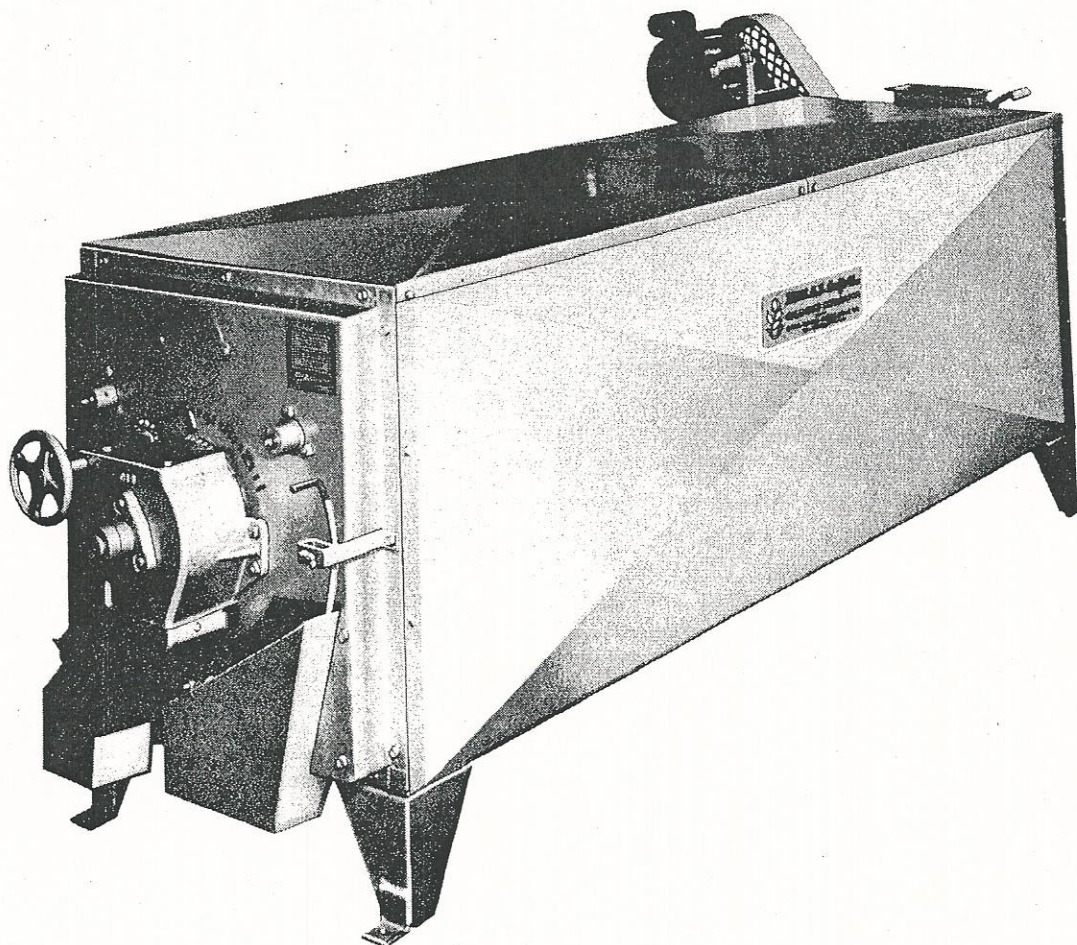


OPERATION AND REPAIR PARTS MANUAL



MODEL S-1 Self Flow Length Grader

IDEAL

GRAIN AND SEED CLEANER COMPANY

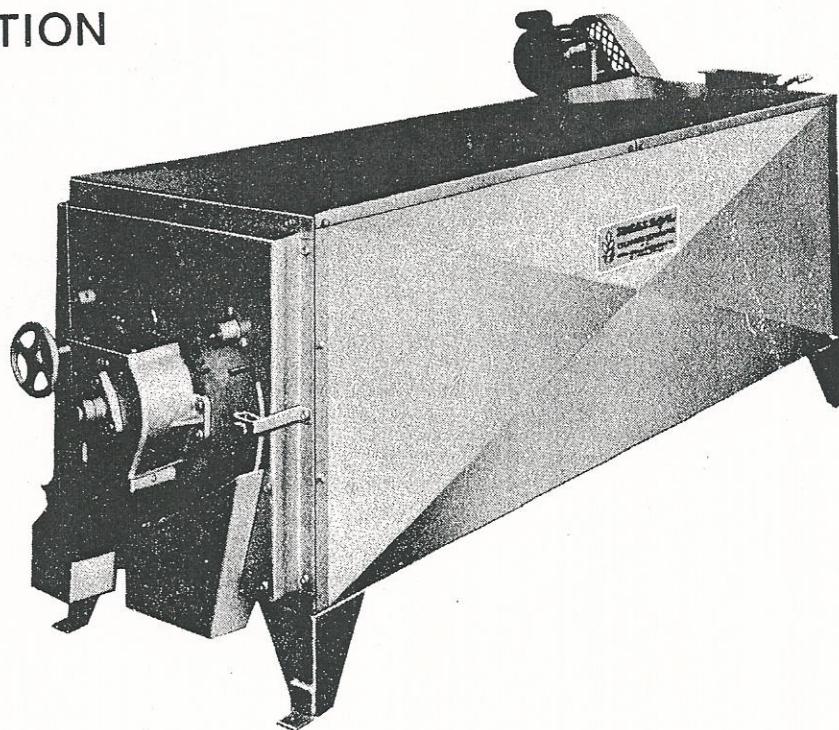
85 Second Avenue S.E. — New Brighton, Mn. 55112



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) | 27" |
| 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. |

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 choke-fed 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.

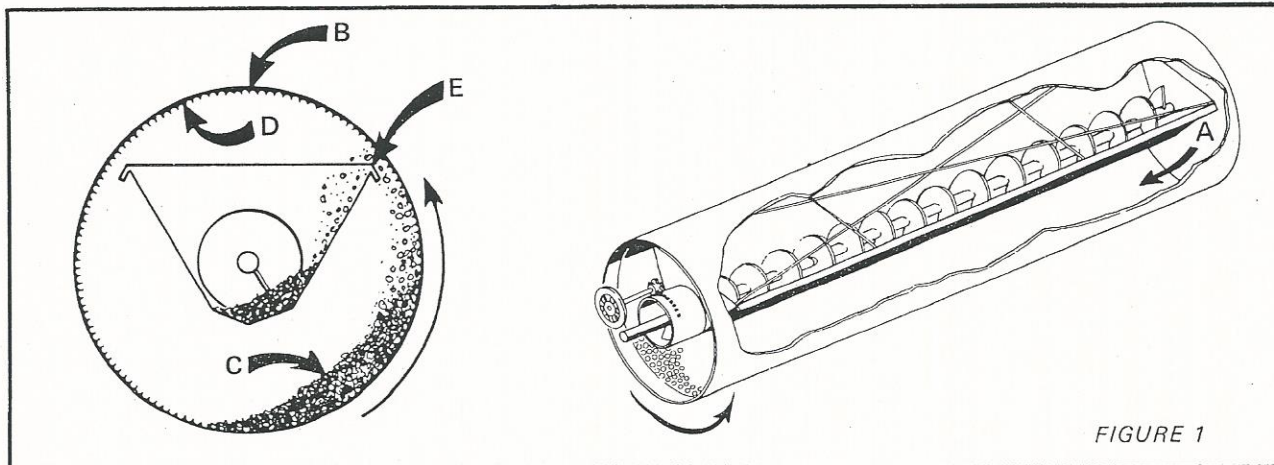
Electrical installation should be made by a qualified electrician, strictly following or exceeding local safety codes. A lockable power switch is recommended to prevent accidental start-up during maintenance.

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



SEQUENCE OF OPERATION

Product is choke-fed into feed hopper and is discharged into the rear of the cylinder at (A, Figure 1). The counter-clockwise 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.

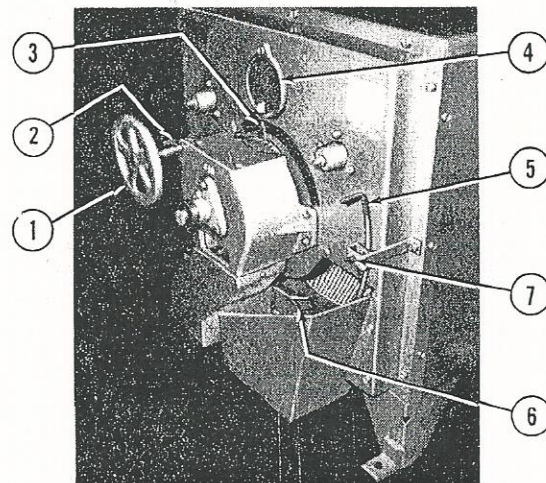


FIGURE 2 — Operating Controls

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.

