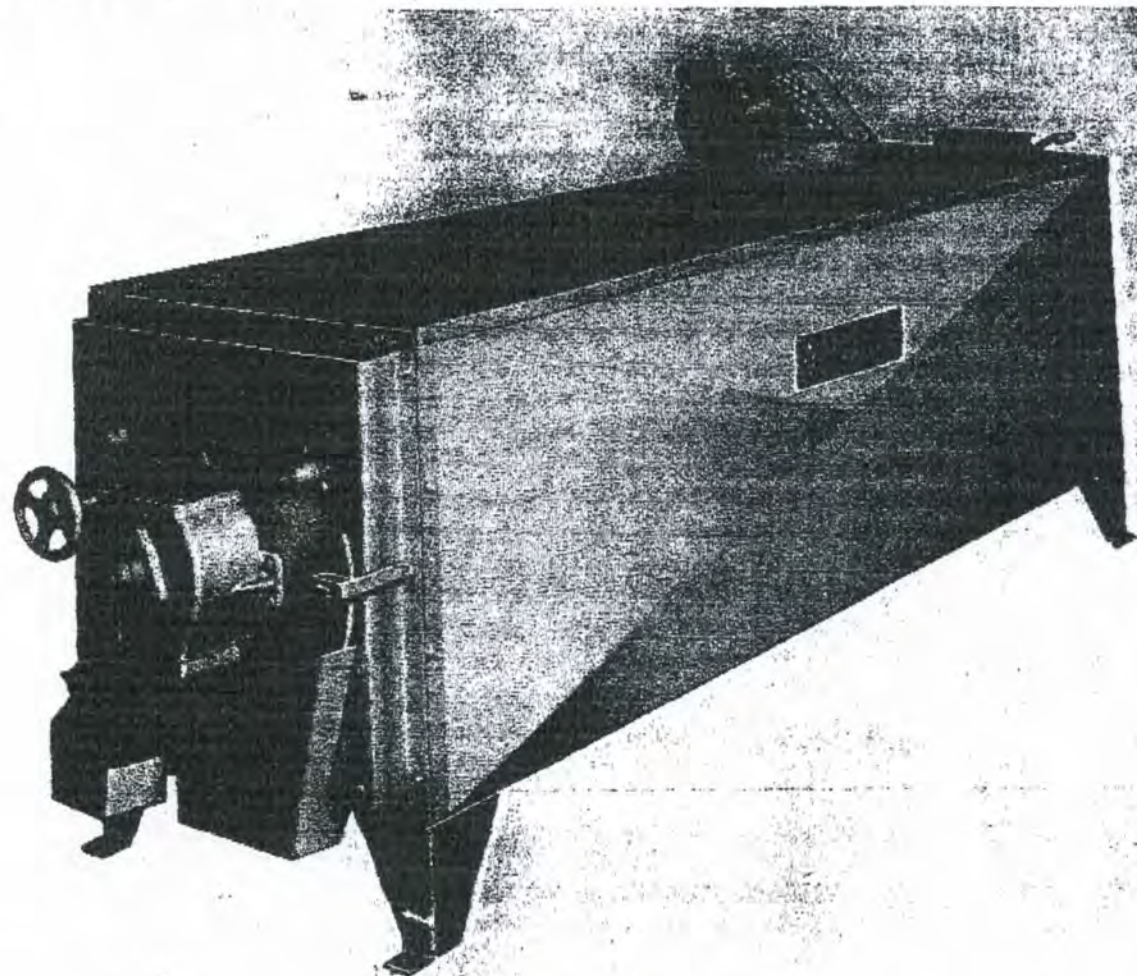


OPERATION AND REPAIR PARTS MANUAL



MODEL S-1 Self Flow Length Grader

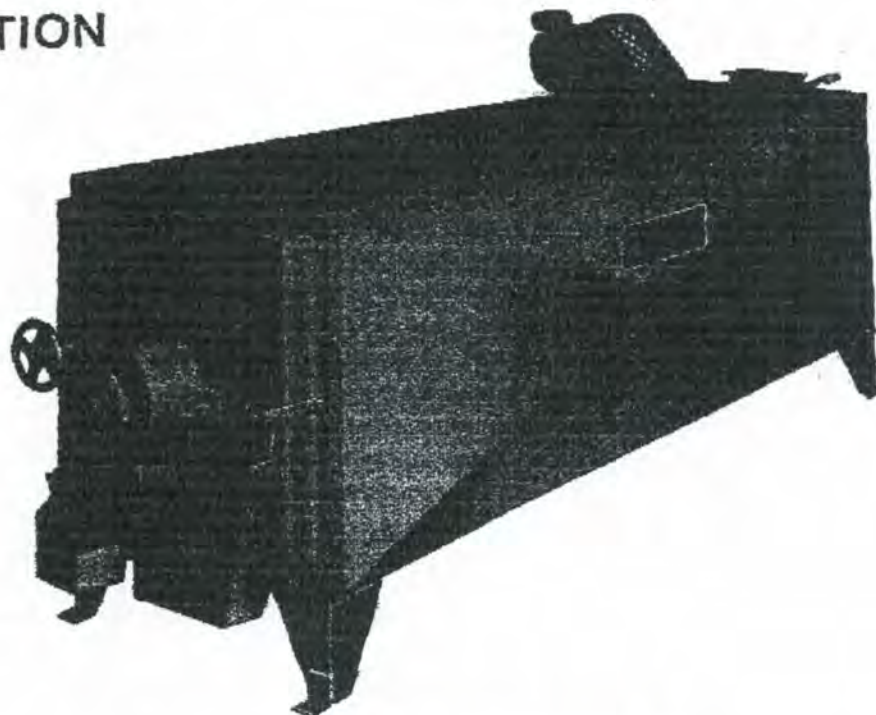
IDEAL GRAIN AND SEED CLEANER COMPANY
85 Second Avenue S.E. — New Brighton, Mn. 55112



MANUFACTURING AND REPAIRING OF GRAIN CLEANING MACHINES

S-1/1076

INTRODUCTION



The Model S-1 Self Flow Length Grader is a basic, one cylinder machine which is designed to clean grain and seed and make separations by length only. The exclusive tapered indent cylinder allows product to flow through the machine for continuous running. A variety of indent cylinder sizes combined with control flexibility and the capability of combining two or more S-1 machines in various height and width combinations allows the processing of many types of product and capacities.

