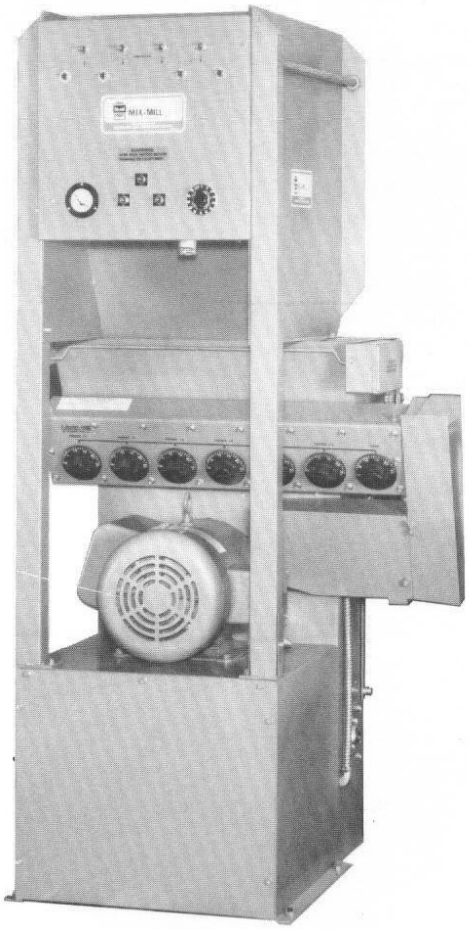
MIX-MILL

INSTRUCTION MANUAL

MODEL CX MILL

GRAVITY AND GROUND LEVEL



"CX" GROUND LEVEL MILL

"CX" GRAVITY MILL

99960088

Dear Mix-Mill Owner/Operator:

Thank you for purchasing a new Mix-Mill Model “CX” Mixer-Grinder. More than a quarter century of experience in the manufacturing of feed-milling and grain-handling systems has made Mix-Mill© the leader in the field of electric-powered, on the farm feed processing and handling systems.

Many of the features that have provided trouble-free service for thousands of Mix-Mill© owners will be found on your new Mixer-Grinder. New design technology and new components have also been incorporated into your mill to further increase the reliability and the flexibility needed for today’s farming needs.

This owner’s manual will aid in the installation of the Mixer-Grinder in a manner consistent with sound, safe construction procedures.

Other quality products form Mix-Mill©, along with this Model “CX” Mixer-Grinder, are capable of producing a complete system to process, move, and store grain and finished feed. These products can be incorporated into an existing system to further diversity and expand at a planned future date.

The following pages of this owner’s manual will provide you with the correct operating information and answer many of your questions about your new mill. Please take a few minutes to read these instructions and keep them for future reference.

The parts breakdown will help you to obtain genuine factory parts when needed. Please contact your local authorized Mix-Mill© dealer any time you need parts or service. He can also provide you with other Mix-Mill©equipment and help you plan for future growth.

Sincerely,
MIX-MILL© MFG. CO.
1440 South Adams Street
Bluffton IN 46714
1-800-537-6260
1-260-824-5213
FAX 260-824-5463

WARRANTY CERTIFICATE

A. T. Ferrell Company warrants each new product of its manufacture when purchased from an authorized representative for a period of one year from the date of shipment. This warranty shall apply to all parts and workmanship (except products of components not manufactured by A. T. Ferrell Company), which shall appear to A. T. Ferrell Company to have been defective in manufacture. A. T. Ferrell Company's sole and entire obligation under such warranty shall be satisfied by shipment to the Purchaser-User, without charge, (except for transportation costs, which shall be paid by Purchaser-User) the part or parts returned (upon request) for inspection and parts intended to replace those acknowledged by A. T. Ferrell Company to be defective. This warranty shall not apply and shall be void under the following conditions:

1. If the product is transported from its original installation site.
2. If any part of the product has been altered, modified or changed, except at A. T. Ferrell Company's factory or is authorized by A. T. Ferrell Company in writing.
3. If attachments or devices unsuitable to the product have been used on or in conjunction with the product.
4. If the product has not been installed, used, operated, handled or serviced in accordance with the appropriate instruction manual.

A.T. Ferrell Company reserves the right to make changes in design or improvements in its products without any obligation whatsoever to prior Purchaser-User of such products.

A.T. Ferrell Company will pass on to a Purchaser-User only such warranty as it shall receive on products or components not of its manufacture from the manufacturer or supplier thereof.

This warranty s expressly in lieu of any other express or implied warranties, including any implied warranty of merchantability of fitness and of any other obligation on the part of A. T. Ferrell Company, and may not be altered, modified or changed in any way except in writing.

A.T. Ferrell Company will not be liable for any consequential damages, loss, or expenses arising in connection with the use or the inability to use the product for any purpose whatsoever. Our maximum liability shall not in any case exceed the cost of replacing defective parts if returned to us within one year from date of shipment.

The Warranty Registration Card must be filled in completely and signed by Purchaser-User and returned to us to validate any warranty claim.

A.T. Ferrell Company, Inc.
1440 South Adams Street
Bluffton IN 46714

(260) 824-5213
(260) 824-5463 Fax
(800) 537-6260

BE A SAFE OPERATOR

AVOID ACCIDENTS

This safety alert symbol identifies important safety messages in this manual. When you see this symbol, be alert to the possibility of personal injury and carefully read the message that follows. Regardless of the care used in the design and construction of any type of equipment, there are many conditions that cannot be completely safe-guarded against without interfering with reasonable accessibility and efficient machine operation. A careful operator is the best insurance against an accident.

Carefully read and understand the operator's manual before operating the machine. Do not attempt to install, connect power to, operate or service machine without proper instruction and until you have been thoroughly trained in its use by your employer.

Keep children, visitors and all untrained personnel away from machine while in operation.

Make certain all electric motors and control panels are properly grounded.

Danger – Do not attempt to work on, clean or service this equipment or open or remove any protective cover, guard, or grate until <u>power has been turned off and mechanically locked out and the machine has come to a complete stop.</u>

Danger – Keep hands, feet and clothing clear from rotating belts, pulleys, rolls and gears when machine is operating. Failure to do so will cause severe injury or death.

Danger – Never operate machine without protective covers, guards, or grates properly installed.

Do not obscure or remove safety decals from the equipment. Replacement decals are available from the manufacturer.

This equipment was manufactured in compliance with existing OSHA regulations. It is the responsibility of the owner/user to maintain OSHA compliance when operating the equipment.

When performing work on the hydraulic system, check all hoses, ensure that they are in good condition and all connections are tight.

Never use your bare hands to locate a hydraulic leak. Use a small piece of wood or cardboard. Hydraulic fluid escaping under pressure can penetrate the skin. Openings in the skin and minor cuts are susceptible to infection from hydraulic fluid.

<u>If injured by escaping fluid, see a doctor at once.</u>

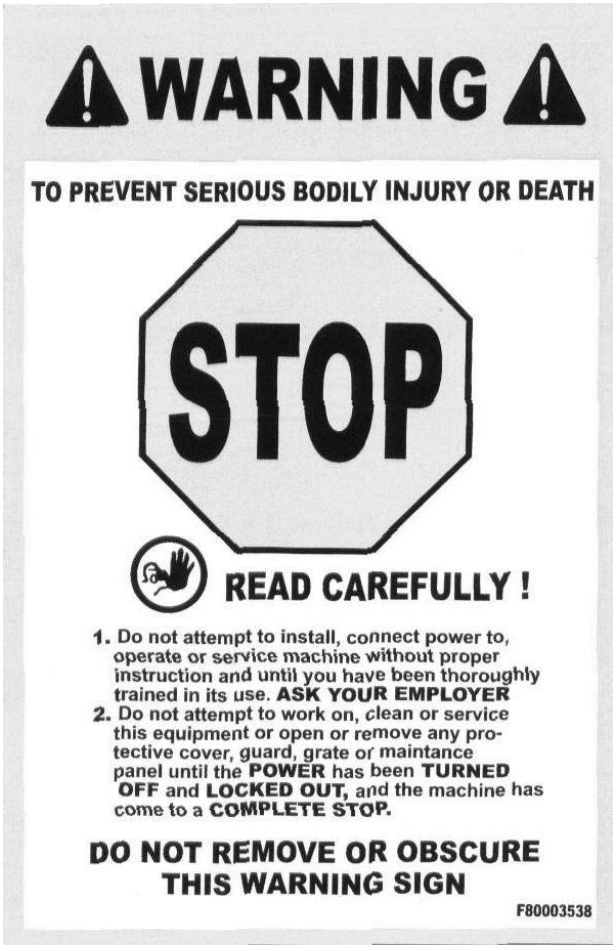
Replace all guards and shields after servicing and before starting up the machine.

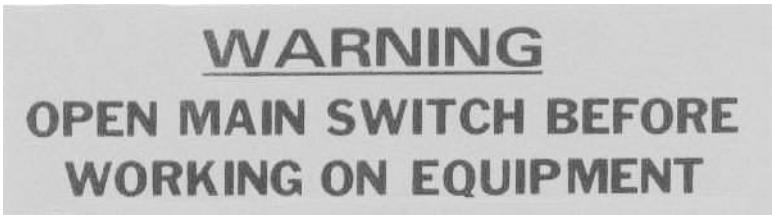
Do not clean, lubricate or adjust equipment while it is in operation.

After servicing, make sure all tools, parts and service equipment are removed from the machine.

Do not start the machine until you are sure that everyone is clear.

TYPICAL SAFETY DECALS





CONTENTS

CONTENTS (Continued)

Section VII. Wiring Diagrams

SECTION II

MODEL "CX" MIXER-GRINDER SPECIFICATIONS

MILL HORSEPOWER ..... 3, 5, 7½ HP—10, 5 HP—3Ø

NO. INGREDIENT HOPPERS ..... 4 and 6

INGREDIENT SUPPLY ..... Gravity Flow

CONTROLS
- Timer ..... 0-2 Hr.
- Ammeter ..... 0-30 or 0-50 Amp.
- Automatic Shutdown if
  - Ingredient Supply Interrupted ..... Yes
  - Foreign Material Enters Proportioner ..... Yes
  - Mill Motor Overload Trips ..... Yes
  - Bin Level Control ..... Yes (Opt. Equip.)
- Manual Operation Switch ..... SPDT w/Center Off

PROPORTIONER
- Type ..... Variable Speed Gear Train
- Auger Position ..... 30° Incline
- Type Lubrication . . . (non-poisonous) ..... Texaco Preservative Oil 10W
- Lubrication ..... Oil Bath
- Driven By ..... Belt From Mill Motor
- Type Belt ..... 1 Section
- Metering Range
  - Std. Auger ..... 80-2000 lbs/ton
  - ½-Speed Auger ..... 40-1000 lbs/ton
  - Premix Section ..... 20-500 lbs/ton

GRINDING CHAMBER
- Diameter ..... 14"
- Screen ..... Full Circle
- Ingredient Inlet ..... Center
- No. of Knives ..... 15 Heavy Duty
- Type Knives ..... Knife Edge Reversible
- Knife Mounting ..... Free Swinging
- Wear Plates ..... Housing and Mill Back

BYPASS ARRANGEMENT

Either outside ingredient on 4 compartment models
2 Outside compartments on either side on 6 compartment models

MAGNET ARRANGEMENT
- Number ..... 4 or 6
- Location ..... Under Proportioner Troughs

SPECIFICATIONS (Continued)

MOTOR

Type..... . ..... Totally Enclosed, Fan Cooled
Bearings..... . .. Farm Duty Ball Bearings
Torque.....Hi-Torque Starting
UnderloadStarting .....Yes
OverloadStarting ..... Yes (Manual Reset)
OperatingLoad .....3 HP —17 amp. (10)
5 HP —28 amp. (10)
7'/2 HP-37 amp. (10)
5 HP —14 amp. (30)

ELECTRICAL

OperatingVoltage 230-60HZ (10)
OperatingVoltage 230/460-60HZ (30)

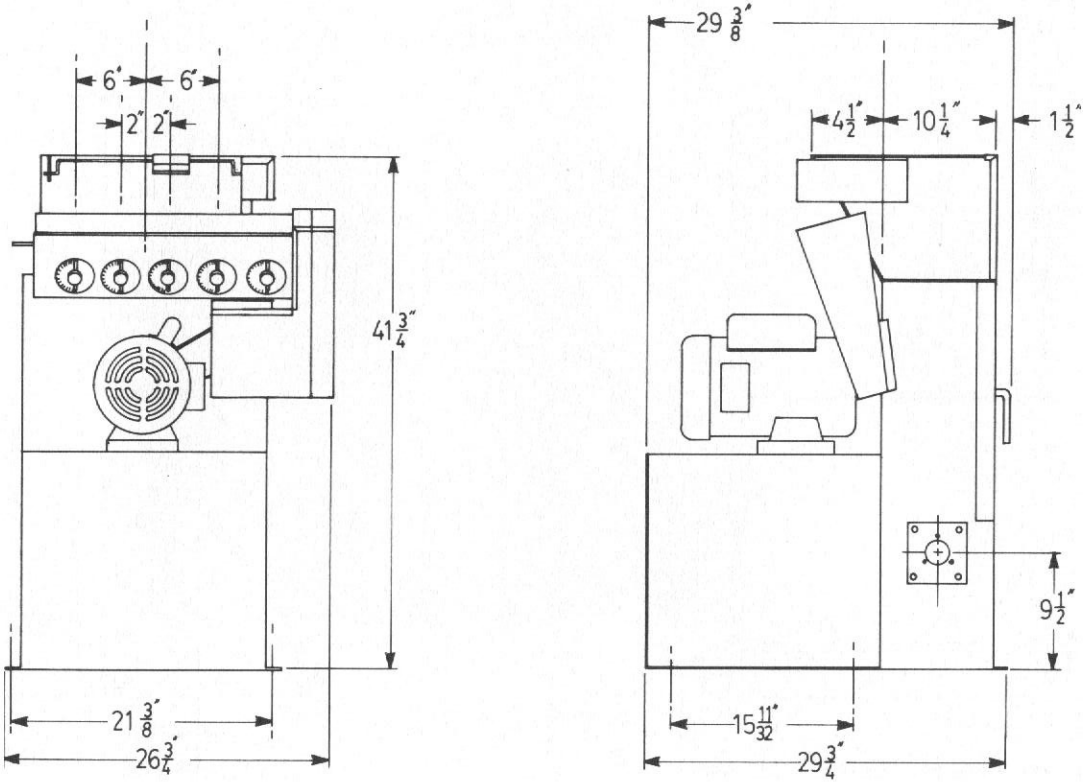
WEIGHT

CXMill, 4-compartment ..... 430 lbs.
CXMill, 6-compartment ..... 460 lbs.
CX Mill, 4-compartment w/ground level hopper .... 535 lbs.
CX Mill, 6-compartment w/ground level hopper ..... 585 lbs.

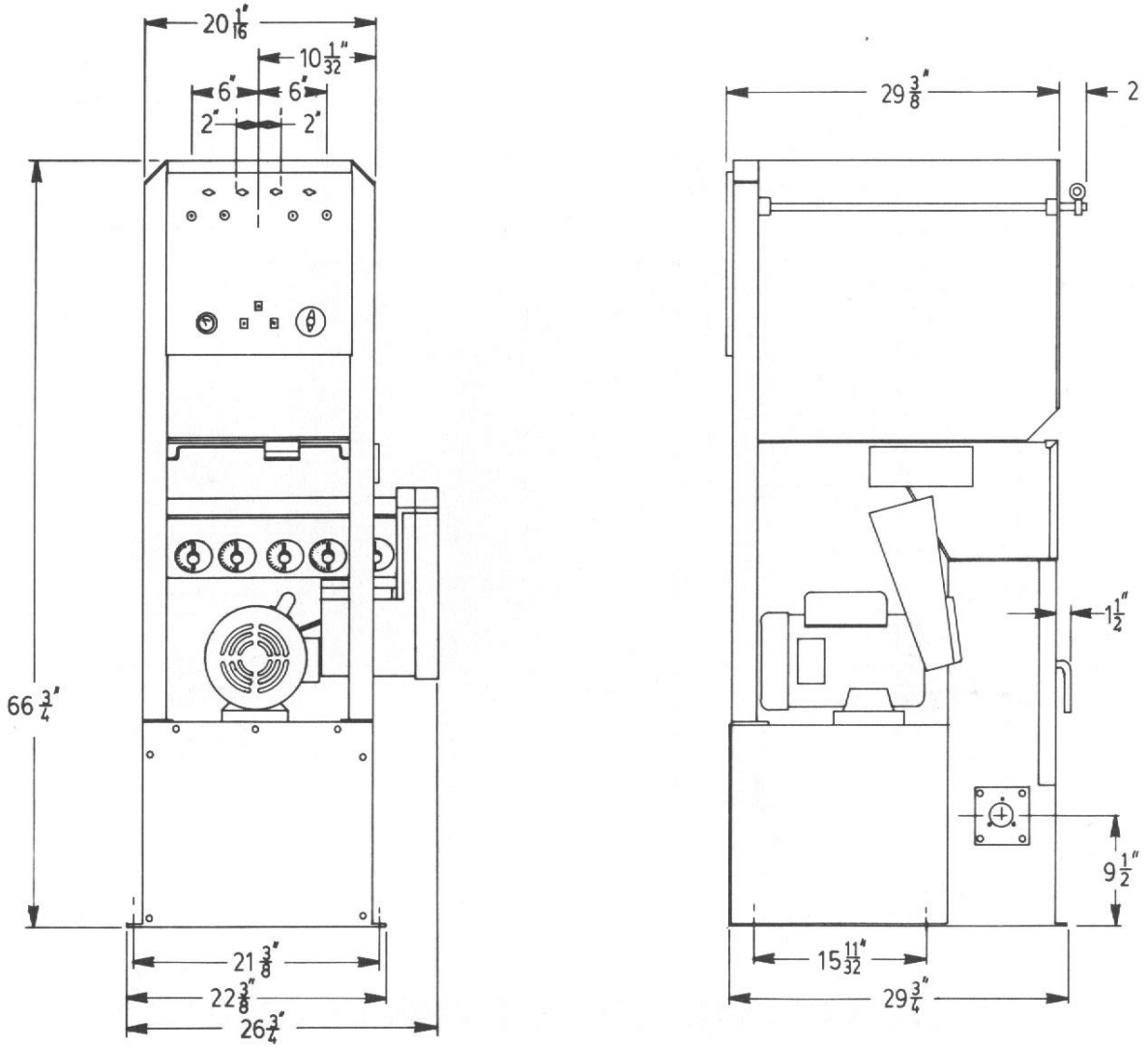
CAPACITY

Several factors must be considered when figuring mill capacities: The type and amount of each ingredient; the amount of material ground; the amount that is bypassed; mill horsepower; and screen size. An undersized discharge system can be a limiting factor on mill capacity. Hardness and variations in the hardness of different grains will have an effect on the mill capacity and the amount of wear to replaceable parts such as screens, hub and hammers, and mill wearplates.

MAJOR DIMENSIONS
4 COMPARTMENT "CX" GRAVITY MILL



MAJOR DIMENSIONS
4 COMPARTMENT "CX" GROUND LEVEL MILL



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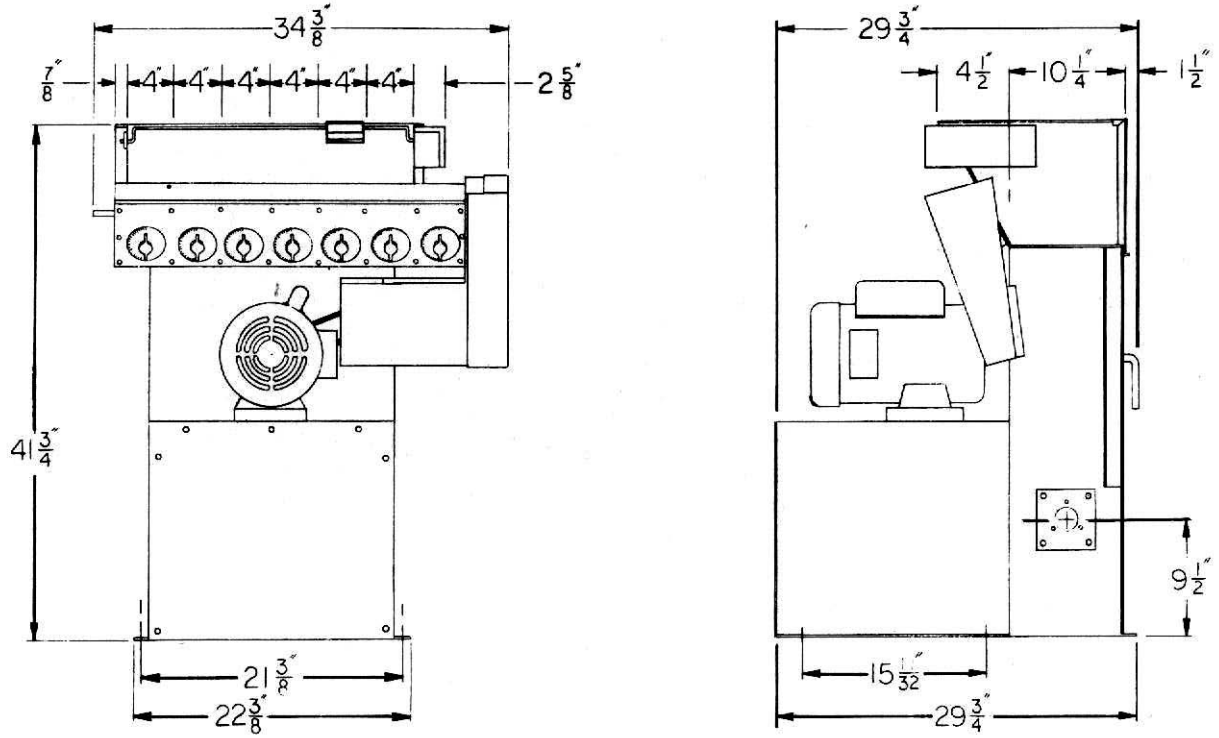
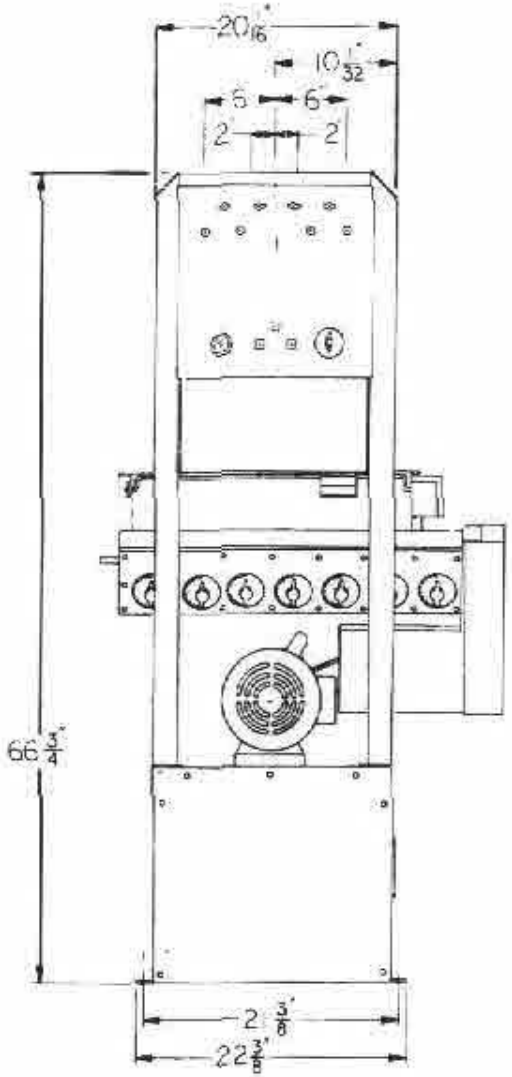
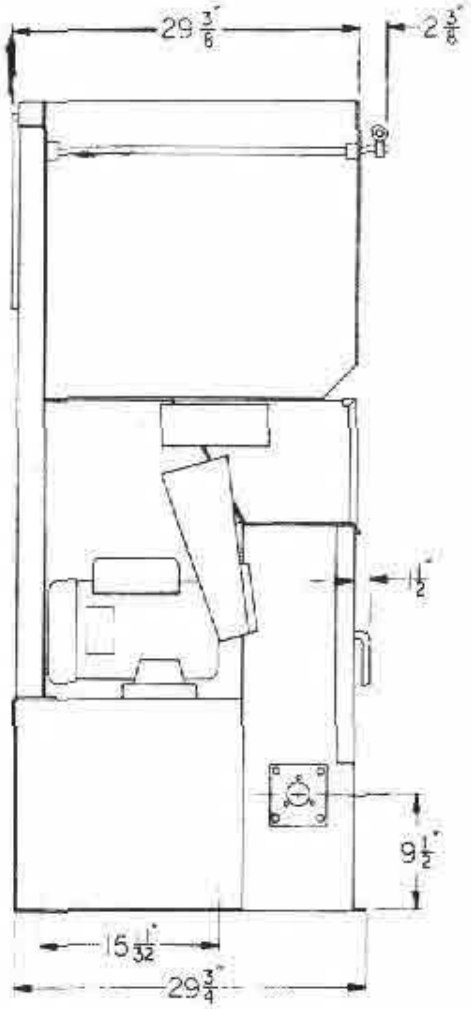
6 COMPARTMENT "CX" GRAVITY MILL



MAJOR DIMENSIONS
6 COMPARTMENT "CX" GROUND LEVEL MILL





SECTION III

Installation

Concrete:

The Mix-Mill® Mixer-Grinder should be permanently anchored to the floor. When installing the mill in a Mix-Mill® Farm Feed Factory, the mill should be anchored by drilling four holes in the concrete floor, fastening the mill by placing anchormen in the holes, and using bolts to secure the mill. These holes should be located 21 3/8" for the width of the mill and 15 11/32" for the length of the mill.
(See Figure #1)

When installing a Mixer-Grinder in an existing building, consult your authorized Mix-Mill® distributor to attain a secure and convenient location.

