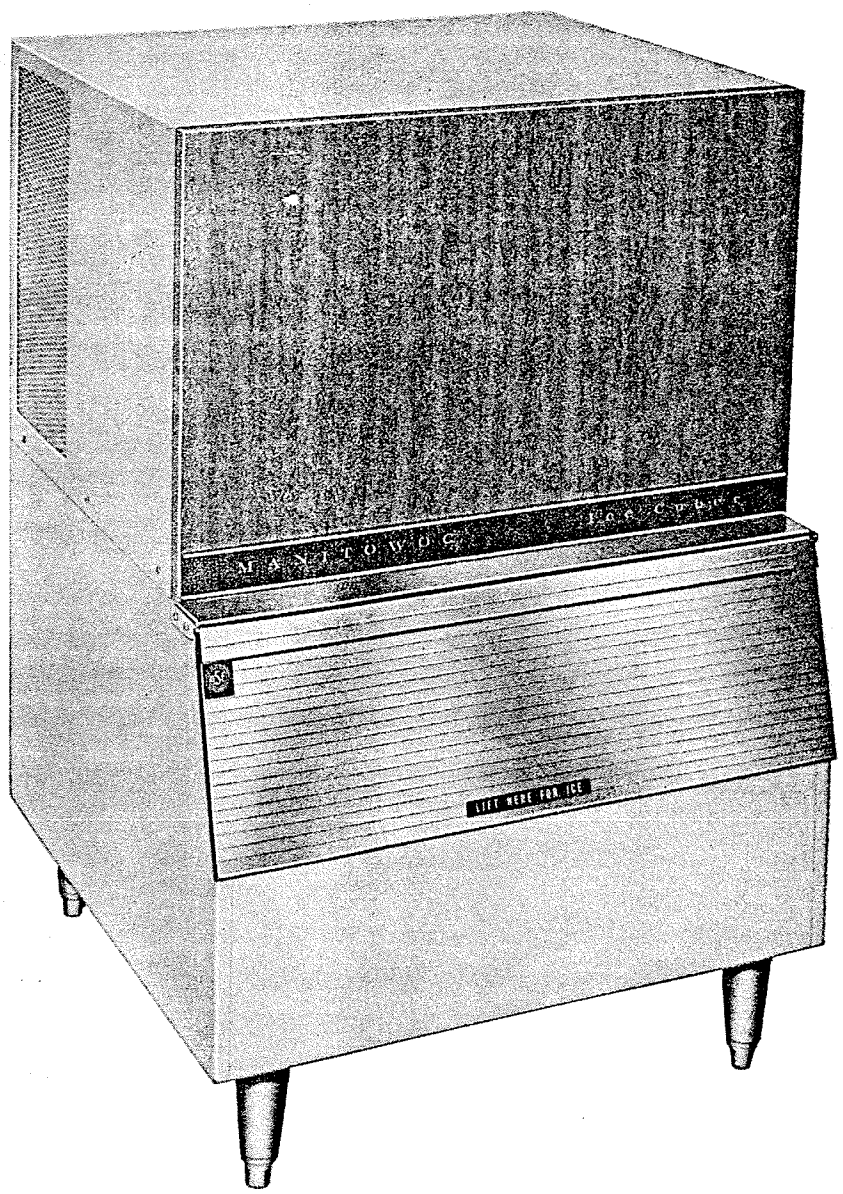
Manitowoc

MG200 SERIES ICE CUBER SERVICE MANUAL



Manitowoc equipment works
Division of The Manitowoc Company, Inc.,
MANITOWOC
WISCONSIN

80-0020-1

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FORWARD

Manitowoc Equipment Works, Division of the Manitowoc Company, Inc., Manitowoc, Wisconsin, presents this Service Manual to assist the service man with information concerning CONSTRUCTION, INSTALLATION, and MAINTENANCE of the MANITOWOC ICE MAKER.

The problems of the user and the service man have been given special emphasis in the development of the latest MANITOWOC Ice Machines.

If you encounter a problem which is not answered by this manual, please feel free to write or call the Service Department of the Manitowoc Equpment Works, Division of The Manitowoc Company, Inc., Manitowoc, Wisconsin, describing the problem you have encountered. The Service Department will be happy to give you particularized advice and assistance. Whenever calling or writing, please state the complete model and serial number of the ice making equipment.

MANITOWOC EQUIPMENT WORKS
Div. of THE MANITOWOC CO., INC.
Manitowoc, Wisconsin 54220

UNCRATING AND INSPECTION

All MGR and MGD 200 Series Ice Cubers and Bins are shipped in separate corrugated cartons. To uncrate, remove the staples around the lower edge of the carton, lift the carton upwards and off, and inspect for concealed damage. Machine section is held to the skid by two bolts. Remove these skid bolts and set the machine on the bin.

LOCATION

Some models are designed to slide under a 42 inch bar or any other convenient location. For maximum efficiency, pick a location away from sources of heat like radiators, ovens, other refrigeration condensing units, direct sunlight, etc. Provide space around the cabinet for air circulation. Air cooled models require a minimum of 3 inches at any louvered opening to the compressor compartment. Cabinets located in unheated areas must be protected from freezing or shut down and drained. When machine is in place, remove wooden wedges under compressor. These were placed there for shipping purposes.

SETTING UP CABINET

Uncrate bin and inspect for concealed damage. Screw the legs in the four holes in bottom of bin. Carefully set bin in place and level, by adjusting the levelers built into each leg. In the event that installation is such that legs can't be used, screw out the four legs and use shims to level the cabinet. The National Sanitation Foundation requires that a cabinet not on legs must be sealed to the floor using mastic around the entire perimeter of the bottom of the bin.

SERIAL AND ELECTRICAL PLATE

The combined serial and electrical plate is located in the upper right corner inside front of cabinet. Be sure to send the complete serial number (14 numbers) and the model number when calling for service or parts.

REMOVING FRONT PANEL

To remove front panel, (Fig. 6 "J") pull forward on lower edge of panel and lift panel up and off. To install panel, set top of panel on edge at the top of head unit and snap into place at bottom.

REMOVING HEAD SECTION PANELS

The top and both sides of the cuber head unit is a one-piece construction. To remove this wrap-around panel, remove the three screws (Fig. 6 "L") along the lower edge and the two screws (Fig. 6 "K") on the back edge on each side of head unit. Lift the entire panel (Fig. 6 "I") forward to remove. This will expose both the ice making and machine section of the cuber.

ELECTRICAL CONNECTIONS

115 Volt – 60 Cycle – 1 Phase 20 Ampere Outlet
230 Volt – 50 Cycle – 1 Phase

GENERAL REQUIREMENTS

All electrical and water supply and drain connections must conform to local codes.

CONNECTING POWER SUPPLY

From rear of cuber place No. 14 separately fused wire into hole (Fig. 6 "B") in back panel. Run wire across machine section and into the hole at lower portion of electrical control box (Fig. 6 "C").

From front of machine, remove the cover from electrical control box. Connect lead wires with the two lead wires supplied in control box leading to N (neutral) and L_2 (line 2). Use No. 20 Ampere Fusetrons only, as all 60 cycle circuits are 115 volt, necessitating a neutral in the supply line.

WATER SUPPLY

Quality and ice making capacity are affected more by chemistry, temperature, and foreign matter in supply water than any other factor. A survey made of water departments of large cities all over the country made it obvious that external filters or strainers should be installed. Such equipment is very effective in improving ice quality and reducing the frequency of cleaning out the ice making sections.

CONNECTING WATER SUPPLY

A ½" female pipe fitting is provided on the right end of the head unit. (Fig. 6 "D") Install the water filter screen provided with the cabinet. Use 3/8" O.D. copper tubing for the water supply.