Consult your sales literature or contact your local sales representative to help you with any cleaning, grading or separating problems. Our Seed Laboratory offers a sample testing service at no obligation or price to you. Send grain and seed samples or written inquiries to:

IDEAL GRAIN AND SEED CLEANER COMPANY
 85 Second Avenue S.E., New Brighton, MN. 55112
 Or call 636-7323, Area Code 612.

USE OF MANUAL

This manual has been prepared especially for use in familiarizing owners and operators with the operation and maintenance of the IDEAL SELF FLOW LENGTH GRADER, Model S-1. In some instances, the information contained in this manual has been generalized since certain specific information can be determined only by actual experience. For thorough understanding, optimum operation and proper maintenance of the IDEAL S-1, please give all the information in this manual your careful consideration.

The right hand and left hand sides of the machine are determined by viewing the machine from the discharge (front) end. As a further aid to orientation, drawings in this manual are designated by direction arrows or captions as to their position.

MECHANICAL SPECIFICATIONS

Overall Height (with motor)	42"
Overall Height (without motor)	35-1/4"
Overall Length	107"
Overall Width (with motor)	36"
Overall Width (without motor)	27"
Length on Floor (base)	92-3/4"
Width on Floor (base)	27"
Width of Inlet Hopper Opening	3-1/4"
Length of Inlet Hopper Opening	7-1/2"
Length of Complete Cylinder	87-5/8"
Power Required	3/4 H.P.
Shipping Weight	Approx. 800 lbs.

INSTRUCTIONS FOR CHANGING CYLINDERS

SINGLE AND MODULAR LENGTH GRADERS

QUICK CHANGE UNITS

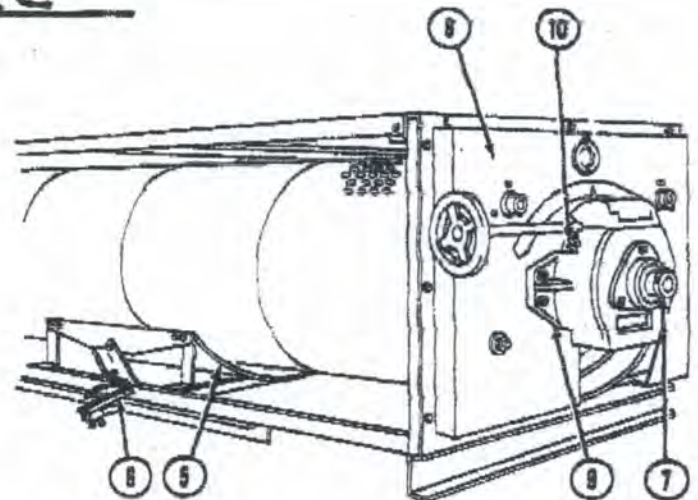
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CYLINDER REMOVAL

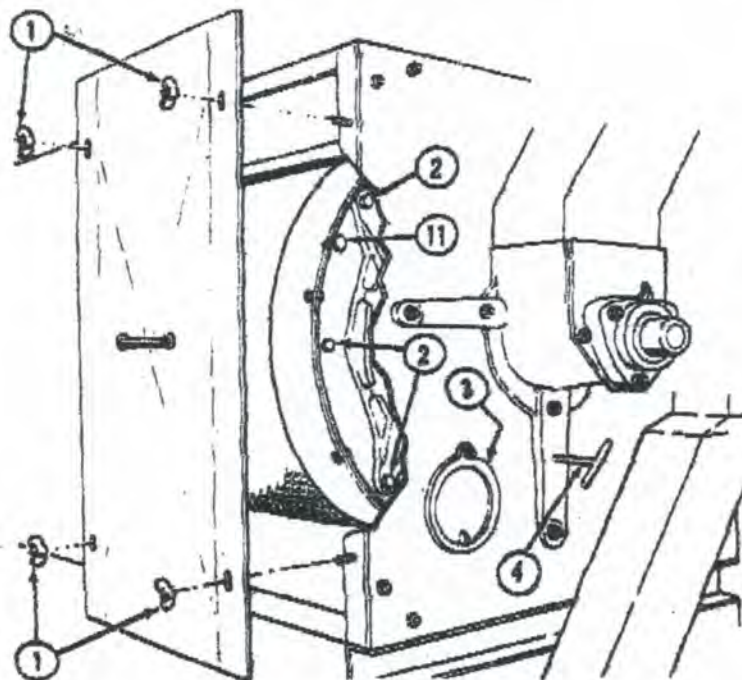
IMPORTANT

Always disconnect power to the machine before attempting any service procedure to prevent accidental start-up and personal injury.

1. Unscrew four wing nuts (1) and remove rear side panel.
2. Hand rotate cylinder and remove eight bolts (2) that hold end plate to cylinder mounting flange of cylinder at the intake end of machine. *Note* - Bolts may be removed through access cover (3) if desired.
3. Screw support screw (4) in until hand tight against sprocket.
4. Raise cradle (5) into support position under cylinder by depressing and pushing inward foot pedal (6) until it is locked in place. If cradle does not support cylinder properly, adjust height of adjustment screw on pedal.
5. Remove discharge spouting (not shown in photo).
6. Remove set collars (7) from drive shaft and conveyor shaft on the discharge end of machine.
7. Detach discharge head (8) from end plate by removing four hex head bolts.