HOLE PATTERN

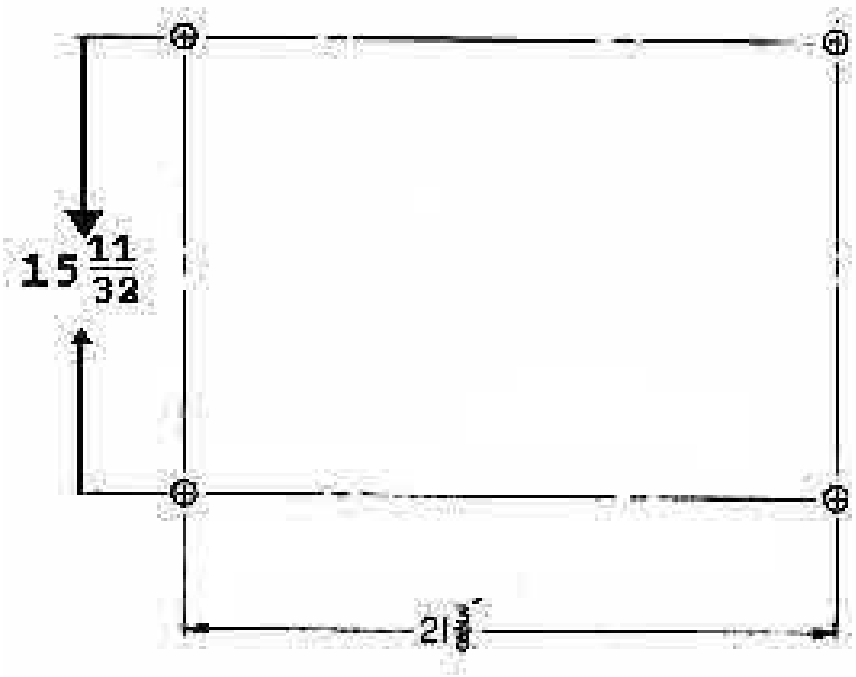


FIGURE # 1

Installation

Electrical Wiring:

NOTE: For detailed wiring instructions, refer to appropriate internal and external wiring diagram in wiring section. Be sure electrical service is adequate to provide full voltage to motors at full load. No motors will operate properly at low voltage.

All electrical equipment must be grounded not only to the neutral of the power supply but also to a substantial ground right at the mill installation or in the livestock house. Refer to the wiring diagram and local electrical code.

The mill should be grounded to a ground rod driven 8 feet into permanently-moist undisturbed earth. A ground rod driven into fill might not be effective.

Make sure all motors, augers, hoppers, etc. are connected permanently and solidly to the ground. If it is not easy to connect to the existing ground, drive another ground rod in moist soil.

Following the installation charts, connect the electrical power to the control panel.

SUGGESTED BREAKER AMPERAGE AND WIRE SIZE FOR "CX" GRAVITY MILL				
H.P.	10		30	
	Amps	Wire Size	Amps	Wire Size
3	50	6	--	--
5	60	6	50	8
$7^1/_2$	60	6	50	8
10	--	--	60	6

SUGGESTED BREAKER AMPERAGE AND WIRE SIZE FOR "CX" GROUND LEVEL MILL				
H.P.	10		30	
	Amps	Wire Size	Amps	Wire Size
3	60	6	--	--
5	70	4	60	6
$7^1/_2$	90	4	70	6
10	--	--	70	4

NOTE: The electrical power is subject to local electrical codes. Wire size is for copper wire.

Installation

Structural:

The Mixer-Grinder must be located in a weatherproof structure. A MixMil1® Farm Feed Factory Building has been designed for this purpose and is available in sizes ranging from 12 Tons through 400 Tons of overhead storage capacities. See your MixMil1® dealer for information regarding one of these all-galvanized-steel, heavy-duty structures. Your dealer has been factory trained to help you determine the best installation of MixMill® equipment to handle your present requirements and provide for future growth.

In existing installations some farm structures are suitable for mill installation. See your authorized Mix-Mill® distributor and let him work with you to develop the most efficient, most economical system for your needs.

Installation

Assembly:

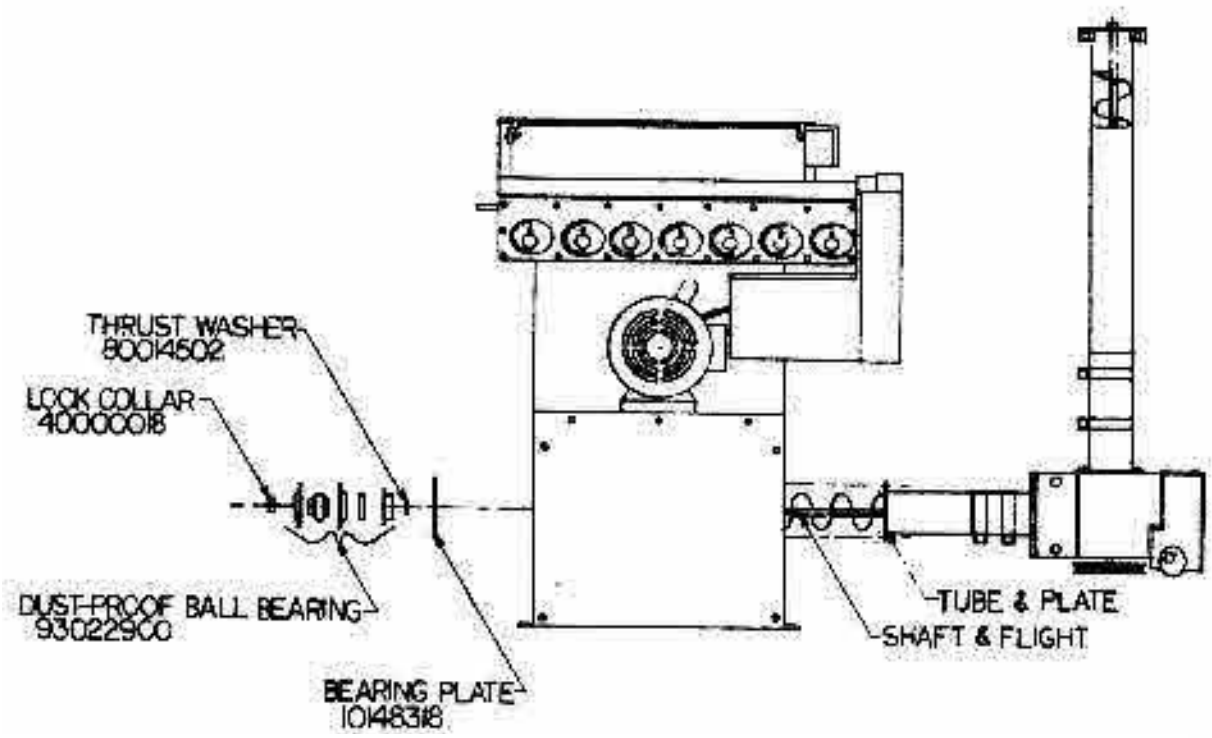


FIGURE # 2

Referring to Figure #2.

1. **Determine on which side of mill the auger corner is to be installed. If opposite from that shown in the above sketch, move part #10148318 Bearing Plate to the opposite side of the mill. Remove Bearing Plate and caulk to eliminate possible dust leakage problems.**

2. **Loosen the screws holding the #93022900 5/8" bore dust-proof ball bearing to the Bearing Plate.**

3. **Assemble bronze thrust washer, #80014502, over short extension end of left-hand shaft-and-flight assembly.**

4. **Insert shaft-and-flight assembly through bearing so that the thrust washer is between the bearing and the end of the fighting.**

5. **On the opposite side of mill, caulk the tube plate flange and then assemble the tube and the plate, flange end toward mill, over shaft-and-flight, and assemble to the mill housing.**

6. **Slip the eccentric Lock Collar, #40000018, onto the bearing and set with a punch and hammer, then tighten down set screw.**

Installation of Auger Corner & Vertical Auger

1. Unpack the auger corner and miscellaneous parts. Lay out the parts and identify them by referring to figures #3 & #4.

2. Remove the self tapping screws from the auger corner assembly (Refer to figure #4). Caulk the flange of the long tube and plate assembly which has a tube stop (Item #1). Assemble this tube and plate to the top of the auger corner welded assembly (Item #2). Repeat the above procedure to install the short horizontal tube and plate welded assembly (Item #3). Place (2) 3 1/2" full clamp rings (Item #4) over the long tube and plate and (1) 3 1/2" full clamp ring over the short tube and plate assembly.
3. Remove the belt guard (Item #5) from the idler bracket assemblies. Remove bearing (Item #6) from the horizontal side of the auger corner welded assembly. Place the auger corner welded assembly over the flight and shaft (Item #7) from the mill discharge. The mill auger tube should slide into the short split tube (Item #3) of the previously assembled tube and plate on the auger corner. Reinstall the bearing as follows. Place a thrust washer over the end of the auger shaft. Then place a retaining cup, cup seal, flange ring, bearing cartridge and flange ring over the shaft and reassemble to auger corner housing with the three self tapping screws and lock washers previously removed. The shaft should extend through the bearing 2 3/4". Place the eccentric lock collar over the shaft and onto the eccentric surface of the bearing. Set lock collar with a punch and hammer, than tighten down setscrew and the 3 1/2" full clamp on the horizontal tube and plate.

4. Install the support stand (Item #8) as shown in figure #4. Note that this stand is adjustable both up and down and sideways to permit easy adjustment and leveling of the auger corner assembly. Level the auger corner and then bolt the half clamp (Item #9) to the support stand.

5. Install the 42104604 5" pulley (Item #10) on end of the horizontal mill discharge auger. This pulley when properly adjusted will measure 2 1/2" from the center line of the pulley to the face of the auger corner welded assembly. See figure #3.

6. Remove the bottom bearing (Item #11, vertical auger bearing) from the auger corner. Install the vertical discharge auger (Item #12).

   *NOTE: This auger must have a keyway on the end going into the auger corner. If your auger does not have a keyway you will be plagued with continual problems with the step pulley coming loose and wollowing out of the bore of this pulley. This would not be considered a manufacturing defect and would not be covered under warranty.

   The vertical discharge auger should slide into the long split tube of the tube and plate on the top of the auger corner. Make sure the auger tube goes in until it hits the tube stop. Reinstall the bearing as follows. Place a thrust washer over the end of the auger shaft. Then place a retaining cup, cup seal, flange ring, bearing cartridge and flange ring over the shaft and reassemble to auger corner housing with the three self-tapping screws, lock washers previously removed. The shaft should extend through the bearing 3 1/2". Place the eccentric lock collar over the shaft and onto the eccentric surface of the bearing. Set lock collar with a punch and hammer, and then tighten down setscrew.

7. Install the 40003508 (4" x 8") step pulley (Item #13) on the end of the vertical discharge auger, 8" side out. This pulley when properly adjusted will measure 3" from the centerline of the 8" pulley to the bottom face of the welded assembly. Make sure the drive key is in place and tighten the two setscrews on the step pulley.

8. Install the round belt as follows: Loosen the mounting bolts for adjusting the angle of the idler pulley brackets. Loosen the bolt and nut holding the idler pulleys. Place the 34.6" round belt part #40000502 (Item #14) over the 4" step pulley (Item #13), over the two idler pulleys (Item #19) and then over the 5" pulley (Item #10). The basic configuration of the belt at this time would be like the figure L. See figure #4.

Round belt adjustment: Place the idler pulley gauge over the *5/8"* shaft with the offset toward the inside. Adjust the idler pulley bracket cam so that the idler pulleys just touch the gauge plate. This is an adjustment to get you close, and a slight refinement of the adjustment may be necessary later on. Adjustment of the eccentric cams also provides the proper belt tension for the round belt. If the belt is riding hard on high on one or the other idler bracket pulleys readjust so that the belt tracks properly in the pulley groove.

9. Drive kit installation: Refer to figure #4. Install the two motor mounting rods (Item #15) into the set collars thru the bottom of the auger corner welded assembly. The long end of these rods should be used at this location. Install the square head S.T. screws in the set collars and snug down to hold the rods in the approximate position as shown in the drawing.

   Install the motor (Item #16) onto the head plate (Item #17) as shown using the carriage bolts, lock washers and nuts provided. Next install the key and 41301304 3" pulley (Item #18) onto the motor shaft. Place the motor (Item #16) and mounting plate assembly (Item #17) onto the short ends of the motor mounting rods with the pulley end down towards the bottom of the auger corner. Install screws in the motor mounting plate and tighten after setting this assembly so that the 3" motor pulley (Item #18) and the 8" step pulley (Item #13) are aligned with each other.

10. Because all new belts will stretch when first put in service, the tension on the auger corner belt must be checked periodically after approximately 15 minutes, 1 hour and 5 hours of running time.

Installation of Ingredient Spouts

A. Gravity Mixer-Grinders

The most frequently used tubing is 4" round, 26 gauge pipe available from Mix-Mill® in 10-foot lengths. Light gauge adjustable and rigid elbows are handy in making the connections. The 4" downspout from the overhead bins should enter as nearly straight down into the proportioner hopper as possible, and should be directly over the exposed metering screw. Downspout should enter hopper about 1/2" and should not interfere with the operation of the switch paddle.

B. Ground Level Mixer-Grinders

1. A ground level cover has been provided for the input of incoming ingredients. Install 4" down spouting into each respective compartment for the correct ingredients needed.

2. The adjustable slide at the lower end of the bypass partition can be adjusted up and down. The lowest position should be used for free-flowing materials and the highest position for difficult-flowing materials, such as bran and dried beet pulp. A good place to start the adjustable slide is at the midpoint of the range.

3. The precision snap action switches inside the control box should be adjusted so that the switch snaps with a very slight movement of the actuating paddle, long before it swings back and touches the hopper side wall. The adjustment can be made by either turning the switch actuator lever on the pivot rod or by bending it slightly.

INSTALLATION OF AUGER CORNER & VERTICAL AUGER

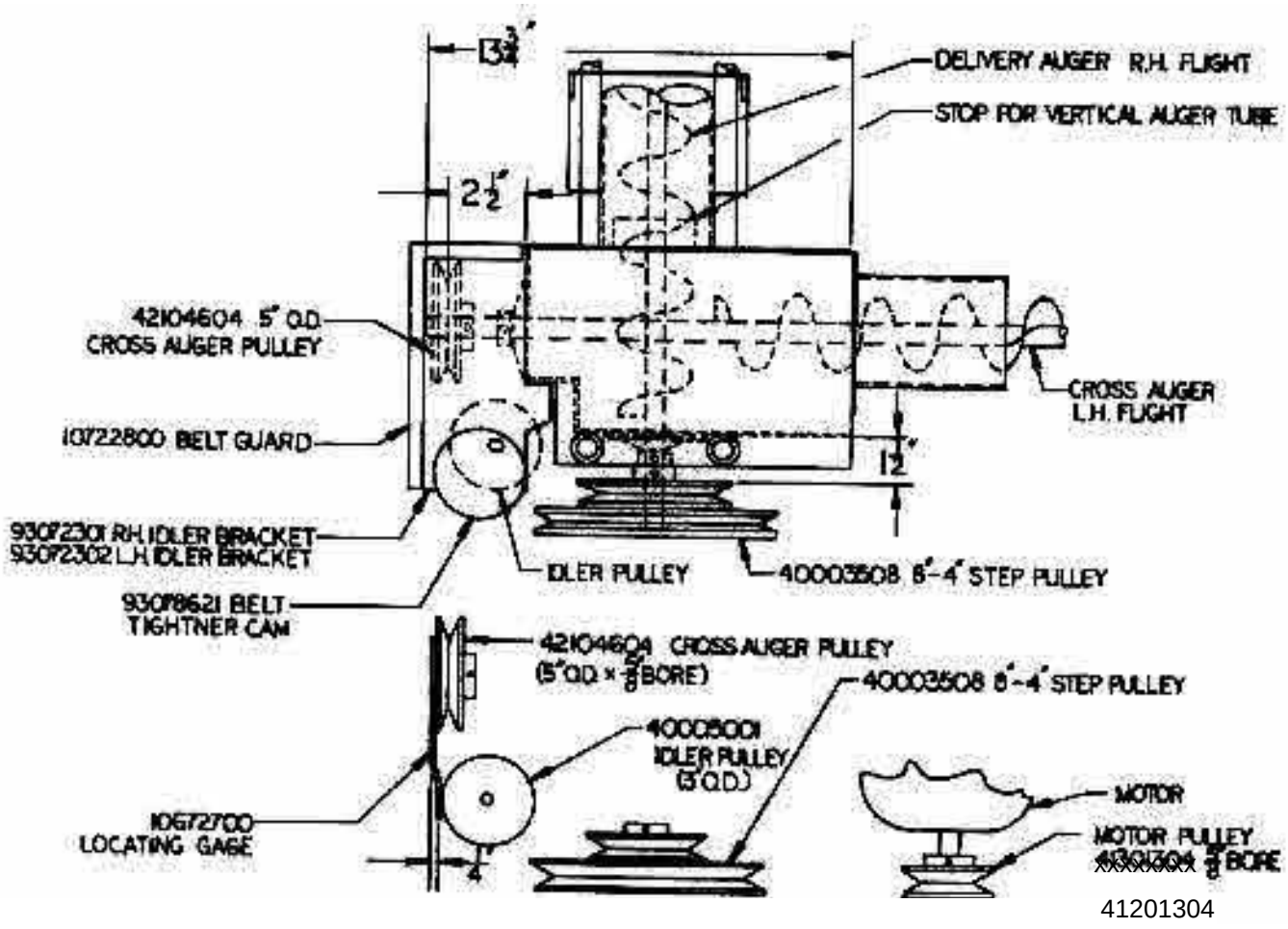


FIGURE # 3

AUGER CORNER ASSY.
FOR INSTALLATION

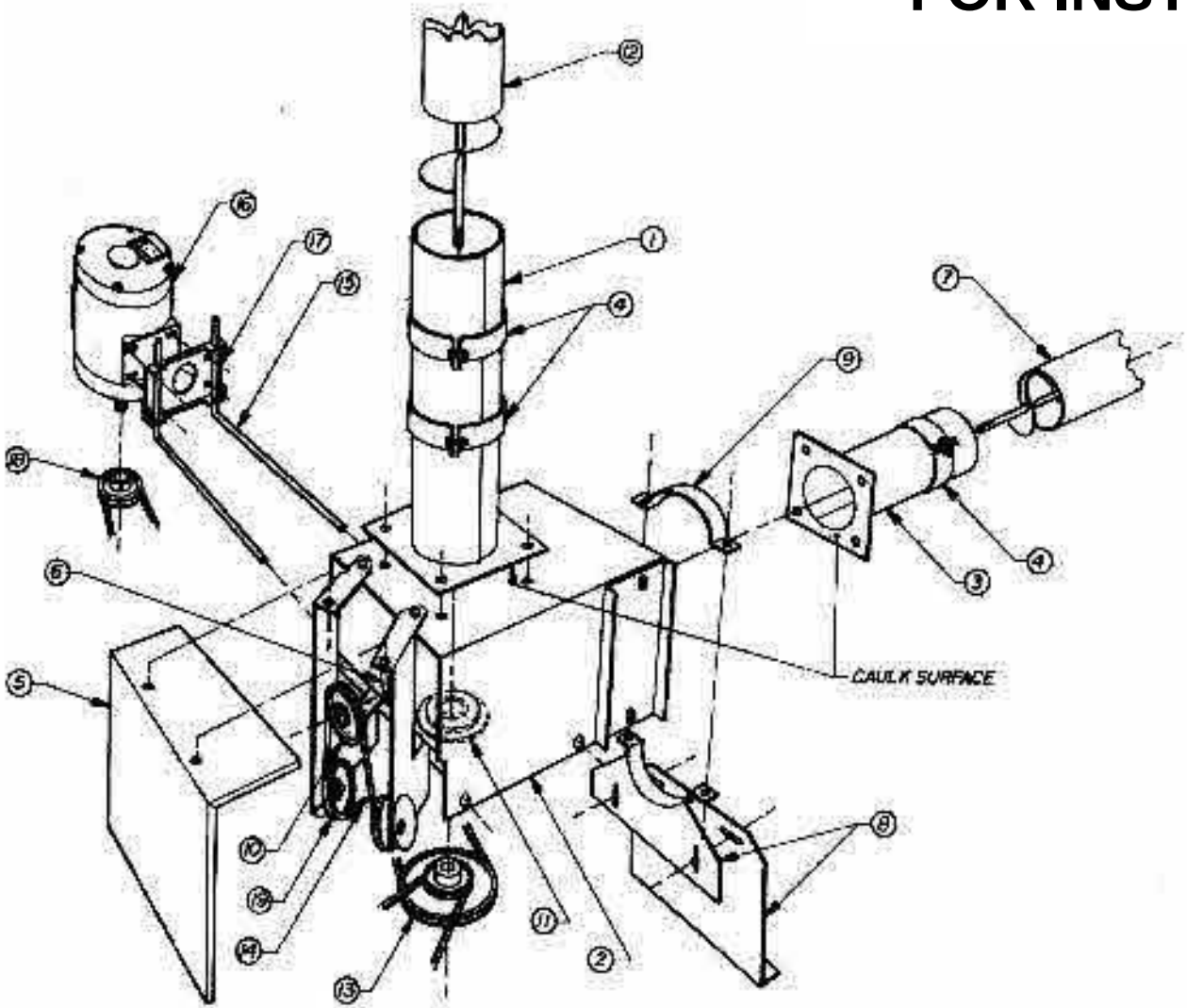


FIGURE # 4

SECTION IV

ROUTINE OPERATION

Before attempting to operate the Mix-Mill® mixer-grinder, the operator should become familiar with the functions of all control elements of this machine.

Each switch, dial, or knob has a specific function which, when properly operated, will produce very satisfactory results.

I. CONTROL PANEL

A. **Instruments:**

1. *Timer—A* spring-wound mechanical timer is provided on each control panel. The standard timer has 0 to 2-hour adjustable timing range (0 to 5-hour range is also available). The timer also has a "hold" position that keeps the mill running until manually turned from the "hold" position. The "hold" position must be used when the operation of the mixer-grinder is to be automatically controlled by other switches. If it is desired to operate the mill for a specific length of time, the timer should be set to this preselected period. The mill will then operate until the time has elapsed. Operation will not be resumed until the timer is again reset manually.

2. *Ammeter—The* load on the mixer-grinder drive motor is indicated by an ammeter on the panel. The load control dial on the right-hand end (facing the dials) of the proportioner controls the load on the motor, which the ammeter indicates. When setting the load, adjust the right-hand (load) dial until full load amps are attained. Full load amps are located on the motor nameplate.

B. Selector Switches:

1. *Gravity Type Mixer-Grinder—There* are two selector switches on the panel, the left-hand switch for mill-drive motor and the right-hand switch for the auxiliary relay that controls ground-feed augers driven by a separate motor. Each switch has three positions: Automatic, Off, and Manual. The "Automatic" position routes the relay coil current through the mill motor overload, timer, proportioner hopper flow switch, proportioner belt guard safety switch, and bin level switch, if used. The "Off" position interrupts the current to the relay coils. The "Manual" position bypasses all control-circuit switches except the mill motor overload. Use the "Manual" position only for testing purposes or emergency situations.

2. *Ground-Level Type Mixer-Grinder—The* ground-level panel has a third selector switch mounted above and between the other two switches. This third switch controls the filling augers relay coil. The other two have the same function as noted above for the gravity type mixer-grinder. In addition, there are four switches across the top of the panel, one for each of the filling augers. When these switches are in the "On" position, the auger motors will operate automatically according to the position of the internal paddle switches.

C. Manual Operation:

When the mill selector switch is in the "Manual" position, all safety switches are bypassed except the mill motor overload. The mill will start immediately if the manual mill switch is energized. The discharge auger will not start unless the auger switch is also placed in the "Manual" position. You must flip these switches back to the "Off" position to shut down the respective motors. Use the "Manual" positions only for testing purposes or emergency situations.

D. Automatic Operation:

With the mill selector switch in the "Automatic" position, the mill is set to be operated under the control of the timer that, when set, will start the mill; allow it to operate a predetermined length of time; and then will stop it. The timer, proportioner hopper flow switch, proportioner drive wire switch, and bin level switch (if used) are wired in series with the relay coil. Should any of the control switches open, the mill motor and the auxiliary system (controlled from the second panel relay) will stop. On the 5, and 7 1/2 HP, single-phase mills, the tripping of the motor overload will cause the entire system to shut down.

E. Accessory Switches:

1. A bin-level switch can be wired in series with the control switches and used to start the mill, to refill a bin, and then to stop the mill. In this case the selector switches are set on "Automatic" and the timer knob placed in the "Hold" position.

