

Southern Green

Soil Reliever

Deep Tine Aerator

Models SR-60 and SR-80

Operator's Instruction Manual

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I. INTRODUCTION

The Southern Green *Soil Reliever* Deep Tine Aerator has been designed and manufactured to meet the highest standards of quality, safety and performance.

The *Soil Reliever* is suitable for use on all types of turf from golf greens, tees, and fairways to football, baseball and soccer fields to lawn areas.

Deep tine aerating will provide many benefits - reduced compaction, healthy root growth, improved drainage and more efficient use of fertilizers and water. In general, deep tine aerating leads to a healthier turf better able to withstand wear and tear during inclement periods.

II. GENERAL NOTES

This instruction manual is intended to guide the user through the safe and correct setting, operation and routine maintenance of the *Soil Reliever*. **This manual should be read thoroughly before attempting to attach or use the *Soil Reliever* and should be kept in a place readily available to those operating and maintaining the aerator.**



This symbol means CAUTION, WARNING or DANGER and the adjacent information should be read carefully in order to avoid possible injury or damage to the machine.

IMPORTANT: While this instruction manual has been written to help the user derive the maximum benefit from this machine, our policy of continuous improvement may mean that specifications may change from time to time. Therefore, if there is any part of this manual which is not clearly understood or on which you require further information, please contact your local dealer or Southern Green.

Thank you for choosing the Southern Green *Soil Reliever*. We wish you many hours of safe and productive use of your new machine!



III. SAFETY

To minimize the risk of injury when working with the *Soil Reliever*, please observe the following safety instructions.

1. **Read the operator's manual** thoroughly and make sure you fully understand all the points covered in it. Please contact Southern Green or your dealer if you require further information.
2. The *Soil Reliever* is heavy. When attached to a tractor and in the raised position, its weight will affect stability, braking and steering. Exercise caution when transporting between working areas.
3. Ensure that your tractor is suitable for use with an implement of this weight by checking with your tractor supplier or manufacturer.
4. Use adequate tractor front weights to prevent loss of steering control.
5. Always mount or remove the aerator with the tractor on a firm, level surface. Never attempt either operation on slopes or soft surfaces.
6. Always apply the parking brake and switch off the engine of the tractor before commencing to attach or remove the aerator, even if another person is assisting you.
7. Ensure that all mounting pins are secured with retaining bridge pins to provide absolute safety.
8. Check that all safety guards are in place and fully serviceable, especially those related to the PTO shaft.
9. Always lower the aerator to the ground before leaving the tractor unattended. NEVER leave the aerator in the raised position unattended!
10. When dismounted, place the aerator on its parking stand or lower it onto suitable blocks to prevent any chance of tipping over.
11. Continually monitor the condition of tines and other moving parts and replace any worn or damaged parts before further use.
12. Keep all nuts and bolts tight. This precaution will prolong the life of the machine by keeping all parts in alignment.
13. Know your machine and respond to any change in operation or noise levels.
14. Avoid operating the machine on undulations where loss of steering or stability may occur.
15. Before servicing or making adjustments, always apply the tractor parking brake, switch off the engine and remove the key.

IV. SPECIFICATIONS

	Model 60	Model 80
Machine Weight	1930 lbs (878 kgs)	2575 lbs (1170 kgs)
Working Width	60" (1.52 M)	80" (2.03 M)
Maximum Working Depth	14" (35.6 cm)	14" (35.6 cm)
Length	43" (1.09 M)	43" (1.09 M)
Width	66" (1.67 M)	88" (2.24 M)
Height	50" (1.27 M)	50" (1.27 M)
Lateral tine spacing	3 1/3" (85 mm) and 5" (127 mm)	3 1/3" (85 mm) and 5" (127 mm)
Hole Spacing	varies with forward speed	varies with forward speed
Power Requirement	30 hp minimum	45 hp minimum
Working PTO Speed	400 rpm max (long tines) 450 rpm max (short tines)	400 rpm max (long tines) 450 rpm max (short tines)
Tractor Forward Speed	up to 1 mph (1.6 km/hr)	up to 1 mph (1.6 km/hr)
Tractor Attachment	Category 1, 3 point lift	Category 1, 3 point lift

Optional Accessories:

- Hydraulic Top Link
- Rear Roller
- Core Collector
- All Weather Cover
- Alternative Drive Sprockets for Faster Tractor
- Tines (see next section)

V. POWER TAKE OFF DRIVE SHAFT FITTING AND NOTES

Your *Soil Reliever* is supplied with a PTO shaft to transmit power from your tractor's PTO to the *Soil Reliever* gearbox.



1. Before fitting or carrying out any work or maintenance to the PTO shaft, switch off the tractor engine, remove the key, and be sure the *Soil Reliever* is supported on its stand.



2. Grease the telescoping tubes and universal joints prior to fitting and use.
3. Always attach the cover safety chains to a suitable fixed point.
4. The PTO shaft is supplied long and may require shortening for your tractor. If you need to shorten the shaft, cut equal amounts off each telescoping tube and the cover. Ensure when cut that each telescoping tube overlaps the other by at least 1/3 of its length in the maximum extended or transport position. Also ensure that the telescoping tubes cannot bottom out when raising or lowering the aerator or damage to the PTO shaft will result.
5. Ensure that the correct end of the PTO shaft is connected to the tractor as indicated on the shaft cover.
6. Ensure a) that the PTO shaft is pushed fully into position on the tractor PTO and b) that the *Soil Reliever* gearbox shaft and the pin or turn collar have returned to their initial positions.
7. Your *Soil Reliever* PTO shaft is fitted with a friction disk torque limiter. The torque limiter is not adjustable. Do not attempt to modify the setting.

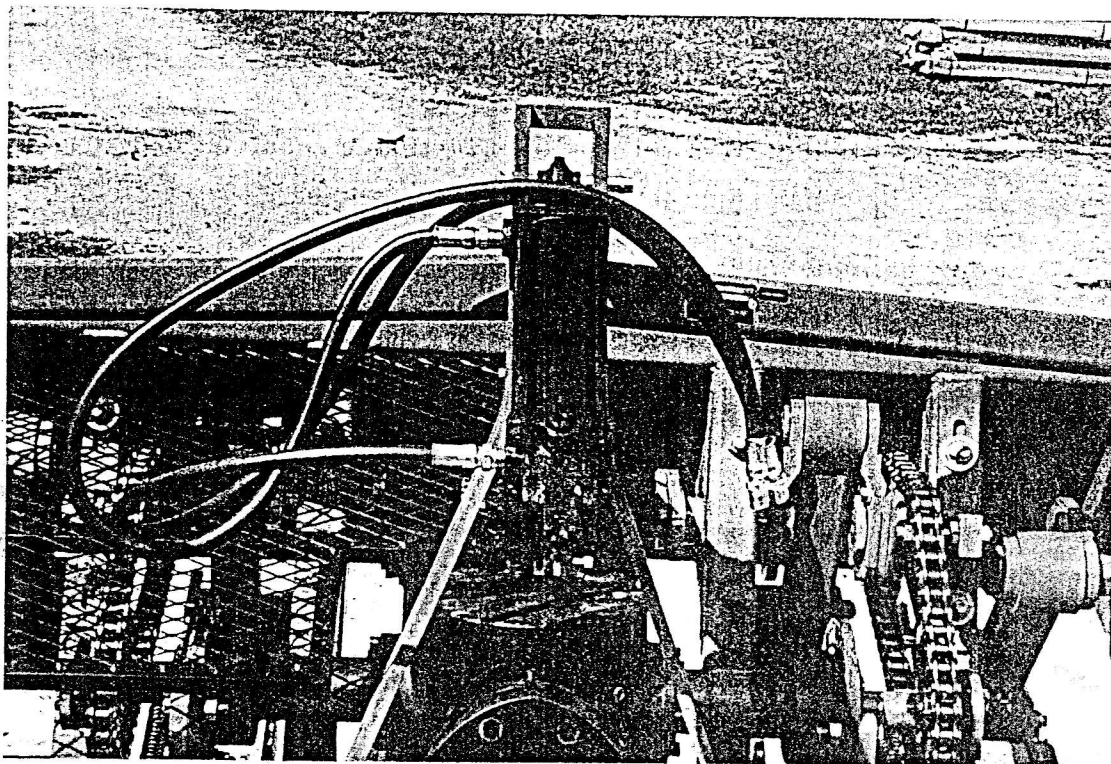


8. Always ensure that all drive line, tractor and aerator guards are in place and functional before operation. Replace any damaged or missing parts immediately.
9. Use the PTO support attached to the "A"-frame to support the PTO when the aerator is not attached to the tractor.

VI. OPTIONAL HYDRAULIC TOP LINK FITTING AND NOTES

If you purchased a hydraulic top link to use in place of your tractor's standard top link, the hydraulic top link will need to be fitted to your tractor and aerator.

Your tractor must be fitted with a double acting spool valve with an operator control lever and two 1/2" quick-release couplings at the rear of the tractor. Your tractor supplier can advise you on this requirement if not fitted as standard. It is also necessary for you to provide two quick-release coupling halves to fit to the hydraulic top link hoses.



VII. AERATOR ATTACHMENT AND REMOVAL

- Notes:
1. The *Soil Reliever* should be supported on the optional stand (available from your dealer) or on blocks when not in use.



2. CAUTION: Always attach and remove the aerator on firm level ground!

If you purchased the optional hydraulic top link, connect it to your tractor as follows:

1. connect the hydraulic top link to the tractor using the swivel pin and securing clip (the top link is fitted with the rod toward the aerator);
2. connect the two hydraulic hoses with quick fit couplings to the ports provided on the tractor;
3. start the tractor engine and operate the spool valve to check the extend and retract motion of the hydraulic ram.

To attach the *Soil Reliever* to your tractor:

1. remove the 3-point linkage pivot pins from the aerator;
2. slowly back the tractor up to the aerator and into the mounting position;



3. switch off the engine and apply the parking brake;

4. connect the aerator's PTO shaft to the tractor;



5. attach the PTO cover chains to a suitable point at each end to prevent the cover from rotating;

6. place the tractor's lower lift arms in the jaws of the aerator and insert the pivot pins (be sure to secure the pins with the bridge pins);

7. fit the tractor's top link (standard or hydraulic) into the jaw provided at the top of the "A"-frame and insert the swivel pin, securing it with the bridge pin.

