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JVMR

REAR ROLL-IN REFRIGERATED
DAIRY MERCHANDISER

INSTALLATION / SERVICE INSTRUCTIONS

ENG.NO. 252424H

May, 1989

Supersedes #252424G

Dated December, 1986

Section 5

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WARRANTY

REVISION CHANGES ("H")

1. R-502 Standard, page 3-1
2. New Control Settings, page 3-4
3. New Serial Plate Amps, page 4-2

IMPORTANT
KEEP IN STORE FOR FUTURE REFERENCE
Quality that sets industry standards.

THIS MERCHANDISE CONFORMS TO THE
COMMERCIAL REFRIGERATOR MANUFACTURER'S ASSOCIATION
HEALTH AND SANITATION STANDARD

CRS-S1-86

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SECTION 1

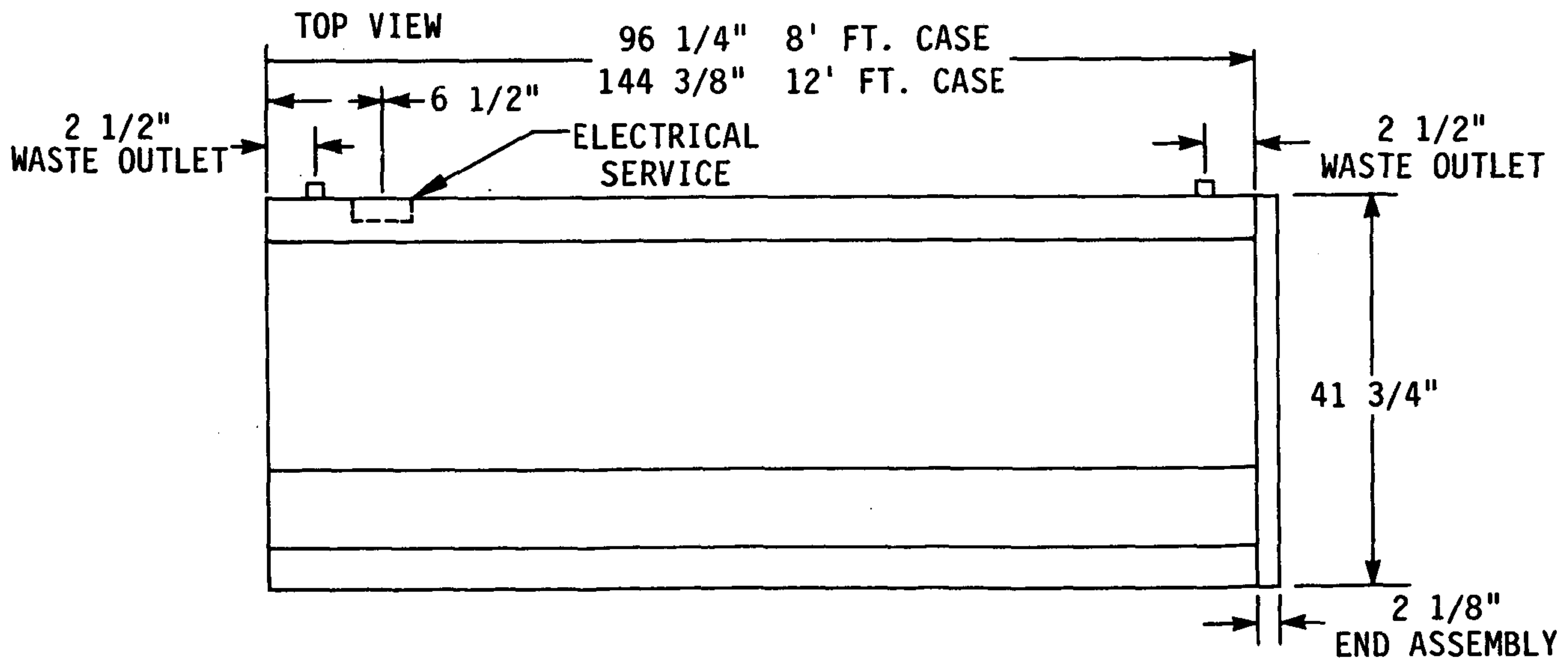
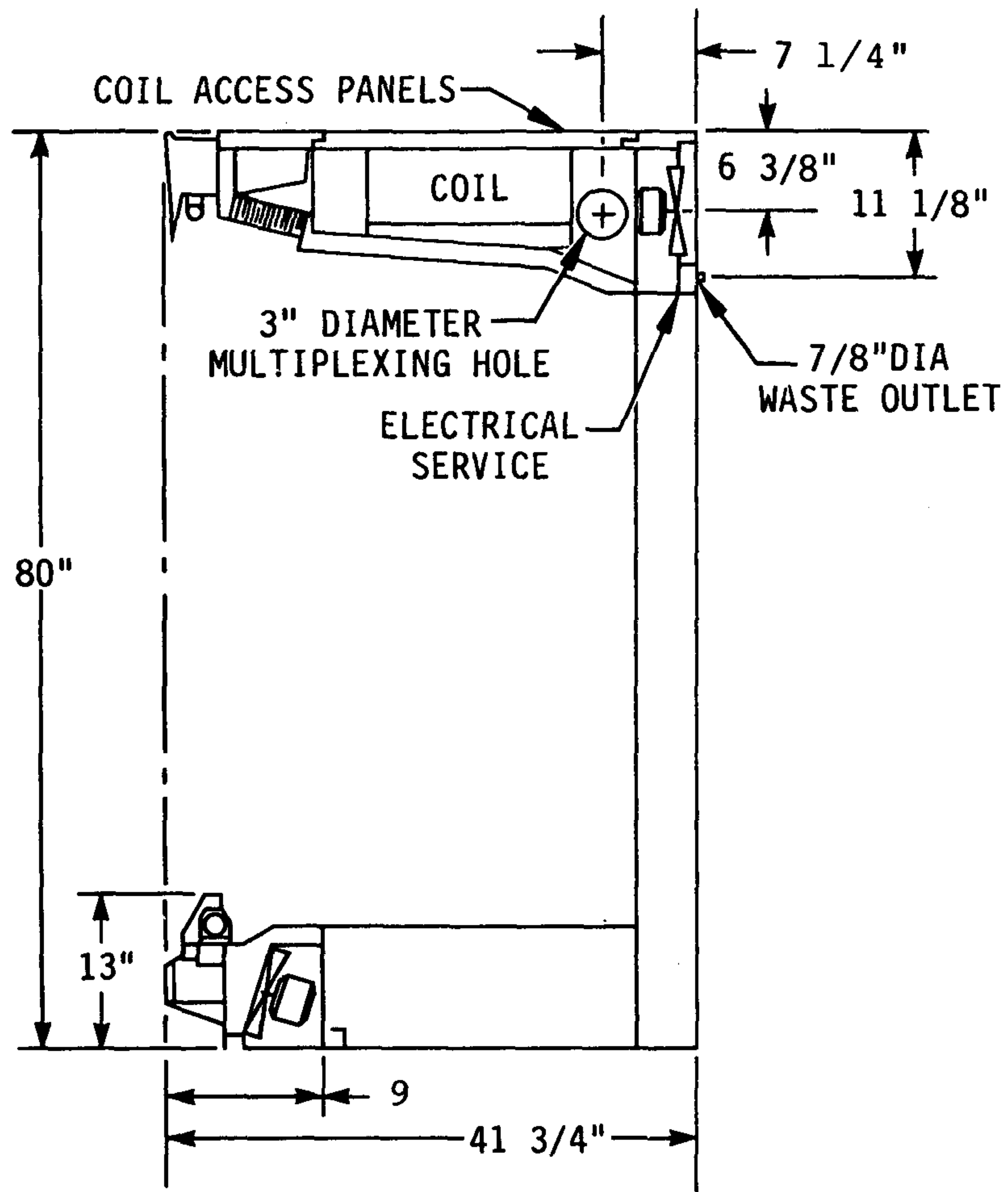
GENERAL INFORMATION

MODEL DESCRIPTION

The JVMR model is a refrigerated dairy merchandiser designed to be installed with the rear of the coil package against a cooler wall opening. This merchandiser is open at the rear. The product may be moved into the merchandiser through the opening in the cooler wall. The JVMR model is available in 8' and 12' lengths.