2. The mill can be wired through a time clock so that the mill will start at a predetermined time, run for a predetermined period, and stop. The time-clock switch must function only as a switch and must not supply current to the control circuit. It may be necessary to rewire the time-clock switch to insure that it does not supply current to the mill control circuit.

II. PROPORTIONER HOPPER

A. Switch Paddles:

A weighted switch paddle is provided for each ingredient hopper. The paddle is inserted into the filled hopper by sliding the paddle blade down inside the sloping hopper on the proportioner side. An alternate method is to: hold the paddle in contact with the inside face of the empty hopper and then fill the hopper. As long as there is grain in the hopper, the paddle in the hopper will be held in this position. If the supply of grain is exhausted and the hopper is empty, the paddle blade will swing up; the weighted end will swing down, trip the rod, and cause the mill to stop. A paddle is needed for each hopper being used; switch paddles should be removed if hopper is empty. A full hopper with the gearbox knob set on zero will stop a lot of dust flow back.

B. Ingredient Flow Switch:

The trip rod on the hopper engages an over center actuator finger that trips a micro switch.

C. Proportioner Hopper Cover:

The side opposite the proportioner is provided with a proportioner cover held by container latches. This provides an inspection cover and a convenient way to catch samples from the proportioner to determine whether the knobs are correctly set. Removing the cover gives access to all augers and makes it possible to catch samples from all augers at the same time when the sampling chute has been installed.

D. Belt-Guard Safety Switch:

The proportioner is driven by a shear pin. Should a piece of foreign material enter the metering troughs and jam an auger, the shear pin will bend. This disengages the proportioner drive and prevents damage to the internal gear train. After the foreign object is removed the shear pin must be replaced with a new shear pin. *Use only shear pins furnished by Mix-Mill®*. Use of a nail will cause internal breakage of gearbox components and will void your warranty. After replacing the shear pin you must re-engage the disc assembly.

III. PROPORTIONER HOPPER COVER AND HOUSING COVER

A. Magnetic Separator:

All mills are provided with magnets that remove tramp iron from the grain being delivered by the proportioner to the grinding chamber. These magnets function whether the material is bypassed or not.

Important: The magnets should be checked every day, if possible, as metal caught by them will eventually work itself off if not removed. If steel parts are forced off of the magnets by the constant flow of grain they will enter the grinding chamber and destroy a screen and a set of hammers. This type of damage is *not* covered by warranty.

B. Bypass Valves:

The built-in bypass valves on the four-compartment mill give the operator the option of bypassing two ingredients around the grinding chamber. Either the material from the left-hand (No. 1) auger, the material from the right-hand (No. 4) auger, or both can be bypassed. On the six-compartment mill, either two or four ingredients can be bypassed. The material from the two left-hand (Nos. 1 & 2) augers, the material from the two right-hand (Nos. 5 & 6) augers, or all four can be bypassed.

Note: Bypass only materials such as oyster shell or grit, materials that would cause excessive wear on hammers and screens.

IV. GROUND FEED AUGER SYSTEM

The ground feed auger system is driven by a motor mounted on the auger corner. The horizontal auger is built with left-hand flighting, and conveys the ground feed from the mill housing into the belt-driven corner. The elevating auger from the auger corner is either a 3 1/2" extension auger or a 3 1/2" general-purpose auger, as the case may require (either must be keyed to pulley). These augers are built with right-hand flighting and are keywayed. The belt-driven auger corner can be operated at any angle, from horizontal on the left to 60 degree from horizontal on the right. The auger corner, horizontal and vertical augers are considered as accessory items and are not included with a basic mill.

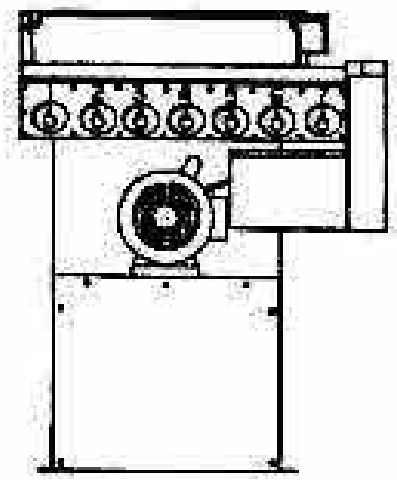
V. GROUND-LEVEL CONTROL HOPPER (GROUND-LEVEL MILLS ONLY)

The function of the ground-level control hopper is to start and stop the motors of the filling augers, thus insuring a supply of grain into the mill at all times. This is accomplished by having the auger drop-pipe discharge into the large compartment that is filled first, then overflow the partition into the bypass compartment, causing the switch paddle to swing back and trip the micro switch, stopping the auger motor. The material feeds out of the bottom of the large compartment, which empties first, and then out of the bypass compartment. When the level of grain drops down sufficiently, the switch paddle swings forward and starts the auger motor; and the cycle repeats itself. This method, originated and patented by MIX-MILL® MFG. CO., provides a time delay so that the filling auger does not start and stop continually.

The four switches across the top of the ground-level panel are used only to select the filling augers to be used. Otherwise, their operation is automatic.

Shut-off plates 10621100 are provided with the ground-level hopper to be inserted under each compartment to keep the grain in the compartments when the gearbox is removed.

CALIBRATION



VI. SETTING THE DIALS

The dials are identified by number from left to right, facing the dials, the dial on the left-hand side being No. 1 and the dial on the right-hand side being No. 5, which is the load dial. In the case of a six-compartment mill, the load dial will be No. 7.

A. The feed formula usually is in pounds per ton. Change the formula into pounds per ton if it is expressed another way.

B. Since the mixer-grinder works on volume, change the formula to bushels per ton. Use a set of scales to get actual weight of each ingredient. Some feed ingredients, particularly mash-type concentrates, will settle to a substantial degree. On the other hand, as materials of this type are delivered by the proportioner, they are not settled at all but are very fluffy.

C. In order to avoid this situation, it is necessary only to "fluff up" any material before it is weighed—that is, make the quantity of ingredient weigh as little as possible. Under no conditions should the ingredients be vibrated or settled as this is not the condition in which they are discharged from the proportioner.

D. The bushels per ton of each ingredient is the dial setting for the knob feeding that ingredient. If a 1/4-delivery auger is used, the dial setting will be four times greater, and if a 1/2-delivery auger is used, the dial setting will be two times greater.

Example:

1. The feed, formula is:	Concentrate	300 lbs.
	Oats	600 lbs.
	Shelled Corn	1100 lbs.

2. For example, say the concentrate has been put **on** the scales and has been found to weigh 41 pounds per bushel when it is fluffed up. The feed formula calls for 300 pounds per ton. Dividing 300 pounds by 41 pounds results in 7.3 bushels per ton being required.

In the same way it is found that 18.8 bushels of oats and 19.6 bushels of shelled corn are required for each ton of finished feed.

The formula for each ton of finished feed is:

Concentrate	7.3 bushels
Oats	18.8 bushels
Shelled Corn	19.6 bushels

3. The dials are then set at:

Concentrate	7
Oats	19
Shelled Corn	20

4. The above settings are entirely correct. However, if somewhat greater accuracy is desired, particularly on concentrate, divide all the settings by the concentrate setting. Then multiply all the settings by a number which makes the highest setting (usually corn) less than, but as near to, 25 as possible. Taking the above settings as an example:

Concentrate	7.3 - 7.3 = 1.00 1.00 x 9= 9.0	The setting would be 9.
Oats	18.8 - 7.3 = 2.58 2.58 x 9 = 23.2	The setting would be 23.
Shelled Corn	19.6 = 7.3 = 2.68 2.68 x 9 = 24.2	The setting would be 24.

5. After setting the dials, it is ESSENTIAL that the settings be checked to make sure that the weights of the ingredients are correct.

VII. CHECKING THE DIAL SETTINGS

The new sampling-chute design makes possible the simultaneous sampling of all ingredients. When using the simultaneous method of sampling, care must be exercised if accuracy within one percent is desired.

Example: To obtain an accuracy of one percent, the amount of least ingredient caught must be at least 100 ounces if the scale used reads to one ounce.

This may make the amount of major ingredient too bulky to catch. When this condition exists, it is best to sample each auger individually, using the timed method.

To attach the sampling chute to a four-auger mill, first remove the cover on back of proportioner hopper. Release the two latches which hold the mill back, and open the mill back slightly. Position the sampling chute so the channel on the underside hooks over the top edge of the mill back. Close the mill back and refasten latches. This holds the sampling chute securely in place.

To attach sampling chute to a six-auger mill, proceed in the above manner except, after removing the cover on back of proportioner hopper, also remove the two aluminum deflectors located in the lower corners of the proportioner hopper.

Caution: To avoid intermixing of ingredients between augers when there is no partition, be sure sampling chute is against the faces of the auger troughs.

A. **Simultaneous Method:**

1. Run the mill until all augers are full. Remove proportioner hopper cover. Remove aluminum deflectors at each side of proportioner hopper on six-auger mills. Place sampling chute into position.

2. Place a container to catch ingredient under each chute trough. Be sure container is large enough to catch a sample of adequate size to assure accuracy.

3. Start mill (a convenient method is to use the trip rod above the control knobs). Let mill run until an adequate amount of the least ingredient is enough to obtain accurate weight.

4. Shut off mill and let run down.

5. Get the net weight of each ingredient (gross weight less container weight).

6. Add together the net weight of all ingredients to get total net weight.

7. Divide 2000 by total net weight of all ingredients delivered.

8. Multiply the net weight of each separate ingredient by the number determined in Step 7. This is the amount per ton of the ingredient delivered.

   Example: Suppose you caught 10 lb. of concentrate

   20 lb. of oats

   37 lb. of shelled corn

   Add 10 plus 20 plus 37 = 67 lbs.

   2000 divided by 67 = 30 approximately

   Now multiply weight of each sample caught by 30 to find equivalent pounds per ton.

   10 x 30 = 300 pounds per ton

   20 x 30 = 600 pounds per ton

   37 x 30 = 1110 pounds per ton

   This is approximately the original formula; therefore, it is not necessary to reset the dials.

   If this result did not agree with the original feed formula, it would mean that the ingredients were not weighted correctly or a miscalculation has been made. In either case the dials should be changed to get the desired amount of each ingredient.

B. **Timed Method:**

1. Set the load dial (on the far right) on 10.

2. Set one ingredient dial on the setting for your formula; all other ingredient dials on zero.

3. Remove the proportioner-hopper cover and assemble the sampling chute to direct the ingredient into a separate container.

4. Start the mill. While it is running, catch in a second container the amount of ingredient discharged in exactly two minutes.

5. Weigh and deduct container weight.

6. Repeat the above operation for each ingredient.

7. Find total net weight of all ingredients delivered by adding net weights. Divide 2000 by total net weight of all ingredients delivered.

8. Multiply the amount of each separate ingredient by **the** number determined in Step #7. This is the amount per ton of the ingredient being delivered.

Reset dials to obtain an accurate amount of ingredient desired, if necessary.

Example: The feed formula is:	Concentrate	300 lbs.
	Oats	600 lbs.
	Shelled Corn	1100 lbs.
The dial settings are:	Concentrate	9
	Oats	23
	Shelled Corn	24

The load dial is on 10; the concentrate dial on 9; oats on 23; and shelled corn on 24.

Assume that 10.0 lbs. of concentrate was caught, 20 lbs. of oats and 37 lbs. of corn.

To find net weight of all ingredients, add 10 lbs. plus 20 lbs. plus 37 lbs. which equals 67 lbs.

To find the amount of each ingredient in a ton of feed, divide 2000 by 67 = 30 approximately. Now multiply the weight of each sample caught by 30 to find the equivalent pounds per ton.

Then the amount of each ingredient per ton being delivered is:

Concentrate	10 x 30 = 300
Oats	20x30 = 600
Shelled Corn	37x30 = 1110

This is approximately the original formula. Therefore, it is not necessary to reset the dials.

If this result does not agree with the original feed formula, it means that the ingredients were not weighed correctly or a miscalculation has been made. In either case, the dials should be changed to get the desired amount of each ingredient.

VIII. METERING MEDICATION

There are two basic ways of metering antibiotics and micronutrients through the mill.

1. Premix method or "bulking up" method.
2. Direct metering method, with a Medicator.

The standard proportioner will meter quantities as small as 60 lbs. per ton. A proportioner with a premix section will provide delivery of 15 lbs. per ton on the left-hand auger, or No. 1 auger. The Medicator will provide delivery of material with approximate ranges of 0-5, 0-10, and 0-20 lbs. per ton.

A. **Premix Method:**

This method consists of "bulking up" the material to about 100 pounds per ton. The premix is then fed through one of the compartments of the proportioner.

This bulking up for medium to small quantities of ration can be done by using a Mix-Mill© 250# or 500# Nutri-Blender. Do not use corn, oats, or other granular grains for the premix, as the antibiotic is likely to settle out after mixing.

When a premix is to be used, proceed as follows:

1. Do not change the ingredient dial settings.
2. Add all the ingredient dial settings. Do not include the load dial on the right or any empty proportioner compartments.
3. Divide 2000 by the sum (total) of the ingredient dial settings. This is the average pounds per ton of finished feed fed by a single dial.
4. Thoroughly mix the amount of antibiotic wanted per ton with two times the number of pounds of finished feed per dial point found in Item #3.
5. Set the premix dial on 2 (on standard proportioners). With premix section, set dial on 8. With 1/2-delivery gears, set dial on 4.

Example: Suppose the 1/2 lb. per ton of an antibiotic is to be fed into the ration previously used as an example.

	Ration	**Dial Setting**
Concentrate	300 lbs.	7
Oats	600 lbs.	19
Shelled Corn	1100 lbs.	20

(a) The dial settings for the ingredients will not be changed.

(b) The sum of the dial settings is 7 + 19 + 20 = 46.

(c) The average lbs. per ton fed by a dial setting of one is 200 + 46 = 43.5 lbs.

(d) One-half lb. of antibiotic thoroughly mixed with 43.5 x 2 = 87 lbs.

(e) The premix dial will be set on 2.

The complete dial setting will be:

Premix	2*
Concentrate	7
Oats	19
Shelled Corn	20

*With premix section, the setting would be 8. Most gearboxes do contain a 1/4 speed premix section.

If 1 lb. per ton of antibiotic is desired, one lb. would be mixed with 87 lbs. of soybean meal and the premix dial setting would be 2. If 1/4 lb. of antibiotic (per ton) is needed, the premix would consist of 87 lbs. of soybean meal and 114 lb. of antibiotic with the dial setting remaining at 2. Any other quantity of antibiotic can be fed in the same manner by premixing it with the proper quantity of soybean meal (87 lbs. in this example).

B. Direct Metering Method:

This method involves the use of a Medicator with the proportioner. To set the correct rate of medication, proceed as follows:

1. To determine the lbs. per hour of feed being ground, catch a sample of the complete feed during a timed period.
2. Determine the lbs. per hour of medication required to give the lbs. per ton of medication recommended.
3. Select a feed auger of the range that will give the pounds per hour of medication required. Three ranges are provided, 0-5, 0-10, and 0-20 lbs. per hour.
4. Set the knob on the medicator auger and catch a sample over a timed period. If the amount delivered is not correct, change the setting and repeat until the correct amount is being delivered. (Time will be saved by calibrating the medicator with the material being used, and making a graph, plotting knob setting on the horizontal axis and pounds per hour on the vertical axis. Using settings of 1, 5, 10, 15, 20, and 24 will provide enough points to draw a curve on the graph. Then, using the graph, the desired pounds per hour can be found on the dial setting selected.)

Example: Suppose 5 lbs. of medication are wanted per ton of feed.

(a) Catch the output of complete feed in a bucket or bag over a timed period.

Container and feed	62 lbs.
Container	-2
	60 lbs.

Time to collect sample = 2 minutes

60 = 30 pounds per minute 2

30 x 60 = 1800 lbs. per hour

(b) Determine the pounds per hour of medication to put 5 lbs. of medication in a ton of feed.

$\frac{1800}{2000} \times 5 = \frac{9}{10} \times 5$ - 4.5 lbs. per hour of medication

(c) Using the 0-10 pound per hour range auger in the insert, set the dial at about 12 and check the amount delivered. This can be done by either of two methods.

Method A—Catch the delivery for exactly 6 minutes. The weight of material caught multiplied by 10 is the amount per hour delivered. A postal scales or kitchen scales are suitable for weighing.

Method B—Using a scale calibrated in ounces, catch the delivery for exactly 3 3/4 minutes. The number of ounces caught in this time is the same as the pounds per hour. For example, if 4 ounces are caught in 3 3/4 minutes, the medicator is delivering at a rate of 4 pounds per hour.

(d) If the delivery of medication is greater than or less than the 4.5 pounds per hour required, readjust the dial setting and recheck the delivery.

Do not pound on the hub while removing or replacing it as the damage will be done to the motor ball bearings. A blow will cause the hard ball bearings to make an indentation in the bearing race. Failure will result, in time, due to "brinnelling".

When to change hammers (and screens) can be determined only by an examination of the texture of the feed produced. The feed texture becomes finer as the hammers wear, and capacity decreases somewhat. Full length, sharp hammers produce the best feed.

SECTION V

MAINTENANCE AND TROUBLESHOOTING

1. Housing:

Both the mill back and the mill housing have replaceable wearplate assemblies that make it possible to replace the screen rings, entry throat, and wear surfaces so that the basic mill housing will never be subject to wear.

2. Screens:

Screens can be reversed in the mill housing for extended life.

3. Hubs and Hammers:

The hammers, hammer **bolts, and hub washers are** replaceable. The hammers can be reversed to double their life. They can also be moved in sets of three from the point of grain entry to the back of the housing for additional life. When changing their location, care must be exercised to keep the hammers in their original sets of three to prevent unbalance.

It is of great importance to inspect the hammers to see if they are wearing properly. Figure #5 illustrates normal wear of a worn out hammer. To get the maximum life out of your hammers, you should rotate the hammer 180° when it wears to the middle of the end tip. The other side can be worn down to the same point, but after the length of the hammer has been affected the hammer is then worn out, as illustrated in Figure #5.

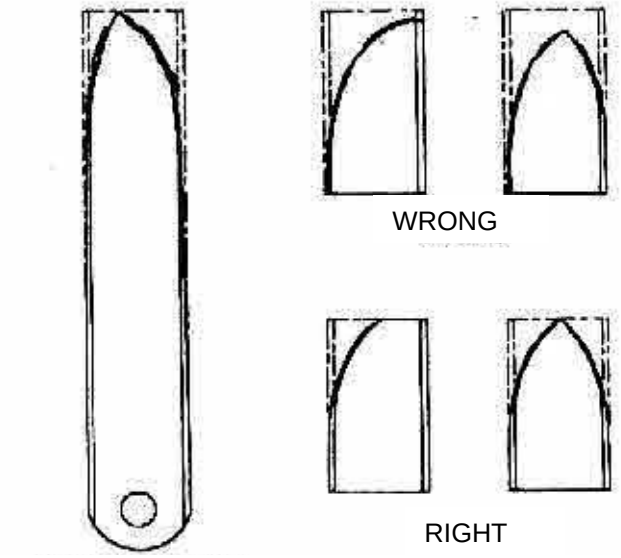


FIGURE 5

The hammer bolts can be rotated 180° in the square holes to present new unworn surfaces to the hammers. This will double the bolt life and maintain the hammer tip clearance.

Hub washers should be replaced if the bolt holes are worn or if the washer is loose on the hub.

Vibration is hard on the motor bearings and can cause premature failure. An out-of-balance condition can result from vibrations caused by a broken hammer. If replacement hammers are not on hand, remove the broken hammer and also the other two hammers in the same set of three. Operate without these three hammers until replacements can be obtained.

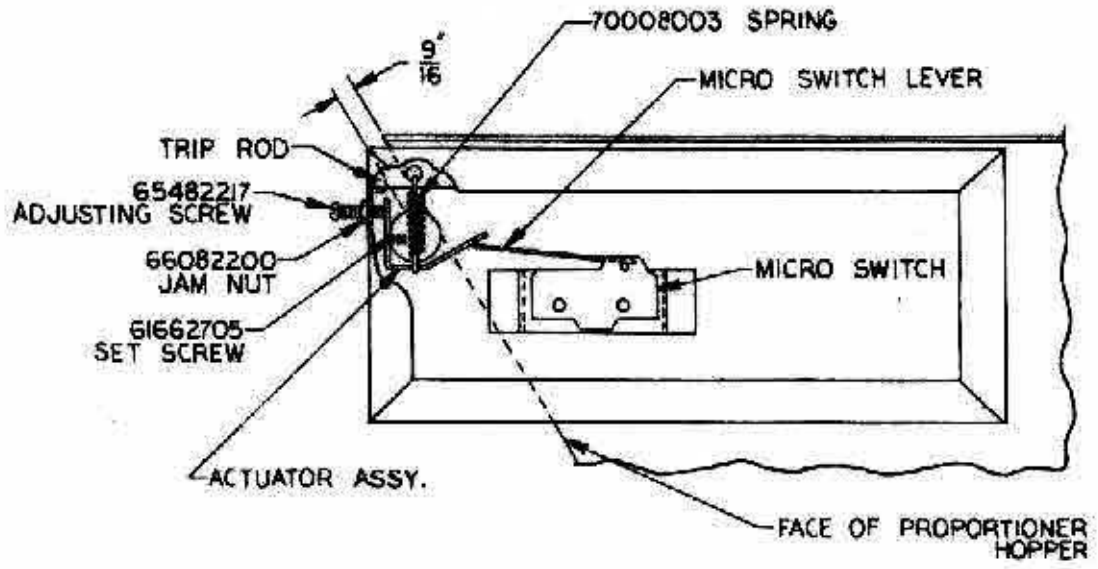
Vibration can be caused by beater washers that have the center holes worn where they contact the beater hub. If a washer is loose on the hub, replace it.

Vibration can be caused by uneven wear of the hammer on the hammer bolts. In spite of carefully-controlled heat treating of the hammers and bolt, the wear is not uniform. The bolt that wears fastest permits the hammers to move out farther from the center of rotation, causing unbalance. The bolts can be- rotated or replaced.

When replacing the mill motor another source of vibration and noise could occur from the hammers striking the screen. This can be corrected by shimming the motor and using a mill knife extended out as a gauge to see that there is a uniform clearance at the tip of the mill knife all around the screen. Check at the back of the housing and at the cover side of the housing while the screen is securely in place in the screen ring.

When removing hub, it is important to clean the threads that the hub puller screws into. The easiest way to do this is to use a I/2" x 20 thread per inch tap. Lubricate the threads in the hub before using the hub puller.

4. Adjustment Instructions—Proportioner Hopper Safety Switch:



SAFETY SWITCH ASSEMBLY

a. Back out 65482217 adjusting screw in end of switchbox to clear actuator and remove 70008003 spring.

b. Position actuator set collar on end of trip rod by inserting Allen wrench through hole in end of switchbox into 61662705 set screw in actuator.

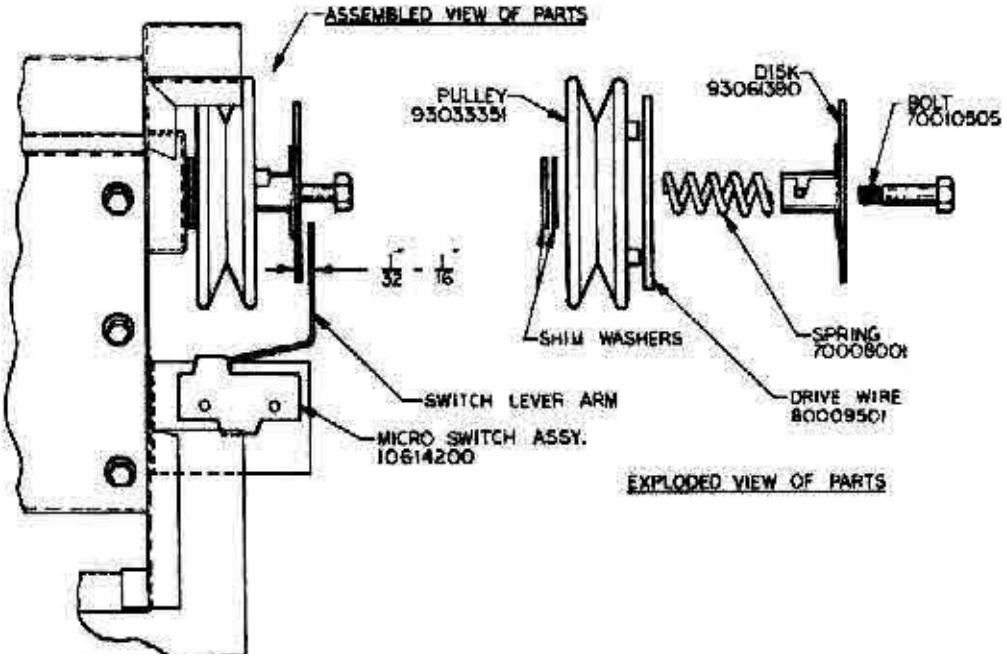
c. Position trip rod 9/16" from face of proportion hopper as shown, using a spacer (9/16" dia. rod is good). Tighten actuator set screw securing actuator to trip rod.

d. Assemble 70008003 spring from hole in switchbox above center line of trip rod to hole in actuator at notch in actuator.

e. Screw 65482217 adjusting screw against actuator to hold the trip rod in the 9/16" position as in Step c. Lock in place with 66082200 on adjusting screw.

f. If necessary for proper tripping, minor adjustment may be **made** with adjusting screw. Care must be exercised to make sure the weighted paddle will always actuate the trip rod and not bind or hang up on the rod and that the actuator will have enough travel to trip the micro switch.

