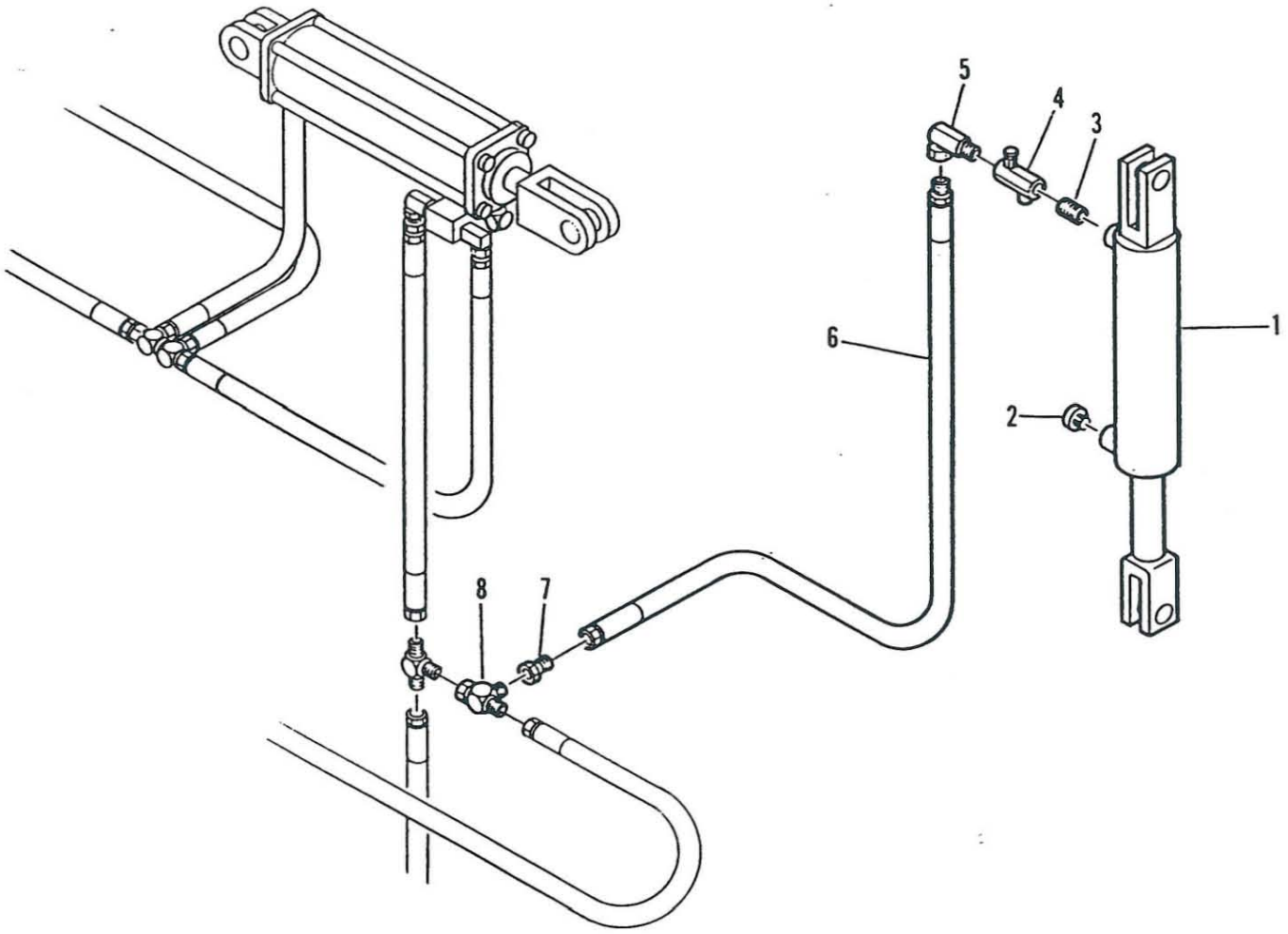


FOLDING HYDRAULIC MARKER

No.	Part No.	Description
1.	113-061H	Folding Marker Mount - Right (Shown)
	113-060H	Folding Marker Mount - Left
2.	113-110D	Marker Body Pivot
3.	802-152C	Bolt, Hex, 1/4"-20 x 2" Lg.
4.	806-006C	U-Bolt, 5/8"-11 x 3 1/2" x 5" Lg.
5.	804-022C	Lock Washer, 5/8"
6.	803-021C	Nut, Hex, 5/8"-11
7.	802-113C	Bolt, Hex, 7/16"-14 x 1 3/4" Lg.
8.	803-015C	Nut, Hex, 7/16"-14
9.	804-014C	Lock Washer, 7/16"
10.	805-042C	Lock Pin W/Hairpin Cotter
11.	113-063H	Marker Arm
12.	800-001C	Zerk, 1/4"-28, Straight
13.	113-062H	Marker Lever
14.	113-064H	Marker Extension - Right (Shown)
	113-065H	Marker Extension - Left
15.	802-159C	Bolt, Hex, 5/16"-18 x 1" Lg.
16.	803-043C	Nut, Whiz, 5/16"-18
17.	803-036C	Jam Nut, Hex, 1/2"-13
18.	113-070H	Disk Bar
19.	113-007H	Marker Disk And Bearing Assembly (Includes No's. 35 Thru 41)
20.	107-096D	Bearing Flange Dust Cover
21.	802-059C	Bolt, Hex, 5/8"-11 x 3" Lg.
22.	802-045C	Bolt, Hex, 1/2"-13 x 5" Lg.
23.	804-015C	Lock Washer, 1/2"
24.	803-020C	Nut, Hex, 1/2"-13