DRAIN CONNECTIONS

It is essential that drain connections be made so waste water can't back up into the head unit or bin. On water cooled models, a separate connection is provided for discharging condenser water. (Fig. 6 "E"). All connections are labeled. We recommend covering all incoming water and drain lines with a plumbing insulation material to prevent condensation. If the head unit and bin drains are tied together through a "T" connection, we recommend using a 3/4" pipe and a stand pipe vented to the atmosphere to prevent water traps. Drains must be at least 1/2" inside diameter and have 1½" drop per 5 feet of run. If drains are not close enough to allow drop for proper drainage, or water is to be drained in a stationary sink higher than ice machine drains, use an automatic condensate disposal pump. (Check and follow local plumbing codes.)

CHECK LIST FOR STARTING MACHINE

Remove tape securing the damper door, splash curtain, water pump, and float valve.

Remove and discard screw securing the water pump mounting bracket to the cabinet wall. Raise the pump enough to remove the corrugated packing protecting the pump during shipment.

Turn on water, and observe that the float valve shuts off the water when the level is about 2 inches deep. Should float require adjustment merely bend float rod carefully until desired water level is achieved. Turn the toggle switch to "water pump", left position.

The water pump will start pumping water into the tube located at the top of the evaporator. Return water will flow into the sump.

CHECK FOR THE FOLLOWING THINGS

A higher than necessary water level wastes water and reduces ice making capacity.

Turn the machine on and off serveral times to flush clean water through the system and to observe that waste water drains properly.

With the toggle switch in the "ICE" position, reach down and push the damper door open. The entire machine should stop and remain off until the damper is released.

The installer should replace the panel on the head unit, put the front panel in place, and check the first harvest of cubes to see that the machine functions properly.

The ice size controls consists of a Ranco or Penn reverse-acting pressure control (opens on pressure rise) and a Paragon time clock. These controls are factory set and should need no adjustment except in altitudes above 5,000 feet.