ASSEMBLED VIEW OF PARTS



EXPLODED VIEW OF PARTS

5. **Adjustment Instructions—Belt Guard Safety Switch:**

a. Parts should be assembled as shown above, using the 70010505 1/4" bolt to hold up the 80009501 drive wire in place. Use shim washers to position 93033351 pulley hub within 1/32" of drive wire.

b. Push the 93061390 disk in and turn until the notches in the disk engage the drive wire (be sure both sides of disk are hooked to drive wire) . Lever arm of 10614200 switch must be outside disk with 1/32" - 1/16" clearance as noted above (arm must not rub disk). Bend switch lever arm, if necessary, to position properly. Check clearance with mill running to be certain that slight amount of wobble disk may have is not enough to rub or trip switch lever.

c. Use only drive wires supplies by MixMill® Mfg. Co. These are made of soft annealed wire and are available free from our Company. Using hardened pins or finishing nails will not protect the gearbox and could result in damage. If a drive wire bends, look for the cause. There might be foreign material in one of the augers, a loose bushing in the drive pulley, feed backed up in cover and obstructing augers, or possibly something wrong inside the gearbox.

6. Adjustment Instructions—Ground Level Hopper (Ground Level Mills Only):

a. A ground level cover has been provided for the input of incoming ingredients. Install 4" downspouting into each respective compartment for the correct ingredient needed.

b. The adjustable slide at the lower end of the bypass partition can be adjusted up and down. The lowest position should be used for free-flowing materials and the highest position for the difficult-flowing materials, such as bran and dried beet pulp. A good place to start the adjustable slide is at the midpoint of the range.

c. The precision snap-action switches inside the control box should be adjusted so that the switch snaps with a very slight movement of the actuating paddle, long before it swings back and touches the hopper side wall. The adjustment can be made by either turning the switch actuator lever on the pivot rod or by bending it slightly.

7. Replacement and Adjustment Instructions—Auger Corner Belt:

a. Assemble the round belt over the auger pulleys and idler pulleys. To avoid undue belt wear, adjust pulley on vertical auger up or down so that belts from idlers will enter this pulley in a horizontal line. They should not ride "heavy" on either top or bottom of pulley groove.

Caution: Bolts holding hinged idler brackets to auger corner must be loose enough to allow idlers to find their proper alignment with the belt. After this adjustment is completed retighten the bolts.

b. Adjust idler pulleys approximately even each side to arrive at proper belt tension. With an approximately three-pound pressure applied midway between idler pulley and vertical auger pulley, belt should deflect no more than 1/16".

c. Because all new belts will stretch when first put into service, the tension on the auger corner belt must be checked periodically after approximately fifteen minutes, one hour, and five hours of running time.

8. Replacement and Adjustment of Proportioner Belt:

a. Open main power switch.

b. Open cover over beltguard.

c. Release adjustable idler pulley on side of beltguard and slip belt off proportioner pulley.

d. Open back of mill and remove screen, beater assembly, and pulley from mill-motor shaft. Remove worn belt through hole in housing.

e. Slip new belt around motor shaft and through hole in housing around motor shaft. Replace pulley, beater assembly, and screen. Close mill back.

f. Rethread proportioner belt over idlers and proportioner pulley.

Note: Do not twist belt when placing over idler pulley or the gearbox will run backwards and no ingredient flow can be obtained. If this occurs a clicking sound will be heard coming from inside the proportioner.

g. Adjust the movable idler in beltguard to take up the slack in the belt and enough additional tension to insure its driving the proportioner without slipping or flapping. Pinch the two vertical strands of belt together lightly with your thumb and forefinger halfway between the proportioner pulley and the adjustable idler just under the switch bracket. The distance between the strands should be 1 " to 1 1/4" when properly adjusted.

9. **Proportioner Replacement:**

Unless auger shaft and ratchet, auger bearings, auger shaft seal, or proportioner itself are to be replaced, it is not necessary to remove proportioner from the mill. It is *not* necessary to remove knobs to remove cover assembly from proportioner.

a. Open main power switch.

b. Drain oil, using pipe plug on bottom.

c. On gravity mills, close valves from overhead bins. On ground-level mills, insert one shutoff plate between ground-level hopper and proportioner hopper in each compartment. This prevents grain from flowing out when proportioner is removed.

d. Open cover over proportioner pulley.

e. Release adjustable idler pulley on side of beltguard and slip belt off proportioner pulley.

f. Remove nuts from four bolts holding proportioner to hopper.

g. Proportioner can now be removed from hopper without further disassembly.

Note: On certain horsepower mills, it may also be necessary to remove capacitor cover from mill motor.

h. To replace, reverse above procedure.

Note: To assure good proportioner performance, the oil should be changed every four months. With auger knobs set on 0 and the load knob on 25, run mill for five minutes, then drain gearbox immediately. Clean oil (Texaco Preservative Oil 10W) should be used to refill the proportioner.

10. **Servicing the Proportioner:**

Unless auger shaft and ratchet, auger bearings, or auger shaft seal need replacing, it is not necessary to remove proportioner from the mill.

a. Drain oil, using pipe plug on bottom before removing cover.

Note: Proportioner oil should be drained and replaced every four months.

b. Record all control knob settings to avoid necessity of recalibrating after servicing.

c. Set all knobs on 25.

d. Remove all cover bolts (do not loosen or remove control knobs as they are part of cover assembly and come off with cover).

e. Remove cover and replace defective parts, including gaskets and rubber "0" rings if damaged or deformed.

Caution: Pawl springs look alike except that the pawls on auger shafts are colored blue and the springs on the worm wheel are bright.

(1) **To replace auger shaft and ratchet:**

(a) Remove auger from shaft on back of proportioner.

(b) Remove set collar and thrust washer.

(c) Wipe shaft clean of dirt and grit to avoid pulling into bearing when shaft is removed.

(d) Carefully remove shaft and ratchet out the front of proportioner, twisting slightly as it is removed.

(e) With pawl carrier pushed tight against nylon bearing shoulder, check to be sure end of nylon bearing extends slightly through the pawl carrier tube. If it does not extend through, replace the nylon bearing.

(f) Make sure the two rubber "0" rings are in the two grooves on the shaft and are not damaged or distorted.

Oil the rubber "0" rings. Then insert the auger shaft and ratchet carefully through the nylon bearing (1/16" thick thrust washer must be between ratchet wheel and end of pawl carrier), twisting slightly as it is inserted.

(g) Replace nylon washer and set collar on auger shaft at back of proportioner, allowing only enough end play in auger shaft and ratchet to let it turn without binding as this positions ratchet relative to pawls.

(2) **To replace nylon auger shaft bearing:**

(a) Remove auger shaft and ratchet as in paragraph 1.

(b) Remove pawl carrier.

(c) Remove four screws holding seal and bearing in place (see back view of proportioner, page 49.

(d) Replace bearing, gaskets, and seal in sequence shown on page 49, back view of proportioner.

(e) When replacing bearing, new gaskets and seal should also be replaced.

(f) Replace parts as outlined in paragraph 1.

(3) **To replace movable cam on cover:**

(a) With cover removed, loosen set screw through side of control knob.

(b) Remove knob (being careful not to lose the steel index ball between knob and cover).

Note: All units produced after 1980 will have a spring plate locator that is permanently mounted. This plate replaces the steel ball.

(c) Remove movable cam and rubber "0" ring from recess in fixed cam tube at front of cover.

(d) Replace rubber "O" ring with a new one, oil "0" ring, and insert new movable cam carefully through the fixed cam tube and "0" ring, twisting slightly as cam tube is inserted to avoid damage to "0" ring.

(e) Align movable cam with fixed cam very carefully as misalignment will cause an improper knob setting. With cams properly aligned, replace indexing ball and knob with knob at a setting of 25. Press fixed cam tube and knob together, firmly compressing spring plate, and tighten set screw in the side of knob to secure in place. (Too much pressure will result in the knob being too difficult to turn. In rare circumstances too light of pressure could result in the knob rotating by itself while running.)

Recheck with knob at setting of 25 to be sure the two cams are exactly lined up.

(4) **To replace worm wheel:**

(a) Remove gasketed bin bolt on back of proportioner which holds worm wheel shaft in place.

(b) Lift out worm wheel assembly and shaft.

(c) Replace worn or damaged parts.

(d) When reassembling worm wheel and shaft assembly, be sure the 1/8" thick thrust washer is between back of proportioner housing and worm wheel assembly. Replace gasketed bin bolt (if gasket on bin bolt is deformed or damaged, replace with a new one).

Caution: Make sure the serrated end of the worm shaft is fully engaged in the mounting hole when installing the bin bolt. Failure to do this will cause the worm shaft to be installed at an angle. This will lead to early failure of worm gear teeth and possible damage to the steel housing of the gearbox itself. Making total replacement necessary.

(5) **To replace worm:**

(a) Open beltguard cover, and release adjustable idler pulley. Slip belt from proportioner pulley.

(b) Remove switch actuator disk, drive wire, and pulley.

(c) Loosen set screws holding bearing hub to shaft (see item 24 on page 47), one at each bearing.

(d) Remove bearing at pulley end of proportioner.

(e) Shaft with worm can now be removed through bearing hole.

(f) Remove rubber "0" ring from groove in shaft close to worm. Drive spring pin (item 34 on page 47) through worm hub (save this pin as it can be reused) . Replace worm, making sure hub end of worm is toward snap ring on shaft. Align hole in worm hub with hole in shaft, and drive in spring pin to secure. (Be careful not to bend shaft.)

(g) Replace rubber "0" ring in shaft groove with a new one as it is very difficult to remove this ring without damage.

(h) Replace shaft and worm, making sure snap ring on shaft is against bearing hub at left, when facing front of proportioner.

(i) Replace bearing assembly, and tighten set screws in each bearing hub. Replace spacer washers between bearing and pulley hub, pulley, drive wire, switch disk assembly, and belt. Readjust idler pulley.

(6) To replace end bearing:

(a) If bearing next to pulley is to be replaced, remove the plug on top. The bearing then can be replaced without removing the proportioner cover because the set screws in the bearing hub can be reached through the pipe plug holes.

(b) Loosen set screw in bearing hub. Remove bearing retainer cup.

(c) Slide bearing and hub off end of shaft.

(d) Replace complete bearing assembly including hub, gasket, and "0" ring in groove in shaft if deformed or damaged. Tighten set screw in bearing hub.

(e) Replace pulley, drive wire, switch disk parts, and belt. Readjust idler pulley.

(f) Bearing on opposite end replaces in the same manner.

(7) To replace proportioner cover assembly:

(a) Set all control knobs at 25.

(b) Replace gasket, preferably with a new one, placing a bead of No. 2 Permatex (non-hardening) around flange under gasket.

(c) Position cover so ends of auger shafts enter bearings in cam hubs.

(d) With light pressure on cover rotate the pulley counter clockwise when facing pulley. This causes pawls to ride up over cams letting cover down against the gasket. DO NOT FORCE. Damage to springs and other components *will* result.

(e) Replace all cover bolts making sure rubber gaskets under the bolt heads are not deformed or damaged. Tighten evenly starting at the center and working toward each end. Tighten only enough to prevent leakage.

(f) Replace drain plug in bottom. Make sure it is tight.

(g) Remove gasket head bin bolt from oil level hole on end of proportioner. Refill with the recommended oil to the oil level hole. Replace gasket head bin bolt and breather plug.

(h) Reset control knobs to their original settings recorded at the beginning. 11.

Electric Motors and Electrical Systems:

a. Fuses or circuit breakers blow immediately before the motors come up to speed.

(1) Check for proper voltage coming in. Low voltage can cause this problem. If voltage measures OK you may possibly have a defective mill motor. Refer to a qualified electrician or service technician. If additional motors have recently been added fuses or breakers may be under-sized.

(2) The fuses are not lag type, such as Fusetrons.

(3) A fault (ground or short circuit) is somewhere in the wiring, motor, or some other device. Refer service to a qualified electrician or Mix-Mill[en] trained service technician.

b. *Fuses or circuit breakers blow after a period of operation.*

(1) The fuse or circuit breaker may be too small for the total load. The fuse or circuit breaker should be approximately 25 % greater than the normal maximum operating load. Do not increase the fuse or circuit breaker **size** without regard to the size of the wire being protected.

(2) There may be a poor connection in the fuse box.
Poor connections will get hot, raise the temperature of the fuse, and cause it to blow well below its rating. The poor connection can be a loose terminal screw, low pressure between the switch blades and clips, plug fuse not screwed in tight, low pressure between cartridge fuse and clips, or dirty contact surface.

Switch and cartridge fuse clips loose their spring tension after they once have been hot. Auxiliary clamps must be used or the switch replaced.

(3) Temporary ground or short.
It is possible but not very likely for a temporary fault to come and go. This happens so infrequently that it probably can be ignored.

c. Overload trips before the mill gets up to speed.

This can be caused by too much grain being on the screen when the mill starts. Before restarting the mill, pull the main line switch., remove the mill back, and remove the grain from the screen. If problem still exists a low voltage problem or a motor problem could be the cause.

d. Overload trips after a period of operation.

Motor is overloaded.
Load meter may be incorrect. Check load current with amp-probe. Adjust load knob to obtain full load amps as listed on motor name plate.
Fan or fan blades are missing.
Air ducts between inner and outer shell are plugged.
Bearings are worn out and rotor is dragging on the stator—makes a loud noise.

Defective (shorted) motor. A motor with a small short circuit in the winding could trip the overload without blowing the fuse. However, a small short circuit will result in a burned-out motor after operating for a short period of time.

A burned-out motor will have a distinct burnt smell. It may growl when energized, may not start at all, or if it does, will not come up to speed. Such a motor must be replaced.

A burned-out motor is always shorted. Sometimes it is also grounded. **Note:** A grounded motor can present a shock hazard.

e. Motor connections.

Mill motors are wired for CCW rotation on 230/460 volts. They should not be run CW facing the shaft (proportioner will operate in one direction only) . Motor connections should be made for the correct incoming voltage as listed on the motor nameplate.

Auger motors have terminal boxes and several wire leads which can be connected for 230 or 115 volts and either direction of rotation. The diagram of connections is on the cover of the terminal box. Follow the diagram exactly. Do not make connections by trial and error. The motor will appear to operate normally when the overload or one-half of the motor winding is not in the circuit. Always operate motors on 230 volts whenever possible. Motors will draw 1/2 the current when operated 230 volt instead of 115 volt.

Most mill motors are shipped connected for 230 volts and CCW rotation (counter-clockwise when viewed from the shaft end) . A 460 volt system is available on special order.

If a motor connected for 230 volts is connected to a 115-volt line, the motor will have only 25 % output. This may cause overheating of the motor winding and may lead to motor failure.

If wired for 115 volts and connected to a 230-volt line, the overload will usually open, protecting the motor winding. However it is possible to burn the winding causing motor replacement to become necessary.

f. The motor will not start.

Turn the shaft by hand to make sure it is free.

(1) If the motor does not hum:

There may not be any power to the motor. Check for voltage at the motor leads with a test light or voltmeter.
The overload protector may be tripped. (Reset—overload)
Motor leads may be loose at the panel terminal board. (Tighten all connections) Motor connections are not made correctly. (Check wiring diagram)
Defective (open circuit) motor. Check from one lead L1 to the other L2 with an ohmmeter. A high reading (more than 100) indicates a defective motor. This test is made with power off. Bad relay contacts. (This may cause low voltage or no voltage to motor)
Open coil on motor relay. (This will result in no voltage to motor)

(2) If the motor hums but does not start:

If there is a loud growl, the motor winding may be partially short circuited and is, or soon will be, burned out. Check motor bearings.

If there is a hum, it probably means the start switch is keeping the run winding energized. Replacement of the start switch is usually required. Repeated attempts to start may burn out the motor wiring.

g. Noisy bearings.

It may not be necessary to replace a motor because of noisy bearings unless there is noticeable end play in the shaft. Bearings should be replaced to prolong the life of the motor windings.

Ball bearings eventually wear out, but their life is seriously reduced by operating the motor overloaded, in a hot area (high temperature operation causes the grease to leak out of the bearings). Hammering on the motor shaft can also cause premature bearing failure and will void your warranty.

When bearings are to be replaced, it is recommended that the motor be returned to the motor repair station.

h. Low output from the mill.

The complaint is, "The mill formerly operated with a load dial setting of 20, but now it cannot be set higher than 15. What is the matter with the motor?"

There is nothing wrong with the motor. There is almost nothing that can happen to a motor which will cause it to loose power. Dozens of motors have been returned for this reason. In every case, the motor has been found to be in perfect condition. The reduced output could be caused by:

(1) Worn screen or hammers.

(2) Low voltage.

(3) Motor leads connected for 230 volts but connected to a 115-volt line.

(4) Change in feed formula (less concentrate).

(5) Incorrect load meter.

(6) Most likely it is a change in the condition of the grain which may change the capacity by 20%.

i. Line voltage.

Motors are built to operate at 10 % over or under the nameplate voltage rating. If the voltage is off more than 10 % (usually under), performance suffers and you can burn out a motor winding.

This is of primary importance. No motor will give good service unless it is supplied with good voltage.

The voltage available during starting is also important. Special attention should be given to this condition because the heavy starting current (amps) inrush pulls the voltage down far more than when the motor is running.

This is especially important for mill motors. Every new mill (and those which sometimes trip their overload during starting) should have the voltage measured during starting. With the mill stopped, place two or three handfuls of grain on the screen. Set the dials normally, start the mill, and read the voltage as soon as the voltmeter stops swinging and before the motor comes up to full speed. There should be at least 198 volts right at the mill.

j. Burned lead insulation.

Occasionally a panel will have two or three inches of insulation burned off. This is almost always the result of heat caused by a poor connection at a terminal screw.

Replacement Parts Lists and Wiring Diagrams

INPUT POWER WIRING

Electrical input wiring should be done by a qualified electrician following NEC and local standards. Each machine should be grounded to a ground rod driven at least 8 feet into moist soil.

SECTION VI

REPLACEMENT PARTS

1. **Replacement Part Ordering Instructions.**

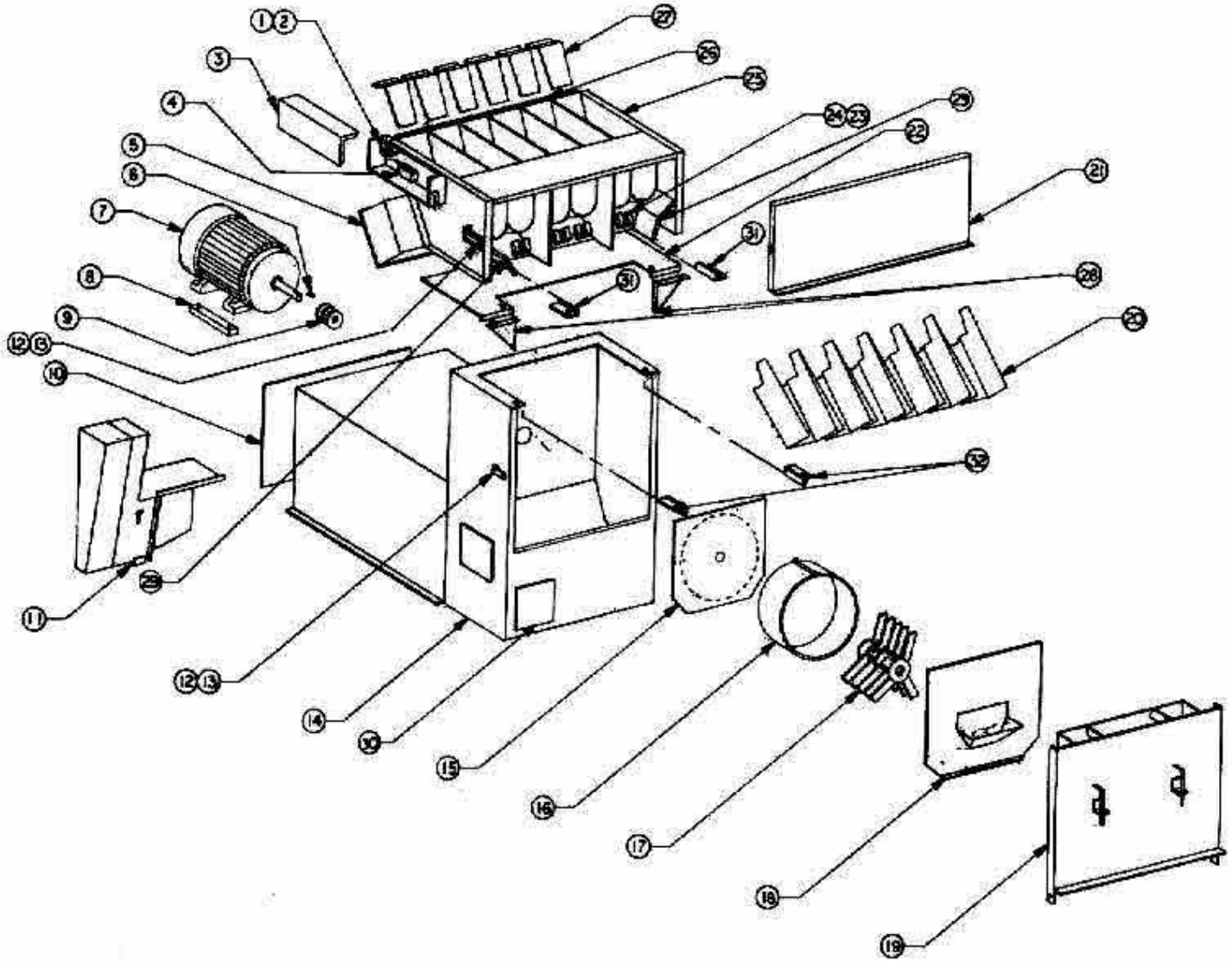
To insure receipt of correct items when ordering replacement parts, use the following procedure:

a. Furnish the serial number and model number of mill from mill nameplate. This identifies your mill as a certain design with various type accessories. This information is needed regardless of type or parts being ordered.

h. If a replacement motor or motor part is desired, specify complete data from motor nameplate.

c. If a replacement proportioner or proportioner part is desired, specify model number of proportioner. To identify the proportioner model number, examine the top right corner of proportioner and furnish Mix-Mill® Mfg. Co. with the three characters stamped on this corner.