APPLICATION

This medium temperature merchandiser is designed for air conditioned stores where temperature and humidity are maintained at or below 75°F dry bulb temperature and 55% relative humidity. The cooler compartment behind the JVMR must be refrigerated at a temperature of 34° to 36°F.



SECTION 2**INSTALLATION****SHIPPING DAMAGE**

All equipment should be thoroughly examined for shipping damage before and when unloading.

This equipment has been carefully inspected at our factory and the carrier has assumed responsibility for safe arrival. If damaged, either apparent or concealed, claim must be made to the carrier.

APPARENT LOSS OR DAMAGE

If there is an obvious loss or damage, it must be noted on the freight bill or express receipt and signed by the carrier's agent, otherwise, carrier may refuse claim. The carrier will supply necessary claim forms.

CONCEALED LOSS OR DAMAGE

When loss or damage is not apparent until after equipment is uncrated, a claim for concealed damage is made. Upon discovering damage, make request in writing to carrier for inspection within 15 days and retain all packing. The carrier will supply inspection report and required claim forms.

LOCATION

This refrigerator, like all other open type refrigerators, is sensitive to air disturbances. Air currents passing around this refrigerator will seriously impair its performance. Do not allow air currents, electric fans, open windows, doors, etc. to create air currents around this refrigerator.

WARNING

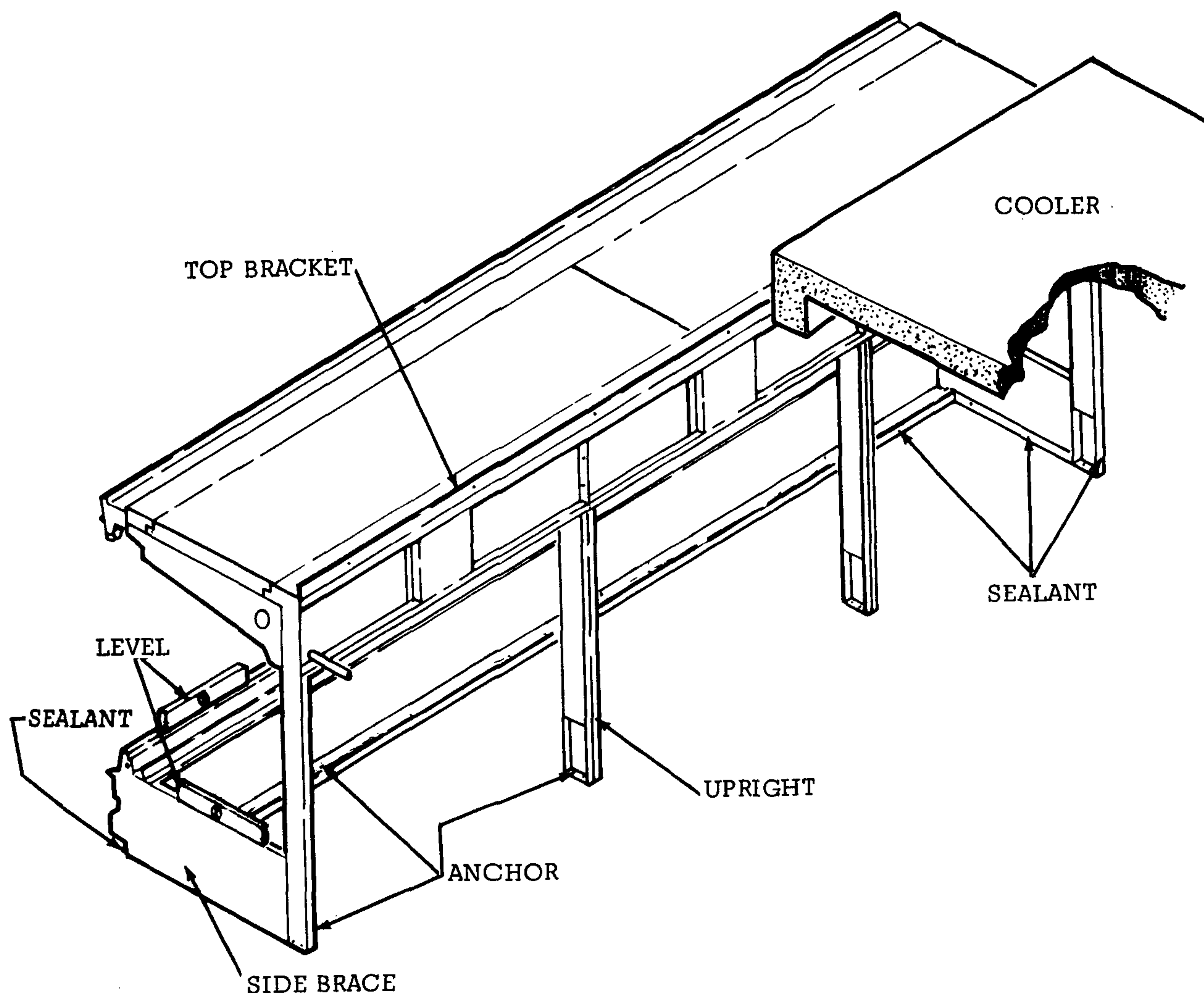
The JVMR is top heavy and must be supported and moved with care at all times until it has been securely anchored. It must be supported while it is being unfastened from the skid and when it is moved off the skid. Once the skid has been unfastened, NEVER leave the fixture unsupported or unattended until it has been anchored.