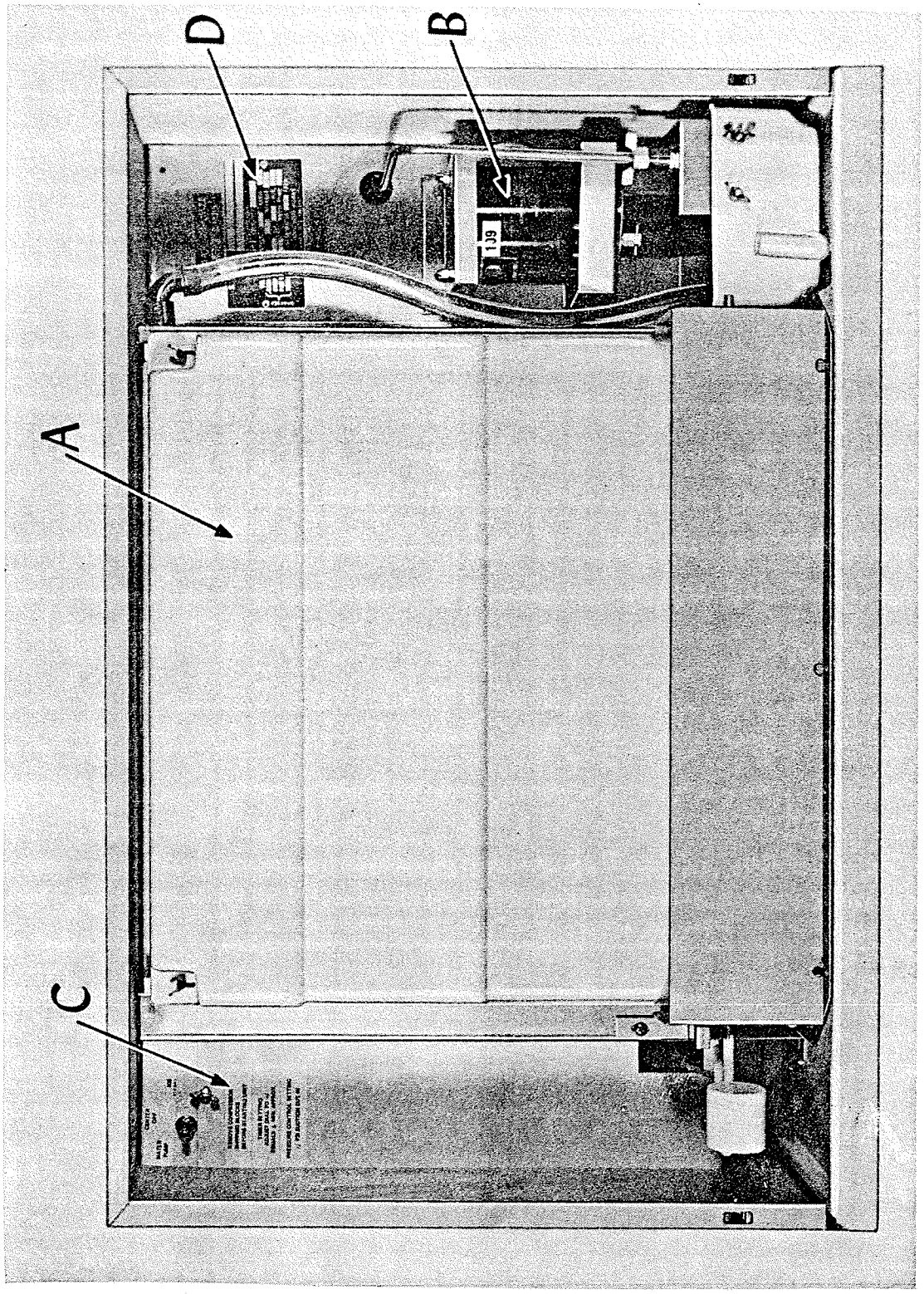


FIG. 1 – FRONT WITH PANEL REMOVED

A. Splash Curtain
B. Water Pump
C. Control Panel
D. Serial Plate

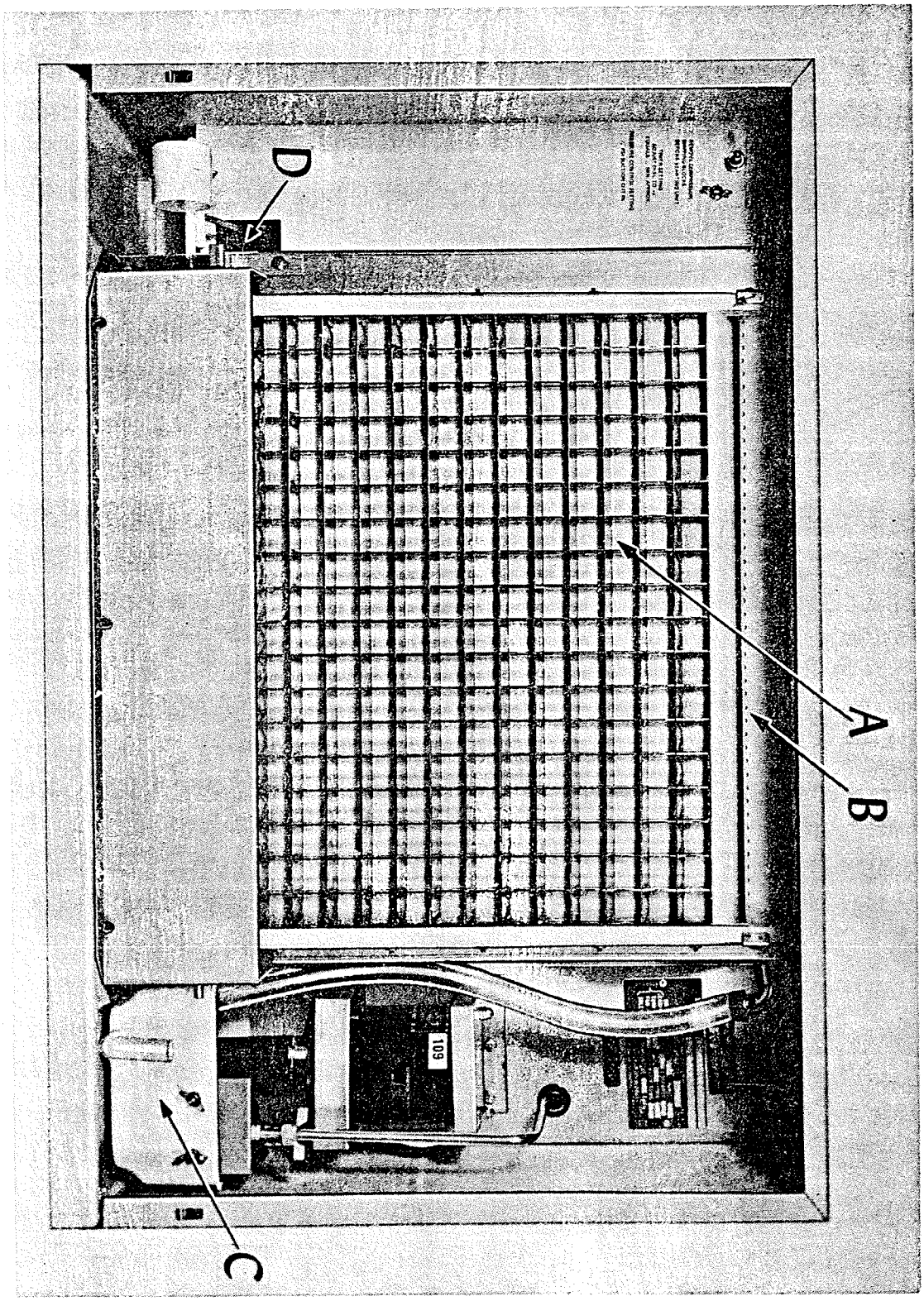


FIG 2 – FRONT WITH SPLASH CURTAIN REMOVED

A. Evaporator
B. Water Distributor
C. Water Sump
D. Bin Switch

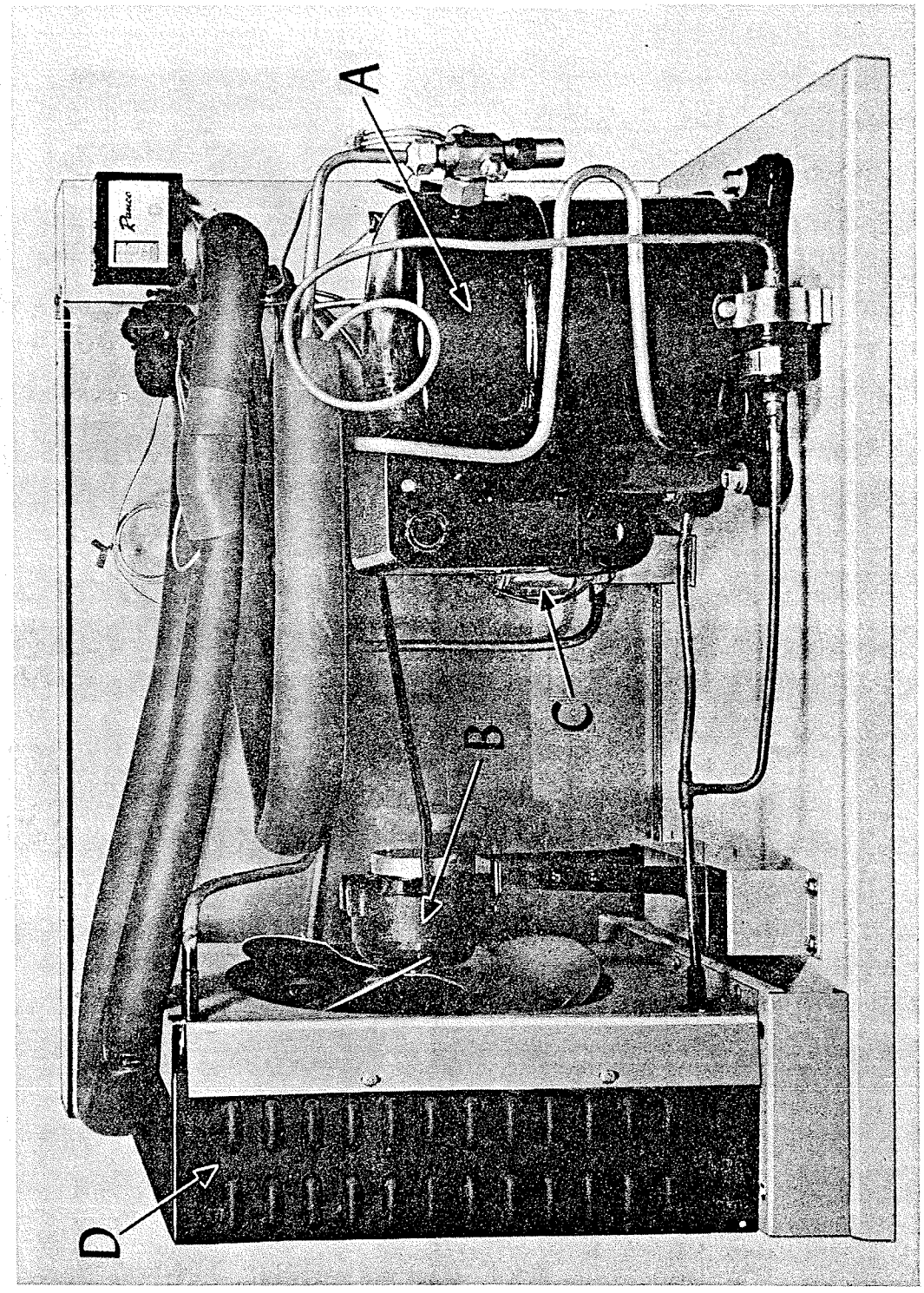


FIG. 3 – MACHINE SECTION

A. Compressor
B. Fan
C. Hot Gas Solenoid
D. Condenser

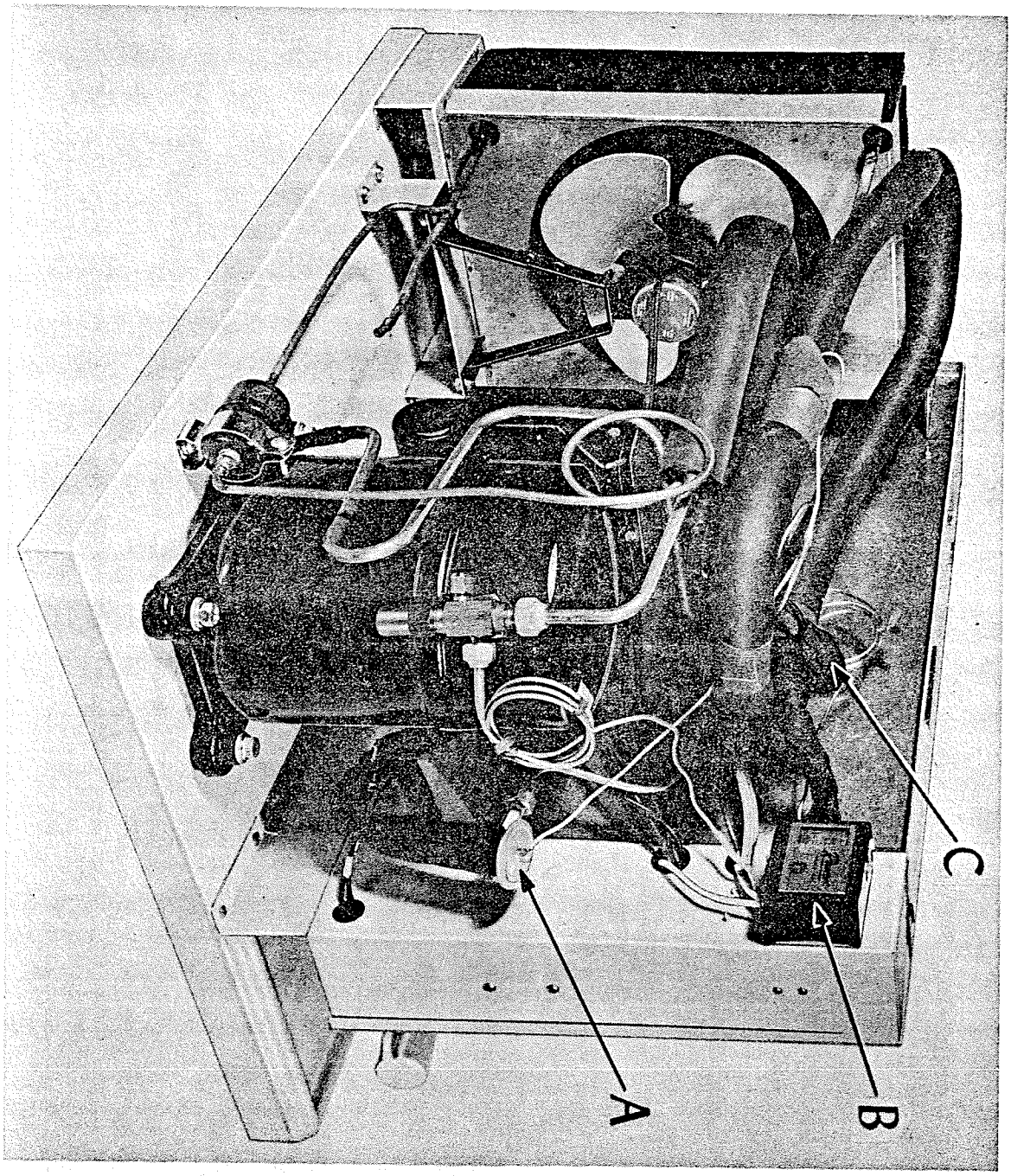


FIG. 4 – MACHINE SECTION

A. Expansion Valve
B. Ranco Pressure Control
C. Thermo Disc

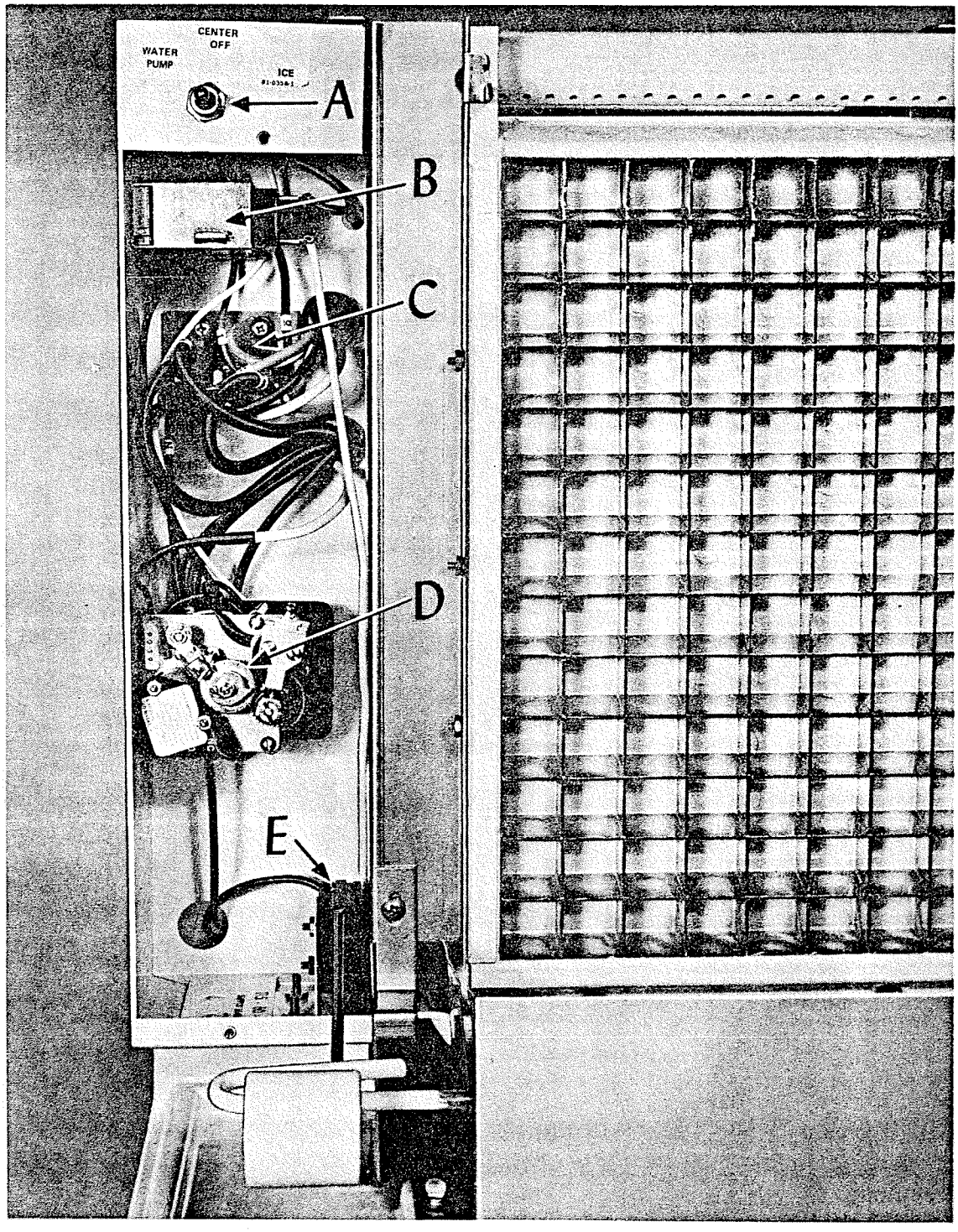


FIG 5 – CONTROLS

A. Toggle Switch
B. High Pressure Cut-Out
C. Terminal Board
D. Timer
E. Bin Switch

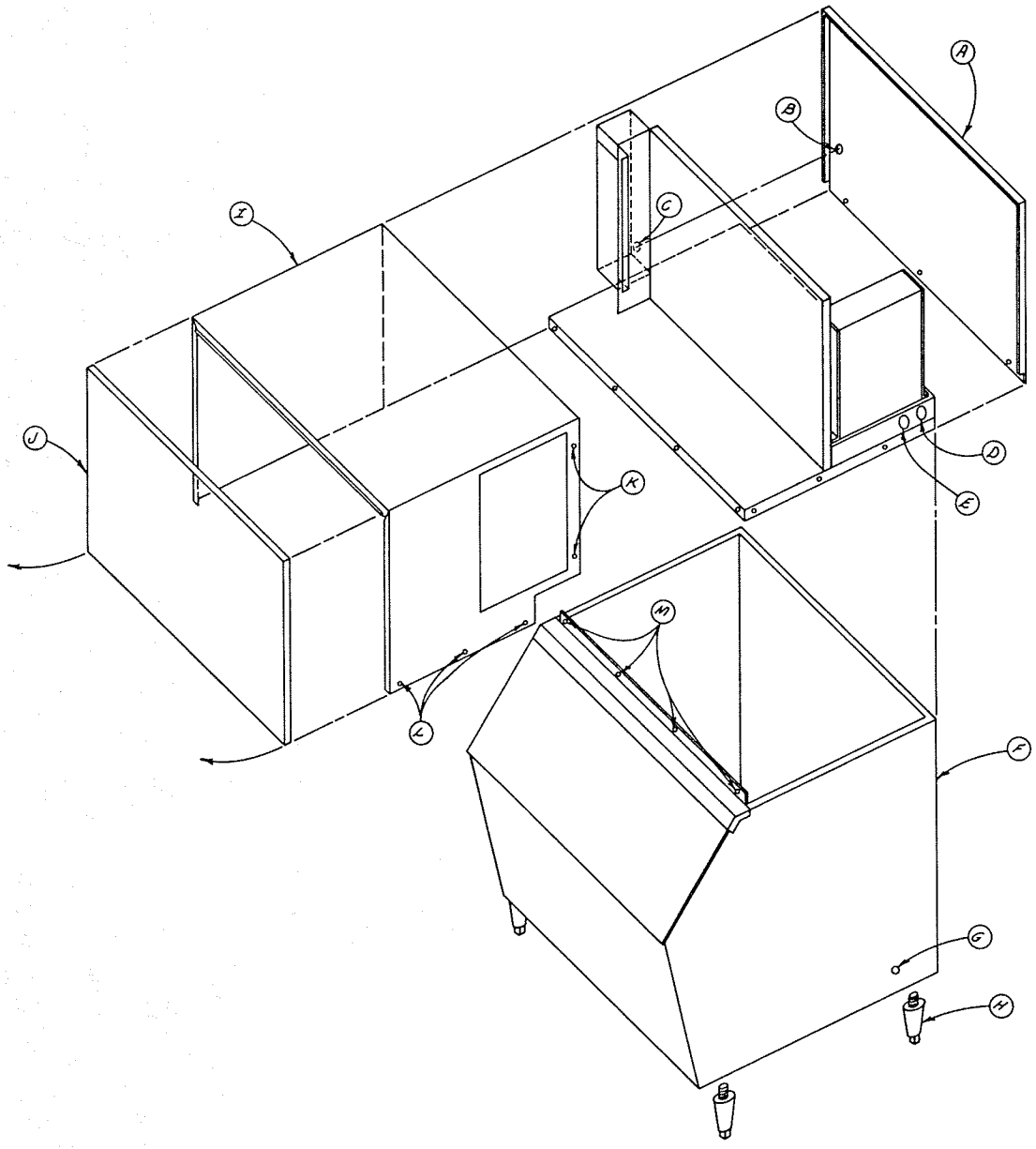


FIG. 6
CABINET AND BIN

A. Back Panel
B. Power Supply Inlet
C. Control Box
D. Water Inlet
E. Condenser Water Outlet (Water Cooled Only)
F. Bin
G. Drain (Bin)
H. Bin Legs
I. Outer Panel
J. Front Panel
K. Back Panel Screw Holes
L. Bottom Screw Holes
M. Head Section Screw Holes

MANITOWOC'S FREEZE AND HARVEST CONTROL FOR 200 SERIES MODELS MGR & MGD

Freeze and harvest cycles on the above model Manitowoc Cubers are regulated by three very simple controls. The basic control is a low side reverse-acting pressure regulator made by either Ranco or Penn. This is mounted in the compressor compartment at the upper edge of the bulk head which separates this area from the freezing section. The second control is a Paragon Timer, located in the control panel of the freezing compartment. The third is a thermo disc installed on the suction line outlet of the evaporator. On starting a warm machine, the suction pressure may be upwards of 