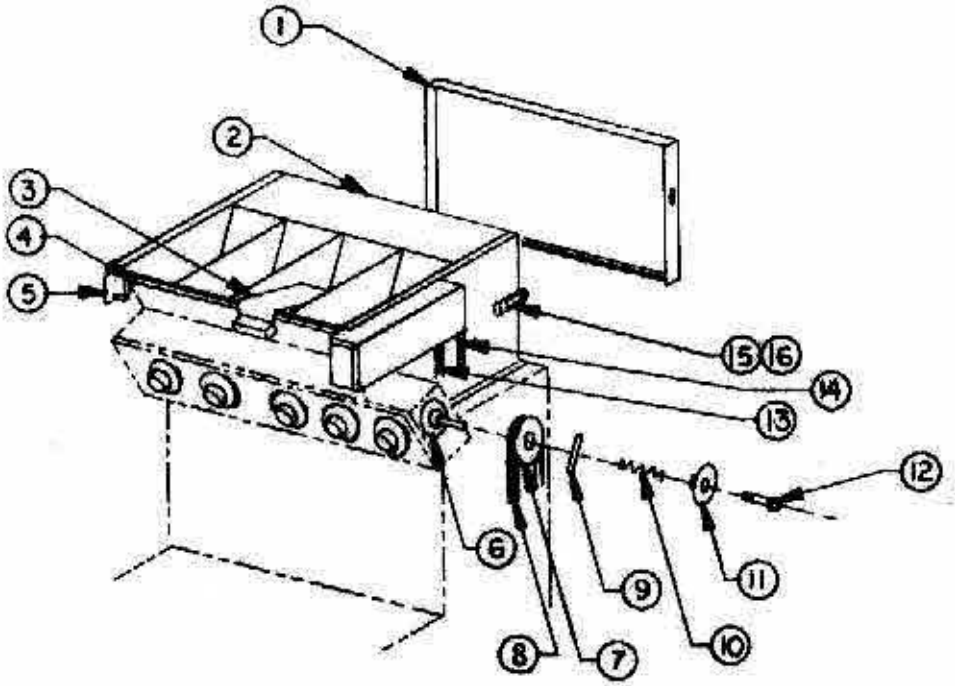
"CX" GRAVITY MILL
REPLACEMENT PARTS

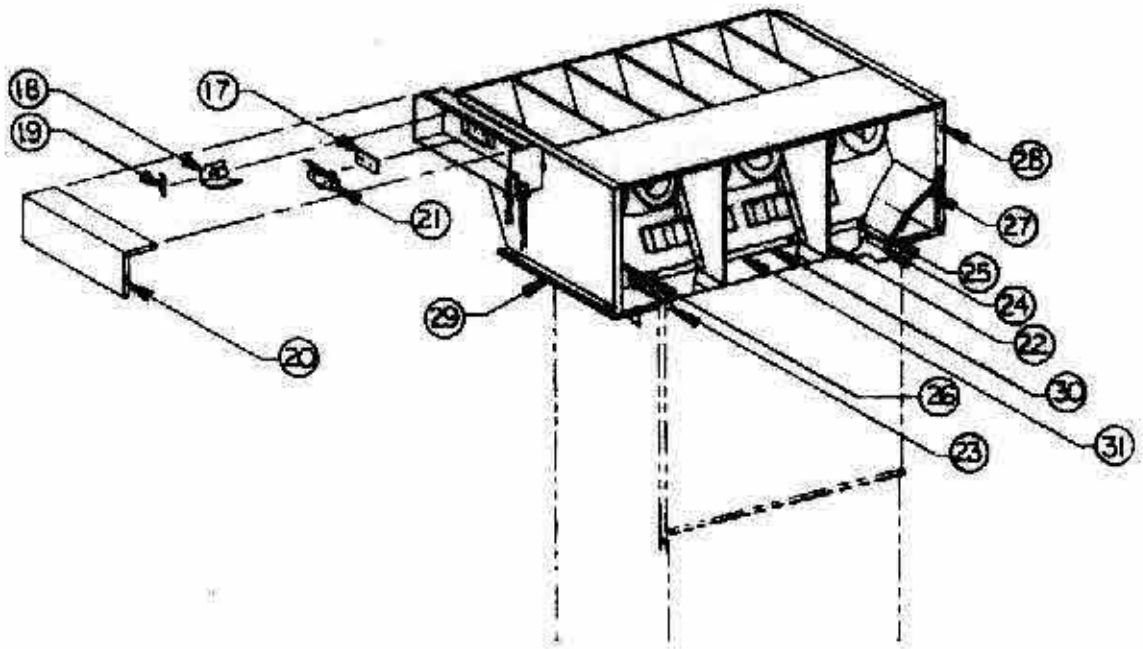


" C X " G R A V I T Y M I L L
REPLACEMENT PARTS

		4 COMPARTMENT		6 COMPARTMENT	
Item	Description	**Qty.**	Part No.	Qty.	Part No.
1	Trip Assy.—Micro Switch	1	90000123	1	90000123
2	Spring—Micro Switch	1	70008003	1	70008003
3	Cover—Switch Box	1	11195901	1	11195901
4	Micro Switch Complete	1	31008001	1	31008001
5	Proportioner	1	93112554	1	93112566
6	Key—Straight (1/4" Sq. x 2-5/8" Lg.)	1	49000642	1	49000642
7	Motor 7 1/2 H.P.-1$	1	33000401	1	33000401
	Motor 5 H.P.-10	1	33000402	1	33000402
	Motor 3 H.P.-1P1	1	33000403	1	33000403
	Motor 5 H.P.-30	1	33000405	1	33000405
	Motor 7 1/2 H.P.-3O	1	33000406	1	33000406
	Motor 10 H.P.-30	1	33000407	1	33000407
8	Bar—Motor Mounting				
	(Used on #184 Frame Motors)	2	10615500	2	10615500
9	Sheave—Mill Motor	1	10634001	1	10634001
10	End—Mill Housing	1	10607800	1	10607800
11	Belt Guard & Idler Pulley Assy.	1	93063071	1	93063072
12	Latch Assy.—Mill Back	4	10627700	4	10627700
13	Pop Rivet—Open End (5/32" Dia. x 3/8")	8	70007001	8	70007001
14	Mill Housing Assy.	1	93071420	1	93071420
15	Wear Plate—Housing	1	10610300	1	10610300
16	Screen (See Page 54 for replacement no.)	—			
17	Beater Assy. Complete	1	93000972	1	93000972
18	Wear Plate—Back	1	93061020	1	93061020
19	Back Assy.	1	93079040	1	93079040
20	Sampling Chute	1	93078960	1	93078970
21	Cover Proportioner Hopper	1	10783300	1	10783500
22	Adapter Plate	—	—	1	10719700
23	Magnet Mill	4	80008001	6	80008001
24	Spacer Hammer	4	80013503	4	80013503
25	Proportioner Body Assy.	1	93060861	1	93072111
26	Trip Rod	1	10856901	1	10856902
27	Switch Paddle Assy.	4	90000131	6	90000131
28	Support Bracket—Right	—	—	1	10854201
	Support Bracket—Left	—	—	1	10854202
29	Deflector—Right			1	10783001
	Deflector—Left	—	—	1	10783002
30	Bank Plate	1	10148301	1	10148301
31	Deflector Retainer	—	—	2	10786000
32	Seal Retainer Assy.—Right	1	93072011	1	93072011
	Seal Retainer Assy.—Left	1	93072012	1	93072012

PROPORTIONER HOPPER ASS'Y.
REPLACEMENT PARTS



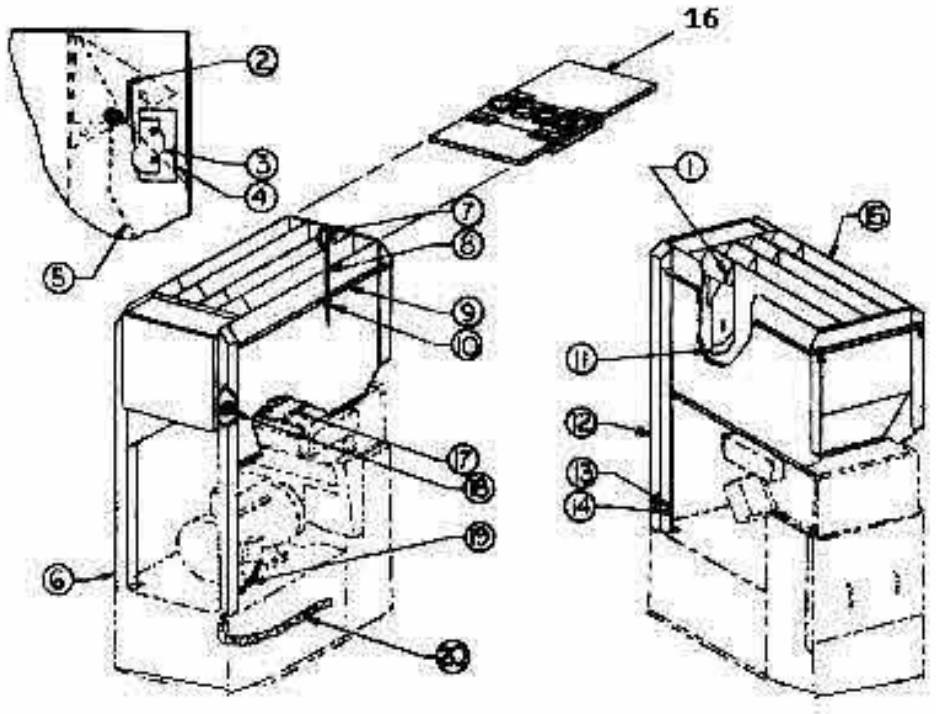


PROPORTIONER HOPPER ASS'Y
REPLACEMENT PARTS

		4 COMPARTMENT		6 COMPARTMENT	
Item	Description	Qty.	Part No.	Qty.	Part No.
I	Cover—Proportioner Hopper	1	10783300	1	10783500
2	Proportioner Body Assy.	1	93060861	1	93072111
3	Switch Paddle Assy.	4	90000131	6	90000131
4	Trip Rod	1	10856901	1	10856902
5	Push on Fastener	1	70006002	1	70006002
6	Retainer—Ball Bearing	1	40000027	1	40000027
7	Sheave—Special (Bushing only 80000503)	1	93033351	1	93033351
8	Proportioner Belt	1	45000057	1	45000065
9	Clutch—Safety Wire	1	80009501	1	80009501
10	Spring—Proportioner	1	70008001	1	70008001
11	Disk Assv.	1	93061390	1	93061390
12	Bolt—Hex Head (114 - 20 - 1 114)	1	70010505	1	70010505
13	Wire Harness—Belt Guard	1	93063161	1	93063161
14	Wire Harness—Grain Flow	1	93063162	1	93063162
15	Cover Latch	2	10627700	2	10627700
16	Pop Rivet—Open End (5132" Dia. x 3/8")	4	70007001	4	70007001
17	Insulation--Micro Switch	1	11195950	1	11195950
18	Actuator Assy.	1	90000123	1	90000123
19	Spring—Actuator	1	70008003	1	70008003
20	Cover—Switch Box	1	11195901	1	11195901
21	Micro Switch	1	31008001	1	31008001
22	Divider Assy.	2	93078420	2	93078420
23	Seal Retainer	1	93072011	1	93072011
24	Seal Retainer	1	93072012	1	**93072012**
25	Deflector Retainer	2	10786000	2	10786000
26	Grain Deflector	—	—	1	93113321
27	Grain Deflector	—	—	1	93113322
28	Polyurethane Tape	38'	80014001	**46**	80014001
29	Adapter Plate	—	—	1	10719700
30	Retaining Strap	1	10844000	1	10844000
31	Neoprene Seal	1	11205310	1	11205310

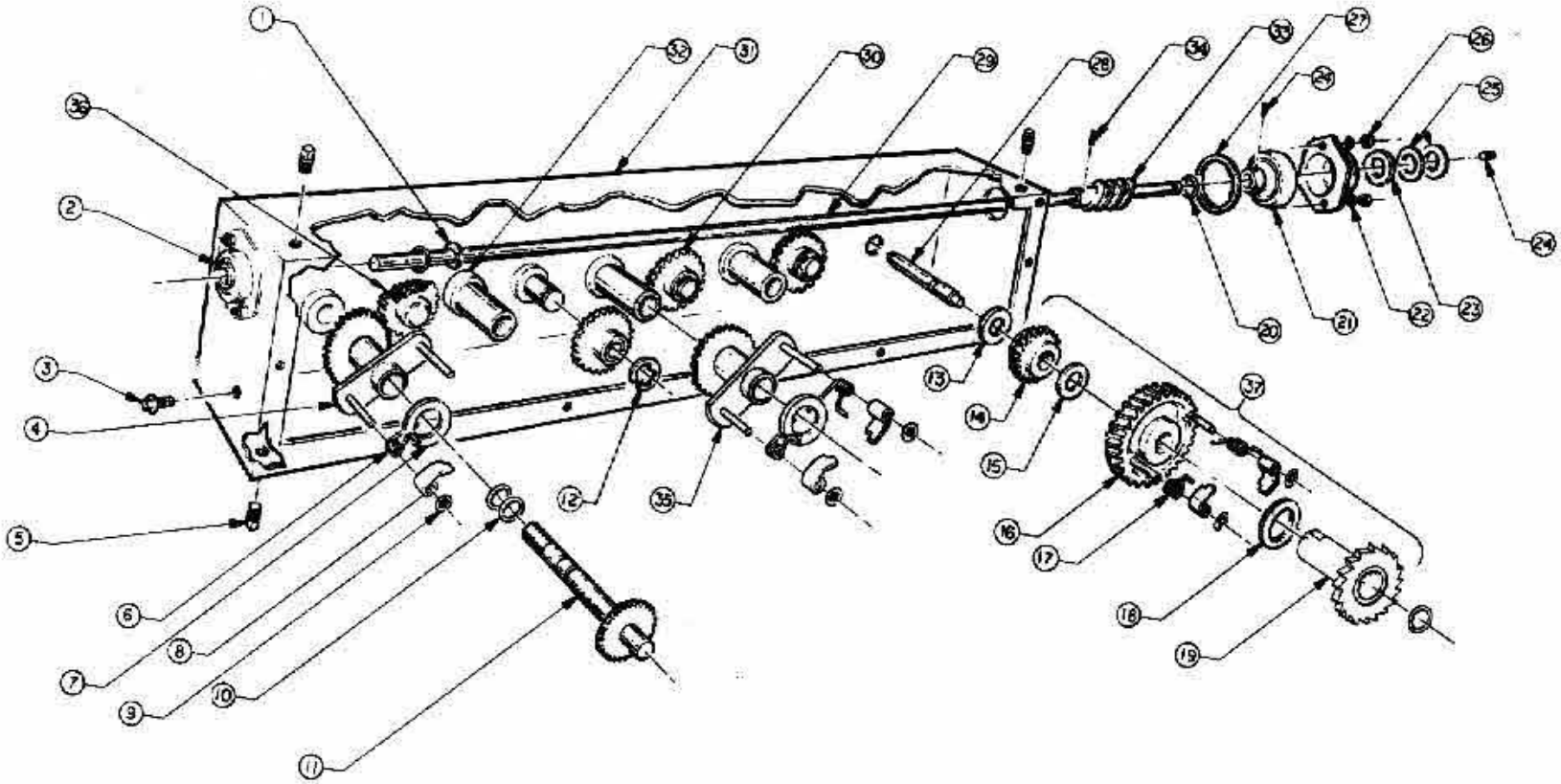
GROUND LEVEL HOPPER
REPLACEMENT PARTS

SWITCH MOUNTING DETAIL



		4 COMPARTMENT		6 COMPARTMENT	
ITEM	Description	Qty.	Part No.	Qty.	Part No.
1	Baffle—Control Hopper	4	10611900	4	10611900
2	Actuator—Switch	4	10424500	4	10424500
3	Micro Switch	4	31008001	4	31008001
4	Insulation—Switch	4	11195950	4	11195950
5	Paddle Assy.	4	93042421	4	93042421
6	Leg Assy.—Left Hand	1	93061202	1	93061202
7	Clamp Assy.	4	93004481	4	93004481
8	Support Rod—Vertical	4	93011410	4	93011410
9	Support Rod—Horizontal	3	10298502	3	10298502
10	Clamp Assy.	6	93012391	6	93012391
11	Adjustable Deflector	4	93061180	4	93061180
12	Leg Assy.—Right Hand	1	93061201	1	93061201
13	Cover—Panel Support	1	10613400	1	10613400
14	Snap-In—Blank	1	80010501	1	80010501
15	Control Hopper	1	93061101	1	93061101
18	Dust Cover	1	93068001	1	93068001
17	Polyurethane Tape	70"	80014001	70"	80014001
18	Grommet	1	80005005	1	80005005
19	Wire Harness	1	93101286	1	93101286
20	Wire Harness	1	93075072	1	93075072

OIL FILLED PROPORTIONER
INTERNAL REPLACEMENT PARTS

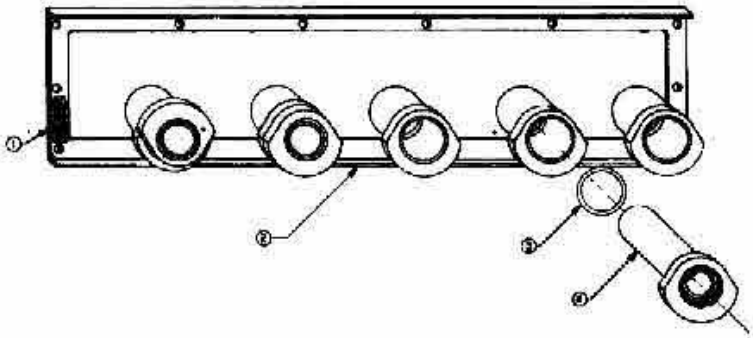


OIL FILLED PROPORTIONER
INTERNAL REPLACEMENT PARTS

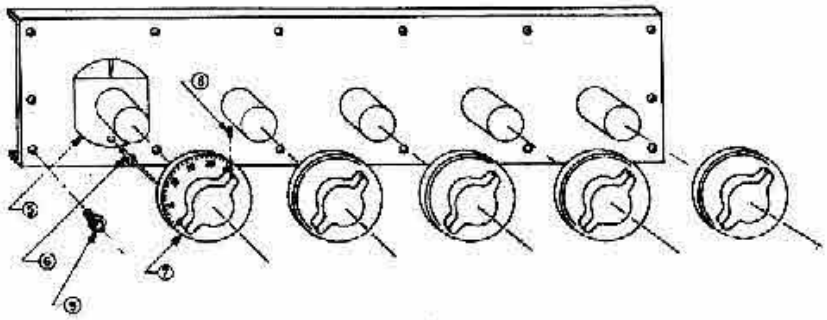
		4 COMPARTMENT		6 COMPARTMENT	
Item	**Description**	**Qty.**	**Part No.**	**Qty.**	Part **No.**
1	Retaining Ring (1/2" Dia. Shaft)	4	70006502	6	70006502
2	Retainer—Ball Bearing	2	40000027	2	40000027
3	Washer Head Bin Bolt Assy.	2	70000501	2	70000501
4	Pawl Carrier Assy. w/Push On Fasteners	1	93034521	1	93034521
5	Pipe Plug	3	51713002	3	51713002
6	Spring—Drive Pawl	7	70008002	11	70008002
7	Washer—Thrust	4	80014501	6	80014502
8	Drive Pawl	9	11195820	13	11195820
9	Push-on Fastener	9	70006002	13	70006002
10	Roto Seal	9	80008501	13	80008501
11	Shaft & Ratchet Assy.	4	93037691	6	93037691
12	Retaining Ring (1/2" Dia. Shaft)	2	70006501	2	70006501
13	Thrust Washer 5/8" x 1 1/4" x 1/8"	1	80014503	1	80014503_
14	Idler Gear Assy.	1	93010470	1	93010470
15	Thrust Washer—I.D. 1 1/2" O.D. 1/8"	1	80014505	1	80014505
16	Worm Wheel Assy. —Helical	1	93114730	1	93114730
17	Spring—Drive Pawl	2	70008005	2	70008005
18	Thrust Washer 1" x 1 9/16" x 1/16"	1	80014504	1	80014504
19	Ratchet & Tube Assy.	1	93057410	1	93057410
20	"0" Ring	2	80008503.	2	80008503
21	Bearing Assy.—Worm Shaft	2	93057970	2	93057970
22	Washer—Lock (1/4")	4	66443300	4	66443300
23	Flat Washer (1/2" S.A.E.)	1	70011004	1	70011004
24	Set Screw (1/4" - 20 x 1/4")	2	61663305	2	61663305
25	Flat Washer (Special 1/32" Thk.)	2	70011005	2	70011005
26	Nut—Hex (1/4" - 20)	4	66083300	4	66083300
27	Gasket	2	80004508	2	80004508
28	Shaft—Worm Wheel	1	80010009	1	80010009
29	Shaft	1	10377700	1	10599600
30	Idler Gear Assy, (80000501 Bushing Only)	3	93010171	5	93010171
31	Wrapper Gear Box	1	93037700	1	93059920
32	Bearing—Auger Shaft	4	40000014	6	40000014
33	Worm Gear	1	40004502	1	40004502
34	Spring Pin	1	70008502	1	70008502
35	Pawl Carrier Assy. w/Push On Fasteners	3	93037551	5	93037551
36	Idler Gear Assy,	1	93022910	1	93022910
37	Worm Wheel Subassembly	1	93011133	1	93011133

OIL FILLED PROPORTIONER
EXTERNAL REPLACEMENT PARTS

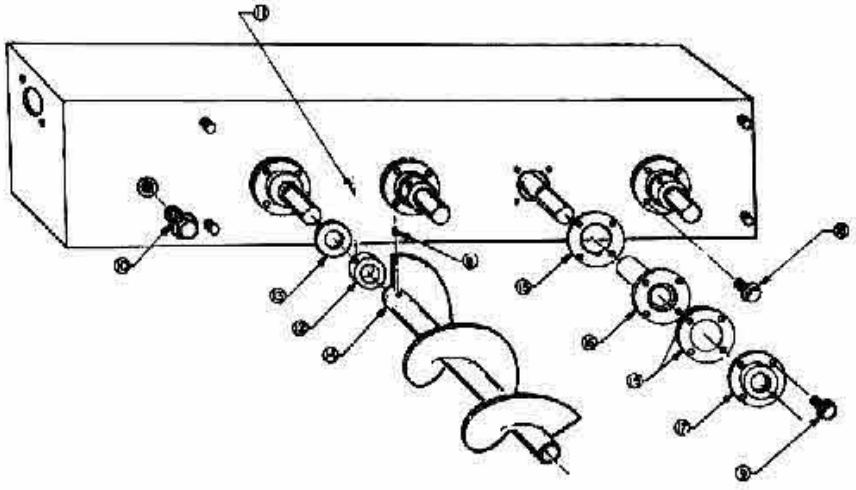
INSIDE VIEW OF PROPORTIONER COVER



FRONT VIEW OF PROPORTIONER COVER



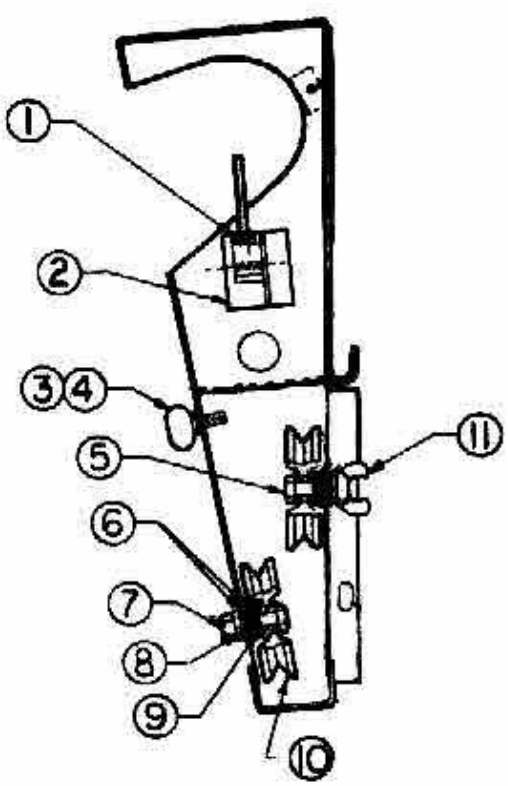
BACK VIEW OF PROPORTIONER

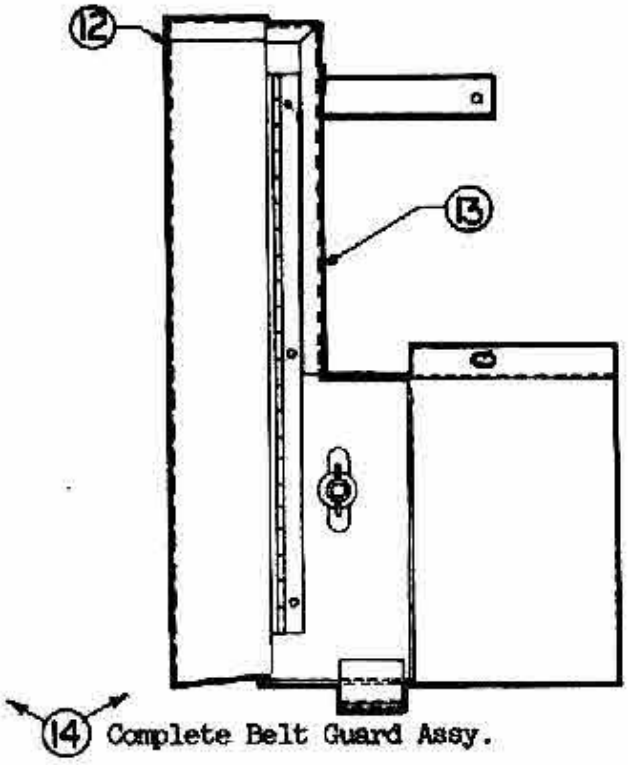


OIL FILLED PROPORTIONER
EXTERNAL REPLACEMENT PARTS

		4 COMPARTMENT		6 **COMPARTMENT**	
Item	Description	**Qty.**	Part No.	Qty.	**Part** No.
1	Gasket—Gear Box Cover	1	80004507	1	80004509
2	Cover Assy.—Proportioner	1	93036670	1	93059950
3	"0" Ring	5	80008502	7	80008502
4	Cam & Sleeve Assy. (80000501 Bushing Only)	5	90000119	7	90000119
5	D—Prop. Knob Spring	5	11195780	7	11195780
6	Pop Rivet 5/32" Dia.	5	70007001	7	70007001
7	Knob Assy.	5	92000235	7	92000235
8	Set Screw	9	61663305	13	61663305
9	Screw Hex Hd. S.T. (1/4 - 20 x 5/8" Swage Form)	26	70000504	38	70000504
10	Bin Bolt Assy.	2	70000501	2	70000501
11	Set Screw (#10 - 32 x 1/4)	4	61662705	6	61662705
12	Set Collar 5/8" x 1" x 5/16"	4	80012001	6	80012001
13	Washer—Rulon	4	70011503	6	70011503
14	Auger & Tube Assy.	4	93056330	6	93056330
15	Gasket—Bearing (Auger Shaft)	12	80004502	18	80004502
16	Bearing—Auger Shaft	4	40000014	6	40000014
17	Bearing Cap Assy.	4	92000232	6	92000232
18	Screw Hex Hd. S.T. (1/4 - 20 x 1/2" Swage Form)	4	70000502	4	70000502

BELT GUARD ASSY.
REPLACEMENT PARTS

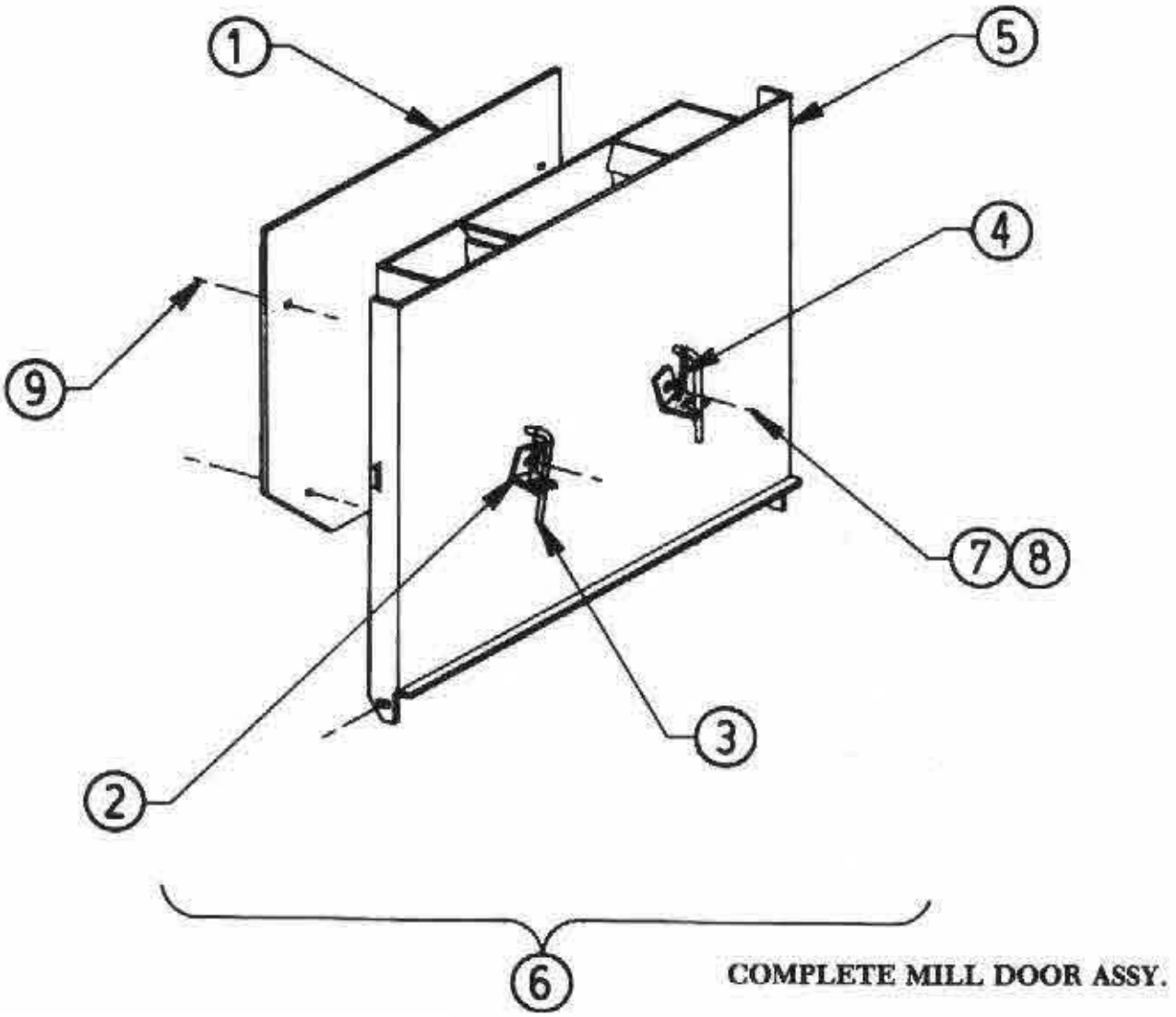




COMPLETE BELT GUARD ASSY.