8. Detach trough adjustment rack (10) from trough assembly by removing five screws.
9. Remove twelve hex head bolts that hold end plate (8) onto frame and lift off end plate.
10. Cylinder can now be removed from machine by sliding and lifting it out of the discharge end.



INSTALLATION

Installing cylinders is essentially the reverse of removal procedures listed above. However, when cylinder is slid into machine over cradle assembly (5), cylinder must be rotated until the two alignment holes in the cylinder mounting flange line up with alignment pins (11) which are welded to cylinder end plate. Sight through discharge end of cylinder to align pins to holes.

CAUTION

After all parts are installed and nuts and bolts are tightened, **RELEASE CRADLE ASSEMBLY (5)** and **CHECK SUPPORT SCREW (4)** to see that it is screwed out far enough to allow cylinder to rotate freely.

INSTALLATION

Machine should be set on a level foundation which is free from as much floor vibration as possible. Adequate clearance around machine should be provided to allow access for service and maintenance. Ideally, one end of the machine should have enough clearance to allow cylinder replacement.

A suitable connection must be provided at the feed hopper to connect to the 3-1/4" x 7-1/2" opening. The machine operates most efficiently if the product is choked to assure a constant infeed volume and flow.

If a motor is supplied with your machine, refer to the packing list or motor name plate to identify power requirements.

Electrical installation should be made by a qualified electrician, strictly following or exceeding local safety codes. A lockable power switch is recommended to prevent accidental start-up during maintenance.

CAUTION

Check rotation of motor pulley after making electrical connections. Viewing motor from pulley end, motor should rotate clockwise. If not, reverse the electrical connections to the motor.

The S-1 machine has been completely pre-lubricated before being shipped from the factory. See Maintenance Section for operational lubrication.

OPERATION

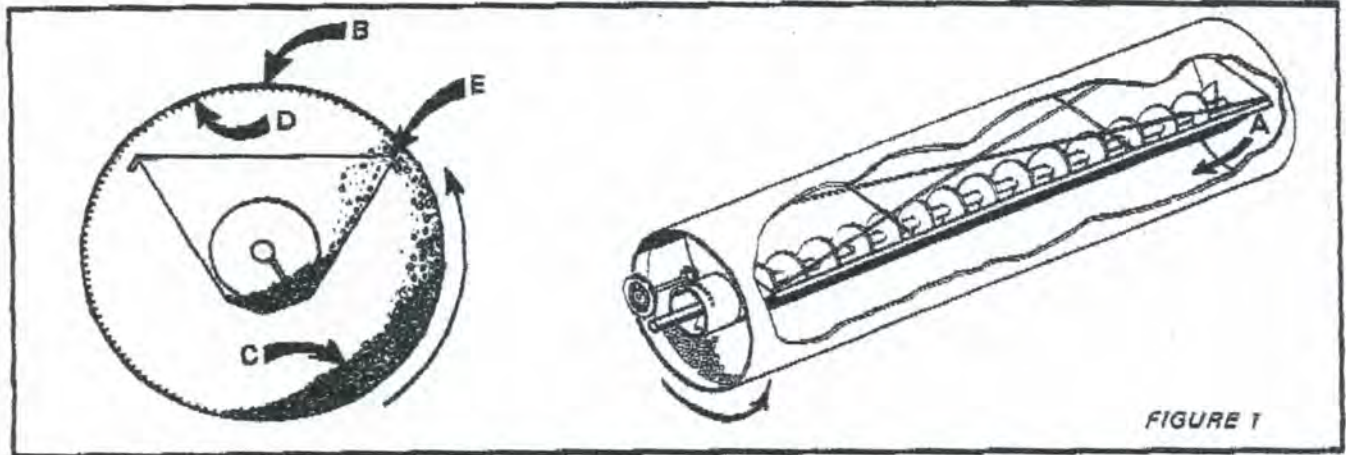


FIGURE 1

SEQUENCE OF OPERATION

Product is choke-fed into feed hopper and is discharged into the rear of the cylinder at (A, Figure 1). The counterclockwise rotating action and the tapered construction of cylinder (B) cause the movement of product along the inside bottom of cylinder toward the front (discharge) end.

The retarder (6, Figure 2) dams up product at the discharge end of the cylinder until a wall is built up of product (C) for the entire length of the cylinder.

Thousands of indent pockets (D) in the rotating cylinder pick up the smaller particles such as grain or seeds and are carried over the separating edge (E). Gravity forces the small particles to fall into the trough where a rotating auger moves them to the discharge opening.

Larger particles such as weeds and longer seeds which cannot be lifted are built up at the retarder where they flow over the retarder and are discharged.

The location of the separating edge, the indent size, the speed of the cylinder and the height of the retarder are all factors in determining maximum separating or cleaning performance.

OPERATING CONTROLS

TROUGH CONTROL — Handwheel (1, Figure 2) is moved clockwise to lower the separating edge of the trough and counterclockwise to raise the edge. Position of trough is locked with Lockscrew (2, Figure 2). As a further aid to the location of the separating edge, pointer (3, Figure 2) is aligned with the edge and increments on decal can be used to record changes in settings.

INSPECTION PORT — Inspection Cover (4, Figure 2) can be pivoted to observe the position of the trough and separating action during operation.

RETARDER CONTROL — Retarder control rod (5, Figure 2) adjusts the position of the retarder (6, Figure 2) and is locked into position with wing nut and eye bolt (7, Figure 2). An increasing amount of product is held in the cylinder as the retarder is raised. When retarder is fully lowered, it is in the cleanout position and allows product to flow freely out of the cylinder.

FEED HOPPER SHUT-OFF SLIDE — Product flow may be shut off and regulated by the shut-off slide (19, Figure 6), located at the rear of the machine. A thumbscrew has been provided to lock the slide in various positions.