75 PSIG; but as the compressor runs, the suction pressure and temperature within the line is lowered. When the line temperature reaches 35^0 F., the thermo disc "cuts in" and closes the clutch on the timer and holds it "in" continuously through the freezing cycle. When the suction pressure reaches 9 lbs. in the regular cube unit (11 lbs. in the dice cube unit), the pressure control electrically activates the timer motor. The cam on the timer motor is set at approximately 4½. This is equal to 6½ minutes running time. The clock continues to run until the cam stalls against the harvest micro switch. This places the unit in defrost, and it will stay in defrost until released by the bin damper switch when the sheet of ice falls into the bin. The thermo disc remains closed during the entire harvest cycle. It opens only when the temperature of the suction line rises to 65^0. This is a safety measure to prevent overheating in case the unit would stay in harvest.

If the dimple in the cubes is too pronounced, you may set the timer dial to 5. This will increase the freezing time. Likewise, if the bridging between cubes is too heavy, you may set the dial back to about 4. This shortens the freezing time.

CONTROLS

High Pressure Cut-Out

This shuts entire machine off, should the head pressure exceed 275 PSIG.

Suction Line Thermo Disc

Suction line thermo disc is a safety control located on suction line. This control is a Klixon switch that opens at 65^0 F + -5^0, and closes at 35^0 F + -5^0. The thermo disc acts only as a safety device to prevent overheating of the machine. Should the damper door switch fail after harvest, the thermo disc will open. When the suction line temperature reaches 65^0 + 5^0, this will return the machine to its normal freezing cycle by disengaging the clock clutch located on the clock.