LEVELING

These refrigerators must be installed level to insure proper operation of the refrigeration system and draining of defrost water. Use a level as shown in the following illustration when leveling.

ANCHORING

The JVMR must be securely anchored to the floor and cooler wall after it has been leveled in its permanent position. Prelocated anchoring holes have been provided in the Front Assembly, Uprights, Side Braces, and Top Bracket for this purpose. As an aid in maintaining the correct lateral position while anchoring the uprights, install a shelf into each section of the JVMR. See following illustration.

**SEALING**

For proper performance, safety and sanitation apply a generous bead of butyl sealant to completely seal the JVMR to the floor and cooler wall. Apply Sealant to:

1. the rear of the coil package to the cooler wall
2. the end of the JVMR to the cooler wall
3. the interior perimeter of the base to the floor
4. the exterior front of the base to the floor

JOINING

The JVMR is of sectional construction; two or more may be joined in line to give one continuous display area with only one pair of end assemblies. The following material is shipped inside each JVMR.

PARTS LIST

<u>ITEM</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
1.	1	1/2x1x120" Gasket
2.	1	1/2x1x180" Gasket
3.	1	Canopy Joint Trim
4.	1	Front Rail Joint Trim
5.	1	Kick Rail Joint Trim
6.	7	5/16-18x3/4" Cap Screw
7.	7	5/16" Flat Washer
8.	7	5/16-18 Nut Retainer
9.	8	#8x1/2" Truss Head Sheet Metal Screw

STEP 1. Install NUT RETAINERS (Item 8) to the left-hand end frame of one JVMR.

STEP 2. Apply GASKETS (Items 1 and 2) to end frame of one JVMR.

1. Do not stretch gasket.
2. Overlap gasket at joints and splices.
3. Remove paper backing after gasket has been applied.