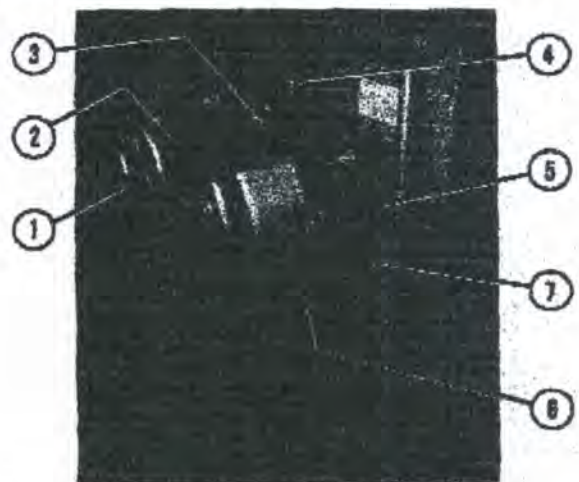


FIGURE 2 — Operating Controls

RECOMMENDED CYLINDER ROTATION SPEED

The following chart lists various types of indent cylinders and the range of speeds which are best suited for separation or cleaning. Further adjustment is made with control settings.

CYLINDER INDENT SIZE	CYLINDER R.P.M.
#8 to #23	45 to 52
#26	42 to 46
#28 to #30	40 to 45

To increase the speed of the cylinder, lower the motor base by adjusting turnbuckle (21, Figure 4), thus increasing the pitch diameter of motor sheave (25, Figure 4). Decreasing the speed is accomplished by raising the motor base with the adjustable turnbuckle which decreases the pitch diameter of the motor sheave. When an adjustable sheave is used, stop machine and adjust motor sheave for correct cylinder speed.

INITIAL START-UP

1. Loosen lockscrew on handwheel shaft and turn handwheel until top of trough is in a horizontal position. Check position through inspection port and note pointer setting. Setting should be about 3-1/2 or 4. Secure with lockscrew.
2. Loosen wing nut on retarder control handle and raise handle until approximately 3" of discharge opening are left. Lock retarder position with wing nut.
3. Check to see that shut-off slide is fully into feed hopper.
4. Supply an adequate volume of product to the feed hopper to allow continuous choke-feeding.
5. Start machine and when cylinder is rotating at recommended speed, open shut-off slide to desired position and lock with thumbscrew.
6. Allow machine to run a few minutes until product is distributed along the bottom of the cylinder and against retarder.

WARNING

MACHINE MUST NOT BE STOPPED UNTIL EMPTY OF PRODUCT BECAUSE START-UP UNDER FULL LOAD COULD DAMAGE DRIVE PARTS.

MAINTENANCE

To assure continued satisfactory operation of the S-1 Machine, it will be necessary to perform the periodic maintenance described in this section. The recommended service intervals are based on 40 hours a week of machine running time. If running time is more than 40 hours a week, maintenance should be scheduled accordingly.

WARNING

Do not perform any maintenance on the machine while it is running. Always be sure power switch is turned off and, if possible, locked in an off position.

OPERATIONAL CHECKS

The preceding starting sequence describes the general start-up procedure applicable to all grain products used in the S-1 Machine. The actual control settings can be determined by experience only and it is recommended that the operator maintain a record of control settings for various products as an aid for future operations.

When the machine is shipped from the factory, all separating cylinders are coated with a rust inhibitor. After the machine has been in operation for four or five hours, the inner surfaces of the cylinder will become smoothly polished which changes the operating characteristics. Therefore, it will probably be necessary to readjust control settings to obtain maximum results.

CONTROL ADJUSTMENTS

After machine has been running with product for a few minutes, sample small grain by inserting a small hand scoop into opening of discharge head and large grain which is discharging over the retarder.

If too much large grain is being lifted into trough, move pointer to a higher number thereby raising the leading or separating edge of the trough. If the output of small grain is too small, lower separating edge of the trough by using a smaller setting. Ideally, the height of separation edge should be set so that small grain is lifted just over the edge before dropping into the trough. Secure trough with lockscrew.

When short material is present in long material being discharged over the retarder it is necessary to raise the retarder slightly. When long material is being carried into the trough, the retarder could be set too high and should be lowered slightly.

NOTE: When changing control settings, wait a few minutes to observe effects of control changes.

The S-1 Machine may be used for grading or cleaning. For a grading operation, clean or aspirated grain which is supplied to the feed hopper is separated more efficiently.

STOPPING AND CLEANOUT

1. Shut off product supply at inlet hopper by moving shut-off slide to the fully in position.
2. Move trough to the dump position (pointer in "D" position on calibration decal).
3. Push retarder control handle down to allow maximum retarder opening.
4. Run machine a few minutes until machine empties and then shut off power to the drive motor.
5. Clean out by hand any foreign material that might be held or imbedded in the retarder. This material might cause undue wear to the cylinder or retarder.

SCHEDULED MAINTENANCE

Grain and dust accumulations should be cleaned from the area daily or at the end of each shift. Excessive accumulations of dirt, especially on shafts, bearings and controls can lead to operational difficulties.

Foreign material such as pieces of metal, glass, etc., which have accumulated behind the retarder should be removed daily or at the end of each shift. See Step 5, Stopping and Cleanout.

After the first week of operation, check setscrews on all bearings, sprockets and pulleys for tightness. Inspect the entire machine for loose bolts or nuts and tighten if necessary. Recheck tightness occasionally.