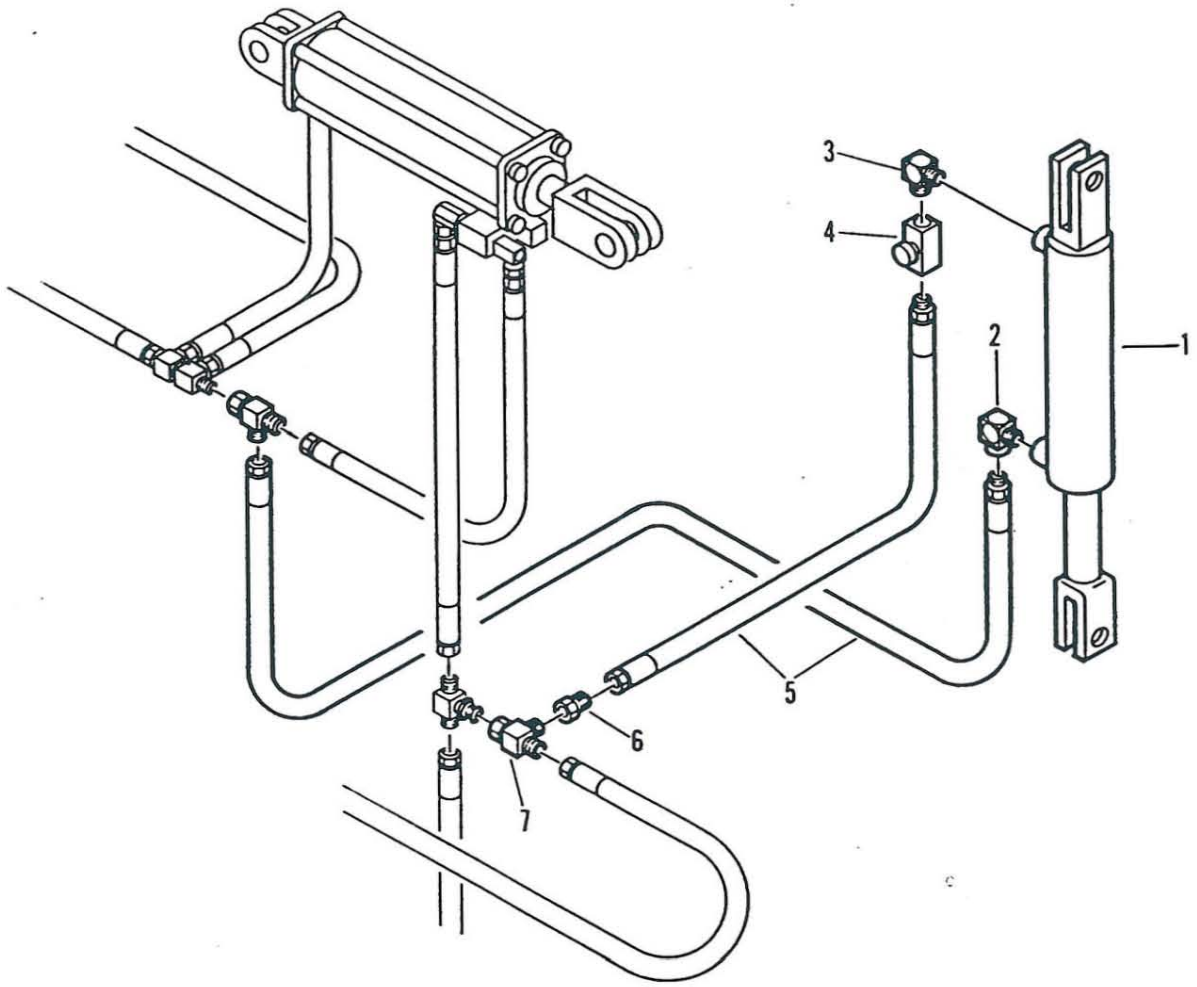
FOLDING HYDRAULIC MARKER (CON'T.)

No.	Part No.	Description
25.	113-067H	Extension Pivot Brkt. - Right (Shown)
	113-066H	Extension Pivot Brkt. - Left
26.	113-111D	Hinge Pivot Bar
27.	802-079C	Bolt, Hex, 3/8"-16 x 1 1/4" Lg.
28.	113-132D	Chain, 1/4" x 89 Links
29.	804-011C	Flat Washer, 3/8" USS
30.	804-013C	Lock Washer, 3/8"
31.	803-014C	Nut, Hex, 3/8"-16
32.	801-013C	Set Screw, Square Head, 1/2"-13 x 1 1/2" Lg.
33.	804-006C	Lock Washer, 1/4"
34.	803-006C	Nut, Hex, 1/4"-20
35.	107-095D	Bearing Flange
36.	822-003C	Bearing
37.	113-009H	Depth Band Assembly
38.	804-021C	Flat Washer, 5/8" SAE
39.	822-002C	Bearing, Extended Race
40.	113-097D	Bearing Flange
41.	800-011C	Button Head Rivet, 3/16" x 5/8"



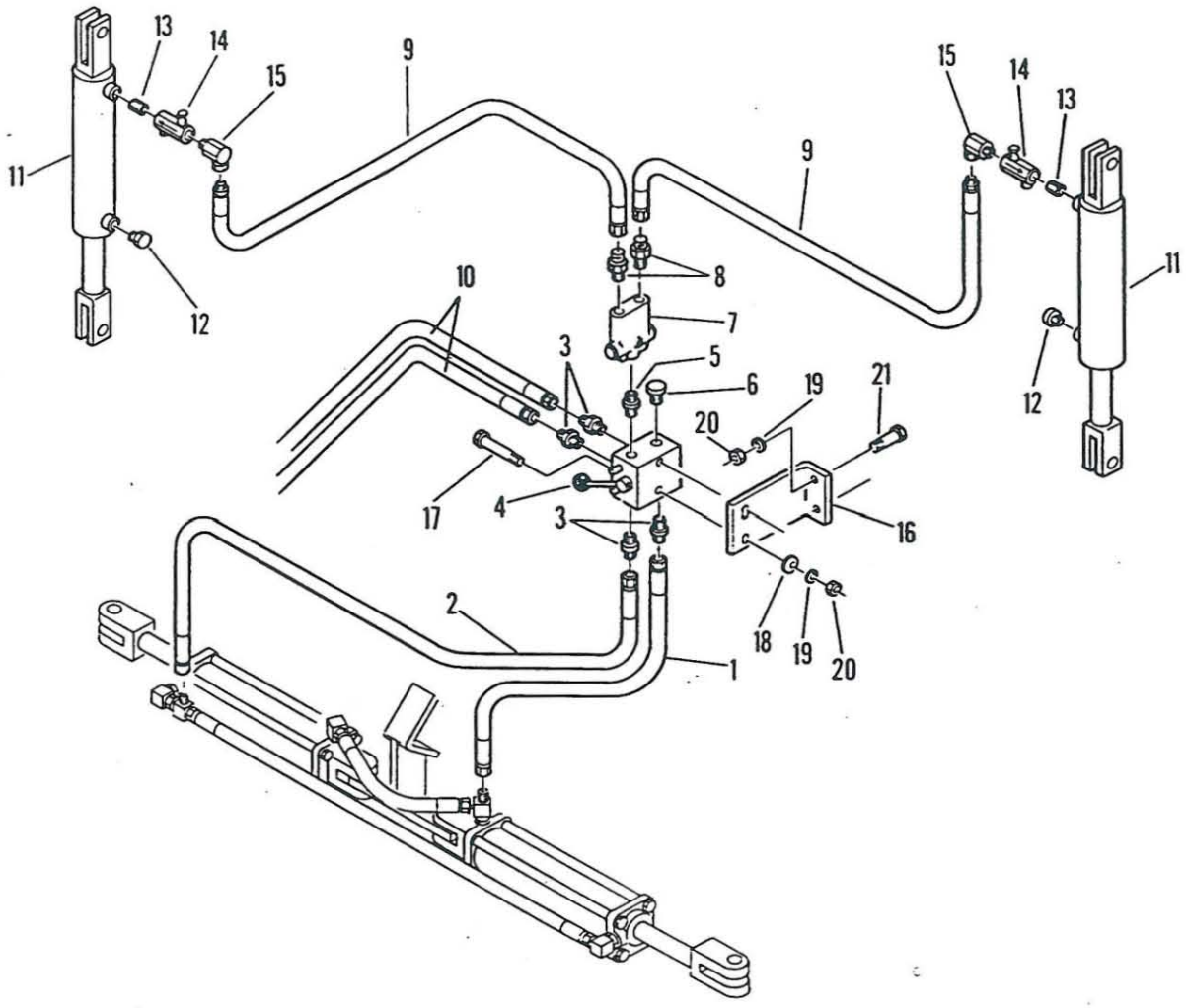
SINGLE MARKER HYDRAULICS - SINGLE ACTING CYLINDER