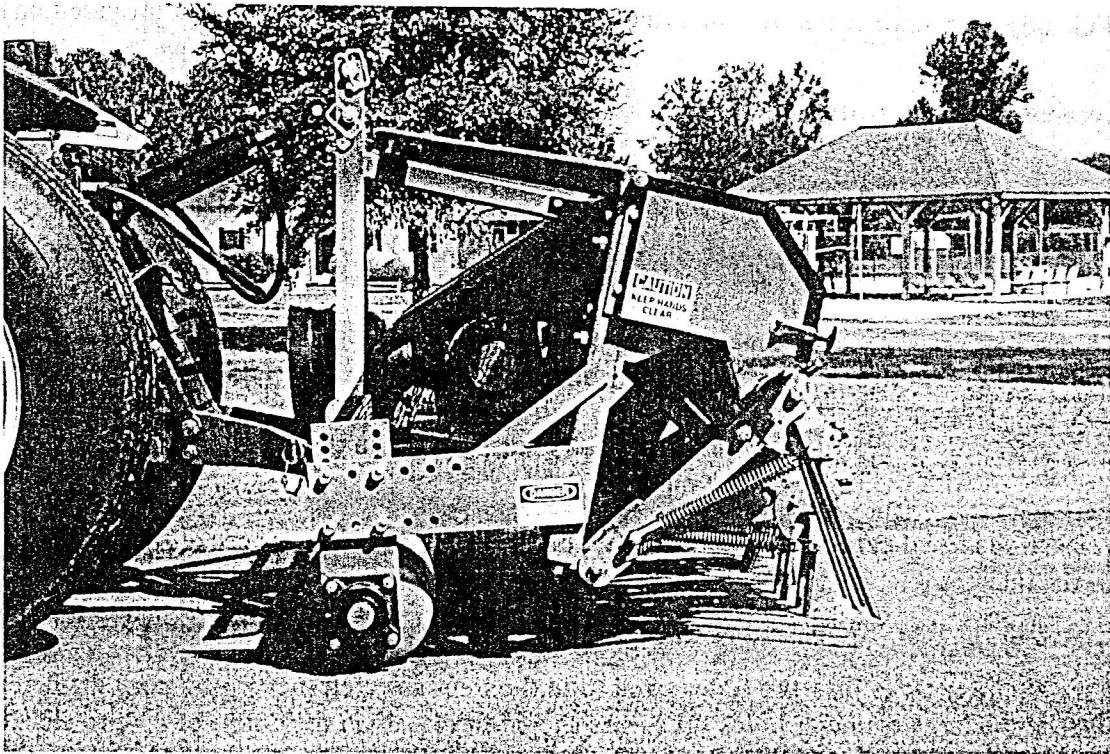
To remove the *Soil Reliever* from your tractor:

1. back the tractor up to the stand or support blocks and lower the aerator;



2. switch off the engine and apply the parking brake;

3. open the PTO cover and disconnect the aerator's **PTO** shaft from the tractor (a rest for the PTO shaft is provided on the optional stand);
4. remove the 3-point linkage pivot pins to disengage the tractor's lower lift arms and top link from the aerator;
5. restart the tractor and carefully pull away from the aerator;
6. replace the pivot pins for storage, securing them with the bridge pins.



VIII. ADJUSTMENTS AND SETUP

A. General Mounting and Safety Adjustments

For safest and most efficient operation, ensure the following:

1. **Attach sufficient front weights** to the tractor to provide stability and safe steering control.
2. **Set the tractor lift hydraulic speed control** to prevent the aerator's being lowered too quickly.
3. **Set the hydraulic lift stops** to ensure that at maximum lift the tines are clear of the ground and in the lowered position the aerator roller is firmly on the ground. **Check this setting on the turf.**
4. **Mount the aerator centered on the tractor and tighten the tractor lift arm check chains** to prevent the aerator's swaying from side to side.
5. **Fill the roller with water for additional weight if required.** A fill plug is provided on the end of the roller.
6. **Keep guards in position and secure.**

B. Tine Installation

To install or change tines:

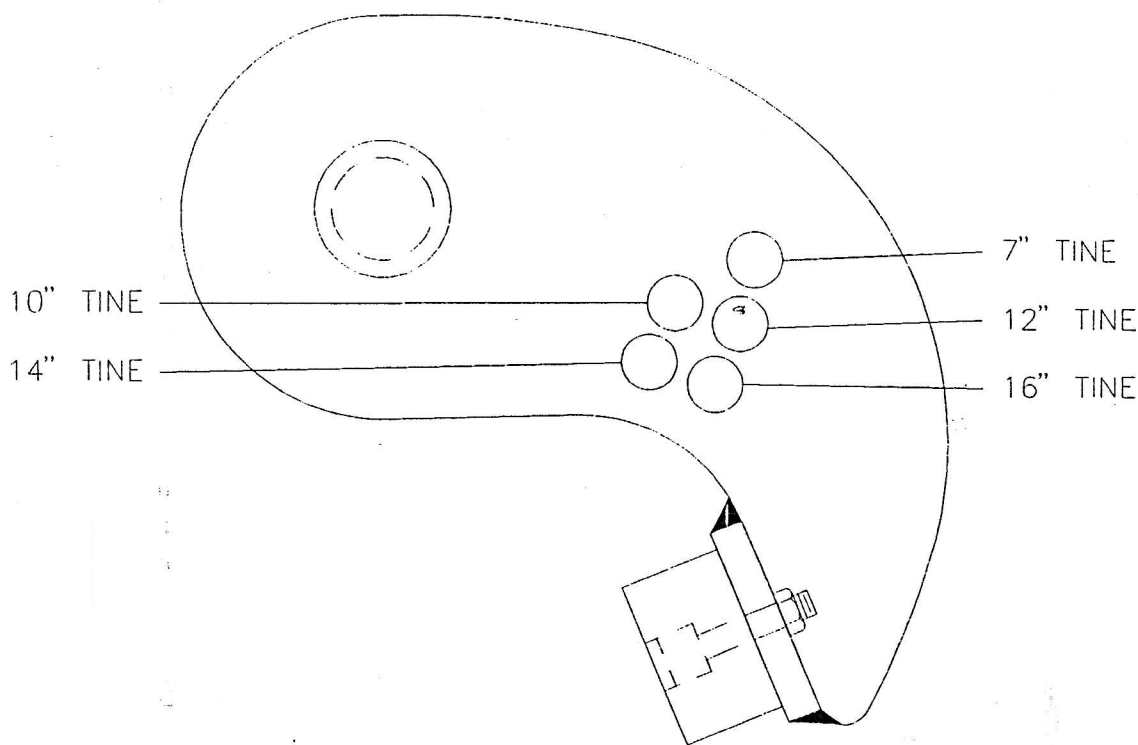


1. **turn off the tractor engine and remove the key;**
2. **make certain the aerator is fully supported (on the stand or support blocks or with the roller resting on the ground);**
3. **release the head return springs** to allow rotation of the head for easier removal and insertion of the tines;
4. **loosen the clamping bolts and remove the previously used tines;**
5. **slide the new tines into the holes** sized to fit the tines selected (never use small diameter tines in the large diameter holes - the tines should fit closely in the hole); be sure to slide the tine up into the head until it bottoms out; note: coring (hollow) tines should be positioned with the ejection slot to the rear;
6. **tighten the clamping bolts firmly to secure the tines;**
7. **check the head stop adjustment for the new tines as described in section C. below;**
8. **reattach the head return springs;**

9. before commencing work on the turf for the first time after changing tines, **test the *Soil Reliever* on a less important area** so that you can try alternative tractor gears and fine tune the adjustment to achieve the hole spacing and turf finish desired.

C. Head Stop Adjustment

Set the teardrop-shaped tine head return stop (see photo below) to the correct position based on the length of tines to be used. The head stop is set to one of five predetermined positions by choosing the hole through which the adjustment rod is bolted. See the drawing following to determine the correct hole for your application.



To change the head stop position:

1. turn the engine off and remove the key;
2. release the head return springs;
3. loosen the large nut securing the head and teardrop to the arm;
4. remove the smaller diameter nut and bolt passing through the adjustment holes on the teardrop;

5. rotate the teardrop to align the chosen adjustment hole with one of the holes in the arm and replace the bolt and nut (see drawing above to choose hole);
6. retighten the large nut.

D. Depth Adjustment

Aeration depth is controlled by extending or shortening the tractor's top link. **Adjust the top link to achieve the desired setting.** If the optional hydraulic top link is used you will be able to adjust the penetration depth while operating the machine by extending or retracting the hydraulic ram.

In general, aerate with the roller height in the position set by the factory (see photo following). Should you wish to aerate to shallower depths with long tines, the front roller can be lowered to support the *Soil Reliever* at a setting higher off the ground.

E. PTO Speed

The *Soil Reliever* is designed to operate with a PTO speed of 400 rpm. If short tines are fused this may be increased to a maximum of 450 rpm. Most tractors indicate a 540 PTO rpm position on the rev counter. Since the engine and PTO rpms are directly proportional, you can determine the engine rpm required for a 400 rpm PTO by calculating as follows:

$$(\text{engine rpm at } \frac{2400}{540} \text{ PTO speed}) \times \frac{400}{540} = \text{required engine rpm}$$

1777.7777777777777
1800 RPM

For example, if the engine rpm is 2700 for a PTO speed of 540 rpm, you would get:

$$2700 \times \frac{400}{540} = 2000 \text{ rpm}$$

$$2600 (JD) = \underline{1925 \text{ RPM}}$$

In this example, running your tractor at 2000 rpm now provides you with a 400 rpm PTO speed.

If your tractor indicates some other PTO rpm, substitute that number for 540 above. If you wish to run with a PTO rpm of 450 for short tines, substitute 450 for 400 above.

F. Subsoil Cultivation Tips

Subsoil cultivation, fracturing or "heave" is created by a spading motion of the tine in the soil as the aerator and tractor move forward. **Maximum heave is achieved with long, large diameter, solid tines.**

Quality of finish on the playing surface after aerating will depend on various factors including turf condition, root growth and moisture content. The best results will be achieved if the tine is vertical or slightly inclined down and to the rear as it enters the soil. Tine tilt is affected by head stop adjustment and the height of the roller.