Toggle Switch

The main power "ON and OFF" toggle switch is a double pole, double throw switch with "OFF" in the center position. With the toggle switch in the "water pump" (Left) position, only the water pump and the condenser fan operate. This is for checking the water inlet float level, pump operation, and for circulating cleaning solution.

With the toggle switch in the "ICE" (Right) position, the water pump, compressor, and condenser fan (air cooled models), run for a normal ice making cycle.

Ranco or Penn Pressure Control

This control is a reverse-acting pressure control that opens on pressure rise. Upon decrease in suction pressure (11 lbs. dice cube, 9 lbs. regular cube), the pressure control closes, actuating the time clock.

Paragon Time Clock

After the pressure control energizes the time clock, the time clock motor turns a cam for 6½ minutes (number 4½ on time clock face). When the 6½ minutes have elapsed, the cam trips a micro switch which in turn cycles the machine into hot gas or harvest cycle. Simultaneously, the water pump (and condenser fan on air cooled models) are shut off

Damper Door Switch

When the harvest is completed, the ice falls through the damper door tripping the damper door switch. This, in turn, opens the holding clutch on the time clock momentarily to reset the clock and return the machine to its normal freeze cycle.

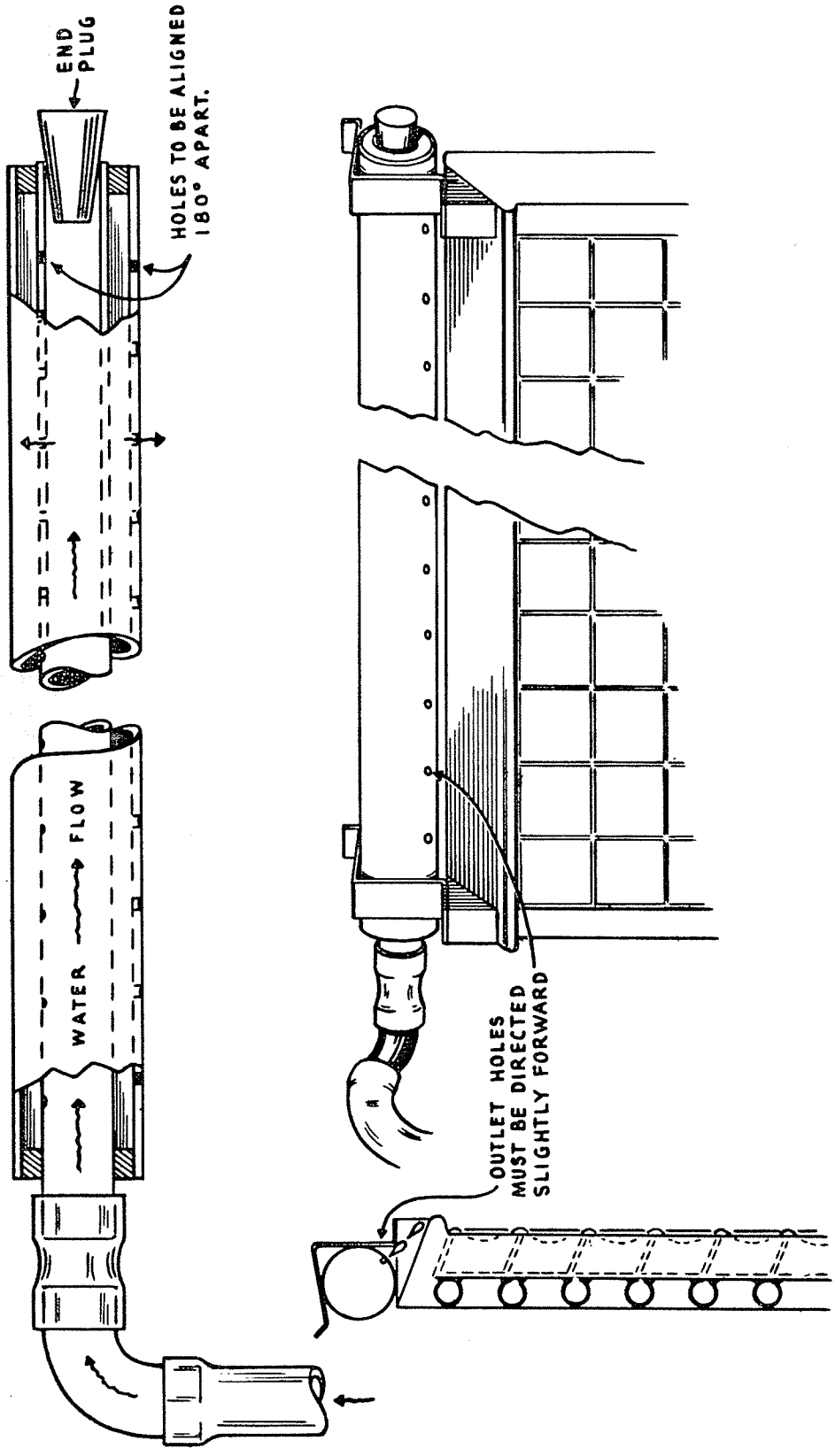
When the ice bin is full, the ice holds the bin switch open keeping the machine shut off.