No.	Part No.	Description
1.	810-005C	Hyd. Cyl., 2" x 8" Stroke
2.	811-019C	Breather Plug
3.	811-044C	Pipe Nipple, 3/8" x Close
4.	810-024C	One-Way Restrictor Valve
5.	811-050C	Elbow Fitting, 3/8" x 90 Degree Swivel
6.	811-036C	Hyd. Hose, 24' Drill, 1/4" x 18' Lg.
	811-035C	Hyd. Hose, 30' Drill, 1/4" x 21' Lg.
7.	811-146C	Fitting, 6 JIC M x 8 JIC F
8.	811-073C	Service Tee, 8 JIC, MMF



SINGLE MARKER HYDRAULICS – DOUBLE ACTING CYLINDER

No.	Part No.	Description
1.	810-005C	Hyd. Cyl., 2" x 8" Stroke
2.	811-026C	Elbow Fitting, 3/8" MNPT x 3/8" FNPT, 90 Degree
3.	811-156C	Elbow Fitting, 3/8" MNPT, 90 Degree
4.	810-058C	Needle Valve, 3/8"
5.	811-035C	Hyd. Hose, 30' Drill, 1/4" x 21' Lg.
	811-036C	Hyd. Hose, 24' Drill, 1/4" x 18' Lg.
6.	811-146C	Fitting, 8 JIC F x 6 JIC M
7.	811-073C	Service Tee, 8 JIC, MMF

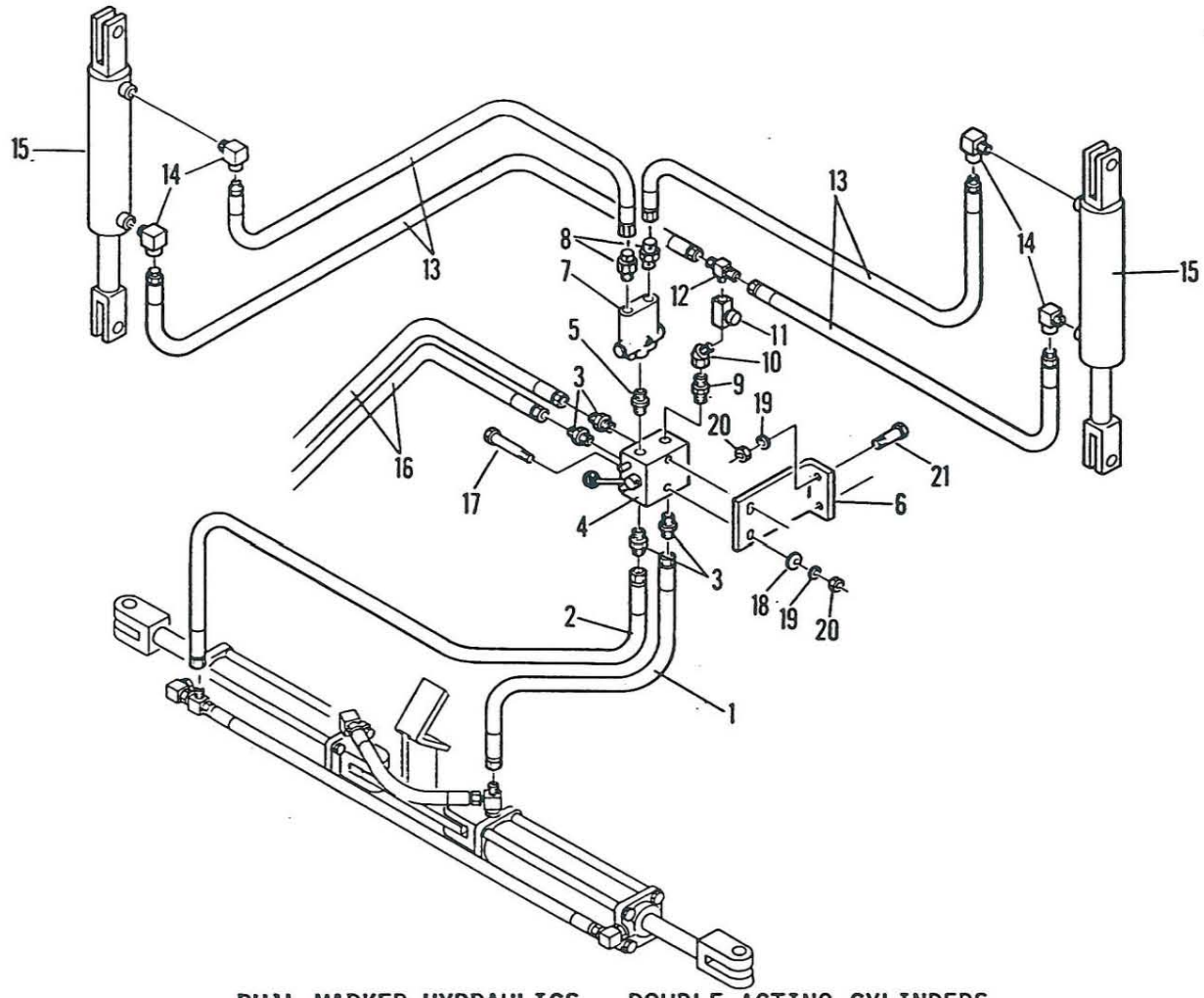


DUAL MARKER HYDRAULICS - SINGLE ACTING CYLINDERS

No.	Part No.	Description
1.	811-057C	Hyd. Hose, 1/4" x 17" Lg.
2.	811-056C	Hyd. Hose, 1/4" x 42" Lg.
3.	811-066C	Fitting, 6 JIC M x 1/2" NPTM
4.	810-023C	Double Selector Valve
5.	811-016C	Fitting, 3/4"-16 ORB x 1/2" MNPT
6.	811-045C	Pipe Plug, 1/2" Square Head
7.	810-006C	Sequence Valve
8.	811-133C	Fitting, 3/4"-16 ORB x 9/16" JICM
9.	811-035C	Hyd. Hose, 30' Drill, 1/4" x 252" Lg.
	811-036C	Hyd. Hose, 24' Drill, 1/4" x 216" Lg.
10.	811-058C	Hyd. Hose, 1/4" x 303" Lg.
11.	810-005C	Hyd. Cyl., Marker, 2" x 8" Stroke
12.	811-019C	Breather Plug
13.	811-044C	Pipe Nipple, 3/8" x Close
14.	810-024C	One-Way Restrictor Valve
15.	811-050C	Elbow Fitting, 3/8" x 90 Degree Swivel

DUAL MARKER HYDRAULICS - SINGLE ACTING CYLINDER (CON'T.)

No.	Part No.	Description
16.	113-154D	Double Sector Valve Mount
17.	802-147C	Bolt, Hex, 3/8"-16 x 3 1/2" Lg.
18.	804-011C	Flat Washer, 3/8" USS
19.	804-013C	Lock Washer, 3/8"
20.	803-014C	Nut, Hex, 3/8"-16
21.	802-017C	Bolt, Hex, 3/8"-16 x 1" Lg.