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.

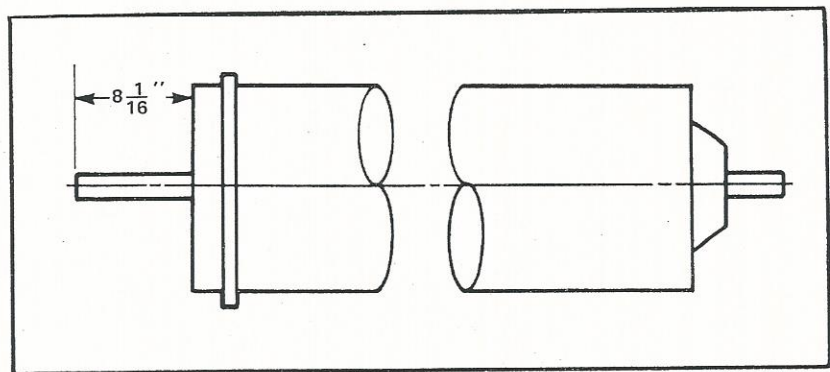


FIGURE 3 — Shaft Location

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 |

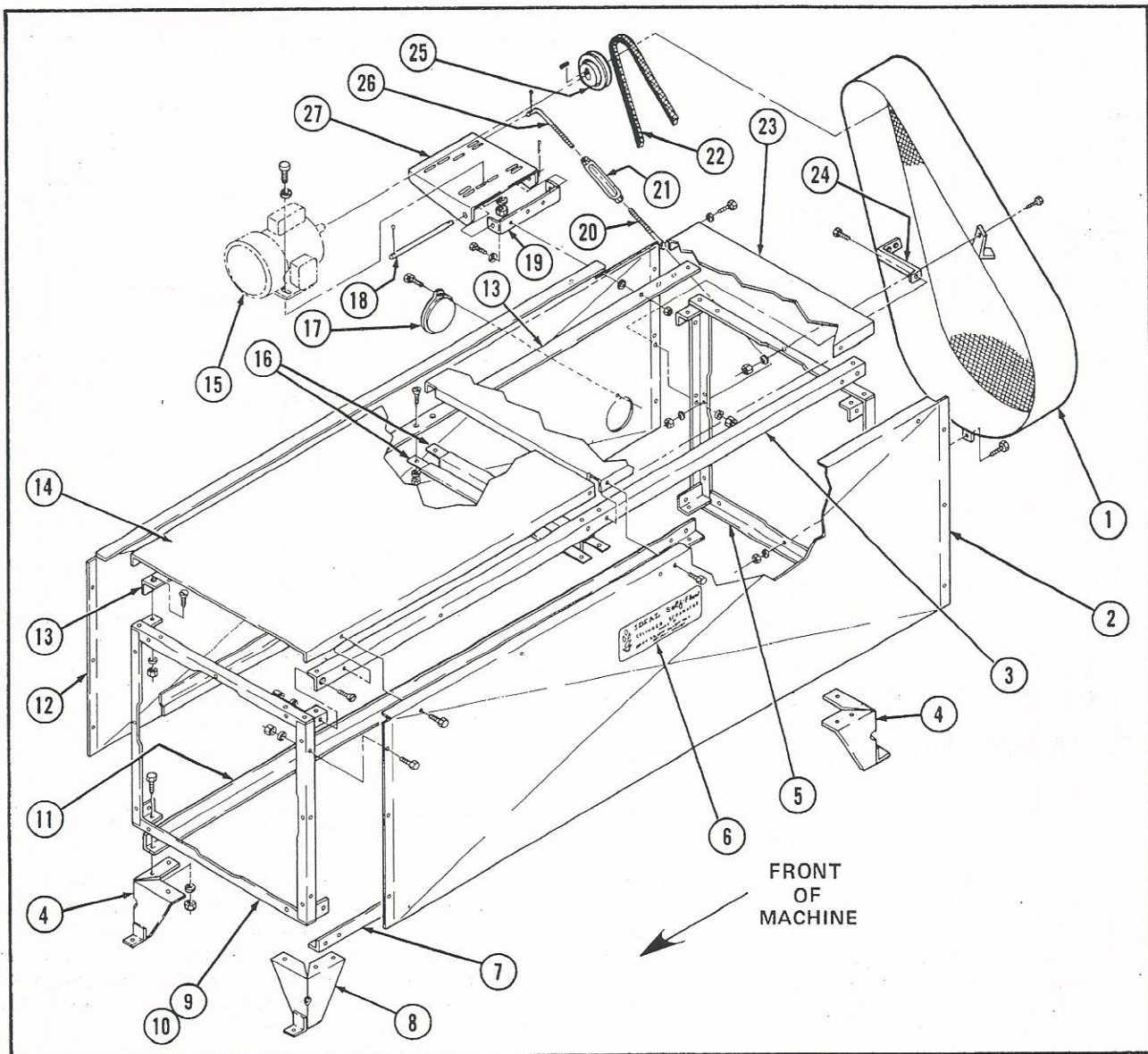


FIGURE 4 – Frame, Drive and Covers

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 | RACK, Trough Adjustment . . | 1 |
| 7 | A201 | CYLINDER ASSY. (Incl. Items 5 & 6, Fig. 5 & Item 2, Fig. 6) . . | 1 | 25 | 3W466 | CONVEYOR | 1 |
| 8 | 3W363 | SUPPORT, Retarder Control Rod | 1 | 26 | 3W469 | 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 | 5 |
| 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 | | | | |