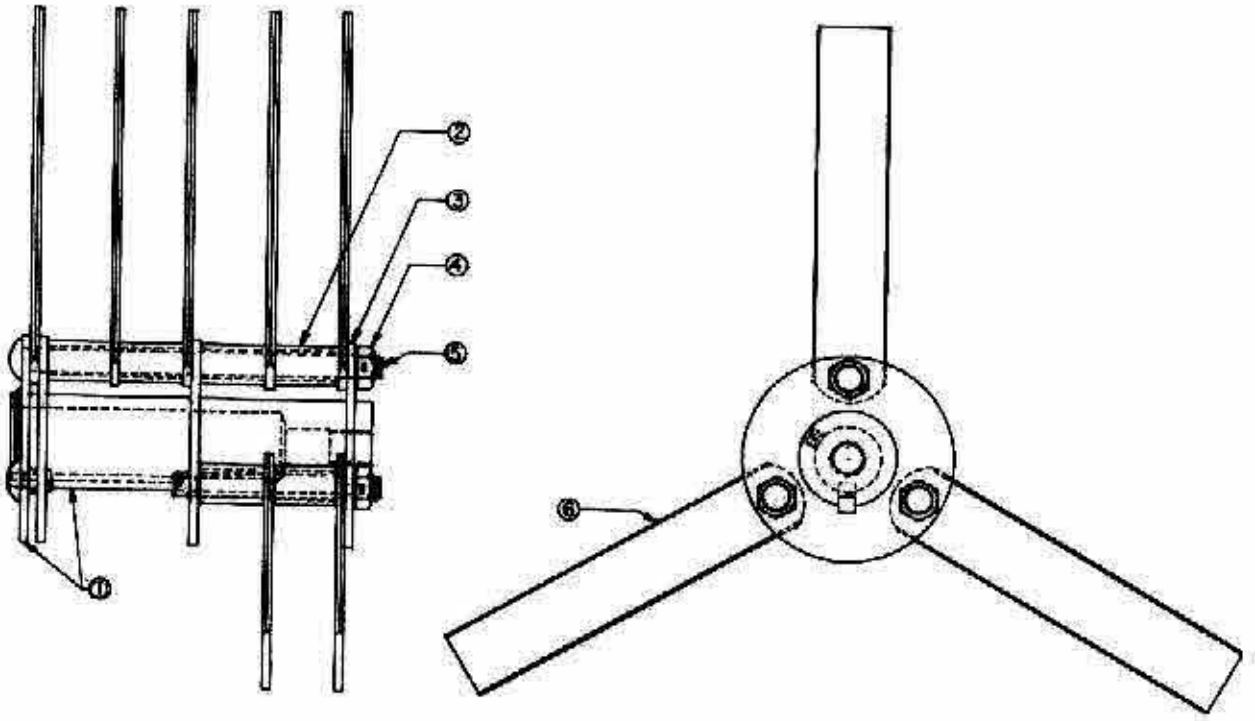
Item	Description	4 COMPARTMENT Qty.	4 COMPARTMENT Part No.	6 COMPARTMENT Qty.	6 COMPARTMENT Part No.
1	Micro Switch	1	10614200	1	10614200
2	Liner—Armite	1	10614300	1	10614300
3	Wing Bolt (1/4" - 20)	1	66843312	1	66843312
4	Washer—Flat (1/4")	1	66403300	1	66403300
5	Screw—Hex Head (3/8" - 16 x **1** - 1/2")	2	62584428	2	62584428
8	Washer—Flat (3/8")	10	66404400	10	66404400
7	Nut—Hex (3/8" - 16)	1	66084400	1	66084400
8	Washer—Lock (3/8")	2	86444400	2	66444400
9	Washer—Flat (3/8") Special	2	70011501	2	70011501
10	Sheave—Idler Assy.	2	40005004	2	40005004
11	Nut—Wing (3/8" - 16)	1	66364400	1	86364400
12	Belt Guard	1	93063050	1	93063050
13	Belt Guard & Idler Bracket Assy.	1	93061250	1	93072120
14	Belt Guard & Idler Pulley Assy.	1	93063071	1	93063072

MILL BACK ASSY.
REPLACEMENT PARTS



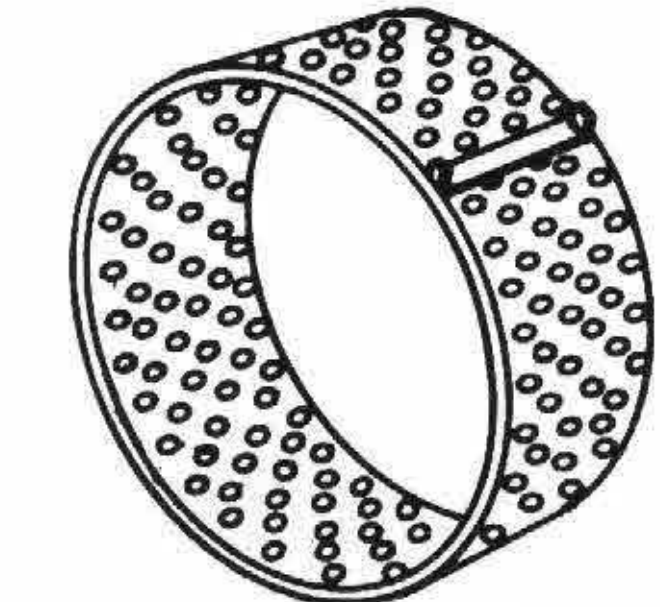
		4 & 6 **COMPARTMENT**	
Item	**Description**	**Qty.**	**Part** No.
1	Wear Plate—Back	1	93061020
2	Bracket—Valve Handle Toggle	2	11196270
3	Valve & Rod Assy.	2	93080710
4	Spring—Valve Handle Toggle	2	70008004
5	Back Assy.	1	93079040
6	Mill Back Assy.—Complete	1	93079031
7	Screw—Slot Hex Hd. T.C. (1/4" - 20 x 1/2")	4	65483312
8	Washer—Flat (1/4")	4	66403300
9	Screw—Hex Hd. T.F. (5/16" - 18 x 1/2")	4	65683812

BEATER HUB ASSY.
REPLACEMENT PARTS



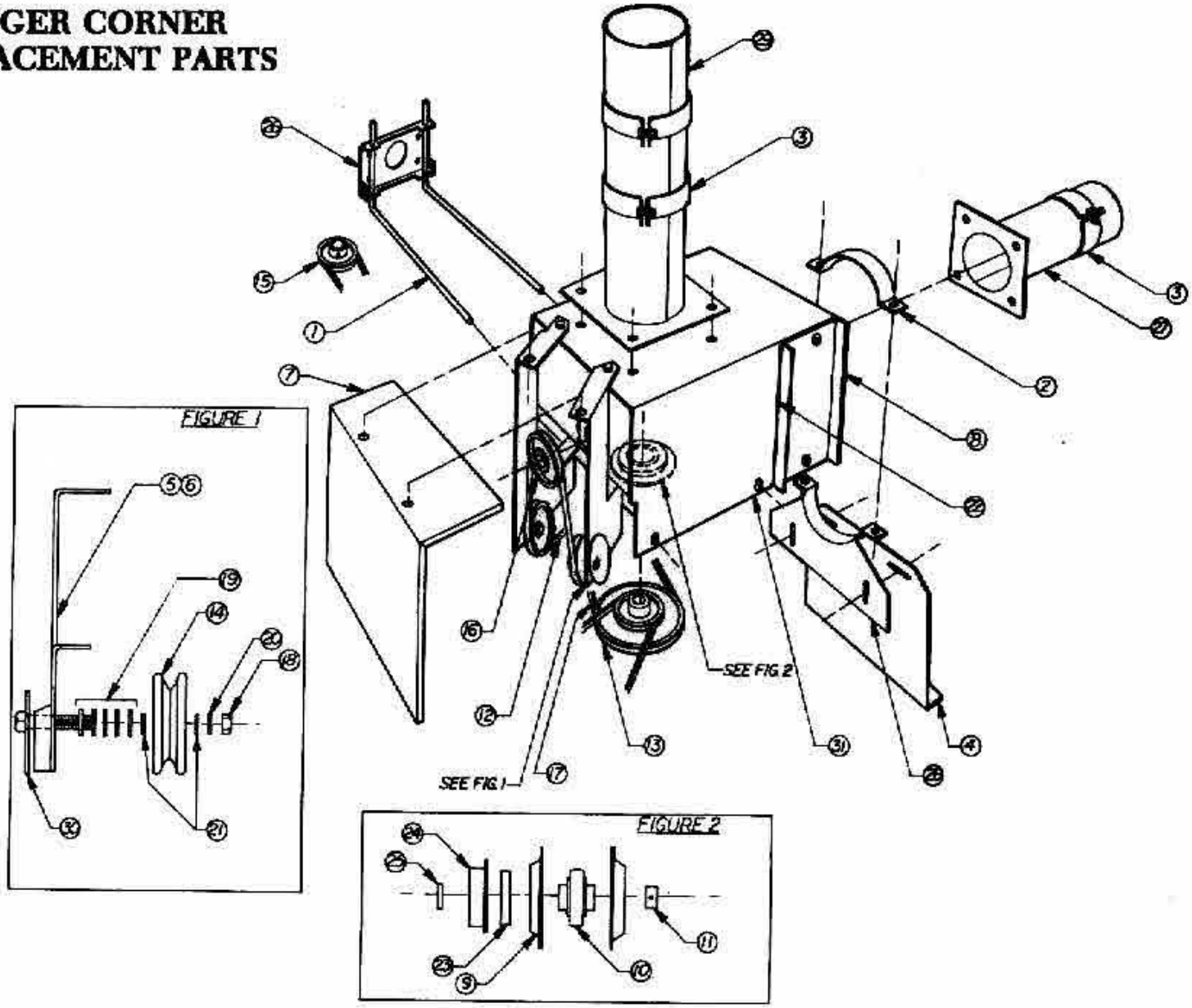
		4 & 6 **COMPARTMENT**	
Item	**Description**	Qty.	Part No.
1	Beater Hub Assy.	1	93055440
2	Spacer—Hammer	12	80013503
3	Washer—Beater Hub	3	11208840
4	Hex Jam Lock Nut (3/8" - 24)	3	66754500
5	Bolt—Beater Hub	3	70011508
6	Hammers (Set of 15)	1	92000278
7	Beater Hub Complete	1	93000972

MODEL "CX" MILL
REPLACEMENT SCREENS



PART NUMBER	DESCRIPTION
93056702	1/8" CX Screen
93056703	3/16" CX Screen
93056704	1/4" CX Screen
93056705	5/16" CX Screen
93056706	3/8" CX Screen
93056708	1/2" CX Screen
93056709	5/8" CX Screen
93056710	3/4" CX Screen
93056712	3/32" CX Screen
93056713	5/32" CX Screen
93056714	7/32" CX Screen*

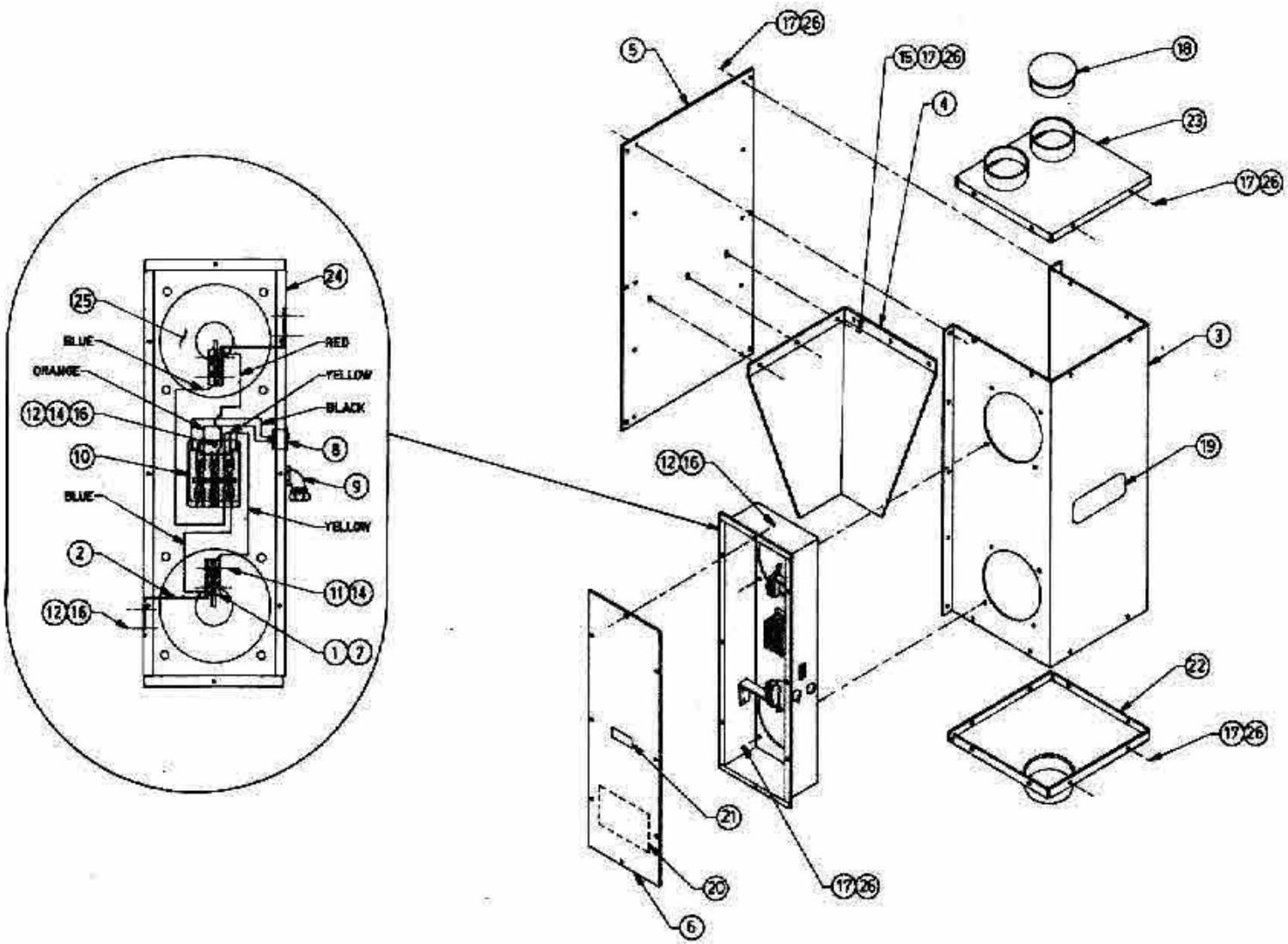
AUGER CORNER REPLACEMENT PARTS



AUGER CORNER
REPLACEMENT PARTS

		4 & 6 **COMPARTMENT**	
Item	Description	Qty.	Part No.
1	Motor Mounting Rod	2	10045800
2	Half Clamp	1	10215901
3	Clamp Ring	3	10322902
4	Plate—Adjustable	1	10637900
5	R.H. Idler Bracket	1	10722701
6	L.H. Idler Bracket	1	10722702
7	Guard—Belt	1	10722800
8	Cover—Clean Out	1	10971301
9	Stamping for 5/8" Bearing	4	40000016
10	Bearing Cartridge-5/8"	2	40000017
11	Lock Collar	2	40000018
12	Belt—Round (7/16" Dia.)	1	40000502
13	Sheave—Step (5/8" Bore)	1	40003508
14	Idler Pulley (3" O.D.)	2	40005001
15	Sheave (3" x 5/8" Bore)—Motor	1	41301304 4120 1304
16	5" Sheave-5/8" Bore	1	42104604
17	Belt—V (41 ")	1	45001041
18	Nut—Hex (3/8" - 16)	2	66084400
19	Washer—Flat (3/8 ")	10	66404400
20	Washer—Lock (3/8")	2	66444400
21	Washer—Special (3/8 ")	4	70011501
22	Gasket—Clean Out	1	80004511
23	Bearing Seal	2	80011506
24	Seal Retaining Cup	2	80011507
25	Thrust Washer	2	80014502
26	Head Plate Assy.	1	93004552
27	Tube & Plate Assy.	1	93030371
28	Support Clamp—Welded	1	93063801
29	Tube & Plate Assy. w/Stop	1	93072321
30	Belt Tightener	2	93078621
31	Gearless Auger Corner—Welded	1	93094141

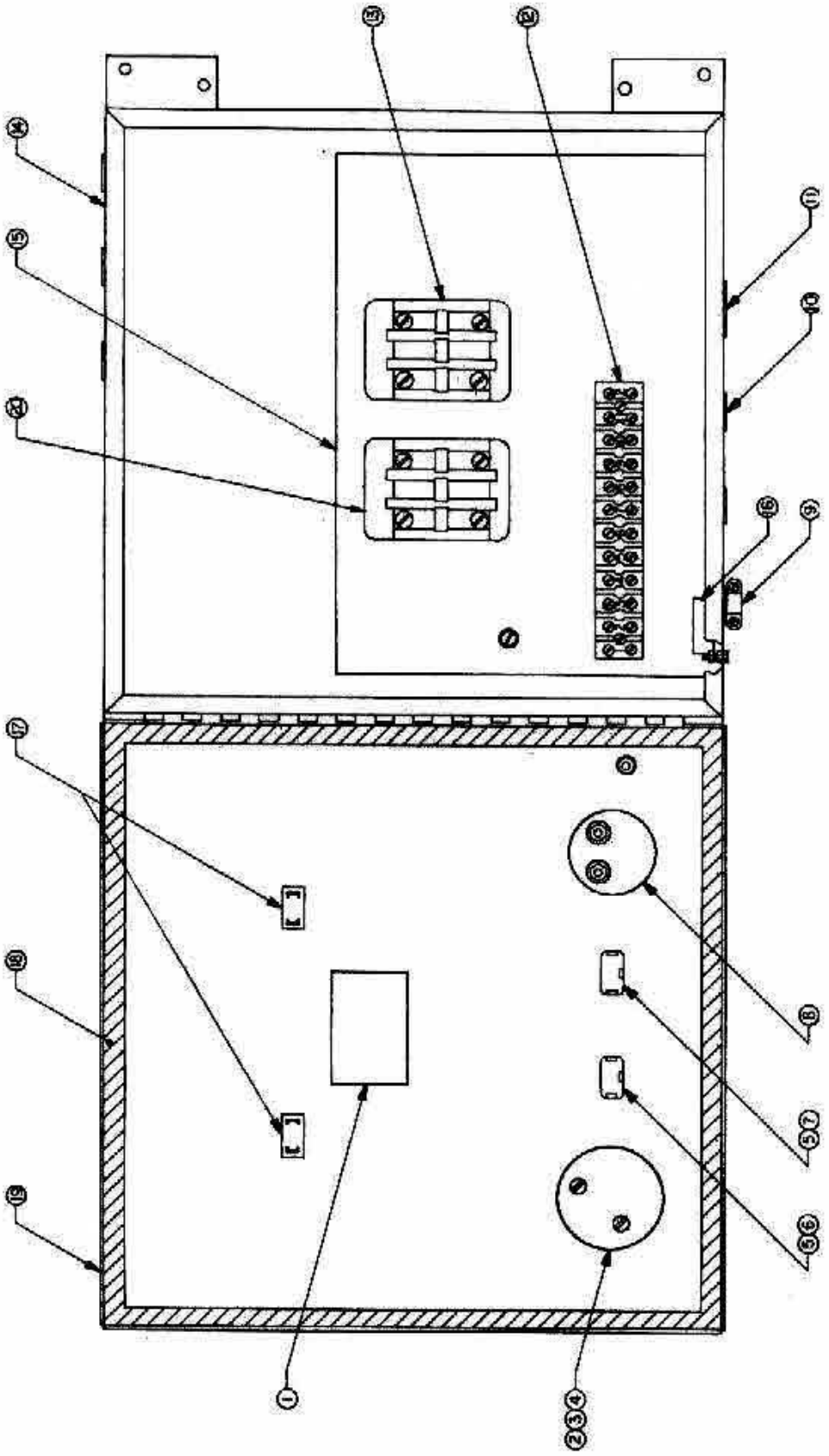
DOUBLE DIAPHRAM CONTROL HOPPER



DOUBLE DIAPHRAM CONTROL HOPPER
REPLACEMENT PARTS

Item	Description	Qty.	Part No.
	Double Diaphram Control Hopper		9310-4831
1	Micro Switch	2	1079-3000
2	Mounting Bracket	2	1104-7900
3	Wrapper	1	1119-0010
4	Transition	1	1119-0020
5	Back Plate	1	1119-0040
6	Cover—Switch Box	1	1119-0050
7	Insulation	2	1119-5950
8	On & Off Switch—SPST	1	3100-8018
9	3/8" 90° Conduit Connector	1	3100-2621
10	Relay	1	3241-1240
11	#6 - 32 x 1"—S.T. Pan Head Screws	4	6468-1822
12	#8 - 32 x 1/2"—S.T. Slotted Hex Screws	12	6548-2212
13	#8 - 32 Hex Nut	4	6608-2200
14	#8 Flat Washer	6	6640-2200
15	1/4" Flat Washer	6	6640-3300
16	#8 Lock Washer	14	6644-2200
17	1/4" Lock Washer	40	6644-3300
18	Cap Plug 4" I.D.	1	8000-1001
19	Decal—Mix-Mill®	1	8000-3502
20	Decal—Control Hopper	1	8000-3513
21	Decal—Warning Label	1	8000-6506
22	End Plate Assembly—Bottom	1	9000-0001
23	End Plate Assembly—Top	1	9000-0002
24	Switch Box Assembly	1	9200-0001
25	Diaphram Assembly	2	9310-4800
26	1/4" - 20 x 1/4"—Thread Cutting Screws	40	6548-3312