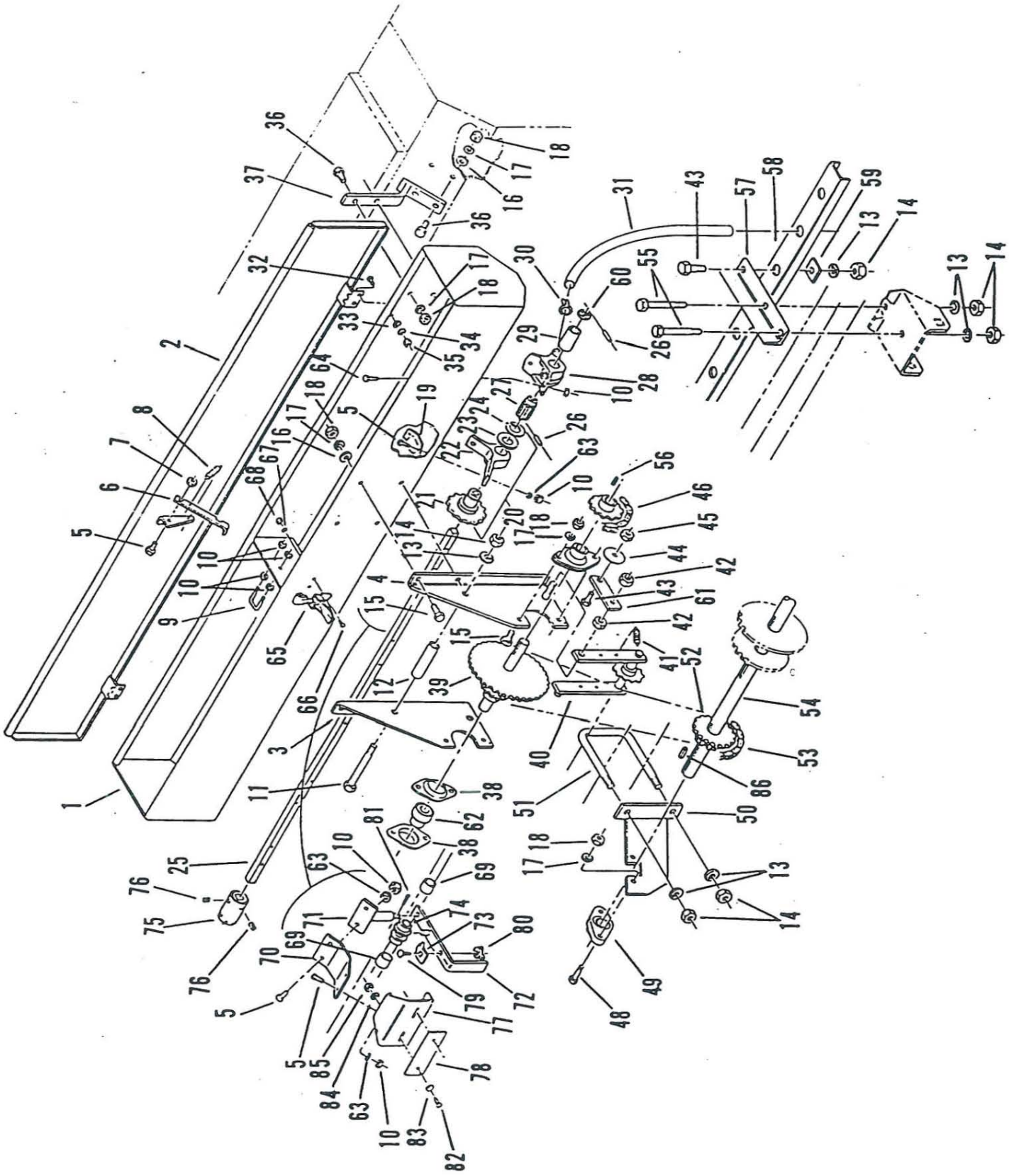
DUAL MARKER HYDRAULICS - DOUBLE ACTING CYLINDERS

No.	Part No.	Description
1.	811-057C	Hyd. Hose, 1/4" x 17" Lg.
2.	811-056C	Hyd. Hose, 1/4" x 42" Lg.
3.	811-066C	Fitting, 6 JIC M x 1/2" MNPT
4.	810-023C	Double Selector Valve
5.	811-016C	Fitting, 3/4"-16 ORB x 1/2" MNPT
6.	113-154D	Double Selector Valve Mount
7.	810-006C	Sequence Valve
8.	811-133C	Fitting, 3/4"-16 ORB x 6/16" JICM
9.	811-155C	Fitting, 3/4" /mnpt x 1/2" FNPT
10.	811-157C	Fitting, 3/8" x 45 Degree Elbow
11.	810-058C	Needle Valve
12.	811-154C	Fitting, 3/8" MNPT Branch x 6 JICM Run Tee
13.	811-035C	Hyd. Hose, 30' Drill, 1/4" x 21' Lg.
	811-036C	Hyd. Hose, 24' Drill, 1/4" x 18' Lg.
14.	811-026C	Fitting, 3/8" MNPT x 3/8" FNPT, 90 Degree Elbow
15.	810-005C	Hyd. Cyl., Marker, 2" x 8" Stroke

DUAL MARKER HYDRAULICS - DOUBLE ACTING CYLINDERS (CON'T.)

No.	Part No.	Description
16.	811-058C	Hyd. Hose, 1/4" x 303" Lg.
17.	802-147C	Bolt, Hex, 3/8"-16 x 3 1/2" Lg.
18.	804-011C	Flat Washer, 3/8" USS
19.	804-013C	Lock Washer, 3/8"
20.	803-014C	Nut, Hex, 3/8"-16
21.	802-017C	Bolt, Hex, 3/8"-16 x 1" Lg.

GRASS SEEDER ATTACHMENT



GRASS SEEDER ATTACHMENT (CON'T.)