IDEAL S-1

INSTRUCTIONS ON REPLACING CYLINDER

1. Remove left side and top covers (left and right determined facing discharge end of machine).
2. Remove chain between drive shaft sprocket and cylinder ring sprocket.
3. Remove bearing on intake end of conveyor.
4. Remove bearing on drive shaft on discharge end of machine.
5. Remove sprocket on trough setting shaft.
6. Place support under cylinder on intake end - 2x4 or similar object.
7. Remove discharge casting from end plate on discharge end of machine.
8. Remove trough setting segment from trough neck.
9. Remove discharge end plate and retarder bracket, cylinder can now be removed from machine.
10. Loosen (3) Set screws on cylinder intake cone casting and remove conveyor and trough.
11. Remove intake cone and ring sprocket from old cylinder and install same on new cylinder.
12. Install conveyor and trough into new cylinder setting shaft to dimension specified on instruction sheet, tighten (3) set screws and lock nuts, cylinder is now ready to put back into machine. (Instruction Sheet - Page 5, Figure 3.)
13. Reassemble machine in reverse order of disassemble.

NOTE: Handle cylinder carefully.

DO NOT DROP OR BUMP!

LUBRICATION

The S-1 Machine has been prelubricated before leaving the factory. For moderate temperature operation, use only a high quality, medium pressure bearing grease for all bearings. For sub-zero temperature operation, use light pressure grease for all bearings.

Sealmaster® bearings should be lubricated according to the manufacturer's recommendations. A general rule would be to lubricate these bearings with 4 to 5 shots of good quality grease from a hand gun at least every 200 hours of running time and more often when machine is running in extremely dirty conditions or high temperature.

Bronze bearing should be lubricated with bearing grease every 40 hours of running time.

Lubricate roller chain with a good grade commercial chain lubricant or with SAE 10W oil. Brush a liberal amount on the chain to assure adequate lubrication of all internal chain pivot points. Chain may be lubricated without removing the machine side cover by pivoting cover (17, Figure 4) and working through access hole.

Friction Rollers (29, Figure 5) which have needle type bearings should be greased every 40 hours of running time.

Apply light oil to all control pivot points periodically.

SERVICE

Your local Ideal distributor is trained to service this machine and assist you with any service, operation or adjustment problems that you may have.

CYLINDER REPLACEMENT, SHAFT ADJUSTMENT

When replacing the indent cylinder, enough clearance must be provided to remove cylinder straight out of one end of the machine.

The placement of the shafts in the cylinder is critical. Position the plain end of the shaft exactly $8\frac{1}{16}$ " from ends of cylinder as shown in Figure 3. Tighten all set screws securely.

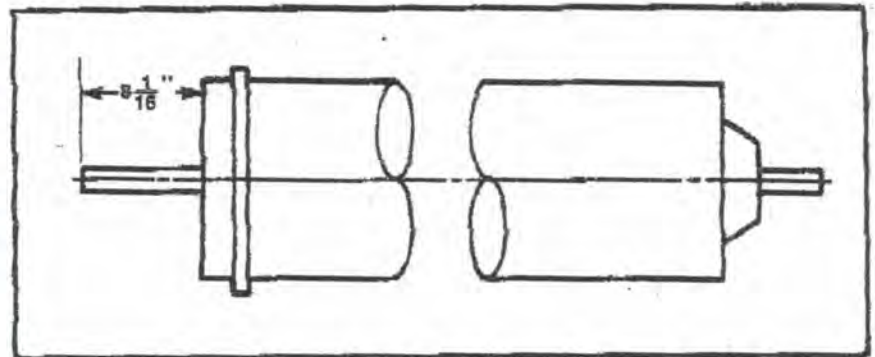


FIGURE 3 - Shaft Location

REPAIR PARTS

The following pages illustrate and list all repair parts for the Ideal S-1 Self Flow Length Grader. Common hardware items such as nuts, bolts, washers, etc., are not listed. It is advisable to obtain these items from your local source.

PARTS ORDERING INFORMATION

1. Order repair parts from your local Ideal distributor or the home office:

Ideal Grain and Seed Cleaner Company
85 Second Ave. S.E., New Brighton, MN. 55112
Phone (612) 636-7323

2. Always specify the model and serial number of the machine when ordering replacement parts. This information is shown on the machine serial plate which is located on the front end plate.

3. Please furnish the part number, description and quantity desired for each part ordered as shown in the following list. Do not show the item number.
4. Specify any special shipping instructions.

CYLINDER ORDERING INFORMATION

When ordering cylinders, please specify INDENT SIZE in addition to part number, description and quantity desired. For ease of installation, it is recommended that a new cylinder be purchased complete with end and ring because these parts are difficult to install correctly in the field. The intake cone assembly or ring sprocket should be ordered separately if required.

PARTS LIST FRAME, COVERS AND DRIVE, See Figure 4

Item	Part No.	Description	Qty.	Item	Part No.	Description	Qty.
1	3W102	GUARD, Main Drive	1	14	453	TOP COVER, Front	1
2	567	SIDE COVER, Right Hand	1	15	-	MOTOR, 3 H.P. (Specify)	1
3	568	ANGLE, Frame Top, R.H.	1	16	3W461	TOP BRACE, Frame	2
4	3W458	LEG WELDMENT, L.H.	2	17	C96	COVER, Inspection	1
5	3W457	END WELDMENT, Frame, Rear	1	18	573	HINGE PIN, Motor Mount	1
6	-	DECAL, Company Identification	2	19	574	HINGE BRACKET, Motor Mount	1
7	570	ANGLE, Frame Bottom, R.H.	1	20	575	ROD, Adjustable, Lower	1
8	3W459	LEG WELDMENT, R.H.	2	21	576	TURNBUCKLE	1
9	3W460	END WELDMENT, Frame, Front	1	22	B90	BELT	1
10	A350	FRAME ASSEMBLY (Includes Items 3, 4, 5, 7, 8, 9, 11, 13 & 16)	1	23	452	TOP COVER, Rear	1
11	571	ANGLE, Frame Bottom L.H.	1	24	586	BRACKET, Guard	1
12	572	SIDE COVER, Left Hand	1	25	-	SHEAVE, Motor (Specify)	1
13	569	ANGLE, Frame Top, L.H.	1	26	577	ROD, Adjustable, Upper	1
				27	578	MOTOR MOUNT	1