IX. OPERATING INSTRUCTIONS

CAUTIONS:



1. **Avoid underground services** such as water pipes, gas pipes or electric cables.
2. If aerating unknown or stony ground, **set your depth cautiously** to avoid hammering the tines into hard underground obstructions as this will damage your aerator. If a hydraulic top link is used, reduce penetration quickly if an underground obstruction is encountered to prevent damage.
3. **Do not attempt to adjust a standard top link while the machine is in operation or the engine is running.**
4. **Do not over extend your hydraulic top link** as you will cause the tine head to hammer the turf.



5. **Avoid turning on steep slopes** as you could overturn the tractor and cause serious injury. The aerator is heavy and changes the handling of the tractor, particularly when in the raised position.
6. When transporting between work areas, **always proceed slowly and carefully, maintaining good control of the tractor.**

To aerate your turf:

1. **Align the tractor** for the first pass on the area you wish to aerate.
2. **Set the tractor engine rpm** to operating speed as calculated previously (see PTO Speed under the section IX. Adjustments and Set-up).
3. **Partially lower the aerator** to a position where the tines do not contact the turf.
4. **Engage the PTO** and the desired gear on the tractor and begin to move forward.
5. **Immediately lower the aerator** until the main roller is firmly on the ground.
6. If you are using the optional hydraulic top link, **extend the top link ram** until you achieve the required aeration depth. If you are operating on undulating ground, you can extend or retract your hydraulic top link to maintain a constant aeration depth. (Reminder: Do not over extend the top link as this will cause the tine heads to hammer the turf.)

Note: Do not attempt to adjust a standard top link while the machine is running. When using the standard top link, the aeration depth is set as described in Depth Adjustment under section IX. Adjustments and Set-up and can not be adjusted "on-the-fly".

7. The *Soil Reliever* can work in both straight lines and gentle curves to follow the contours of the playing field.
8. On completion of a section of turf and before stopping, raise the aerator and immediately switch off the PTO. Raising the aerator on the move reduces turf disturbance and leaves a cleaner finish. If the hydraulic top link is used, you might find it helpful to close the ram before raising the aerator. This will give you greater clearance between the tines and the turf when maneuvering over undulating ground.

X. TROUBLESHOOTING TIPS

Problem	Solution
1. Springs are breaking or not pulling back.	Slow the PTO speed. The longer and heavier the tines, the greater the centrifugal force on the head.
2. Holes are elongated or picking.	Adjust the angle of the tine or change the tractor ground speed.
3. Tines are hitting the ground with an erratic pattern.	<ul style="list-style-type: none"> - Check for crossed or broken spring wires. - Slow the PTO speed of the tractor.
3. PTO clutch slips excessively.	Adjust tines to a shallow depth.
4. Turf is pulling up with coring tines.	Shallow-rooted turf may require solid tines the first time.
5. The soil is too hard for full penetration.	Aerify at the depth that the machine can achieve, water overnight, then increase the depth. Repeat if necessary until soil can be aerated at desired depth.
6. Coring tines are breaking.	You are trying to get too much depth for the soil condition. See above and aerate to a shallower depth.
7. Anti-flipping devices are bending.	The PTO is set too fast for the tine size being used or the machine is being dragged on the ground without the PTO engaged.
8. Tines will not stay in the head.	Tighten the tine holder bolts and lock nuts in place. If the bolt will not hold the tine, replace it and the nut.
9. Hole spacing is too far apart for your tractor.	Larger drive sprockets can be substituted for the standard sprockets (this will increase the machine's operation speed).
10. Tines pull the soil up when the machine is raised.	Raise the machine part of the way out of the soil before disengaging the PTO.
11. The machine will not turn.	Make sure the PTO and driveshaft are working properly.
12. The tractor has difficulty lifting the <i>Soil Reliever</i> .	Drill holes in the bottom lift arms 3" to 4" closer to the <i>Soil Reliever</i> .
13. The hydraulic top link cylinder is spongy. (It "gives" and moves in and out a short span when force is applied.)	Air is in the cylinder or lines and must be bled out.
14. The hydraulic top link cylinder can not be fully retracted (PTO shaft jams).	The PTO shaft is too long for your tractor and should be cut to the correct length as explained in Section V. of this manual.
15. The tractor does not seem to have enough power to operate the <i>Soil Reliever</i> .	<ul style="list-style-type: none"> - Check chain tension. - With the tractor and PTO off, turn the machine with your hands to check for obstructions in the mechanism. - Smaller drive sprockets can be used to increase power. (This will reduce the machine's operation speed and increase hole spacing.)

XI. MAINTENANCE

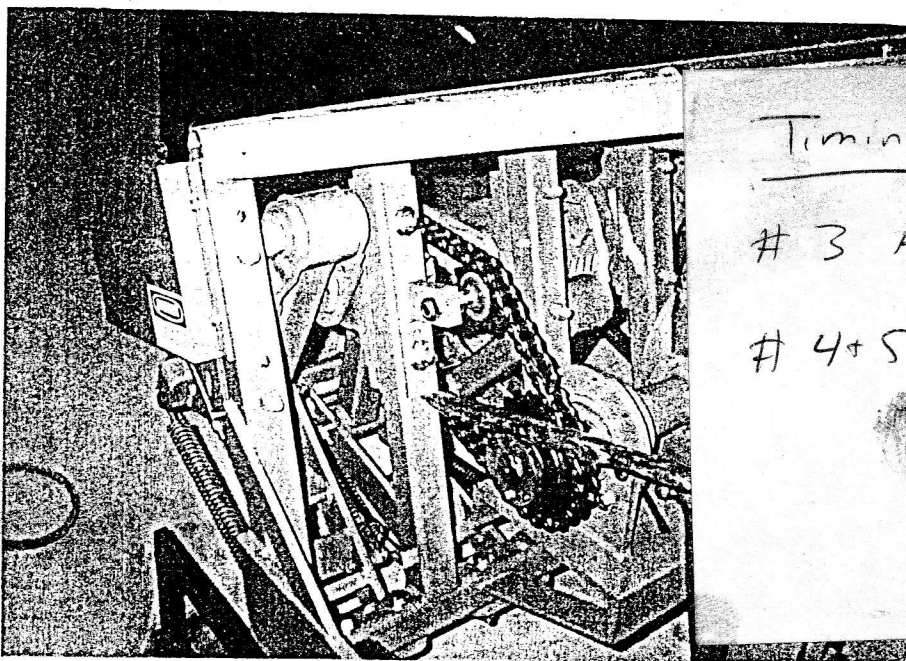
Your *Soil Reliever* has been designed for low maintenance operation. Adhering to the following simple guidelines will keep your machine in good working condition for many years.

1. At the end of work, clean the machine and apply a rust inhibitor to the tines.



2. Rest the aerator on its stand when leaving it unattended (i.e. break periods or overnight) and when carrying out routine maintenance.

3. Regularly check all nuts and bolts for tightness and examine tines for damage or wear.
4. Check crankshaft drive chains for damage and correct adjustment. Chain tension can be adjusted by moving the idler carrier in the slotted holes provided. See below. CAUTION: Do not overtighten chains. The machine will work more smoothly with slightly loose chains.

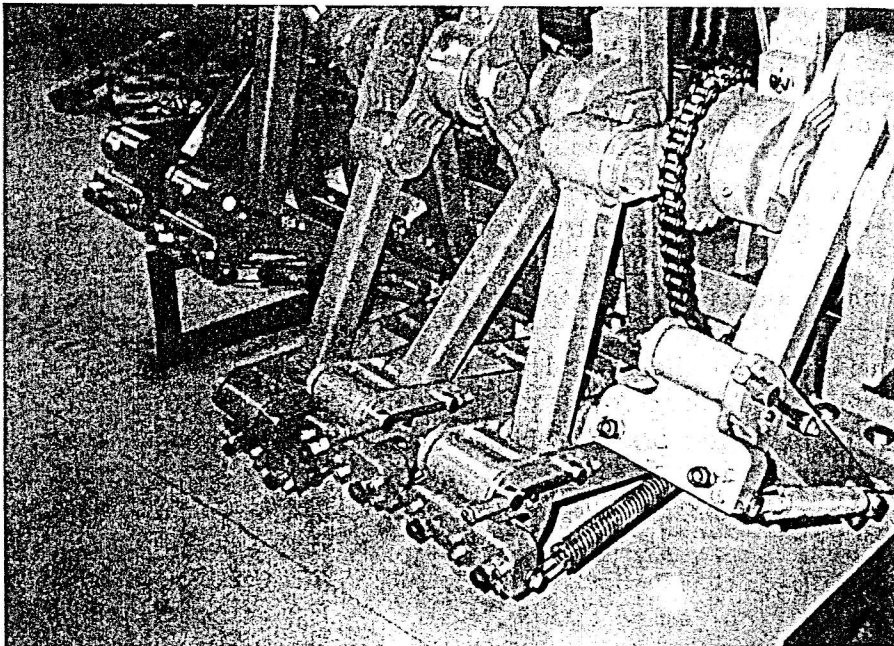


Timing
3 Full down
4+5 even

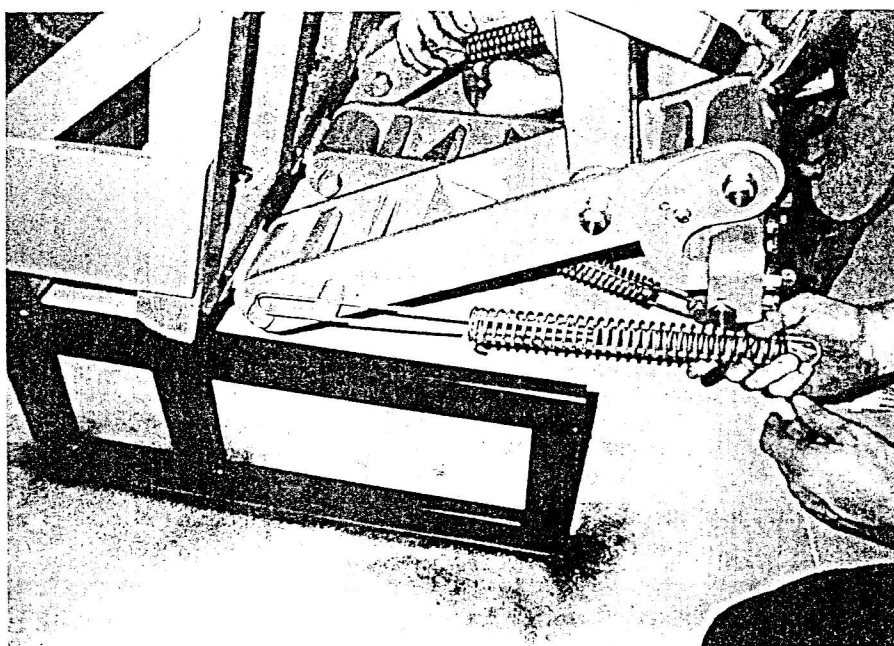
5. Check the PTO for signs of wear regularly.
6. Grease the machine, including PTO and crankshaft drive chains at 40 hour intervals and after any extended storage period.
7. Check the gearbox oil level at 40 hour intervals and top off if necessary with EP90 oil.
8. Drain the roller after use if it has been filled with water.