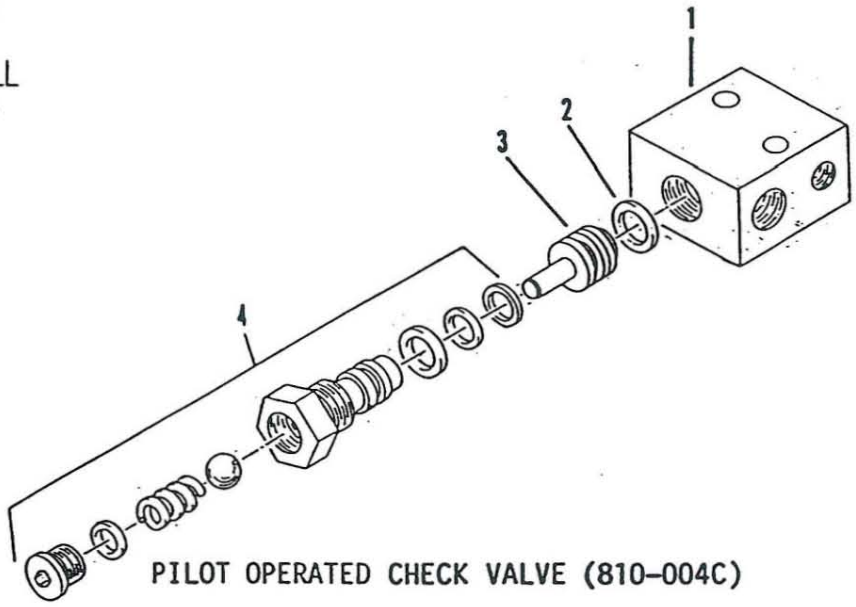
No.	Part No.	Description
1.	123-106H	Grass Seed Box LH 12"-7'
	123-105H	Grass Seed Box RH 12"-7'
	123-103H	Grass Seed Box LH 10"-7'
	123-102H	Grass Seed Box RH 10"-7'
	123-101H	Grass Seed Box LH 8"-7'
	123-100H	Grass Seed Box RH 8"-7'
	123-099H	Grass Seed Box LH 7 1/2"-7'
	123-098H	Grass Seed Box RH 7 1/2"-7'
	123-097H	Grass Seed Box LH 7"-7'
	123-096H	Grass Seed Box RH 7"-7'
	123-087H	Grass Seed Box LH 6"-5'
	123-086H	Grass Seed Box RH 6"-5'
	123-085H	Grass Seed Box LH 7"-5'
	123-084H	Grass Seed Box RH 7"-5'
	123-083H	Grass Seed Box LH 7 1/2"-5'
	123-082H	Grass Seed Box RH 7 1/2"-5'
	123-081H	Grass Seed Box LH 10"-5'
	123-080H	Grass Seed Box RH 10"-5'
	123-079H	Grass Seed Box LH 12"-5'
	123-078H	Grass Seed Box RH 12"-5'
	123-062H	Grass Seed Box LH 6"-7'
	123-061H	Grass Seed Box RH 6"-7'
2.	123-064H	81" Seed Box Lid Weldment
	123-121H	59" Seed Box Lid Weldment
3.	123-133D	Drive Change Mounting Plate RH (shown)
	123-134D	Drive Change Mounting Plate LH
4.	123-056H	Drive Change Bracket LH (shown)
	123-057H	Drive Change Bracket RH
5.	802-078C	Bolt, Hex, 1/4"-20 x 5/8" Lg.
6.	123-125D	Lid Lock Bar
7.	803-007C	Nut, Lock, 1/4"-20
8.	807-018C	Lid Latch Spring
9.	806-025C	U-Bolt, 1/4"-20 x 15/16" x 1" Lg.
10.	803-006C	Nut, Hex, 1/4"-20
11.	802-044C	Bolt, Hex, 1/2"-13 x 4" Lg.
12.	123-141D	Drive Bracket Spacer Tube
13.	804-015C	Lock Washer, 1/2"
14.	803-020C	Nut, Hex, 1/2"-13
15.	802-007C	Bolt, Hex, 5/16"-18 x 3/4" Lg.
16.	804-010C	Flat Washer, 5/16"
17.	804-009C	Lock Washer, 5/16"
18.	803-008C	Nut, Hex, 5/16"-18
19.	123-051D	Seeder Box Sprocket Cap
20.	123-066S	Drive Sprocket Assembly (Includes 1 Ea. of No's. 21 Thru 24)
21.	123-053E	Seed Cup Drive Sprocket
22.	817-026C	Drive Sprocket Hanger Bearing
23.	804-044C	Flat Washer, 1 3/8" x .876" x .048" Thick
24.	800-028C	Ring, Snap 7/8"

GRASS SEEDER ATTACHMENT (CON'T.)

No.	Part No.	Description
25.	123-207D	Seed Cup Shaft 6"-59"
	123-208D	Seed Cup Shaft 6"-59" Center
	123-209D	Seed Cup Shaft 7"-59"
	123-210D	Seed Cup Shaft 7"-59" Center
	123-211D	Seed Cup Shaft 7 1/2"-59"
	123-212D	Seed Cup Shaft 7 1/2"-59" Center
	123-213D	Seed Cup Shaft 10"-59"
	123-214D	Seed Cup Shaft 10"-59" Center
	123-215D	Seed Cup Shaft 12"-59"
	123-216D	Seed Cup Shaft 12"-59" Center
	123-218D	Seed Cup Shaft 6"-81"
	123-219D	Seed Cup Shaft 7"-81" L.H.
	123-220D	Seed Cup Shaft 7"-81" R.H.
	123-221D	Seed Cup Shaft 7 1/2"-81"
	123-222D	Seed Cup Shaft 8"-81"
	123-223D	Seed Cup Shaft 10"-81"
	123-224D	Seed Cup Shaft 12"-81"
26.	805-057C	Roll Pin, 1/8" x 3/4" Lg.
27.	817-010C	Grass Seeder Sprocket
28.	817-008C	Seed Cup Assembly
29.	817-009C	Sleeve
30.	800-029C	Hose Clamp
31.	123-143D	Grass Seeder Hose
32.	801-003C	Screw, Round Head, #10-24 x 1/2" Lg.
33.	804-046C	Flat Washer, #10
34.	804-004C	Washer, Internal Star, #10
35.	803-001C	Nut, Hex, #10
36.	802-159C	Bolt, Hex, 5/16"-18 x 1" Lg.
37.	123-120H	Seed Box Mounting Bracket
38.	822-041C	Flangette, 47 MST Bearing
39.	123-055H	Drive Change Shaft
40.	123-058H	Chain Idler Bracket
41.	807-001C	Lid Extension Spring
42.	803-036C	Nut, Jam, 1/2"-13
43.	802-034C	Bolt, Hex, 1/2"-13 x 1 1/4" Lg.
44.	804-047C	Washer, 1 3/4" x 9/16" x .190"
45.	803-019C	Nut, Lock, 1/2"-13
46.	804-020C	Chain, #40 x 36 Pitches
47.	808-027C	Sprocket, 40B10 x 3/4" Bore With Set Screw
48.	802-012C	Bolt, Hex, 5/16"-18 x 1 1/2" Lg.
49.	822-007C	Bearing, 1" Bore, 2 Bolt Flange
50.	120-159D	Jackshaft Bearing Bracket RH
51.	806-002C	U-Bolt, 1/2"-13 x 3 1/2" x 4 1/2" Lg.
52.	123-054H	Sprocket, Type 1 & 2 Drive Change
53.	809-022C	Chain, #40 x 76 Pitches
54.	123-052D	Grass Seeder Jackshaft
55.	802-039C	Bolt, Hex, 1/2"-13 x 3" Lg.
56.	123-146D	Key, 3/16" x 7/8"
57.	123-149D	Channel Support Angle

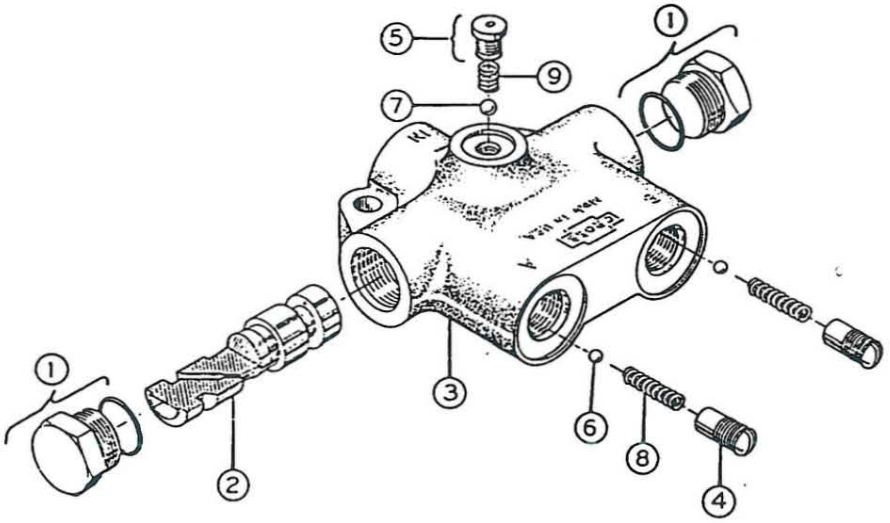
GRASS SEEDER ATTACHMENT (CON'T.)