Should the damper switch fail, the suction line thermo disc will open to reset the time clock.

SETTING TIMER

Should it be necessary to adjust the timer for an accurate bridge thickness, proceed as follows:

1. Remove cover from the control box Fig. 1 "C".
2. Locate timer Fig. 5 "D".
3. Loosen adjustment screw, Fig. 8 "D".
4. To decrease bridge thickness, set arrow Fig. 8 "C" to number 3. Likewise to increase bridge thickness, set arrow to number 5.
5. Retighten set screw.



Water System Sketch

FIG. 7

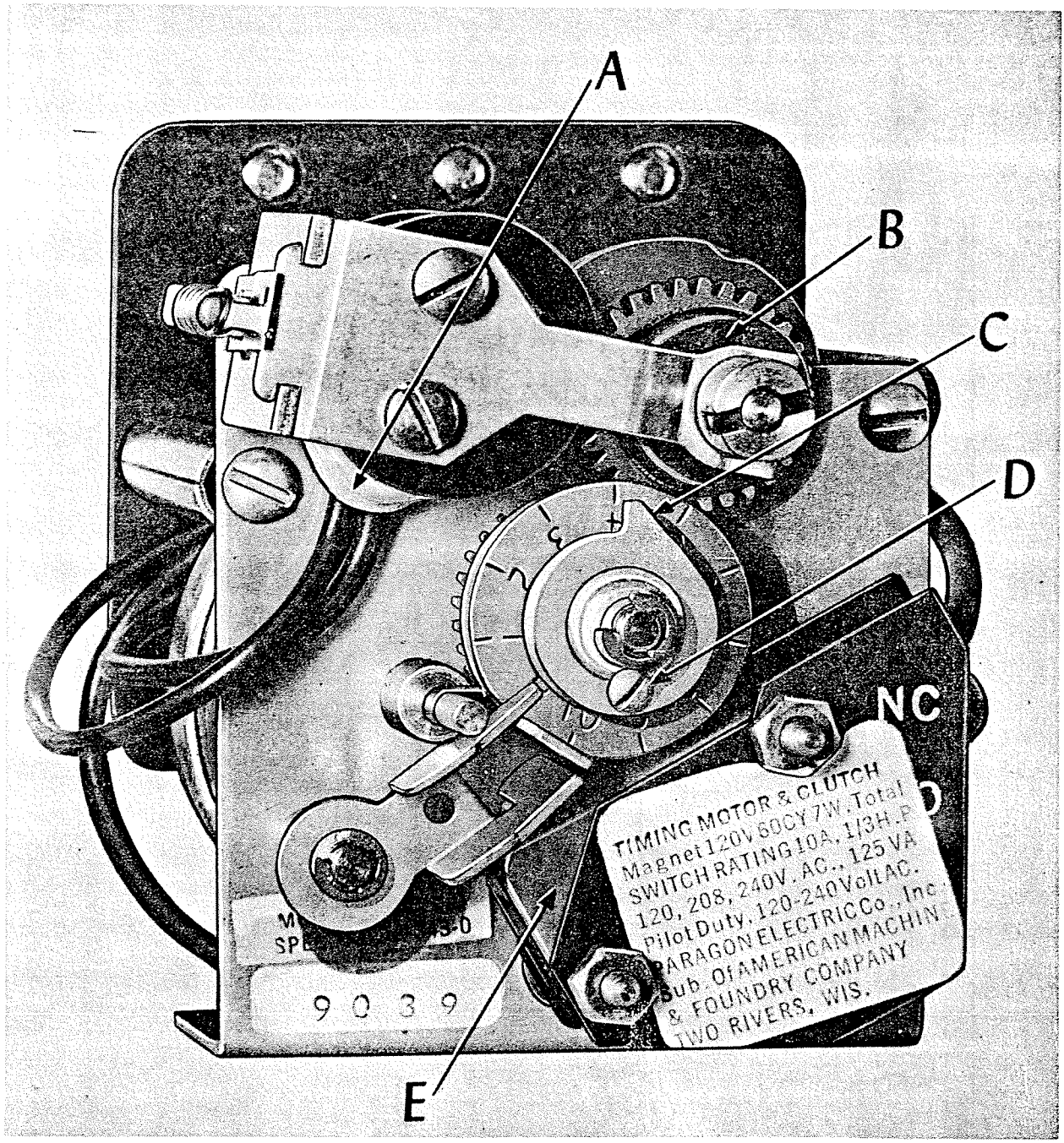


FIG. 8
A. Clutch Coil
B. Clutch
C. Timer Setting
D. Timer Setting Lock Screw
E. Micro Switch

SERVICE ANALYSIS

COMPLAINT	CAUSE	CORRECTIVE MEASURES
Slow harvest	Contaminated or limed water system	Clean water system
	Low ambient (air cooled models)	Must be above 50^0 F
	Water valve set too low	Adjust water valve to 125 PSIG head pressure
	Leaking water valve (water cooled models)	Replace water valve
High head pressure	Air in system	Evacuate and recharge
	Defective water valve (water cooled models)	Replace water valve
	Defective fan (air cooled models)	Replace fan
	Water valve not properly adjusted	Adjust water valve
	Contaminated air cooled condenser	Clean condenser
	Defective expansion valve	Replace
High suction pressure	Contaminated condenser	Clean
	Defective fan.	Replace fan
	Defective water valve (water cooled models)	Replace or adjust water valve
	Moisture in system	Replace drier, evacuate, and recharge
Low suction pressure	Shortage of refrigerant	Locate leak and repair
	Moisture in system	Replace drier, evacuate system
	Ambient too low for operation	Must be above 50^0 F.
Unit noisy	Fan shroud touching fan blades	Adjust fan mounting brackets
Ice maker will not stop when full of ice	Damper door not properly adjusted	Adjust damper door
	Defective damper door micro switch	Replace damper door micro switch
Time clock will not operate	Ranco pressure control not closing	Replace control
Time clock will not actuate harvest	Timer micro defective	Replace micro switch
	Thermo disc is not closed	Check thermo disc
Small cube bridge	Ranco pressure control not opening	Replace control
	Leak in refrigeration system	Locate leak, repair, evacuate, and recharge
Machine will not cycle into harvest	Defective time clock clutch coil	Replace
	Defective time clock micro switch	Replace, or tighten on suction line
	Defective thermo disc or thermo disc loose on suction line	