85W140
Fill to lower plug.

9. Each tine head is equipped with an anti-flip device. This is the long bolt and spacer on the right hand side of the tine head (see below). It is designed to prevent the tine head from swinging up too far during operation. Ensure the anti-flip mechanisms are in place and undamaged on each tine head.



10. Check springs for crossing of the wires or broken wires. (This will cause an erratic hole pattern in the turf.)



XII. PARTS LISTS AND IDENTIFICATION DRAWINGS

A. Tines

SOLID TINES

Part Number	Size (diameter x length)	Quantity Required for Model 60	Quantity Required for Model 80
S08313 *	5/16" x 8" (adapter required)	18	24
S10500	1/2" x 10" <i>5/8" dia</i>	18	24
S12500 ✕	1/2" x 12"	18	24
S14500 ✕	1/2" x 14"	18	24
S10750	3/4" x 10"	12	16
S12750 ✕	3/4" x 12"	12	16
S14750 ✕	3/4" x 14" ✕	12	16
S12875	7/8" x 12"	12	16
S14100	1" x 14"	12	16
508313 *	Adapter for 5/16" x 8" tine	18	24

CORING TINES COMPLETE (TUBES AND SHANKS)

Part Number	Size (tube dia. x lg. - shank dia.)	Quantity Required for Model 60	Quantity Required for Model 80
C07625	5/8" x 7" - 1/2" shank	18	24
C07750	3/4" x 7" - 1/2" shank	18	24
C10755	3/4" x 10" - 1/2" shank	18	24
C10750	3/4" x 10" - 3/4" shank	12	16
C10100	1" x 10" - 3/4" shank	12	16
C12100	1" x 12" - 3/4" shank	12	16
C08125	1 1/4" x 8" - 3/4" shank	12	16
C12125	1 1/4" x 12" - 3/4" shank	12	16

REPLACEMENT CORING TUBES

Part Number	Size (dia. x length)
T07625	5/8" x 7"
T07750	3/4" x 7"
T10750	3/4" x 10"
T10100	1" x 10"
T12100	1" x 12"
T08125	1 1/4" x 8"
T12125	1 1/4" x 12"

REPLACEMENT SHANKS

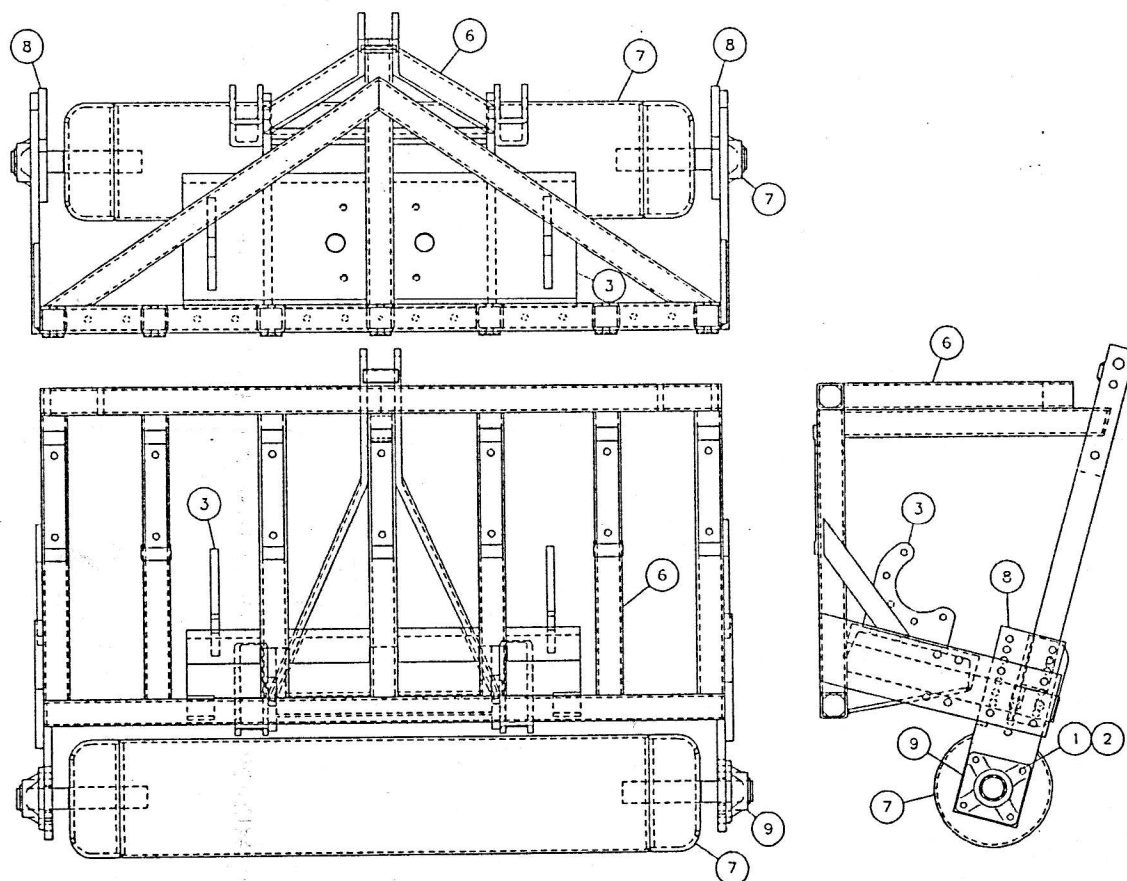
Part Number	Size (shank dia. - tube dia.)
K50625	1/2" shank - 5/8" tube
K50750	1/2" shank - 3/4" tube
K75750	3/4" shank - 3/4" tube
K75100	3/4" shank - 1" tube
K75125	3/4" shank - 1 1/4" tube

B. Frame and Roller Assembly

FRAME AND ROLLER PARTS LIST (SR-60 ONLY)

Item	Part No.	SR-60 Qty.	Description
1	562562	8	9/16" NC x 2.5" Saddle Bolt (for Roller Bearing)
2	572562	8	9/16" NC Locking Nut (for Roller Bearing)
3	591000	(1)	Transmission Mounting Plate (welded to frame)
4	600250	1	1/4" Pipe Plug
5	600750	1	3/4" Pipe Plug
6	606000	1	60" Frame
7	620060	1	60" Roller
8	625070	2	Roller Adjustment Plate
9	631937	2	Bearing, 1 15/16" 4-bolt (for Roller)
10	656060	1	Scraper, 60"
11	660625	8	5/8" NF Locking Nut (for Roller Adjustment Bar)
12	672371	12	3/8" NC x 1" Bolt, Grade 5
13	676225	8	5/8" NF x 2" Bolt (for Roller Adjustment Bar)
14	690375	12	3/8" Lockwasher

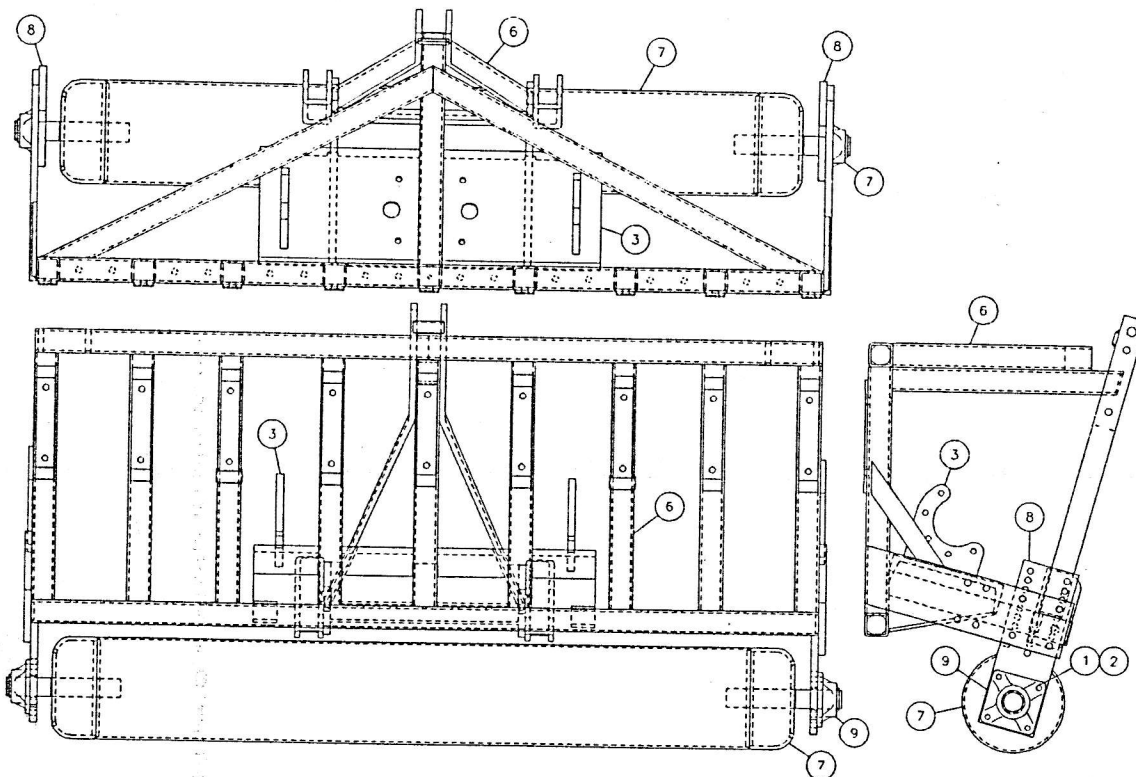
SR-60 FRAME & ROLLER ASSEMBLY



FRAME AND ROLLER PARTS LIST (SR-80 ONLY)