No.	Part No.	Description
58.	123-147D	Hose Mounting Channel 6"-81"
	123-148D	Hose Mounting Channel 6"-59"
	123-182D	Hose Mounting Channel 7"-81"
	123-183D	Hose Mounting Channel 7 1/2"-81"
	123-184D	Hose Mounting Channel 8"-81"
	123-185D	Hose Mounting Channel 10"-59"
	123-186D	Hose Mounting Channel 7"-59"
	123-187D	Hose Mounting Channel 7 1/2"-59"
	123-188D	Hose Mounting Channel 8"-59"
	123-189D	Hose Mounting Channel 10"-59"
59.	123-150D	Channel Support Tab
60.	804-042C	Washer, Grass Seeder Cup Shaft
61.	123-139D	Upper Idler Arm
62.	822-040C	Bearing, SB 204-12
63.	804-006C	Lock Washer, 1/4"
64.	802-148C	Bolt, Hex, 1/4"-20 x 1/2" Lg.
65.	800-027C	Latch
66.	801-017C	Screw, Round Head, #6 x 1/2" Lg.
67.	804-050C	Lock Washer, #6
68.	803-065C	Nut, Hex, #6
69.	123-127D	Adjustment Spool Spacer
	123-155D	6 3/4" Adjustment Spool Spacer
	123-156D	6" Adjustment Spool Spacer
	123-157D	12" Adjustment Spool Spacer
	123-158D	10" Adjustment Spool Spacer
	123-159D	8" Adjustment Spool Spacer
	123-160D	7 1/2" Adjustment Spool Spacer
	123-161D	7" Adjustment Spool Spacer
	123-162D	6 7/8" Adjustment Spool Spacer
70.	123-118D	Seed Adjustment Support
71.	123-050H	Adjustment Handle Pivot
72.	123-051H	Adjustment Handle
73.	123-113D	Lock Tab
74.	123-116D	Seed Adjustment Spool
75.	123-217D	Seed Cup Shaft Coupler
76.	801-027C	Screw, Set, Hex, Socket, 5/16"-24 x 5/16" Lg.
77.	123-112D	Gauge Mounting Bracket
78.	819-005C	Seed Rate Gauge
79.	802-092C	Bolt, Carriage, 5/16"-18 x 3/4" Lg.
80.	803-058C	Nut, Wing, 5/16"-18
81.	805-019C	Pin, Cotter, 5/32" x 1" Lg.
82.	801-001C	Screw, Round Head, #8-32 x 3/8" Lg. Brass
83.	804-003C	Flat Washer, #8 Brass
84.	804-002C	Lock Washer, #8 Internal Star
85.	803-035C	Nut, Hex, #8-32 Brass
86.	123-004D	Drive Sprocket Key



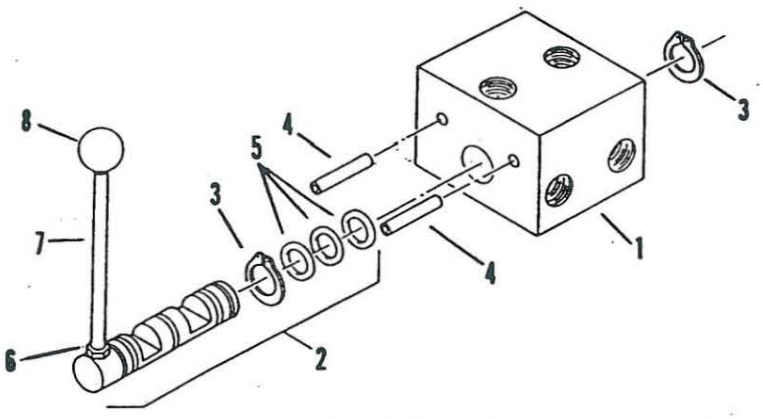
PILOT OPERATED CHECK VALVE (810-004C)

No.	Part No.	Description
1.	360753	Valve Body
2.	406584	O-Ring
3.	360755	Piston
4.	711259	Cartridge Sub-assembly



SEQUENCE VALVE (810-006C)

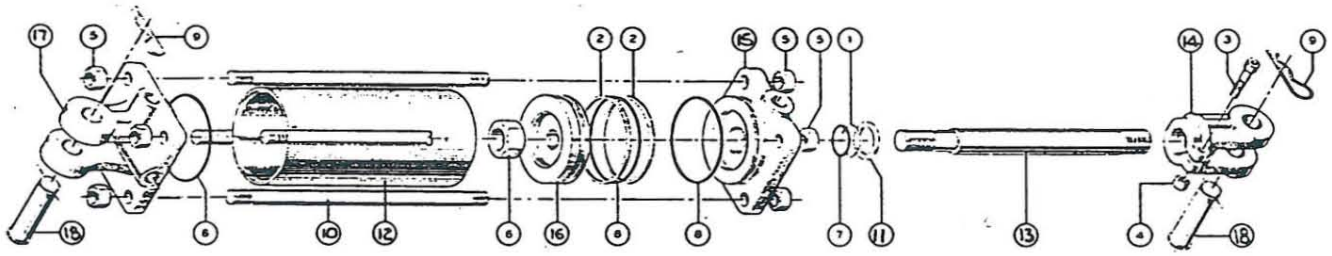
No.	Part No.	Description
1.	1V1880	O-Ring Boss Plug Assembly
2.	1V1882	Spool
3.	1V2003	Body Machining
4.	1V2003	Check Valve Retainer
5.	3-V4153-022	O-Ring Boss Plug Assembly
6.	2A0017-6	3/16" Ball
7.	2A0017-8	1/4" Ball
8.	2A9018-3	Check Valve Spring
9.	2A9024-1	Spring
	2A0353-12	Shipping Plug



DOUBLE SELECTOR VALVE (810-023C)

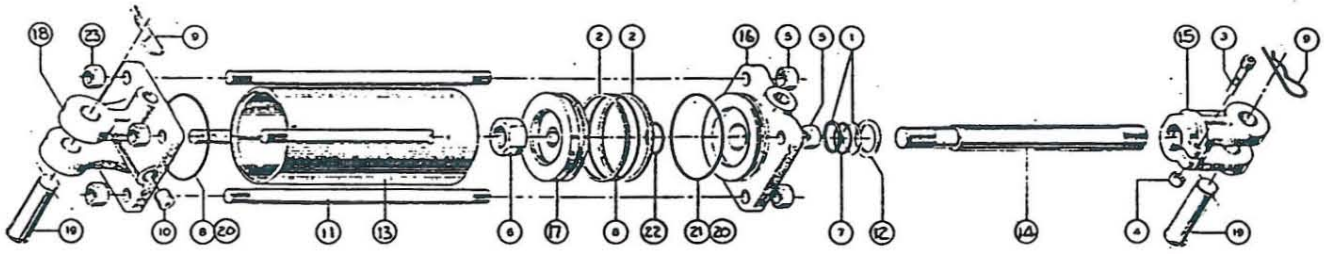
No.	Part No.	Description
1.	C-10-572-001	Custom Valvepac Body
2.	C-10-573	Control Spool Assembly
3.	5100-87	Snap Ring
4.	805-041C	Roll Pin, 1/4"
5.	-115	O Ring, 7/8 OD" x 3/32"
6.	803-011C	Lock Nut, 5/16"-18
7.	R19	Handle
8.	Knob	CL-442-PB