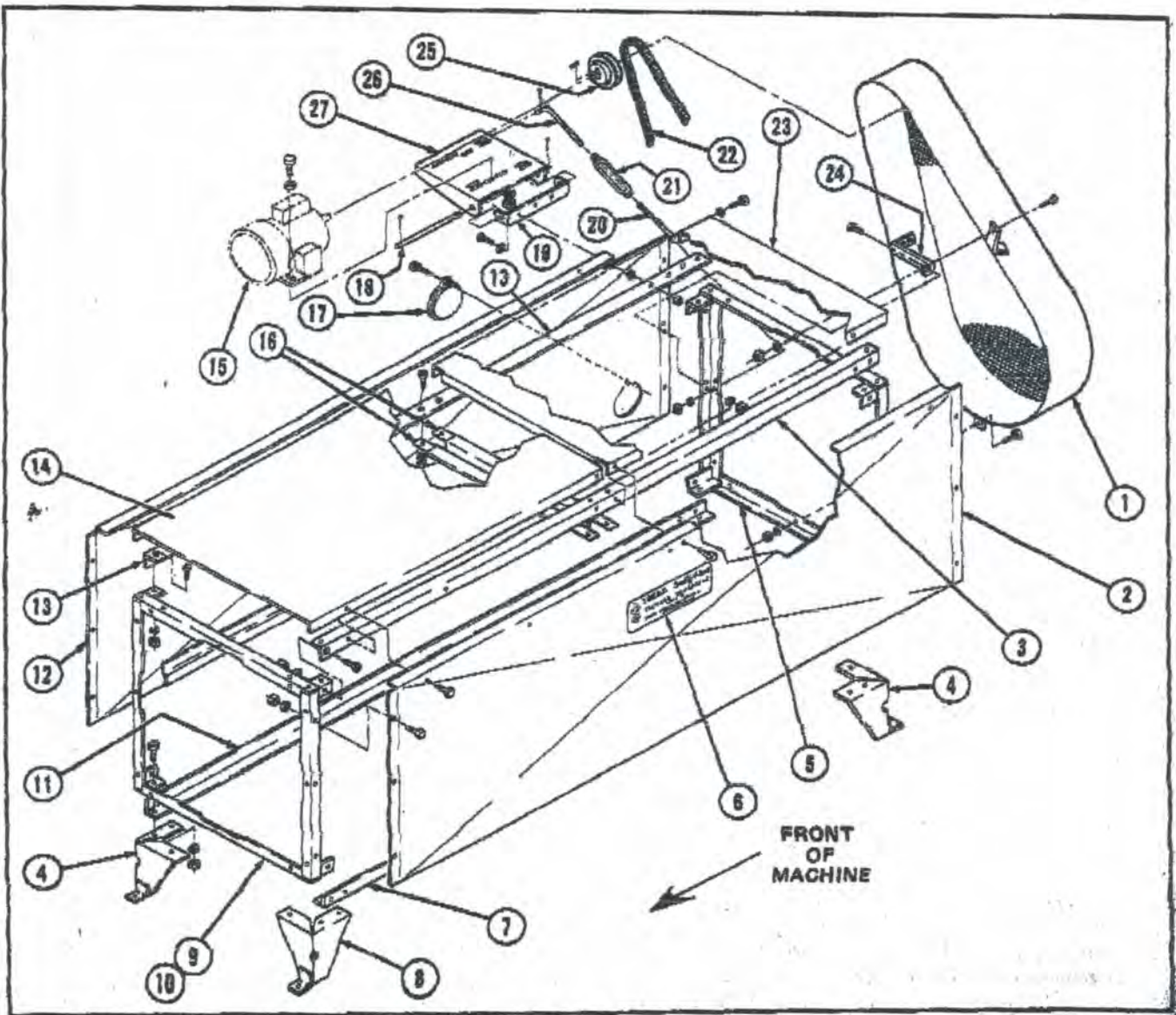


FIGURE 4 - Frame, Drive and Covers

PARTS LIST
CYLINDER AND FRONT END PARTS, See Figure 5

Item	Part No.	Description	Qty.	Item	Part No.	Description	Qty.
1	3W403	SEAL, Wool Band	1	19	—	WING NUT	1
2	3W375	RETARDER BLADE	1	20	C96	COVER, Inspection	1
3	3W406	GUIDE, Retarder	1	21	C69	DIAL, Calibration	1
4	581	DEFLECTOR, Corn Machine Only	1	22	—	SERIAL PLATE	1
5	W5001-0	CYLINDER — ONLY (Specify) . .	1	23	582	END PLATE, Front	1
6	C1	CYLINDER RING — ONLY	1	24	3W370	RAK, Trough Adjustmant	1
7	A201	CYLINDER ASSY, (Incl. Items 5 & 6, Fig. 5 & Item 2, Fig. 6) . . .	1	26	3W466	CONVEYOR	1
8	3W363	SUPPORT, Retarder Control Rod	1	26	3W468	TROUGH WELDMENT	1
9	406	RETARDER CONTROL ROD	1	27	A206	TROUGH ASSEMBLY	1
10	3W462	SPOUT, Large Grain	1	28	C11	HOUSING, Wood Bearing	1
11	3W463	SPOUT, Small Grain	1	29	102	WOOD BEARING	1
12	C12	BEARING HOLDER	1	30	A113	WOOD BEARING ASSEMBLY (Incl. Items 29 & 30)	1
13	A335	BEARING, Bronze	1	31	C39	BLADE, Leveling	6
14	487	SHAFT, Trough Setting	1	32	C12	BEARING HOLDER	1
15	C84	HANDWHEEL	1	33	C36	BRACKET, Roller Assembly	2
16	468	SET COLLAR, 3/4"	2	34	A332	FRICTION ROLLER ASSY.	2
17	A342	DISCHARGE HEAD ASSY.	1				
18	C67	WORM GEAR	1				