Item	Part No.	SR-80 Qty.	Description
1	562562	8	9/16" NC x 2.5" Saddle Bolt (for Roller Bearing)
2	572562	8	9/16" NC Locking Nut (for Roller Bearing)
3	591000	(1)	Transmission Mounting Plate (welded to frame)
4	600250	1	1/4" Pipe Plug
5	600750	1	3/4" Pipe Plug
6	608000	1	80" Frame
7	620080	1	80" Roller
8	625070	2	Roller Adjustment Plate
9	631937	2	Bearing, 1 15/16" 4-bolt (for Roller)
10	658080	1	Scraper, 80"
11	660625	8	5/8" NF Locking Nut (for Roller Adjustment Bar)
12	672371	12	3/8" NC x 1" Bolt, Grade 5
13	676225	8	5/8" NF x 2" Bolt (for Roller Adjustment Bar)
14	690375	12	3/8" Lockwasher

SR-80 FRAME & ROLLER ASSEMBLY

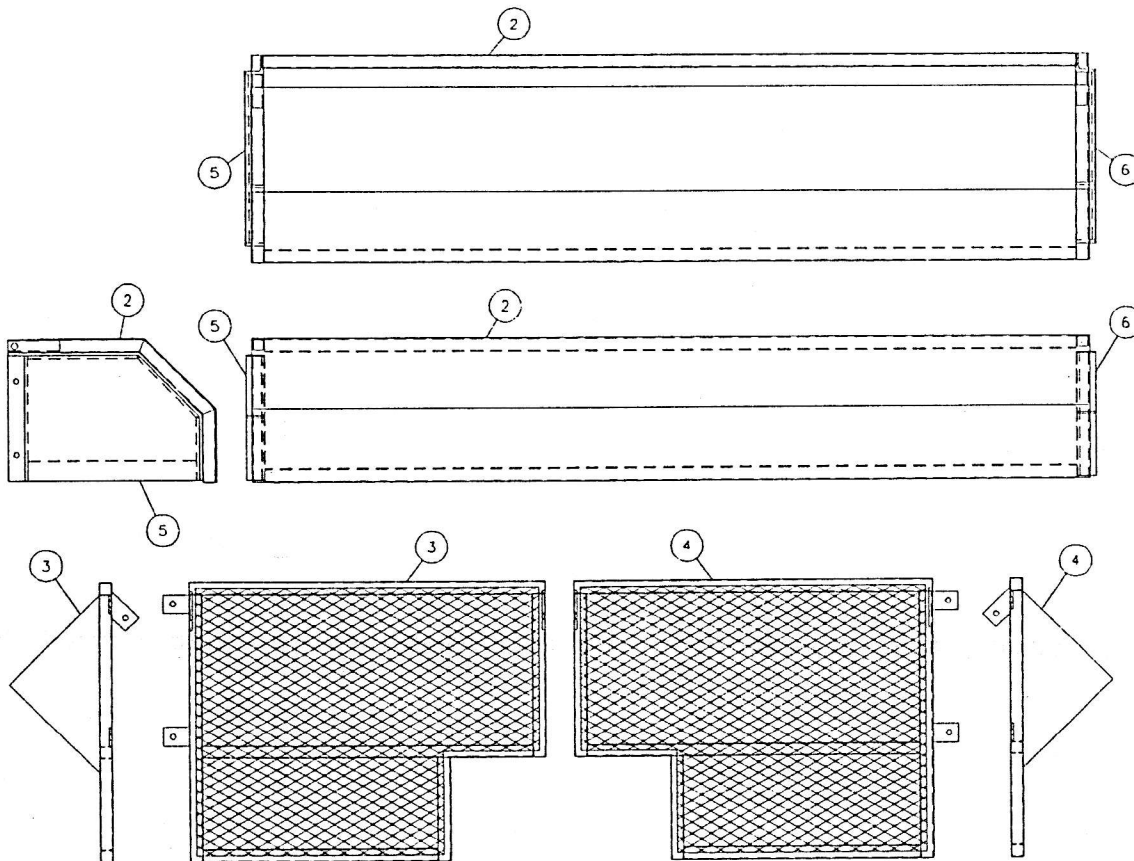


C. Covers

COVERS PARTS LIST (SR-60 ONLY)

Item	Part No.	SR-60 Qty.	Description
1	650006	2	Rear Locking Device
2	651060	1	Back Cover, 60"
3	652460	1	Front Right Cover, 60"
4	652560	1	Front Left Cover, 60"
5	653470	1	End Right Cover
6	653570	1	End Left Cover

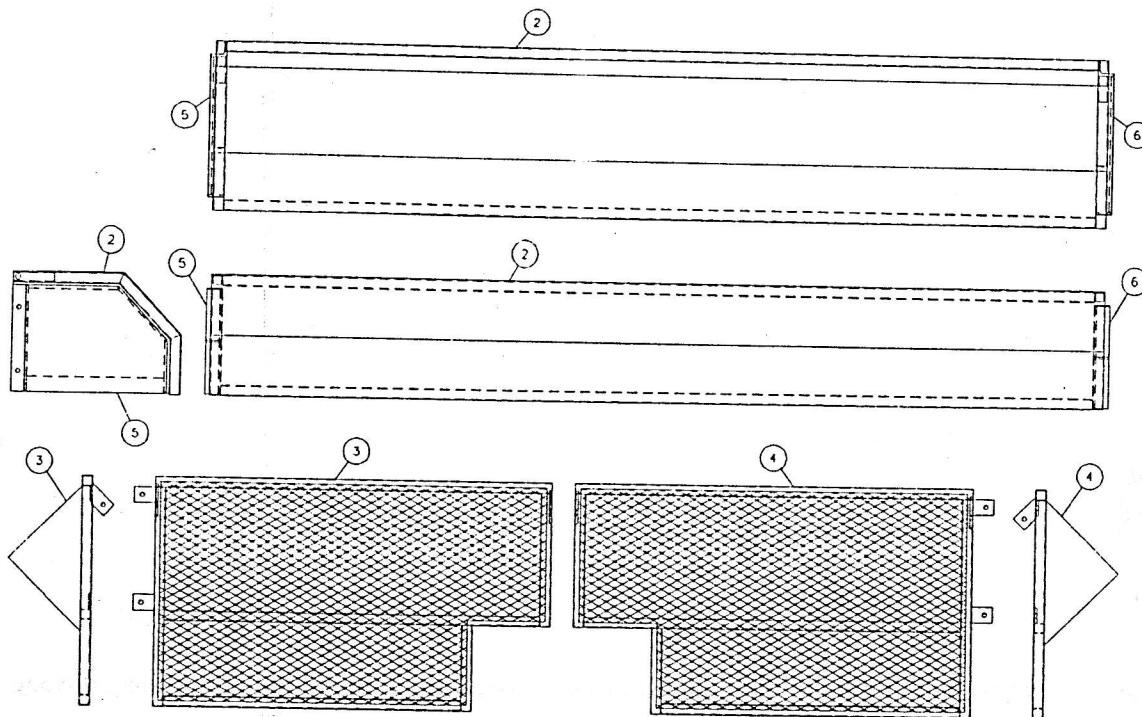
SR-60 COVERS



COVERS PARTS LIST (SR-80 ONLY)

Item	Part No.	SR-80 Qty.	Description
1	650006	2	Rear Locking Device
2	651080	1	Back Cover, 80"
3	652480	1	Front Right Cover, 80"
4	652580	1	Front Left Cover, 80"
5	653470	1	End Right Cover
6	653570	1	End Left Cover