Effective 1-84



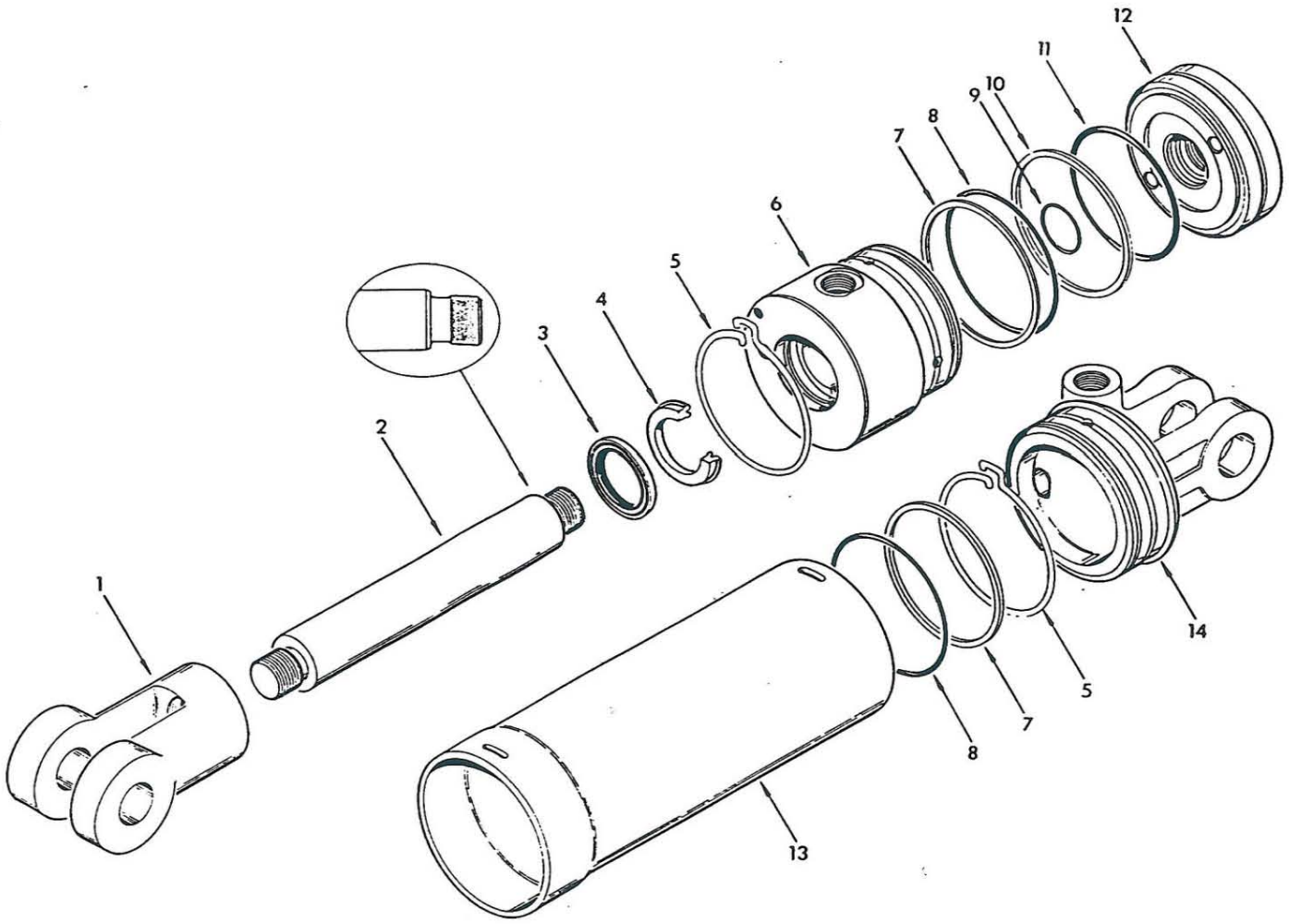
4" X 10" X 1 1/4" ROD HYDRAULIC CYLINDER (810-020C)

No.	Part No.	Description
1.	2A0263	Back-up (Rod)
2.	2A0100	Back-up (Tube)
3.	2A0006	Capscrew
4.	2A0012	Clevis Nut
5.	2A0018	Tie Rod Nut
6.	2A0024	Piston Nut
7.	2A0056	O-Ring (Rod)
8.	2A0078	O-Ring (Tube)
9.	2A0132	Pin Clip
10.	7M6318	Tie Rod
11.	2A0038	Wiper
12.	5M6118	Tube
13.	2M6470	Tube
14.	1M6010	Clevis
15.	3M6412	Head
16.	4M6102	Piston
17.	6M6164	Base
18.	2A0208	Clevis Pin
	3A6102	Seal Kit



2 1/2" X 10" X 1 1/4" ROD HYDRAULIC CYLINDER (810-018C-LH & 810-022C-RH)

No.	Part No.	Description
1.	10069	Back-Up (Rod)
2.	10077	Back-Up (Tube)
3.	20352	Capscrew
4.	20215	Clevis Nut
5.	20215	Tie Rod Nut
6.	20008	Lock Nut
7.	10039	O-Ring
8.	10047	O-Ring
9.	20001	Pin Clip
10.	30343	Plug (SAE #6)
11.	082585	Tie Rod
12.	10254	Wiper
13.	048019	Tube
14.	055866	Rod
15.	06327	Rod Clevis
16.	071707	Head
17.	071251	Piston
18.	063301	Base Clevis
19.	80008	Clevis Pin
20.	10071	Back-Up
21.	10041	O-Ring
22.	10030	O-Ring
23.	20353	Lock Nut



4" & 4 1/4" X 20" X 1 1/4" ROD HYDRAULIC CYLINDERS (810-029C & 810-028C)

No.	810-028C Part No.	810-029C Part No.	Description
1.	51423-100	51403-102	Rod End (Clevis)
2.	51429-301	51409-311	Piston Rod
3.	16074-225	16074-222	Wiper Seal
4.	16184-228	16184-125	U-Cup Seal
5.	16098-34	16098-25	Lock Ring
6.	51424-50	51404-50	Bearing
7.	16012-220	16012-218	Back-up Washer
8.	16004-20	16004-18	O-Ring
9.	16003-27-90	16003-25-90	O-Ring
10.	16102-268	16102-264	Slipper Ring
11.	16004-19-90	16004-17-90	O-Ring
12.	51424-2	51404-2	Piston
13.	51424-204	51404-205	Barrel
14.	51423-150	51403-150	Head

Tools required for servicing the wyr-loc cylinder:

A complete special tool servicing kit or the individual special tools may be purchased directly from Cessna.