Cuber Model	60 CYCLE MGR & MGD 200 Series Water Cooled 60 Cycle			MGR & MGD 200 Series Air Cooled 60 Cycle		
Compressor Model	RSF20050-1AA			RSF20050-1AA		
Compressor Voltage	115V-60Cy-1Ph			115V-60Cy-1Ph		
Winding Resistance Common to Run	.6 OHMs			.6 OHMs		
Winding Resistance Common to Start	3.8 OHMs			3.8 OHMs		
Start Capacitor Rating	189-210MFD220V			189-210MFD220V		
Fan Motor Model	MORRILL			MORRILL		
Fan Motor Amps	.82			.82		
Fan Motor Watts	9 Watt			9 Watt		
Fan Motor Volts	115 Volts			115 Volts		
Fan Winding Resistance	28 OHMs			28 OHMs		
Solenoid Valve Volts	115V			115V		
Solenoid Valve Winding Resistance	49 OHMs			49 OHMs		
Hartell Water Pump Winding Resistance	9.5 OHMs			9.5 OHMs		
Hartell Water Pump Amperage	1.8 Amps			1.8 Amps		
Refrigerant Charge – R-12	32 ozs.			28 ozs.		
Normal machine amperage	13 Amps			14 Amps		
Room Temperature	70	90	110	70	90	110
HEAD Maximum				130	160	200
PRESSURE Minimum				105	125	170
SUCTION Maximum				18	19	21
PRESSURE Minimum				9	10	11
Water Temperature Condenser Out	100	100	100			

CLEANING INSTRUCTIONS

IN PLACE CLEANING

To clean the ice cuber water system without removing the components proceed as follows. NOTE – This is only recommended in locations where impurity build-up is not heavy.

1. Remove ice cuber front panel.
2. Shut off ice cuber.
3. Remove ice from bin.
4. Shut off water supply and remove water from water sump.
5. Pour one bottle of ice machine cleaner into sump and turn supply water on.
6. Place toggle switch to water pump position and circulate cleaner for about 30 minutes.
7. After cleaning shut machine off and remove cleaner. Flush water system thoroughly.
8. Clean ice storage bin with ice machine cleaner also.

DISASSEMBLING WATER SYSTEM FOR CLEANING

To clean parts by removing proceed as follows:

1. Shut machine off.
2. Remove splash curtain, water pump and water distributor.
3. Disassemble distributor as indicated in Fig. 7.
4. Disassemble water pump as follows:
   A. Turn pump over and remove the 6 brass thumb screws.
   B. Hold and depress impeller. Rotate plastic thumb nut counter-clockwise.
   C. Remove screws and pump housing. Pump is now ready for cleaning.
   D. Reassemble in reverse order as removed.

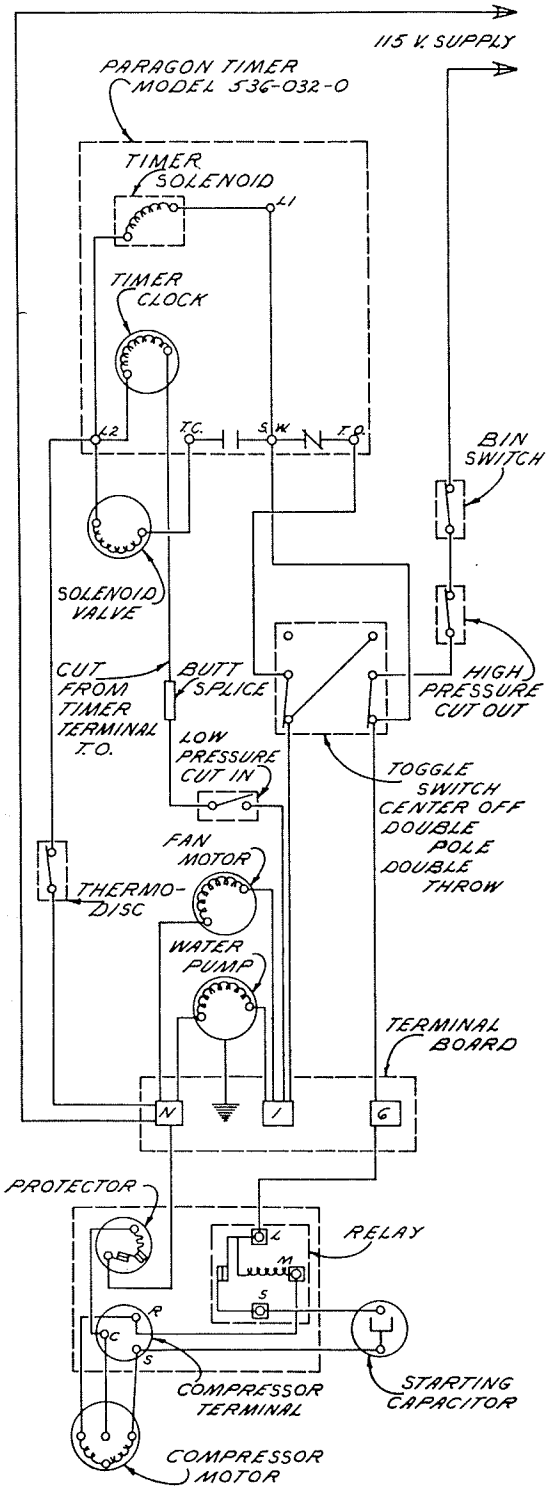
Scrub all parts removed using a nylon scouring pad, brushes, and a cleaning solution such as LIME–A–WAY from Economics Laboratory, Inc., Calgon Ice Machine Cleaner, or Boss Brand Milk Stone Cleaner from Northern Laboratories. Rinse all parts with clear water.

It is recommended that the ice be removed from the storage bin before scrubbing the base and evaporator assembly. Rinse with clear water. Check to see that overflow or dain hole in the base is clear and that water drains through freely.

Reassemble unit. To sanitize unit, mix ONE TEASPOON OF SODIUM HYPOCHLORITE IN ONE GALLON WATER. Pour solution into sump, then turn toggle switch to the left to start water pump.

Keep pouring solution into sump until system has enough to keep pump primed. After one minute, turn off pump and remove solution from water sump. Repeat with clear water before turning switch back to the ice making position. Make visual inspection for leaks and operation before replacing the front panel.

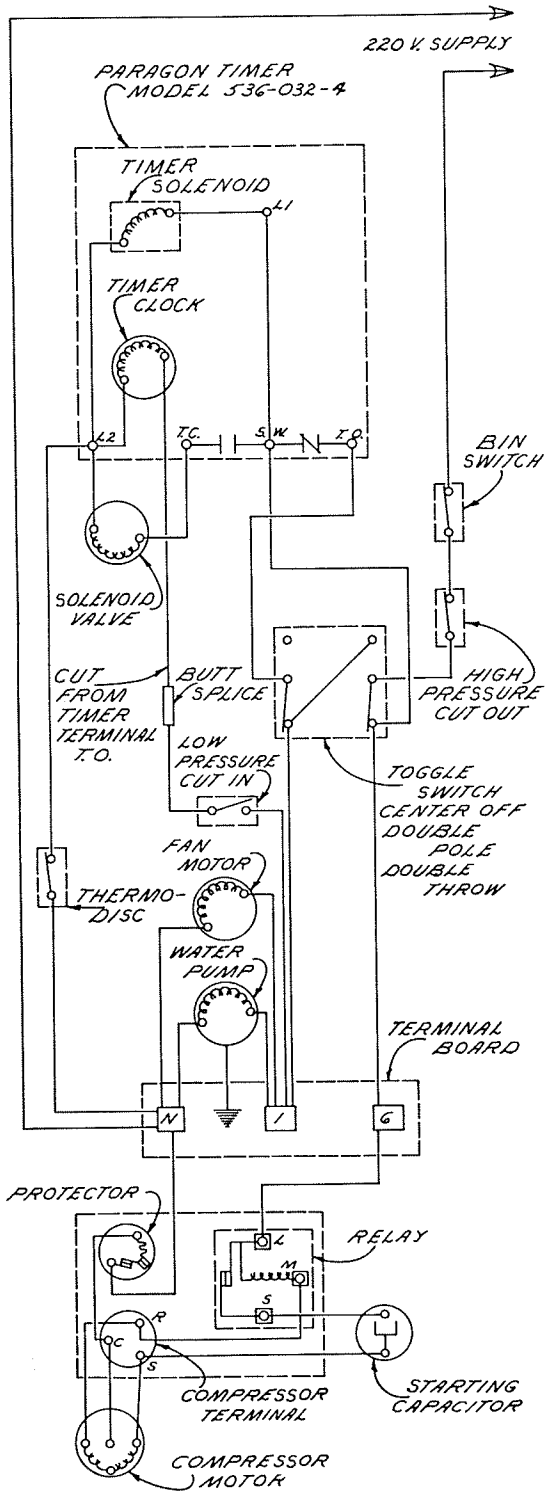
MGR & MGD 200 SERIES
AIR & WATER
FAN ON AIR COOLED ONLY
SHOWN AT BEGINNING OF
FREEZE CYCLE