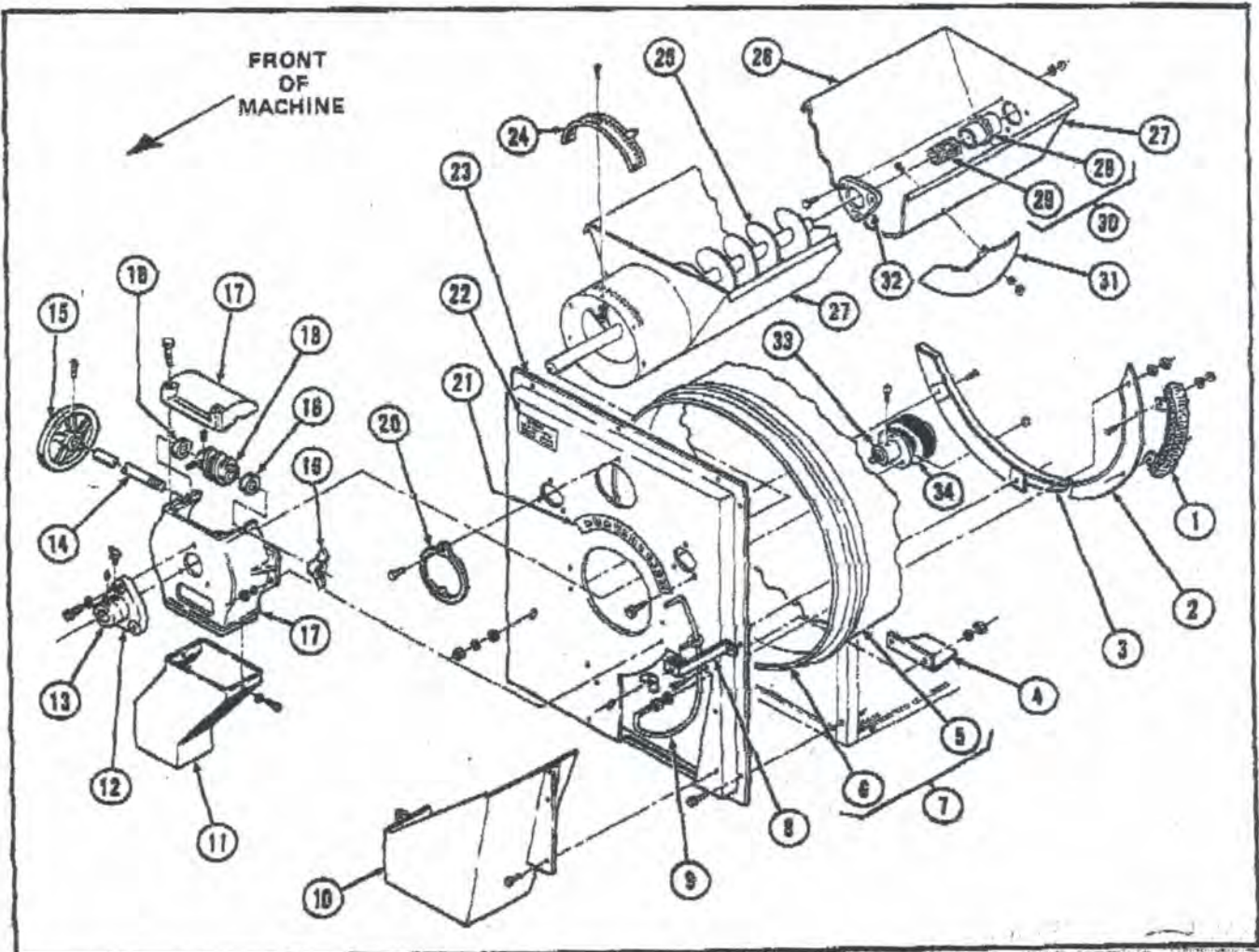


FIGURE 5 — Cylinder and Front End Parts

PARTS LIST

CYLINDER AND REAR END PARTS, See Figure 6

Item	Part No.	Description	Qty.	Item	Part No.	Description	Qty.
1	W5001-0	CYLINDER—ONLY (Specify)	1	12	A506	BEARING, Sealmaster®	2
2	423	CYLINDER END — ONLY	1	13	1B18.4	SHEAVE, 18.4" P.D.	1
3	A201	CYLINDER ASSEMBLY (Incl. Items 1 & 2, Fig. 6 and 6, Fig. 5)	1	14	B90	V-BELT	1
4	3W488	CONVEYOR	1	15	C18	INTAKE CASTING	1
5	C5	CONE	1	16	500	FELT WASHER	1
6	A7010-87	CHAIN, Roller, 3/4" — 87 P.	1	17	465	SET COLLAR, 1-5/16"	1
7	7002-10	SPROCKET, 15T., 3/4" P.	1	18	3W468	FEED HOPPER	1
8	583	DRIVE SHAFT	1	19	584	SHUT-OFF SLIDE	1
9	—	GREASE FITTING, 1/8" x 45°	1	20	336	WOOL SEAL	1
10	—	COUPLING, Pipe, 1/8"	1	21	585	END PLATE, Rear	1
11	—	PIPE NIPPLE, 1/8" x 4"	1	22	—	DECAL, Direction of Rotation	1
				23	C18	SPROCKET, 76T., 3/4" P.	1