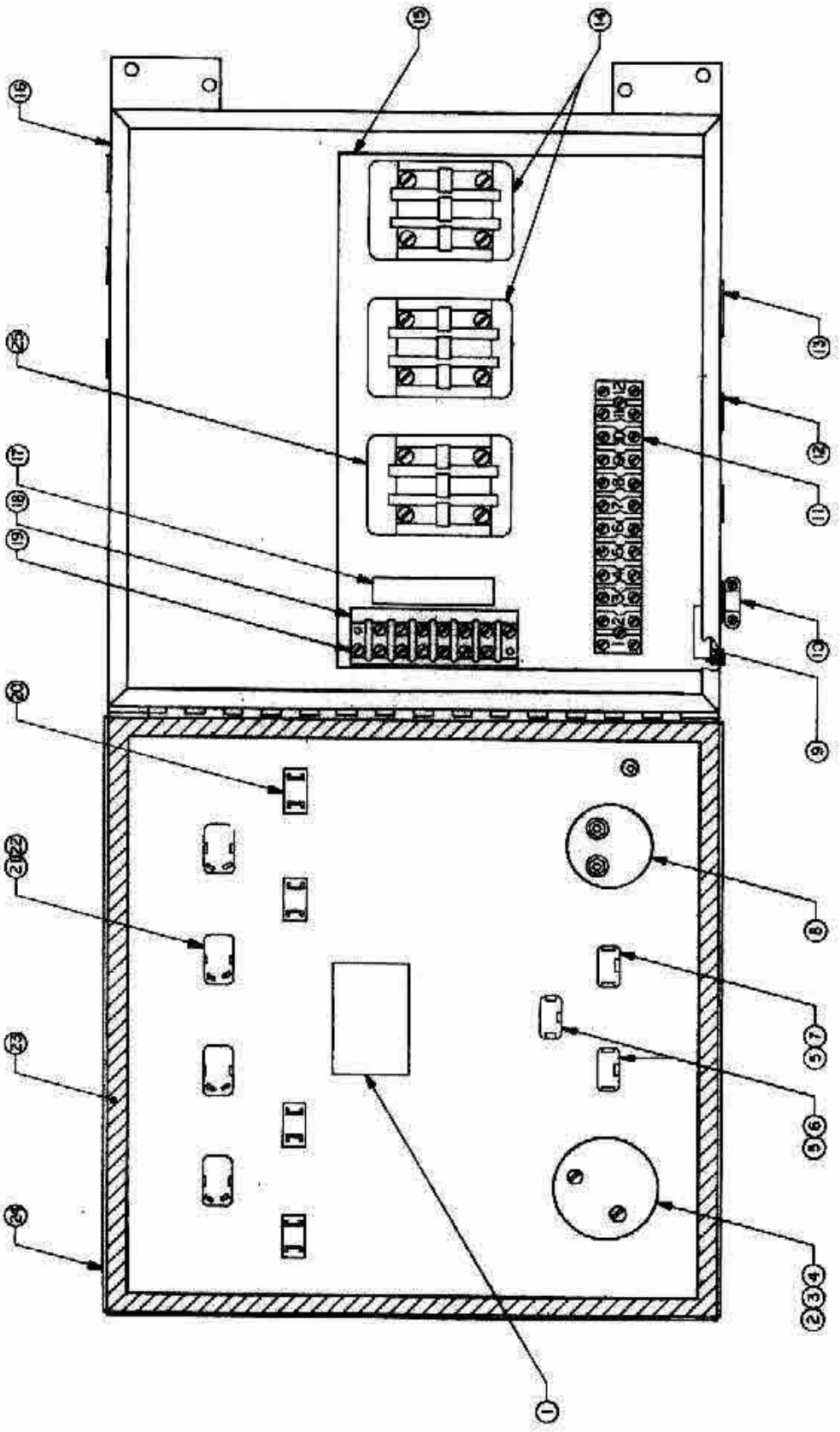
PANEL COMPONENT PARTS–GRAVITY
REPLACEMENT PARTS



"CX" GRAVITY MILL PANEL
REPLACEMENT PARTS

Item	Description	Qty.	**Part** No.
1	Label—Electrical Rating	1	80006505
2	Timer (2-Hour)	1	31011001
3	Timer Knob	1	31011005
4	Dial-2-Hour Timer	1	31011006
5	Switch—Toggle	2	31008004
6	Switch Plate—Auger	1	31008016
7	Switch Plate—Mill	1	31008017
8	Panel Meter (0-50 Amp) 5-7'/2 H.P.-10 Gravity Panel	1	31000001
	Panel Meter (0-30 Amp) 5-10 H.P.-30 Gravity Panel	1	31000002
9	Straight Cable Connector (3/4 ")	1	31002503
10	Snap-In-Blank (7/8" Hole)	5	80010501
11	Snap-In-Blank (1 1/8" Hole)	1	80010502
12	Pressure Contact Terminal Block	1	31009001
13	Relay (30 Amp) 5 H.P.-10 Gravity Panel	1	32231240
	Relay (30 Amp) 7'/2 H.P.-10 Gravity Panel	1	32231240
	Relay (30 Amp) 5-10 H.P.-30 Gravity Panel	1	32431240
14	Housing Assy. —Panel	1	93061210
15	Panel—Auxiliary	1	10626600
16	Label—Ground Connection	1	80006501
17	Circuit Breakers	2	31001001
18	Tape (Polyurethane Adhesive Backing)	63"	80014001
19	Panel Cover Assy. (Gravity)	1	93062883
20	Relay (30 Amp) 5 H.P.-10 Gravity Panel	1	32231240
	Relay (40 Amp) 7'/2 H.P.-10 Gravity Panel	1	32241260
	Relay (30 Amp) 5-10 H.P.-30 Gravity Panel	1	32431240

PANEL COMPONENT PARTS–GROUND LEVEL
REPLACEMENT PARTS



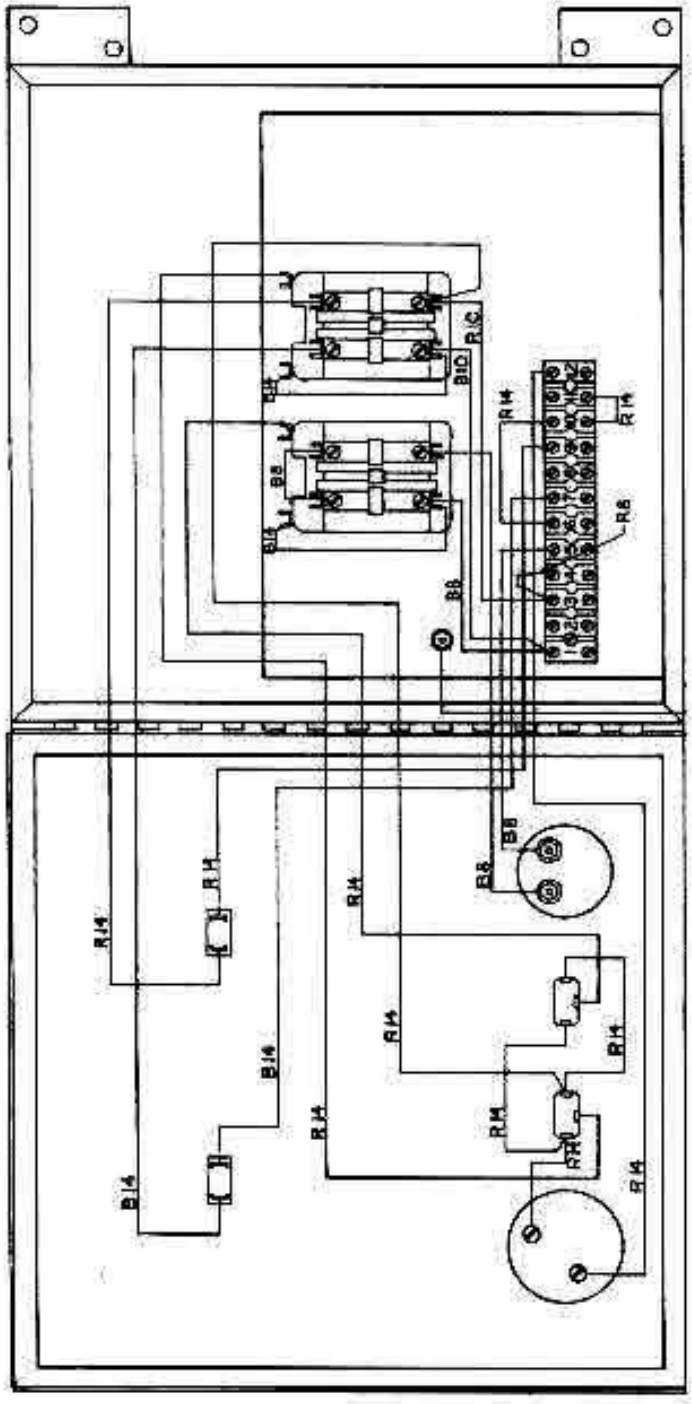
"CX" GROUND LEVEL MILL PANEL
REPLACEMENT PARTS

Item	Description	Qty.	Part No.
1	Label—Electrical Rating	1	80006505
2	Timer (2-Hour)	1	31011001
3	Timer Knob	1	31011005
4	Dial-2-Hour Timer	1	31011006
5	Switch—Toggle	3	31008004
6	Switch Plate—Auger	2	31008016
7	Switch Plate—Mill	1	31008017
8	Panel Meter (0-50 Amp)		
	5-7 1/2 H.P.—10 G.L. Panel	1	31000001
	Panel Meter (0-30 Amp)		
	5-10 H.P.-30 G.L. Panel	1	31000002
9	Label—Ground Connection	1	80006501
10	Straight Cable Connector (3/4")	1	31002503
11	Pressure Contact Terminal Block	1	31009001
12	Snap-In-Blank (7/8" Hole)	5	80010501
13	Snap-In-Blank (1118" Hole)	1	80010502
14	Relay (30 Amp) 5 H.P.—10 G.L. Panel	2	32231240
	Relay (30 Amp) 7 1/2 **H .** P. —10 G L. Panel	2	32231240
	Relay (30 Amp) 5-10 H.P.-30 G.L. Panel	2	32431240
15	Panel—Auxiliary	1	10626600
16	Housing Assy.—Panel	1	93061210
17	Identification Tape	1	80006502
18	Fiber Marker	1	31005001
19	Terminal Block	1	31009002
20	Circuit Breakers	4	31001001
21	Switch—Toggle	4	31008002
22	Switch Plate On-Off	4	31008015
23	Tape (Polyurethane Adhesive Backing)	63"	80014001
24	Panel Cover Assy. (Ground Level)	1	93062884
25	Relay (30 Amp) 5 H.P.-10 G.L. Panel	1	32231240
	Relay (40 Amp) 7 1/2 H.P.-10 G.L. Panel	1	32241260
	Relay (30 Amp) 5-10 H.P.-30 G.L. Panel	1	32431240

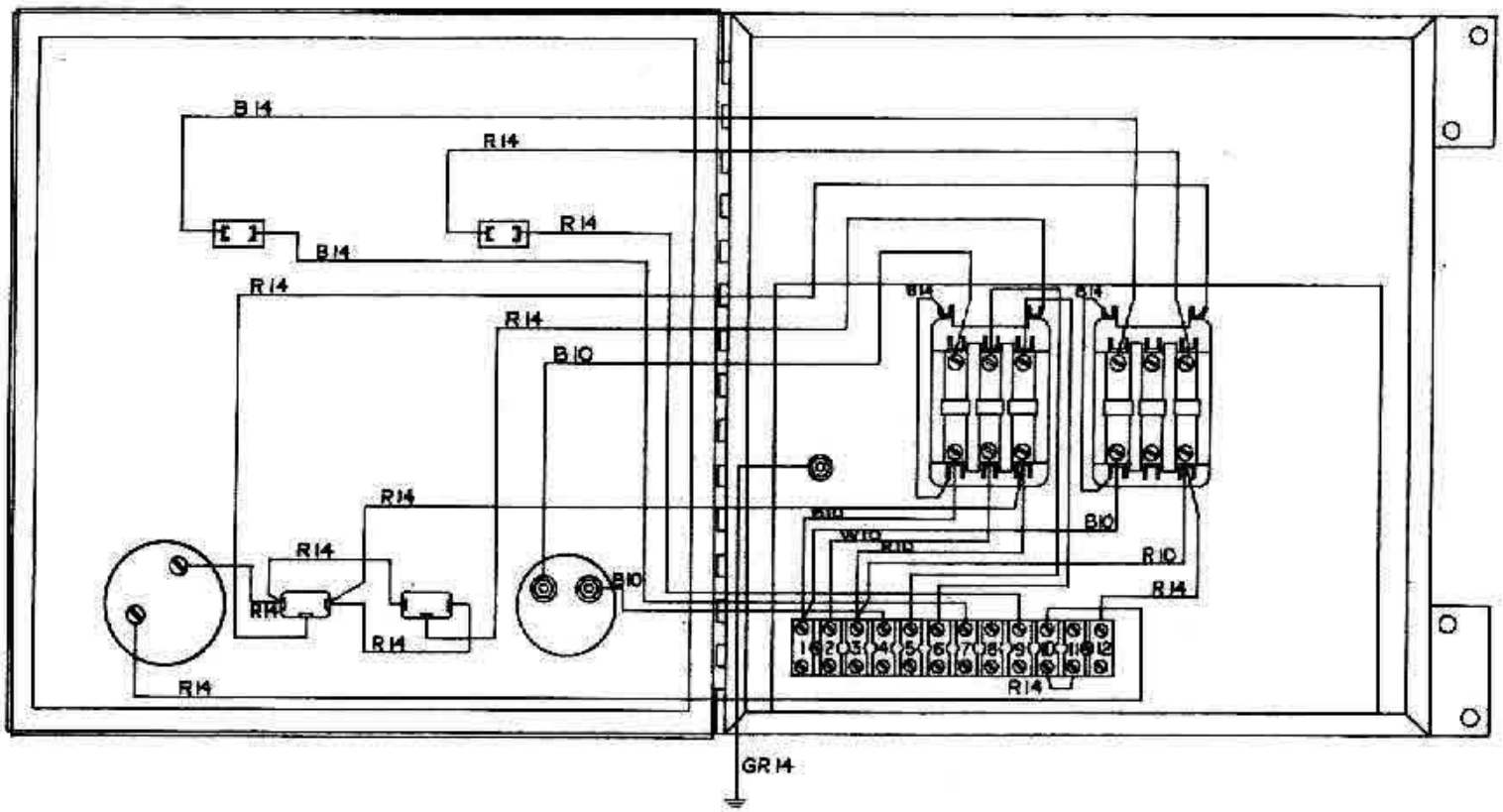
SECTION VII

WIRING DIAGRAMS

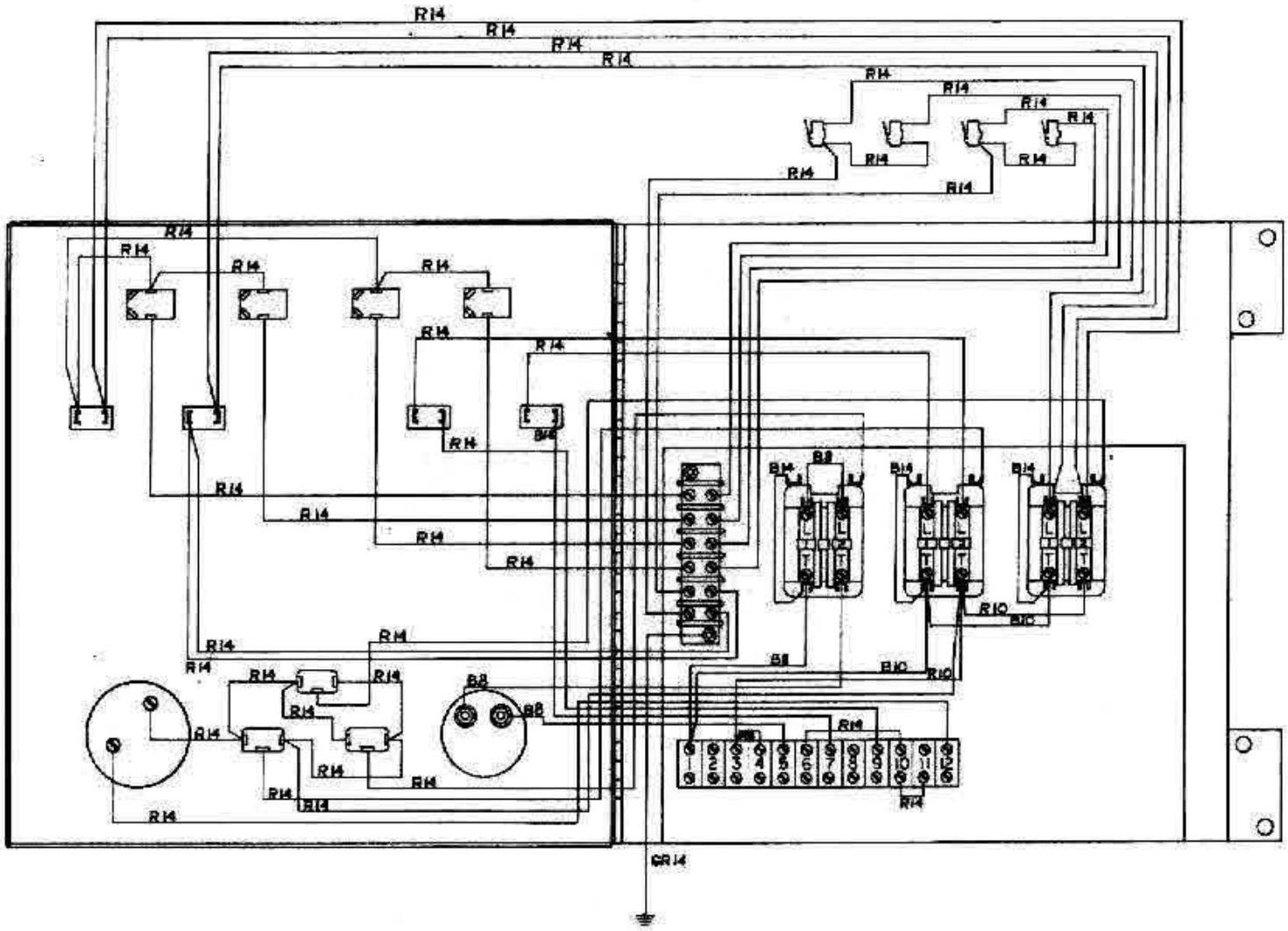
10 GRAVITY CX-MILL
INTERNAL WIRING DIAGRAM



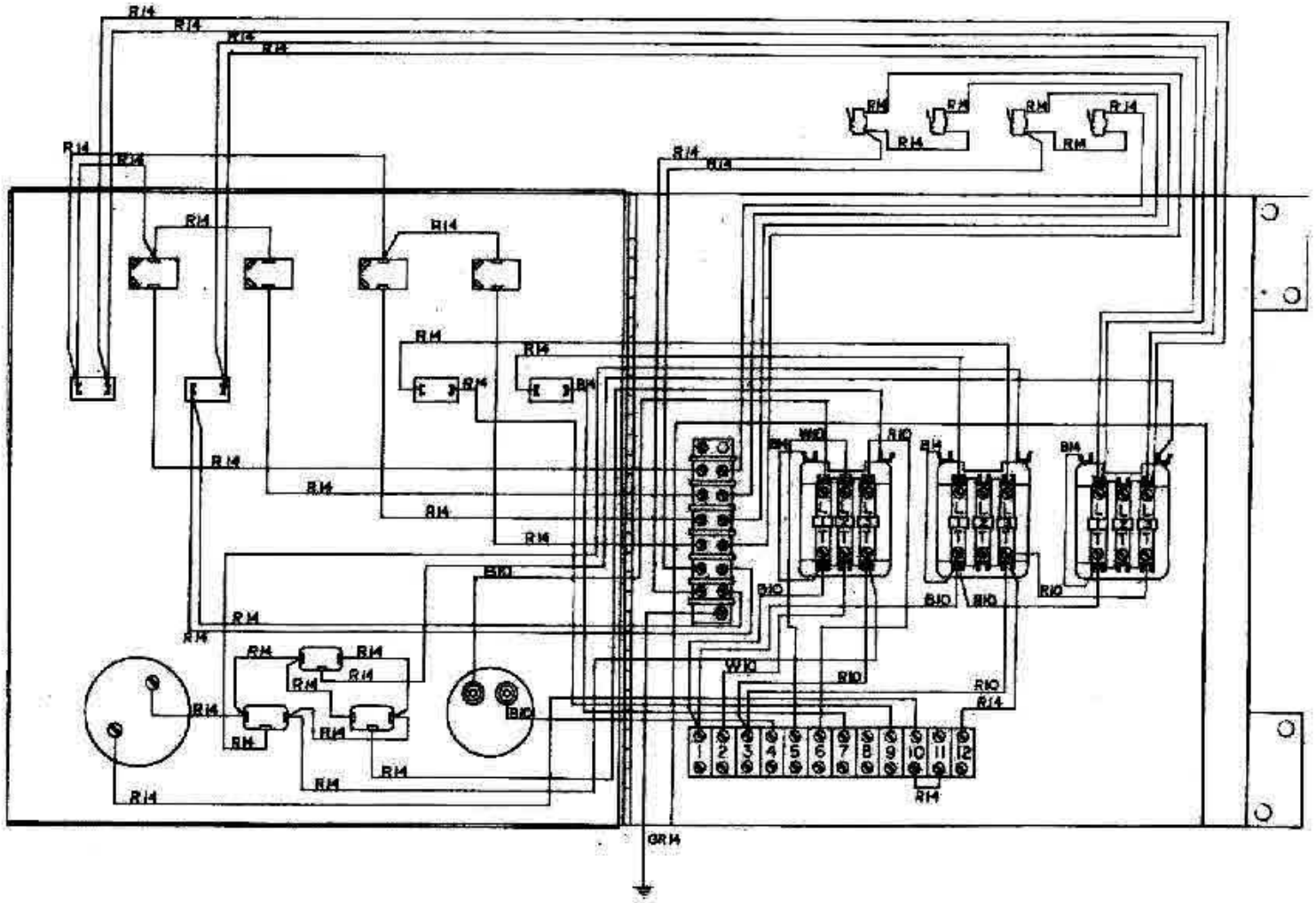
3Ø GRAVITY CX-MILL
INTERNAL WIRING DIAGRAM



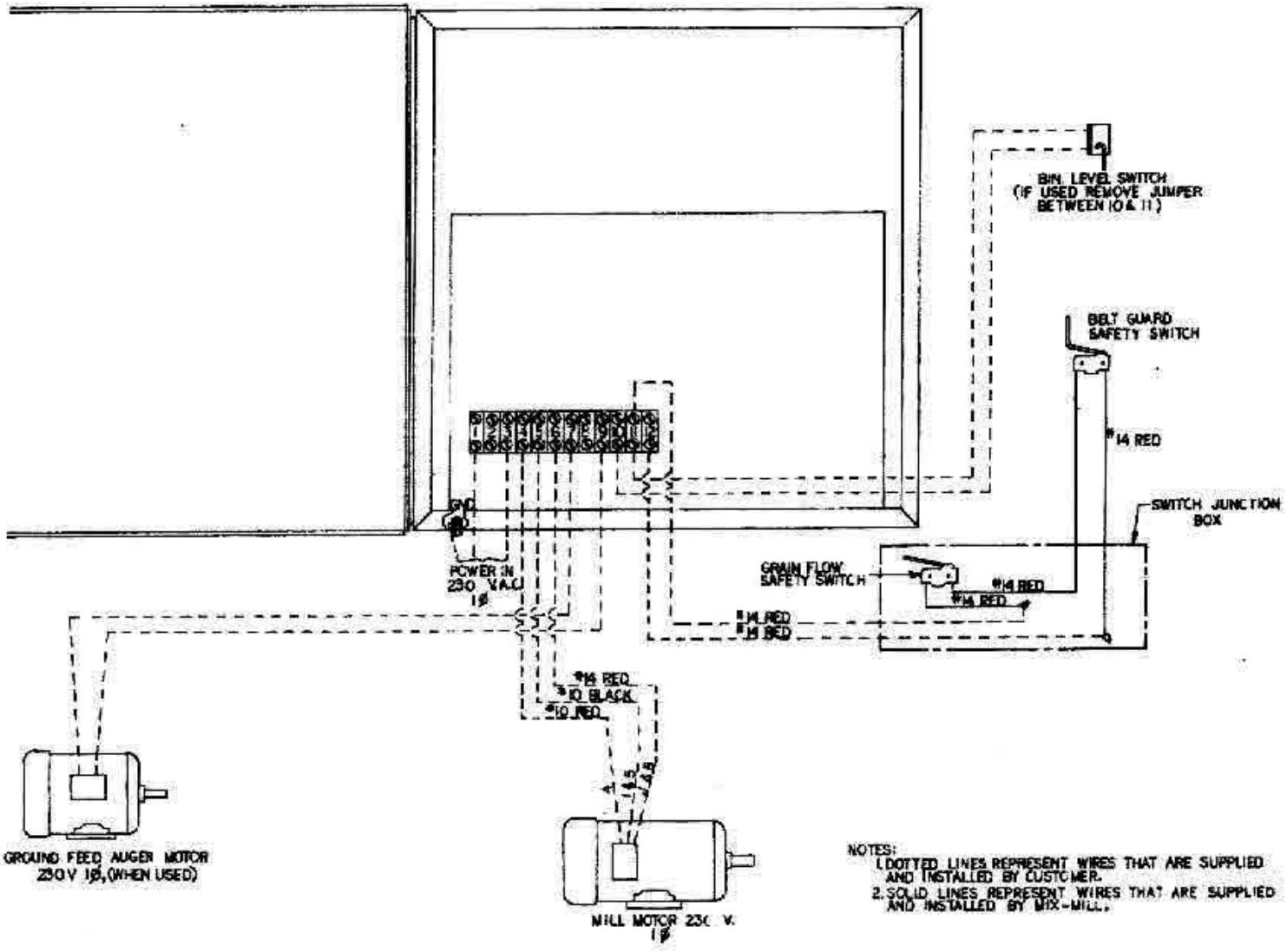
10 GROUND LEVEL CX-MILL
INTERNAL WIRING DIAGRAM