60 cy

81-0407-1

MGR & MGD 200 SERIES
AIR & WATER
FAN ON AIR COOLED ONLY
SHOWN AT BEGINNING OF
FREEZE CYCLE
220 VOLT, 50 CY.



50 cy

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BASIC PARTS LIST	PART NUMBER
Compressor	14-0004-1
Relay	15-0266-1
Overload	15-0003-1
Start Capacitor	15-0002-1
Drier	12-3006-1
Condenser (Air Cooled)	11-5016-1
Condenser (Water Cooled)	11-0015-1
Fan Motor	24-0221-1
Fan Blade	24-0015-1
Expansion Valve	13-6701-1
Solenoid Valve	24-0218-1
Thermo Disc	23-5082-1
Timer (Paragon)	24-0217-1
Bin Switch	23-0074-1
Toggle Switch	23-0056-1
Ranco Pressure Control	23-5079-1
High Pressure Cut-out	23-5501-1
Water Distributor	10216-1
Water Pump Assembly	14-8023-1
Float Assembly	13-6902-1

The following parts used on 230 Volt 50 Cycle models only.

Compressor	14-0007-1
Water Pump	14-8024-1
Solenoid Valve	24-0401-1
Paragon Timer	24-0603-1
Fan Motor	24-1203-1

SERVICE AND PARTS PROCEDURES

Order and Pricing Procedure

All replacement parts for the Manitowoc ice machine equipment are to be ordered directly from the factory; however, any distributors or dealers who may be interested in stocking replacement parts for the machines they sell, in order to provide their customers with a prompt and efficient service, may purchase these parts with the understanding that, any time they feel they have parts they no longer need or feel they no longer want to carry replacement parts, they are to notify the factory's Parts Department as to which parts they wish to return.

Upon receipt of this listing, we will immediately send them written authorization to return these parts; and upon receipt of these parts, full credit will be issued. There will be no charge for restocking these parts. Of course, credit can only be issued if the parts are returned in a new and unused condition.

When placing your order, be sure to do as follows:

1. Print name and address plainly.
2. If special routing is requested, please show the name of the carrier.
3. Indicate quantity desired, print catalogue part number plainly and print name as shown in the catalogue.
4. Indicate model and serial number of the unit. The complete serial number is needed.
5. If uncertain as to the proper part number, please give a complete description or sketch of the part and the location of the part which is needed.
6. Check to see that all required information is contained in your order to facilitate prompt shipment.

All replacement parts are shipped from the factory on a f.o.b. Manitowoc basis. It is company policy to bill

for all field replacement parts, according to terms as specified by our Credit Department.

All parts orders will be honored by the factory and will be billed according to our parts list schedules.

Parts which are covered by our warranty policy are to be returned to the factory for credit, transportation charges prepaid. Upon receipt of these parts here at the factory, they will be inspected; and if they are found to be defective, in material and workmanship, under normal use and service, credit will be issued.

Transportation companies are responsible for damage in transit as all shipments are tendered to them in good condition; and our responsibility ceases upon receipt of a signed bill of lading from the carrier. If the shipment arrives in a damaged condition or is short, the delivery carrier should be notified immediately.

Return of Defective Parts

All defective parts returned to the factory, transportation prepaid, must be tagged with a return material tag properly filled in. It is especially important that the cabinet serial number be secured and recorded on the tag, securing as much information as possible about the nature of the defect to prevent any delays in issuing credit. All parts should be returned as they are removed from the cabinet and not mutilated or tampered with. The return material tags are provided on a no-charge basis by the factory upon receipt of your request.

Our warranty and protection plan does not apply to cabinets that are not registered; therefore, it is necessary that, upon completion of the installation of the cabinet, the registration card be signed on the date of installation and mailed promptly to the factory Service Department in order for the cabinet to be registered.

Return of Hermetically-Sealed Units

Extreme care should be used in servicing the hermetically-sealed mechanism. It is important that the trouble be correctly determined before the unit is changed. Be sure it is not the control, relay, or overload causing the trouble. The defect must be listed on the return material tag.

The inoperative assembly should be returned to the factory, freight prepaid, making certain that all service valves and tubing are sealed properly so as not to let in dirt, air, or moisture into the system. After inspection of the returned hermetic mechanism, if it has been determined that the reason for failure is the result of defective workmanship and material, credit will be issued. If a returned hermetic mechanism is found, after inspection, not to be defective, it will be returned to the sender, along with the necessary charges to cover the inspection, handling, and freight. Credit will not be allowed for defective mechanisms damaged from improper packaging or handling.

Return of Complete Machines

No complete machines may be shipped back to the factory for repairs without first securing prior permission from the factory. If an unauthorized shipment is received at the factory, it will be refused by our warehouse and immediately returned to the sender. Upon receipt of your request to return a cabinet, if we feel that your request is legitimate, you will be sent an authorized return label authorizing you to return this cabinet to the factory freight prepaid.

Service and Labor Charges

In accordance with our warranty and protection plan, which is included in each cabinet, this protection plan provided is available only through distributors and dealers who will be solely responsible for service and labor charges.

Warranty and Protection Plan

ONE YEAR PROTECTION PLAN - This Ice Machine is warranted, under normal use and service, against defects in workmanship and material for a period of one year from the date of its installation to the original owner only. This warranty and protection plan does not apply if the cabinet is resold. We agree to repair or to replace, without charge to the original purchaser, any part or parts of this ice machine which in our judgment are defective providing they are returned to us through our distributors, and/or dealers, transportation charges prepaid.

The protection plan provided is available only through distributors and dealers who will be solely responsible for service or labor charges.

FOUR YEAR ADDITIONAL PROTECTION - During the four years following the expiration of the one year protection plan, we will repair or exchange for the original purchaser the hermetically sealed compressor unit, which in our judgment, is inoperative due to defects in factory workmanship or material. We may, at our option, replace it with another compressor unit of like or similar design.

GENERAL PROVISIONS - The above one year and four year protection plan applies only if the cabinet is registered at the time of purchase. It is void on any cabinet on which either the cabinet or serial plate has been tampered with. It is also void if the cabinet has been damaged by flood, fire or through gross negligence on part of owner or damage of accidental nature. Our responsibility is limited to supplying replacement parts and does not obligate us to replace the complete ice machine.

This warranty is given expressly in lieu of all other warranties, expressed or implied, and no representative or other person is authorized to make any warranty, or to commit this company to any liability not strictly in accordance with this plan.

To validate the plan, the registration card must be signed on date of installation and mailed promptly to the Service Dept., Manitowoc Equipment Works, Manitowoc, Wisconsin. Also this certificate should be signed by the dealer and retained by the owner.

(The entire plan applies only within the
United States of America and Canada)

DEALER'S SIGNATURE _____

INSTALLATION DATE _____

MANITOWOC EQUIPMENT WORKS
(DIVISION OF THE MANITOWOC COMPANY, INC.)
MANITOWOC, WISCONSIN

Form 81-0143-1
ALL