SR-80 COVERS

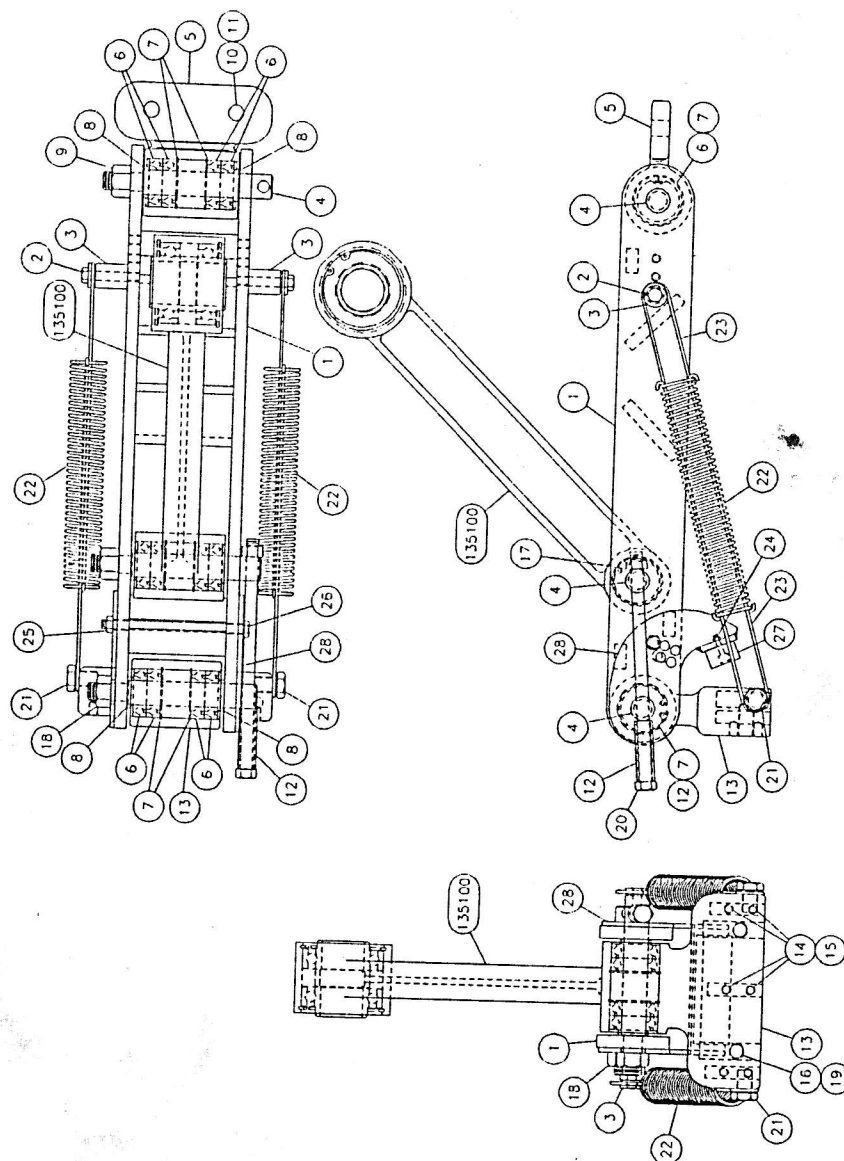


D. Arm, Head and Hinge Assembly

ARM, HEAD AND HINGE ASSEMBLY PARTS LIST

Item	Part No.	SR-60 Qty.	SR-80 Qty.	Description
	140000	6	8	Arm Sub-Assembly (includes items 1-3)
1	400024	6	8	Arm
2	471325	12	16	3/8" NF x 2.5" Spring Spool Bolt, Grade 8
3	484162	12	16	Rear Spring Holder Spool Sleeve
	142000	6	8	Hinge Sub-Assembly (includes items 4-12)
4	410000	6	8	Wrist Pin (+6-8 each in Head Sub-Assy & Connecting Rod Assy)
5	420000	6	8	Hinge, Cast
6	431012	24	32	Bearing, Nominal 1" I.D. x 2" O.D. (+ qty. in Head & Conn. Rod)
7	432200	12	16	Snap Ring, Int., 5000-200 (+quantities in Head & Conn. Rod)
8	441240	12	16	Spacer, .24" Wide (+quantities in Hinge & Conn. Rod)
9	460750	6	8	3/4" NF Nut (for Wrist Pin) (+6-8 in Connecting Rod Assy)
10	471645	12	16	5/8" NF x 4.5" Bolt, Grade 8
11	265625	12	16	5/8" NF Locking Nut
	145100	6	8	Cast Head Sub-Assembly (includes items 4, 7 & 13-23)
4	410000	6	8	Wrist Pin (+6-8 each in Hinge Sub-Assy & Connecting Rod Assy)
6	431012	24	32	Bearing, Nominal 1" I.D. x 2" O.D. (+ qty. in Hinge & Conn. Rod)
7	432200	12	16	Snap Ring, Int., 5000-200 (+quantities in Hinge & Conn. Rod)
8	441240	12	16	Spacer, .24" Wide (+quantities in Hinge & Conn. Rod)
12	422500	6	8	Head Stop Tubing (slips over item 22)
13	450100	6	8	Head, Cast
14	461125	36	48	3/8" NF x 1.25" Bolt, Grade 8 (for Tines)
15	461375	36	48	3/8" NF Nut (for Tines)
16	461625	12	16	5/8" NF Nut (for Tines)
17	462500	6	8	1/2" NC Locking Nut
18	462750	6	8	3/4" NF Turned Wrist Pin Nut
19	471622	12	16	5/8" NF x 2" Bolt, Grade 8 (for Tines)
20	472510	6	8	1/2" NC x 10" Kick Back Bolt, Grade 8
21	483125	12	16	Spring Holder, Front
	148151	12	16	Spring Sub-Assembly (includes items 22-23)
22	481512	12	16	Spring
23	482014	24	32	Spring Wire
	149100	6	8	Head Adjustment Sub-Assembly (includes items 26-30)
24	460250	12	16	1/4" NC Locking Nut
25	462375	6	8	3/8" NC Locking Nut
26	472376	6	8	3/8" NC x 6" Adjustment Bolt, Grade 8
27	491000	6	8	Bumper Pad (including 1/4" studs)
28	492000	6	8	Head Stop Adjustment Lever

ARM, HEAD AND HINGE ASSEMBLY

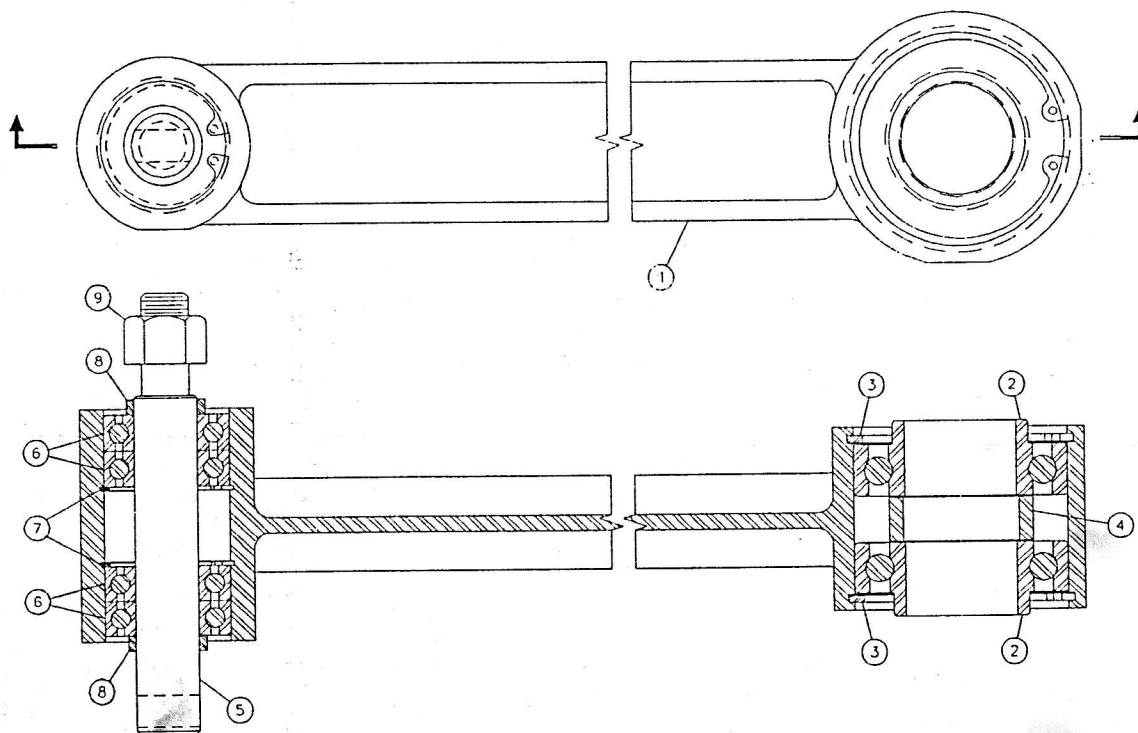


E. Connecting Rod Assembly

CONNECTING ROD ASSEMBLY PARTS LIST

Item	Part No.	SR-60 Qty.	SR-80 Qty.	Description
	135100	6	8	Connecting Rod Assembly (includes items 1-8)
1	303165	6	8	Connecting Rod, Cast, 2" I.D.
2	331112	12	16	Bearing, RA-112
3	332334	12	16	Snap Ring, 5000-334
4	340700	6	8	Spacer, .700" Wide
5	410000	6	8	Wrist Pin (+12-16 in Arm Assembly)
6	431012	24	32	Bearing, Nominal 1" I.D. x 2" O.D. (+48-64 in Arm Assembly)
7	432200	12	16	Snap Ring, 5000-200 (+24-32 in Arm Assembly)
8	441240	12	16	Spacer, .24" Wide
9	460750	6	8	3/4" NF Nut (for Wrist Pin) (+6-8 in Connecting Rod Assy)

CONNECTING ROD ASSEMBLY

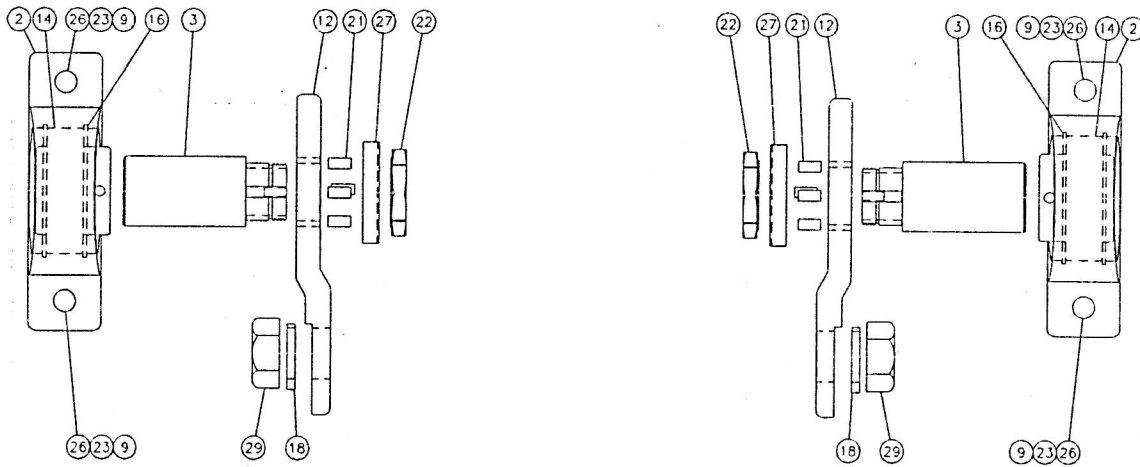
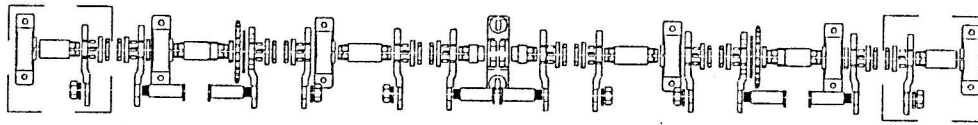


F. Crank Mechanism

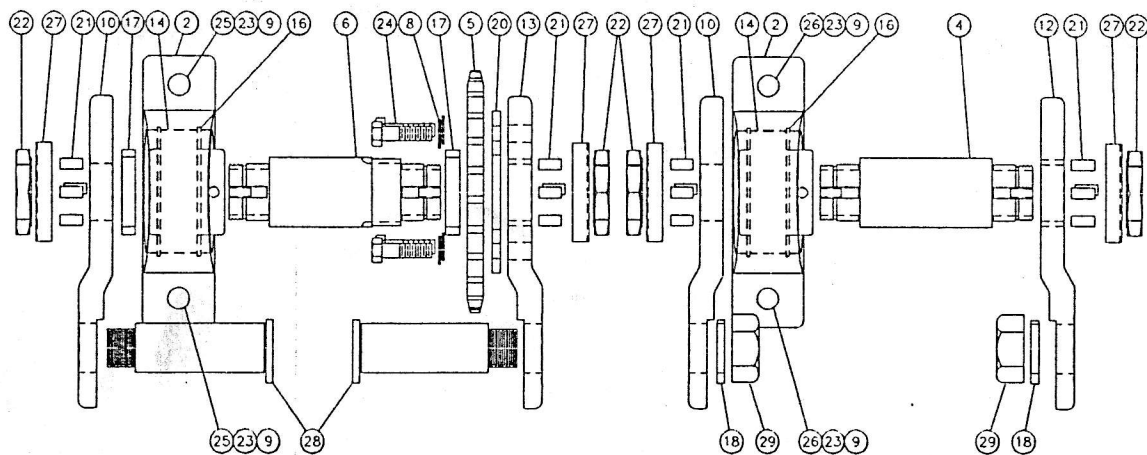
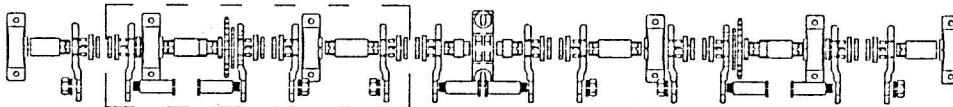
CRANK MECHANISM PARTS LIST