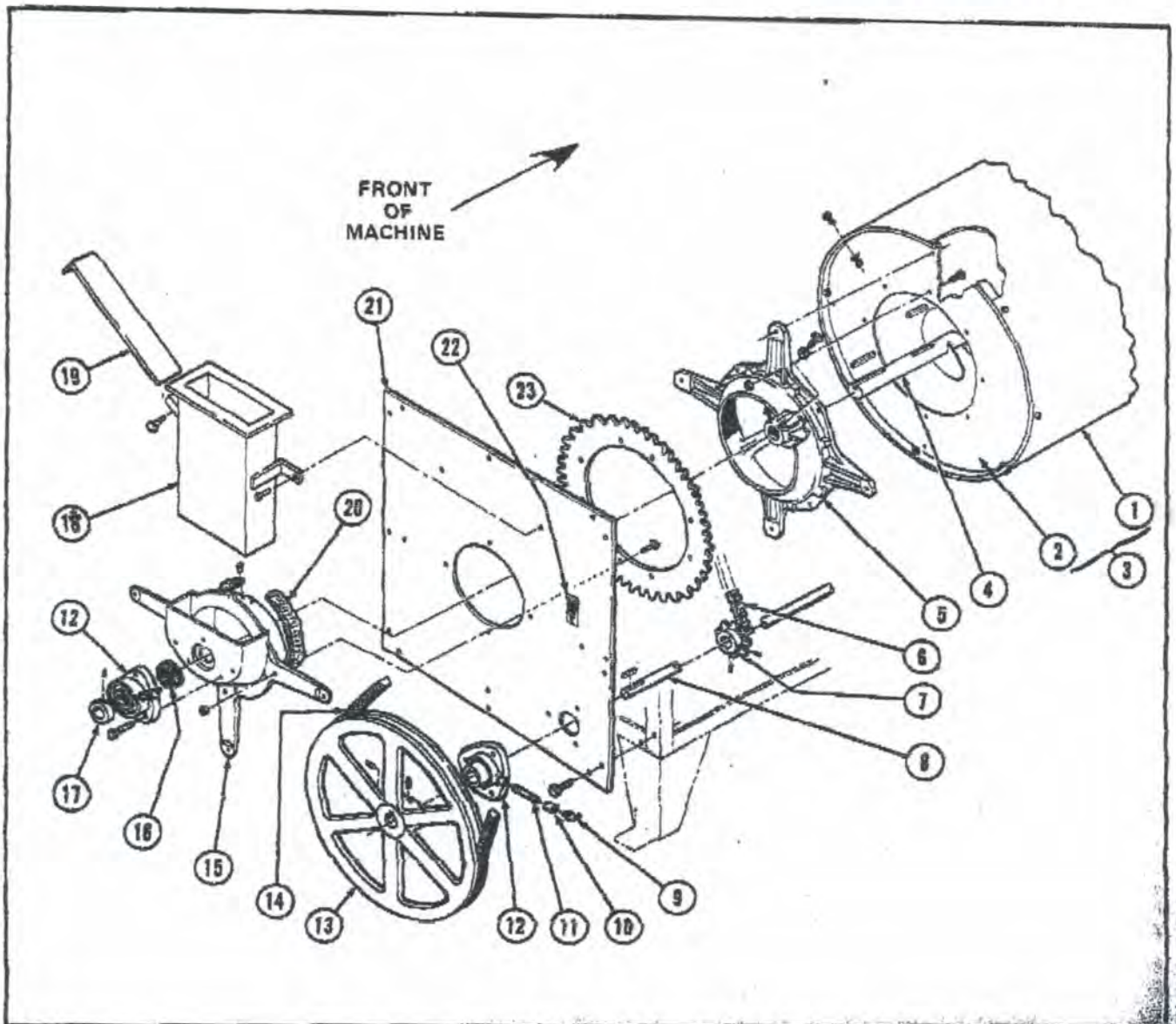


FIGURE 6 — Cylinder and Rear End Parts

WARRANTY

The following does not supersede or alter the policy stated in the General Conditions of Sale of the Ideal Grain and Seed Cleaner Company, Inc. Rather it is extracted from that policy as a guide for this manual.

EQUIPMENT WARRANTY:

The equipment is warranted to the Purchaser to perform within the limits specified in the contract. If performance is not as warranted, the Purchaser must notify the Company in writing within 30 days from its first use, stating wherein performance is not warranted. A reasonable time shall be allowed the Company to remedy the alleged defect, and the Purchaser will render all necessary and friendly assistance. In the event installation of the equipment was completed by the Purchaser, the Company's obligation under its performance warranty shall be limited to furnishing replacement equipment or modifying existing equipment F.O.B. point of shipment.

Any repairs or modifications not specifically authorized by the Company in writing shall not be the responsibility of the Company.

The Company will repair or replace with a similar part any equipment or part thereof of its own manufacture which proves defective in workmanship or material within one year of date of shipment. This warranty is null and void, and the Company shall in no way be liable, if any part or parts not manufactured or supplied by the Company are used in the equipment, or if the equipment is not installed and operated in accordance with the contract. All costs, other than repair or replacement of the defective equipment, are the responsibility of the Purchaser.

In the event the equipment cannot be made to operate by the Purchaser or Company within the limits specified in the contract, the Purchaser may remove and return such of the equipment as is of Company manufacture, freight prepaid, and in accordance with the "Returned Goods" section below. The Company will issue credit for the returned equipment, although credit shall be limited to the purchase price thereof, less installation, dismantling charges, freight, and taxes, and less a reasonable deduction for the Purchaser's use of said equipment.

The warranty does not cover products, services, accessories, parts, or attachments not manufactured or supplied by the Company except to the extent of the warranty given by the actual manufacturer or supplier.

RETURNED GOODS:

Before any equipment is returned, the Purchaser must receive the Company's written authorization. Freight shall be prepaid by the Purchaser.

Authorized returns of new and unused equipment shall be subject to a charge of 15% of the net selling price in addition to whatever restocking charges are necessary to restore the material to a saleable condition. Requests received for return of equipment later than 30 days after system start-up shall not be considered.