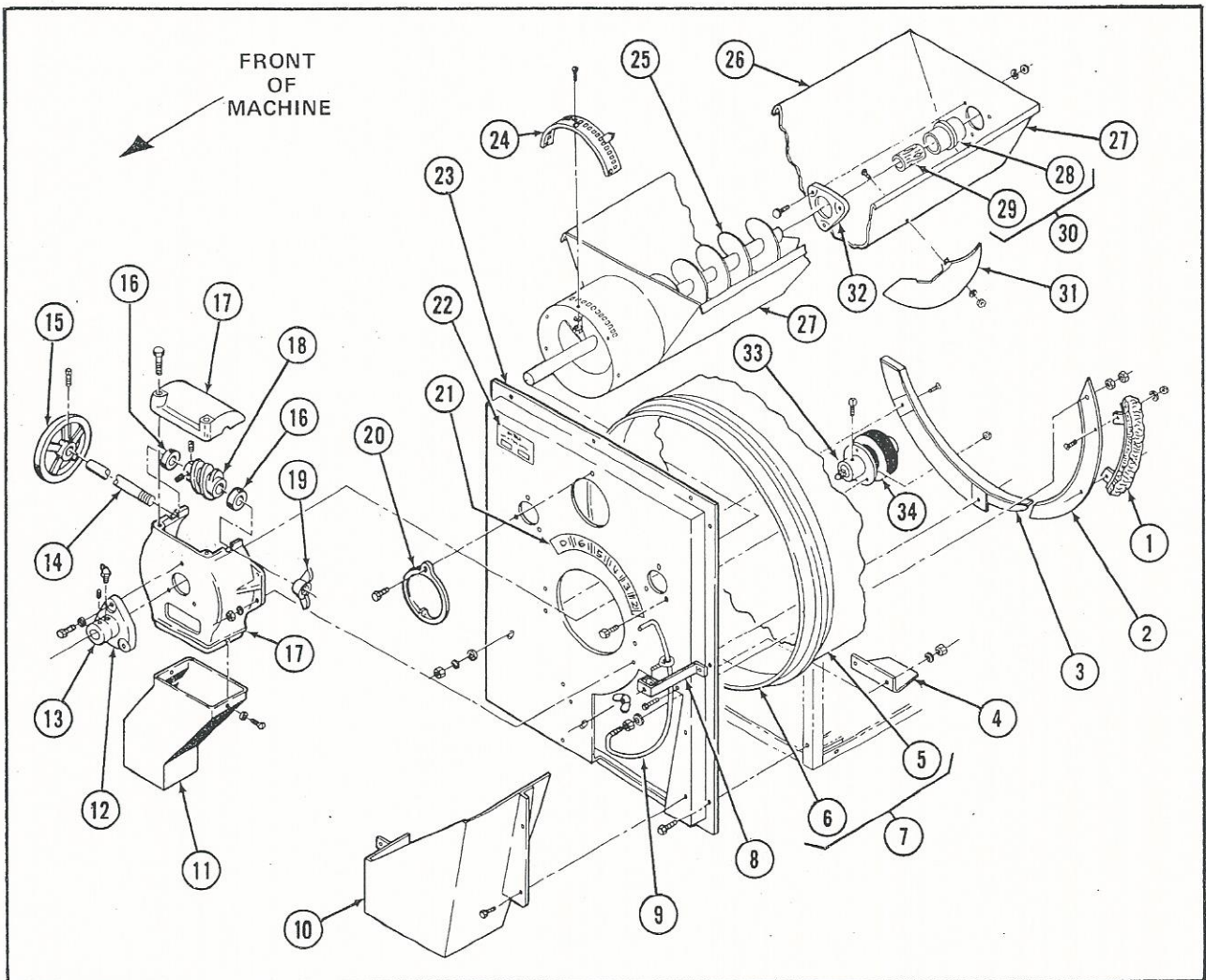


FIGURE 5 — Cylinder and Front End Parts

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 | 3W466 | 