Item	Part No.	SR-60 Qty.	SR-80 Qty.	Description
1	200920	1	1	Center Bearing Housing
2	204571	6	8	Main Bearing Housing
3	211557	2	2	Crank Shaft, Single Shoulder, 5.578" Long
4	212734	2	4	Crank Shaft, Both Ends Threaded, Non-splined
5	213025	2	2	Sprocket, 25 Tooth, 8.5" O.D.
6	213734	2	2	Crank Shaft, Splined
7	214351	2	2	Crank Shaft, Center Bearing, 3.516" Long
8	225500	8	8	1/2" Lockwasher (Sprocket)
9	225625	14	18	5/8" Flat Washer (Bearings)
10	226112	2	0	Crank Arm, Cast, 30 deg. Offset Round Keys, L.H.
11	226312	2	0	Crank Arm, Cast, 30 deg. Offset Round Keys, R.H.
12	227100	6	14	Crank Arm, Cast, Round Keys on Axes
13	227300	2	2	Crank Arm, Cast, Keys on Axes, Tapped Holes
14	231039	6	8	Bearing, Main Shaft, ER 39
15	231621	2	2	Bearing, Center Shaft, 6210
16	232433	12	16	Snap Ring, HO-433
17	241495	4	4	Spacer, Sprocket, .495"
18	241753	6	8	Spacer, Clipped Washer, Crank
19	242875	1	1	Bushing, Center Bearing Housing
20	243300	2	2	Spacer Plate, Sprocket, .30" Thick
21	250375	48	64	Dowel Pin/Key, Crank Arm
22	261535	12	16	Crank Shaft Nut
23	265625	14	18	5/8" Nylon Lock Nut (Bearings)
24	271517	8	8	1/2" NF x 1.75" Hex Bolt, Grade 8 (Sprocket)
25	271655	6	6	5/8" NF x 5.5" Hex Bolt, Grade 8 (Center, Sprocket Bearings)
26	278625	8	12	5/8" NF x 5" Hex Bolt, Grade 8 (Main Bearing)
27	281240	12	16	Locking Plate, Crank, 4" Wide
28	315750	6	8	Crank Pin, Connecting Rod
29	361375	6	8	Crank Pin Nut, 1 3/8", Connecting Rod

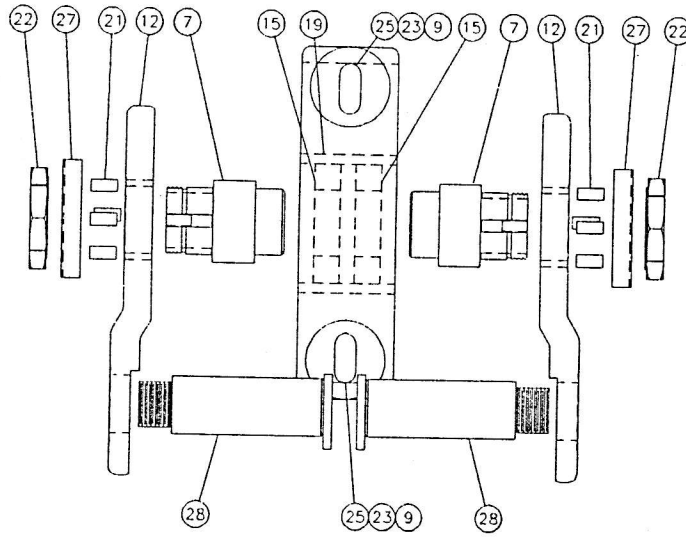
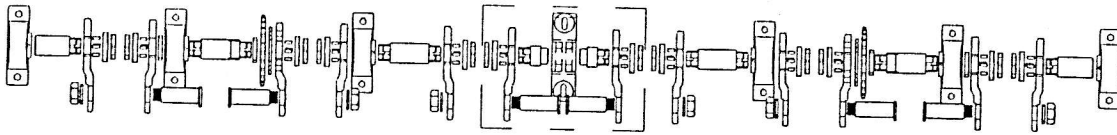
SR-60 CRANK MECHANISM - END SECTIONS



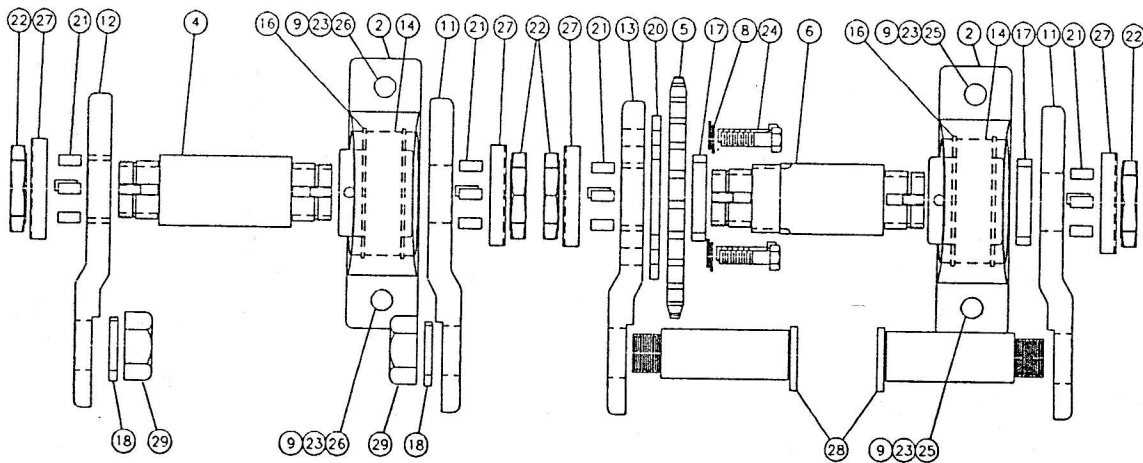
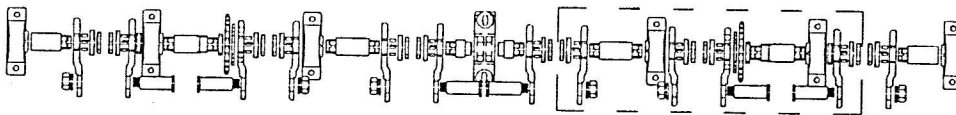
SR-60 CRANK MECHANISM - LEFT CENTER



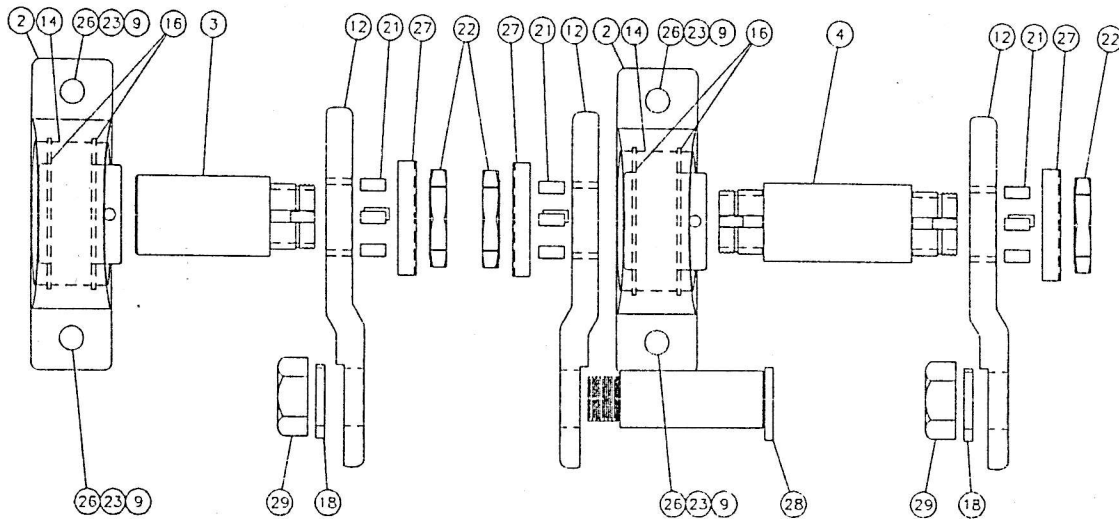
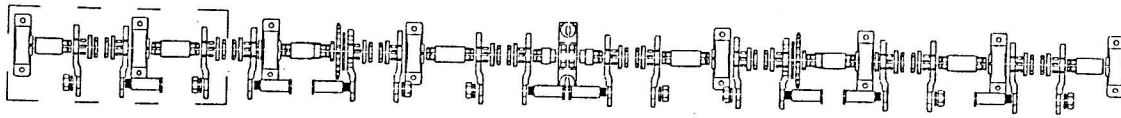
SR-60 CRANK MECHANISM - CENTER