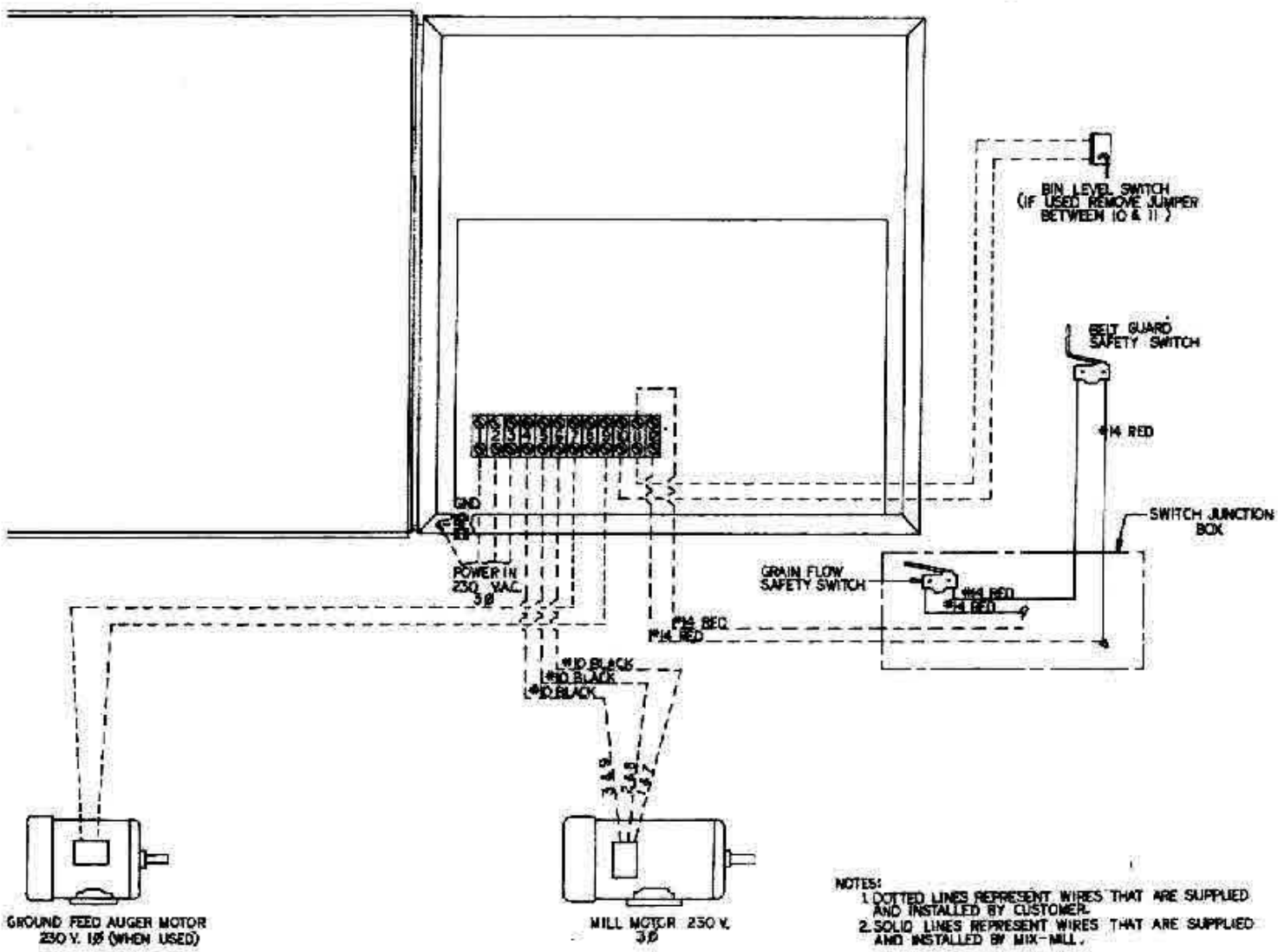
3Ø GROUND LEVEL CX-MILL
INTERNAL WIRING DIAGRAM



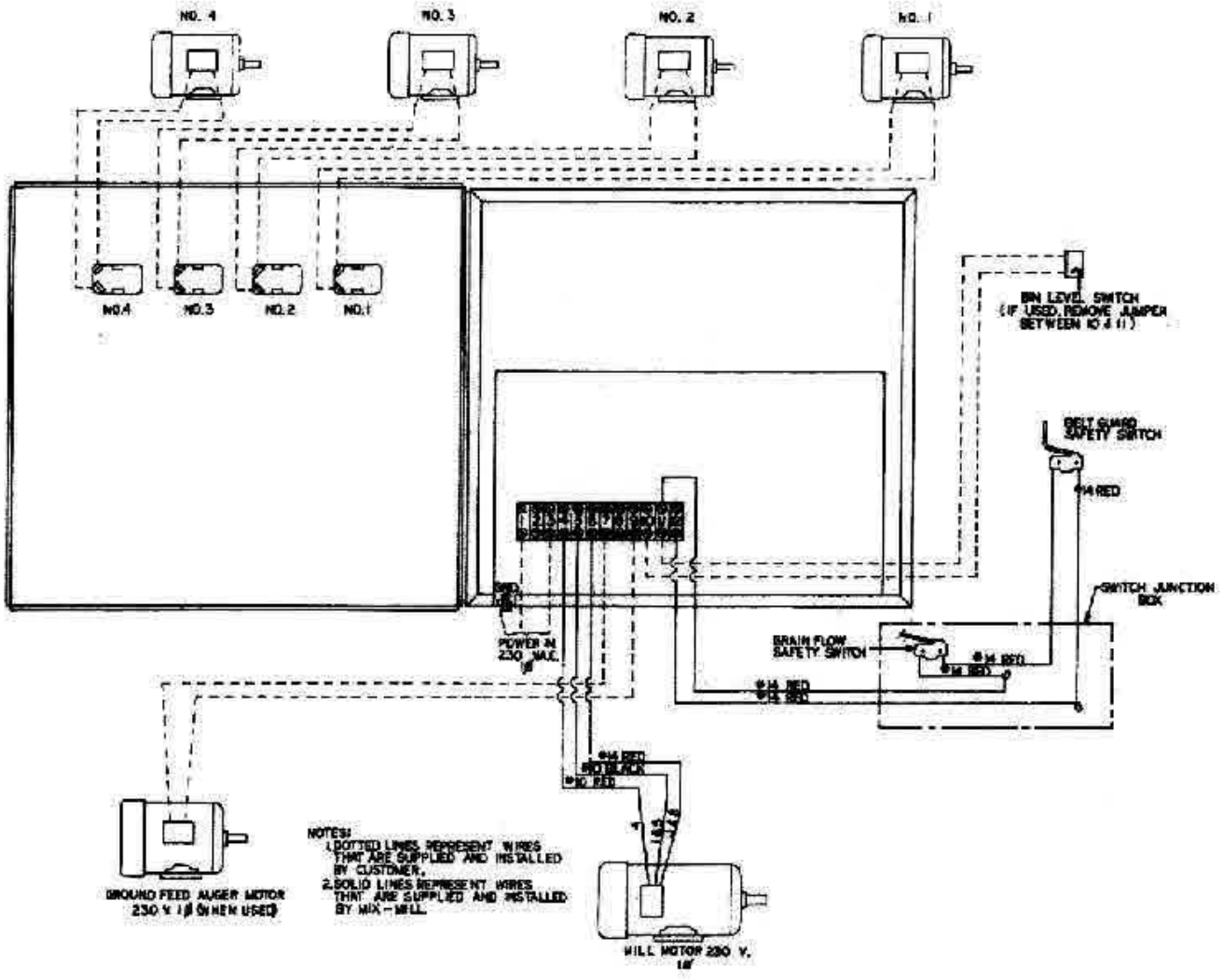
1Ø GRAVITY CX-MILL
EXTERNAL WIRING DIAGRAM



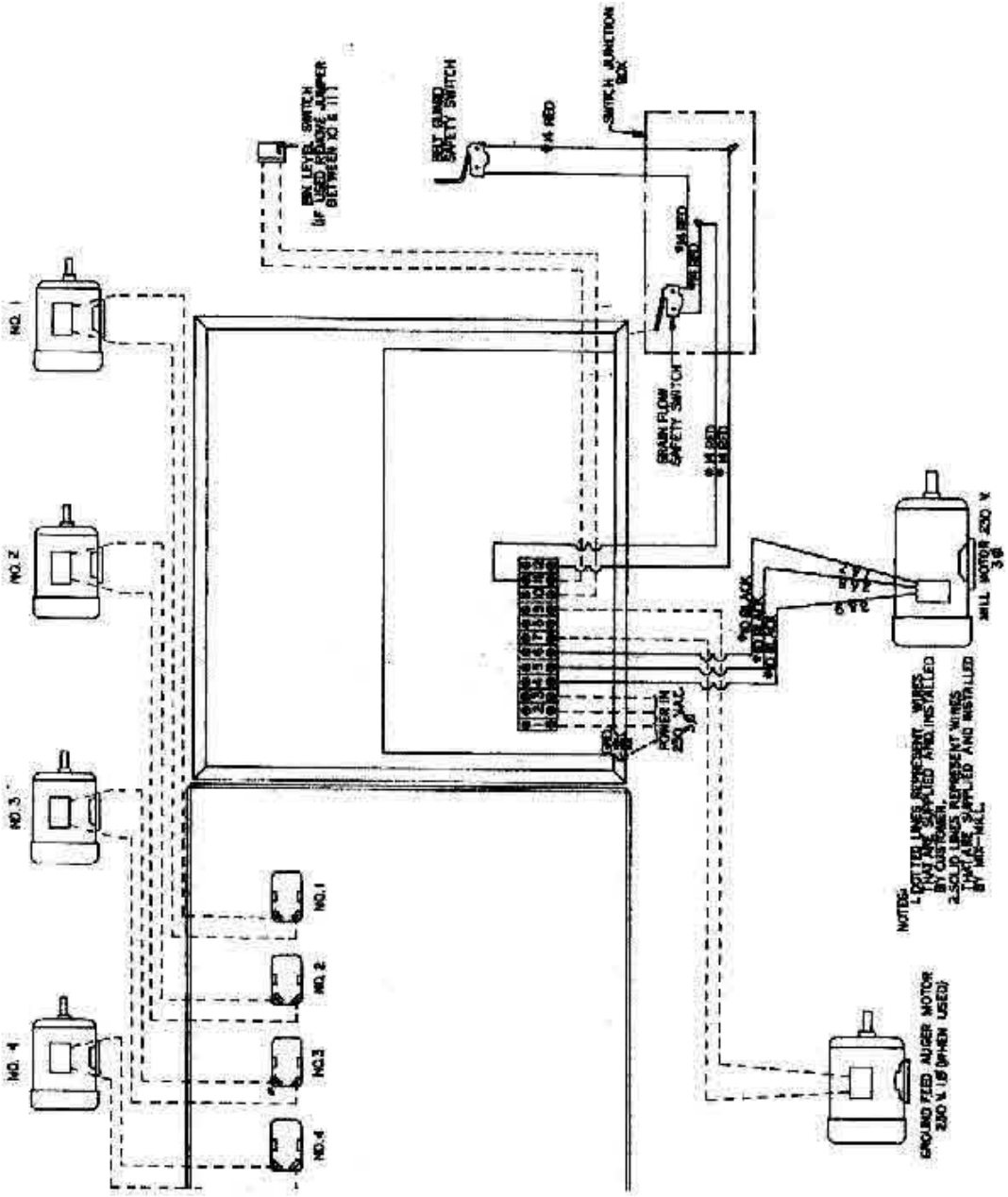
3Ø GRAVITY CX-MILL
EXTERNAL WIRING DIAGRAM



1Ø GROUND LEVEL CX-MILL
EXTERNAL WIRING DIAGRAM

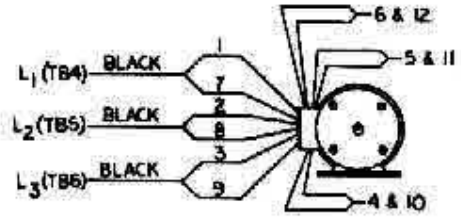


3Ø GROUND LEVEL CX-MILL
EXTERNAL WIRING DIAGRAM



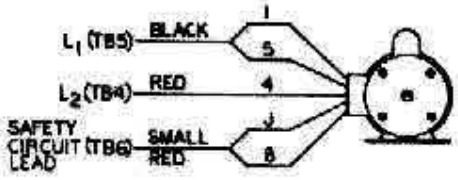
1Ø & 3Ø MILL MOTOR
LEAD CORRELATION

BALDOR ELECTRIC MOTORS



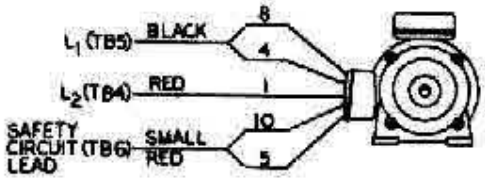
230 VOLT - 3Ø

BALDOR ELECTRIC MOTORS



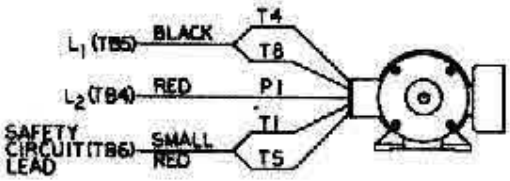
230 VOLT - 1Ø

GENERAL ELECTRIC MOTORS



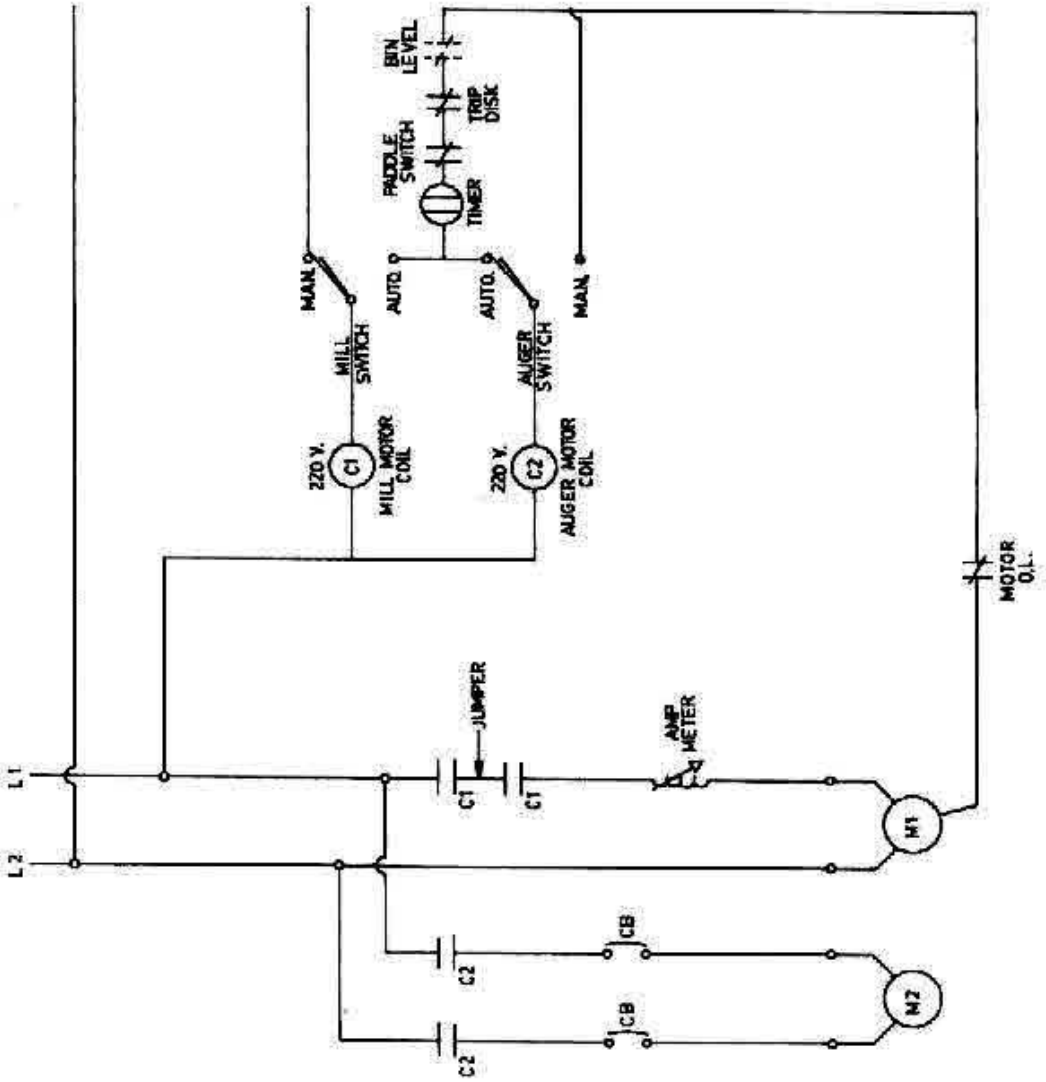
230 VOLT - 1Ø

DOERR ELECTRIC MOTORS

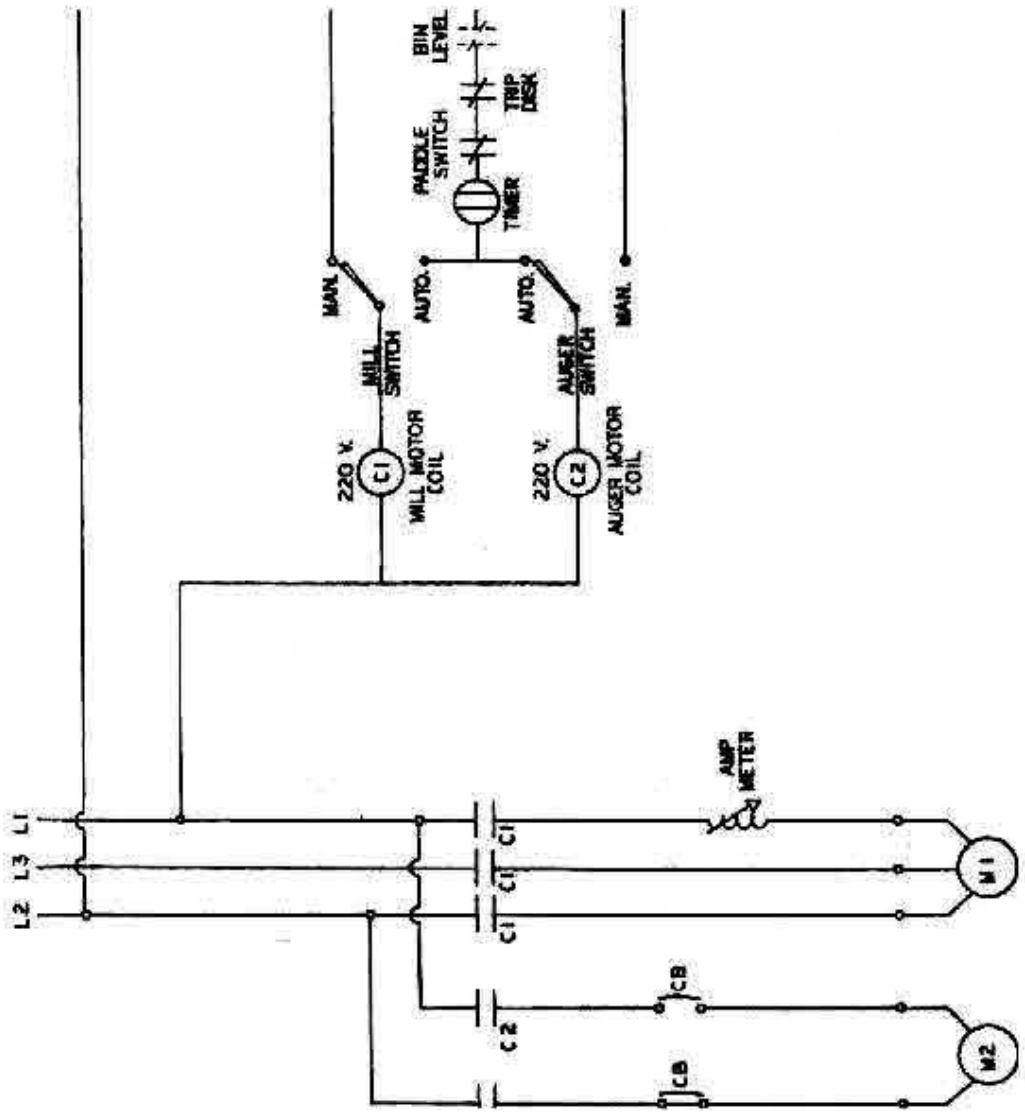


230 VOLT - 1Ø

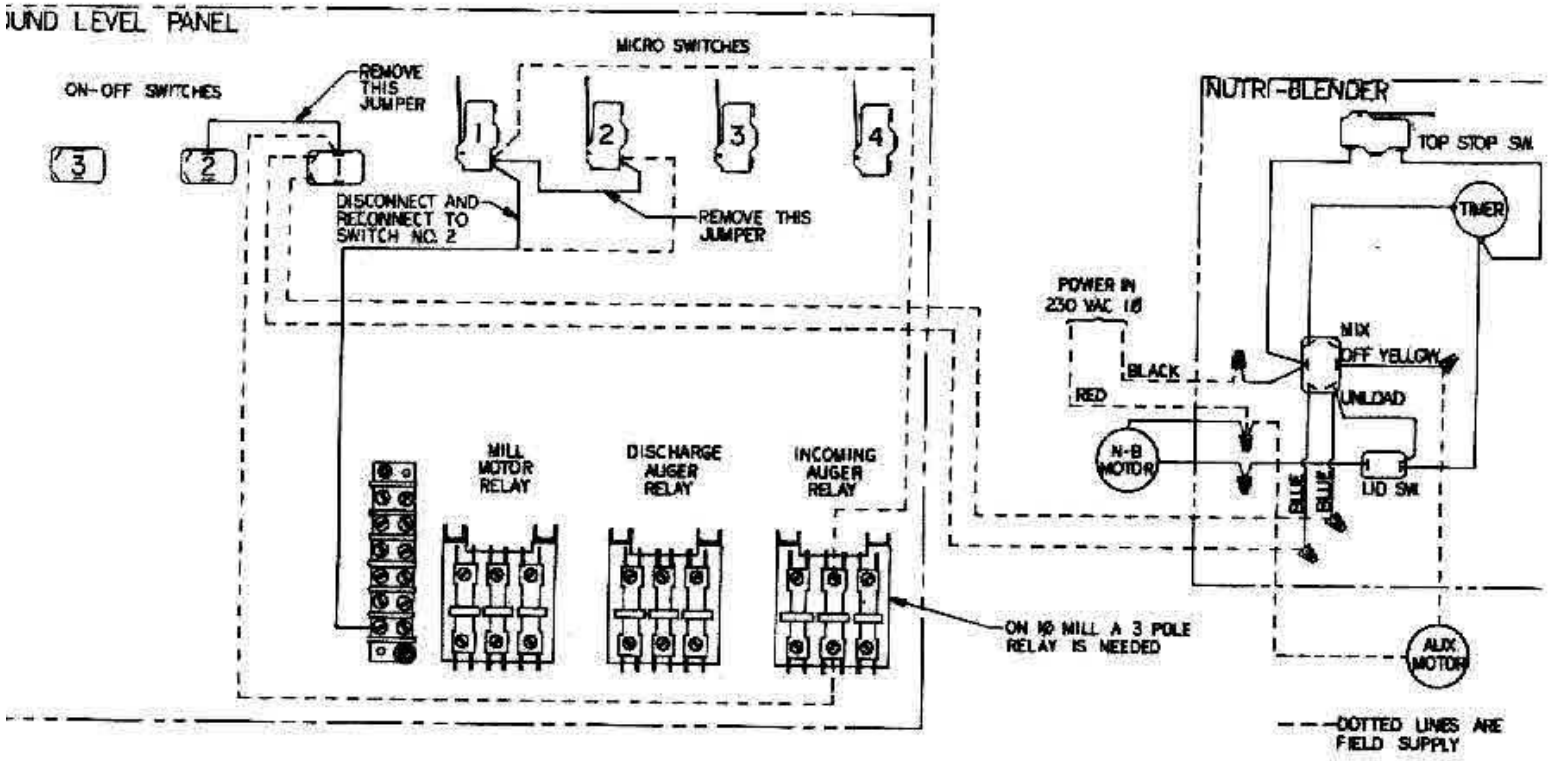
SCHEMATIC DIAGRAM
1Ø CX-MILL



SCHEMATIC DIAGRAM
3Ø CX-MILL



CX GROUND LEVEL MILL WIRING DIAGRAM
WITH NUTRI-BLENDER



CX GRAVITY MILL WIRING DIAGRAM
WITH NUTRI-BLENDER AND DBL. DIA. CONTROL HOPPER