Cessna Special Tool Servicing Kit 51100-900
which consists of one each of the following special tools:

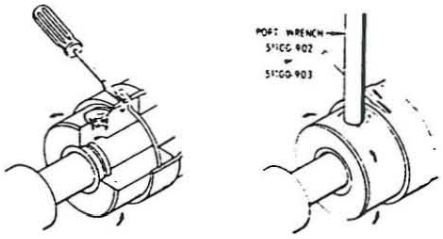
51100-901	Piston Spanner Wrench
51100-902	9/16 - 18 UNF - 3/8 NPTF Port Wrench
51100-903	3/4 - 16 UNF - 1/2 NPTF Port Wrench

Additional Equipment Required:

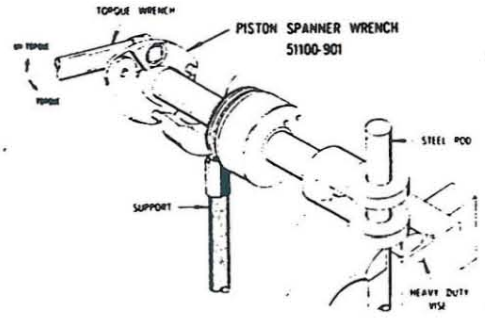
Heavy duty vise
1" diameter steel rod 8" long or 1-1/4" diameter rod 8" long
3/4" drive torque wrench (700 ft. lb. maximum)
Automotive type ring compressor or smooth surface hose clamp to fit O.D. of piston
O-ring hook tool

DISASSEMBLY

1. Drain oil from cylinder and plug all ports. Thoroughly clean outside of cylinder.
2. Clamp barrel of cylinder in vise near head end.
   Note: Scribe line across barrel and bearing to assure proper reassembly.
3. Remove lock ring (5) on bearing end (6) by lifting up on lock ring at the slot with a screwdriver while rotating the bearing. The bearing can be rotated by installing the proper size port wrench in work port in bearing. (A strap wrench or pipe wrench may be used if special port wrench is not available).
   Note: Be sure tab on end of lock ring is in hole in bearing prior to rotating the bearing.



4. Pull out on rod assembly (2) until piston (12) touches bearing (6), then pull on rod (2) until back up washer (7) and o-ring (8) are exposed under slot in barrel. Use an o-ring hook tool to pull out on o-ring and back up washer through slot. Cut both items and pull out through slot in barrel.
5. Remove piston assembly from barrel.



6. Clamp the appropriate size 8" long steel rod (same diameter as pin hole in clevis) in a heavy duty vise in a vertical position and slide clevis end of cylinder rod over steel rod.
7. Rest piston rod on an appropriate support to keep rod from moving while loosening piston.
8. Use spanner wrench and 3/4" socket drive to loosen piston from rod.
   Note: It is only necessary to remove the piston from the rod to properly service the seals in the cylinder. Occasionally the clevis may loosen from the rod before the piston. In the event the clevis should loosen first, use the spanner wrench to retorque the piston and clevis to the rod to the proper torque as noted in the torque chart. Retorque the piston till it moves on the rod. Once again use the spanner wrench to remove the piston from the rod, the piston will now loosen before the clevis loosens.
9. Remove bearing (6) from rod (2).
10. Remove lock ring (5) from head end (14) of cylinder using the same procedure as described when removing the bearing from the barrel. Cut and remove back up washer (7) and o-ring (8) then remove head end (14) from barrel.
11. Remove all o-rings, slipper ring, back up washers, u-cup seal and wiper seal from parts.

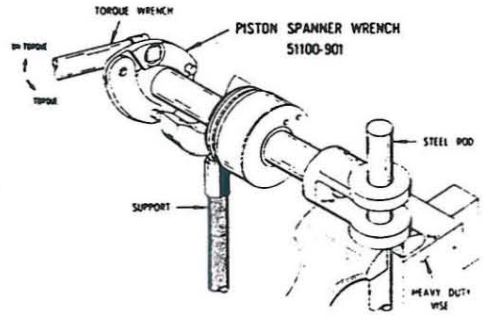
INSPECTION

The o-rings, slipper ring, back up washers, u-cup seal, wiper seal and lock rings need not be inspected as they are included in the seal repair kit available for these cylinders and should be replaced as new items.

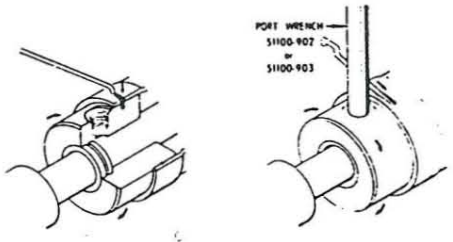
1. Remove all nicks and burrs from all parts with emery cloth.
2. Inspect I.D. of barrel for scoring and excessive wear.
3. Inspect rod for dents, scratches, scoring or pitting.
4. Inspect O.D. of piston for scoring.

REASSEMBLY

1. Clean and dry all parts thoroughly. All parts should be lightly oiled prior to assembly.
2. Install new u-cup seal (4) in I.D. of bearing (6) with u-groove towards pressure side of cylinder (inside of cylinder).
3. Install new wiper seal (3) in I.D. of bearing with lip outward.
4. Install new back-up washer (7) and o-ring (8) on O.D. of bearing (6) with o-ring towards the pressure side.
5. Install new back-up washer (7) and o-ring (8) on O.D. of head end (14) with o-ring towards pressure side.
6. Oil rod and carefully slide bearing (6) over rod with a straight forward motion. Note: One end of rod has a slight chamfer on O.D. to aid the installation of the bearing over the rod. Always assemble chamfered end of rod through the u-cup and rod wiper seals.
7. Install new o-ring (9) in I.D. of piston (12) and install piston to chamfered end of rod (2).
8. Place support under rod and place clevis on the vertical steel rod in vise. Use 3/4" drive torque wrench and spanner wrench and retorque clevis and piston to rod per the torque specifications required in torque chart. Note: It is extremely important that the piston and clevis be retorqued to the required torque specifications.



9. Install new o-ring (11), the one with the red dot, on O.D. of piston, carefully work the slipper ring (10) over piston and into groove. The slipper ring will stretch as it is installed on the piston and it must be compressed after installation to help retain its original size. An automotive type ring compressor or a smooth hose clamp is recommended as a field tool to compress the slipper ring.
10. Clamp barrel assembly in vise and carefully slip in head end (14). (Caution: It may be necessary to use a blunt tool to depress seals as they pass under slot in barrel). Line up lock ring hole in the head with the lock ring groove in the cylinder barrel. Insert lock ring (5) in the hole in head and rotate head until lock ring enters slot in barrel. Guide end of wire into slot then lightly tap end down into slot with hammer.
11. Lubricate O.D. of piston and insert rod and piston assembly into barrel with a straight forward motion. Lubricate bearing O.D. and slide bearing into barrel. (Caution: It may be necessary to use a blunt tool to depress seals as they pass under slot in barrel.) Line up lock ring hole in the bearing with lock ring groove in barrel using original scribe line as a guide.
12. Insert lock ring (5) and rotate bearing until lock ring enters slot in barrel. Guide end of wire into slot then lightly tap end down into slot with hammer. Make sure work port is in its original position and scribe lines are in line.



13. Cycle cylinder and check for leaks.

TORQUE SPECIFICATIONS FOR PISTON AND ROD CLEVIS			
ROD SIZE	ROD THREAD SIZE	ACTUAL FT. LBS. OF TORQUE	TORQUE WRENCH SETTING USING SPANNER WRENCH
1-1 8" Dia.	15/16 - 16 UN	100	No Holes
1-1 4" Dia.	1 - 16 UN	205	185
1-3 6" Dia.	1-1/6 - 16 UN	285	255
1-1 2" Dia.	1-3/16 - 16 UN	335	300
1-5 8" Dia.	1-5/16 - 16 UN	425	385
1-3 4" Dia.	1-7/16 - 16 UN	490	440
1-7 8" Dia.	1-9/16 - 16 UN	555	500
2" Dia.	1-11/16 - 16 UN	705	635

Great Plains Manufacturing, Inc.
Corporate Office: P.O. Box 5060
Salina, Kansas 67402-5060 USA