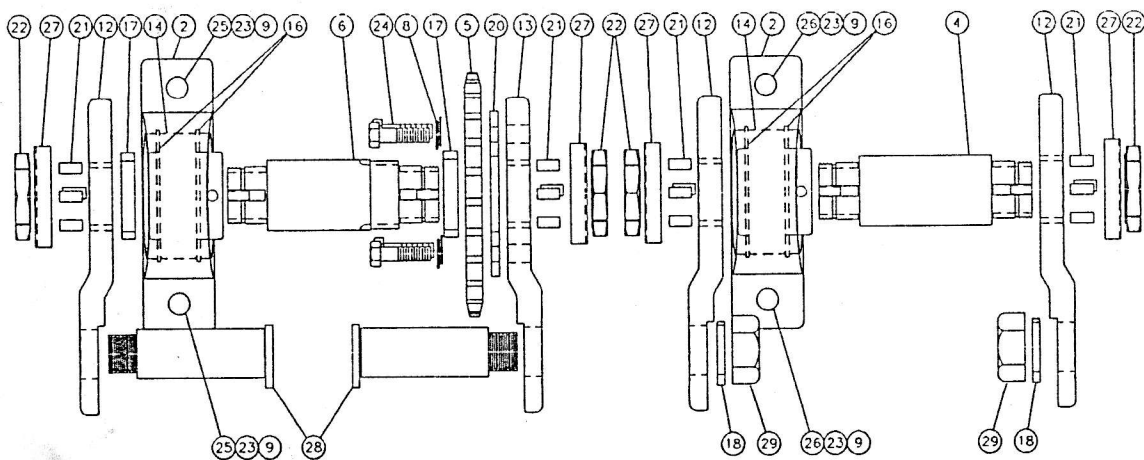
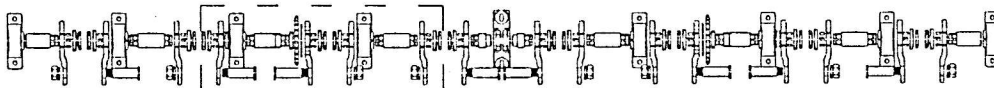
SR-60 CRANK MECHANISM - RIGHT CENTER



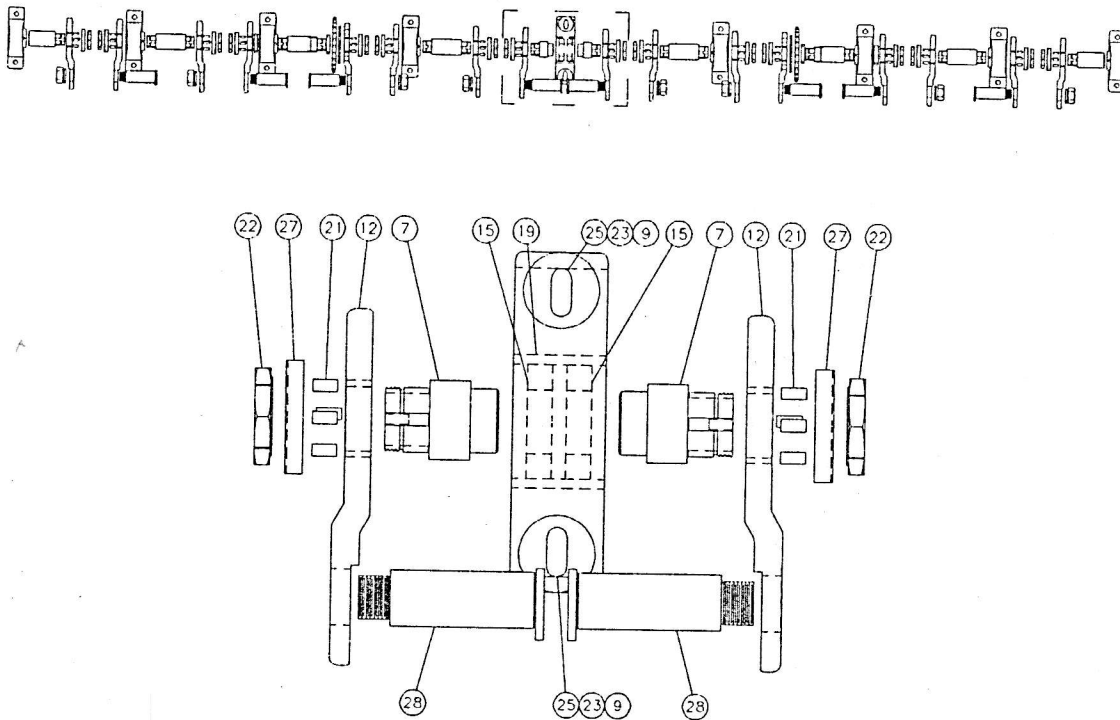
SR-80 CRANK MECHANISM - LEFT END



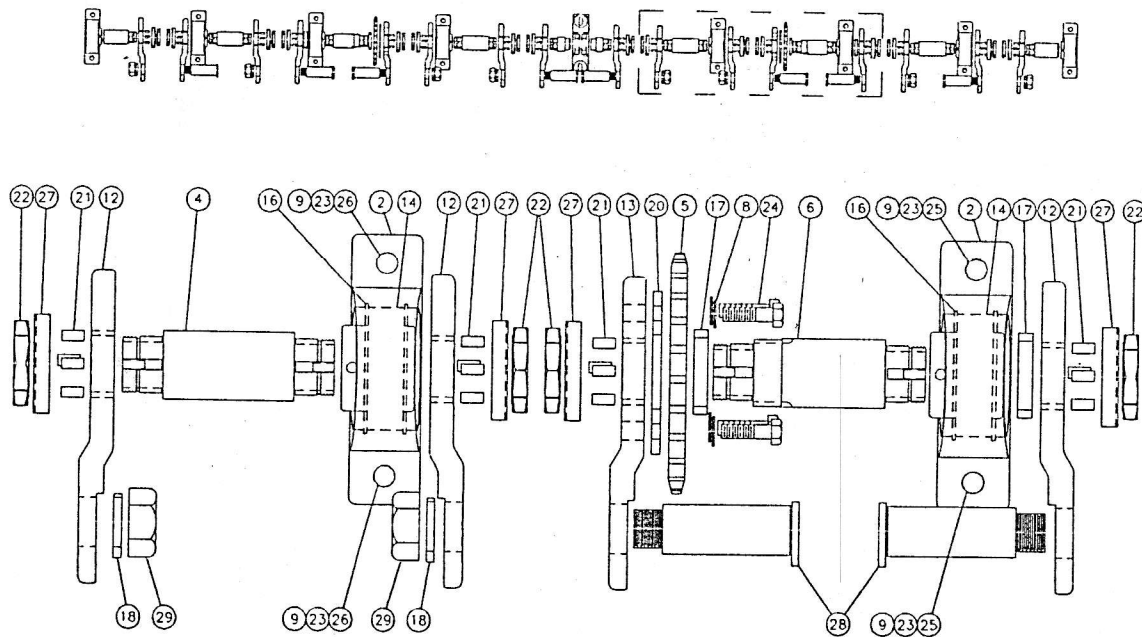
SR-80 CRANK MECHANISM - LEFT CENTER



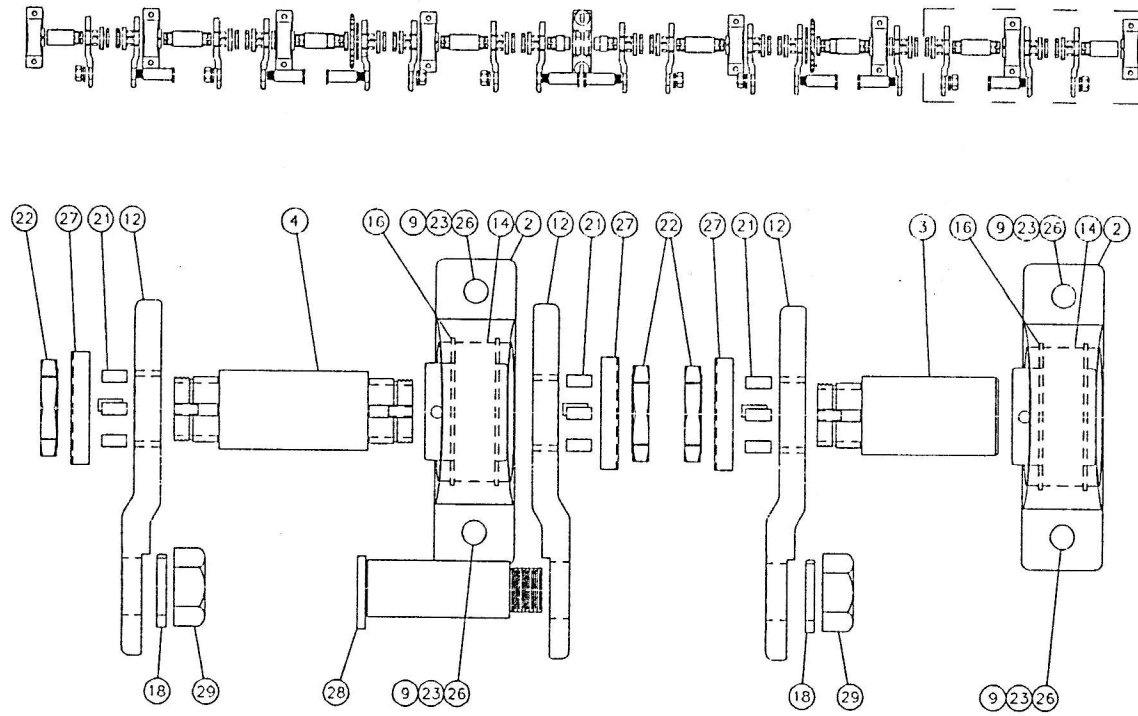
SR-80 CRANK MECHANISM - CENTER



SR-80 CRANK MECHANISM - RIGHT CENTER



SR-80 CRANK MECHANISM - RIGHT END



G. Drive Assembly

DRIVE ASSEMBLY PARTS LIST

Item	Part No.	SR-60 Qty.	SR-80 Qty.	Description
	151280	2	2	Idler Sprocket Assembly (includes items 1-4)
1	511280	2	2	Idler Sprocket
2	541000	2	2	Chain Adjustment Plate
3	561745	2	2	3/4" x 4/5" All-Thread Stud
4	571750	8	8	3/4" Locking Nut
5	500100	1	1	Gear Box
6	510020	2	2	Sprocket, 20 Tooth
6	519922	2	2	Sprocket, 22 Tooth
6	510024	2	2	Sprocket, 24 Tooth
6	510026	2	2	Sprocket, 26 Tooth
7	550175	2	2	Hub, 1.75"
8	561645	4	4	16mm x 45mm Bolt (for Gear Box)
9	562562	10	10	9/16" NC x 2.5" Saddle Bolt (for Roller Bearing)
10	572562	10	10	9/16" NC Locking Nut
11	580016	4	4	16mm Lockwasher (for Gear Box)
12	580080	10	10	Chain, #80 Roller
13	580562	10	10	9/16" Lockwasher
14	581080	2	2	Master Link, #80
15	582080	2	2	Offset Link, #80
16	169008	1	1	Top Link Assembly, 8"
16	169010	1	1	Top Link Assembly, 10"

DRIVE ASSEMBLY