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 | C16 | SPROCKET, 76T., 3/4" P. | 1 |

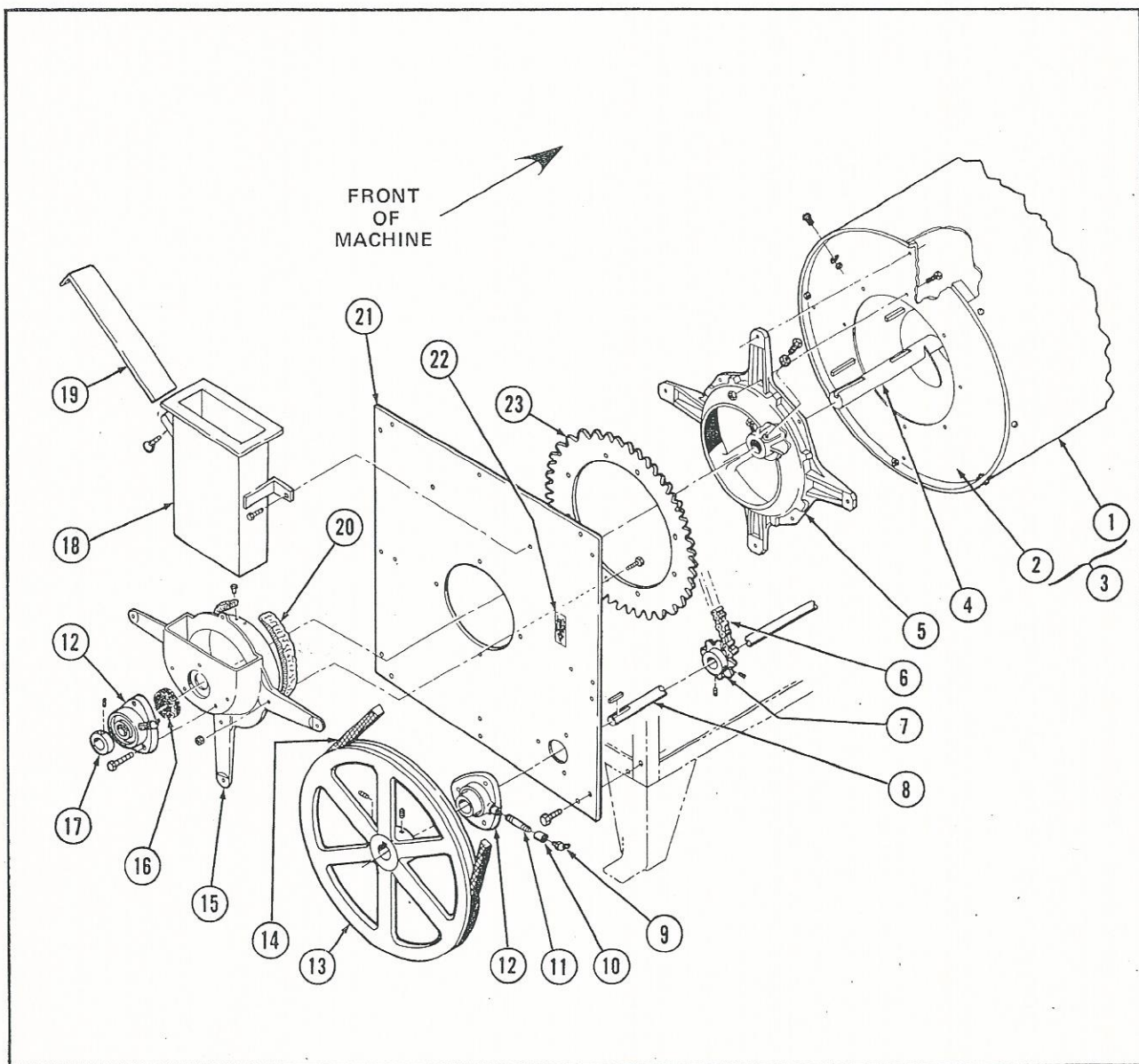
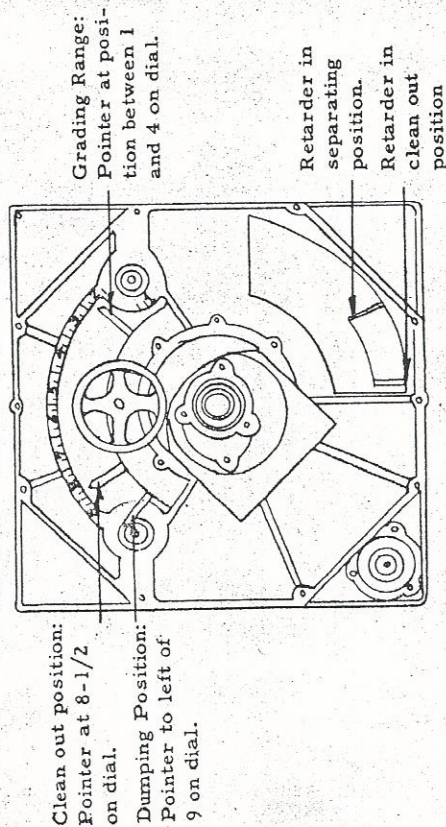


FIGURE 6 — Cylinder and Rear End Parts

SUPERIOR C-11



INSTALLATION

1. Be sure machine is installed level.
2. Be sure installation provides for a constant even flow of grain or seed to the machine which is essential for uniform grading and cleaning.
3. Be sure machine is installed on a solid floor free from vibration.

OPERATION

These operating instructions have been prepared for the new operator. Necessarily they are "average" settings intended only to give the new operator a standard to work by. As there are no two lots of grain or seed just alike, the operator varies these standard settings to suit the conditions of each lot.

All cylinder grain cleaners effect separation by minute differences in length. Once you understand the cylinder action and the function of the pickup trough inside the cylinder, you will find it easy to clean grain or seed with accuracy unmatched by operators of other types of equipment.

1. Precaution should be taken to run grain or seed through a new machine for a few hours to polish the cylinder before making adjustments for final cleaning.
2. Adjust for correct speed of cylinder. The best way to determine the correct speed is to look through the inspection opening on the discharge end of the machine and see that the trough end is setting about level. Then regulate the speed of the cylinder so most of the grain or seeds picked up by the indents will fall straight into the trough from the top part of the cylinder.

If the grain or seeds are carried past the left side of the trough, the speed is too fast. If most of the grain or seeds fall into the trough on the right side, the speed is too slow.

To increase the speed of the cylinder, lower the motor base by adjustable turnbuckle, thus increasing the pitch diameter of motor sheave. To decrease speed of cylinder, raise the motor base by adjustable turnbuckle, thus decreasing pitch diameter of motor sheave.

3. Adjust trough for desired separation. This may be done by adjusting or tilting the trough one way or the other until you receive the correct length of grain or seed that is desired. It is very important after having made a trough adjustment, to allow the machine to run a minute or two before checking discharges to determine if a further trough adjustment is necessary.

4. Adjust position of retarder. In order for the indented cylinder to pick out the small grain and seeds from the large, a grain or seed bank must be kept in the cylinder at all times. The retarder at the discharge end of the cylinder creates this bank.

By keeping the retarder at a point furthest from the cleanout position, a high bank will be created and by moving the retarder to a point at or near the cleanout position, a low bank will be obtained. If the bank is kept too high, some of the larger grain or seeds may go over the edge of the trough with the small. If kept too low, the smaller grain or seeds will go out with the large.