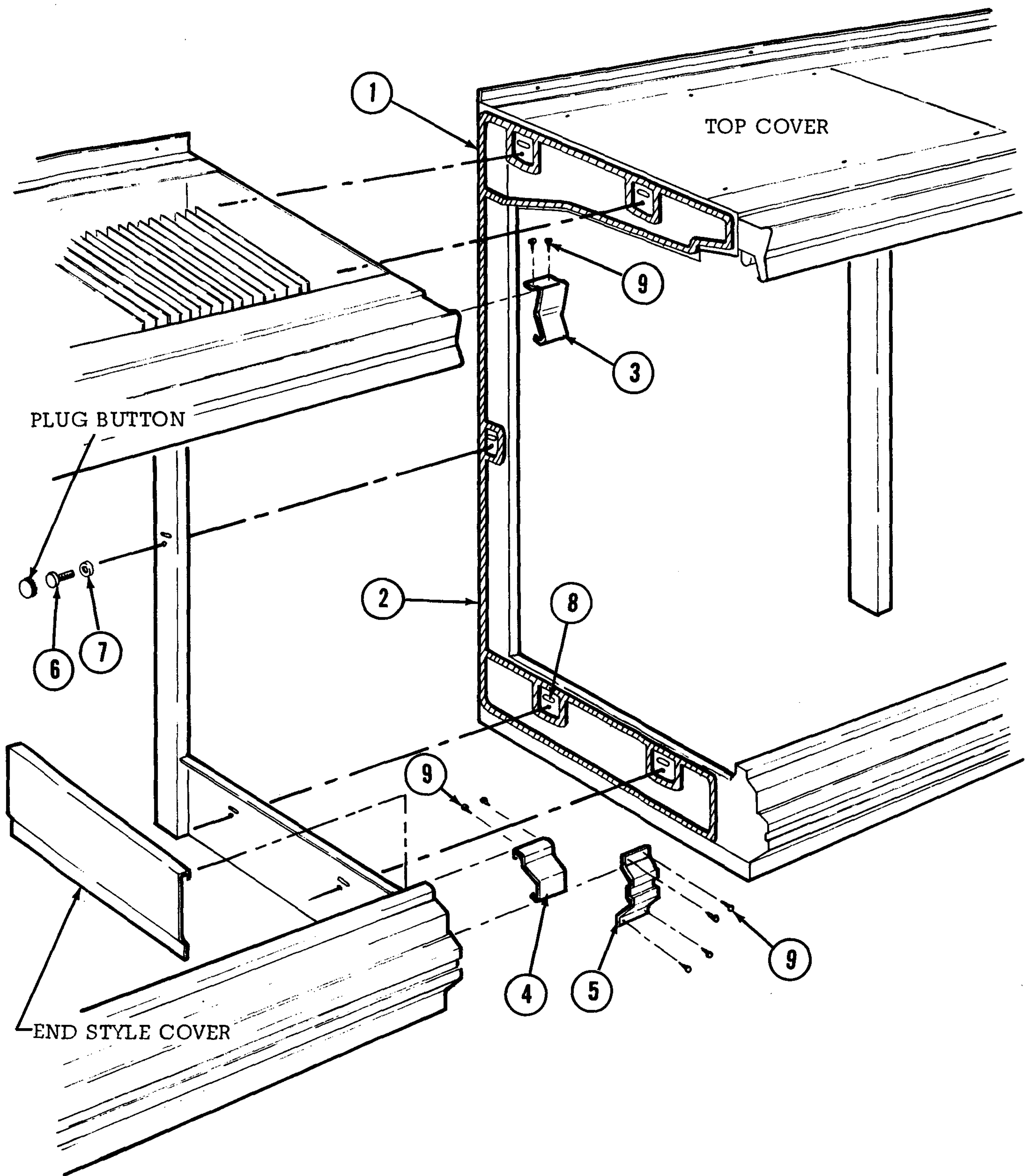
STEP 3. Slide the FRONT RAIL JOINT TRIM (Item 4) onto one of the cases loosely, until they have been joined.

STEP 4. Move second JVMR into alignment with the first, compressing the gasket for a good seal.

STEP 5. Remove the Top Cover, End Style Cover and Plug Button as shown in illustration for access to joining holes. Fasten the cases together using 5/16-18x3/4" CAP SCREWS (Item 6) and 5/16" FLAT WASHERS (Item 7).

STEP 6. Replace the items removed in the previous Step and seal the exterior top joint using a butyl sealant.

STEP 7. Reposition the FRONT RAIL JOINT TRIM (Item 4) installed in Step 3, install CANOPY JOINT TRIM (Item 3) and KICK RAIL JOINT TRIM (Item 5) centered over the joint then fasten in place using #8x1/2" TRUSS HEAD SHEET METAL SCREWS (Item 9).

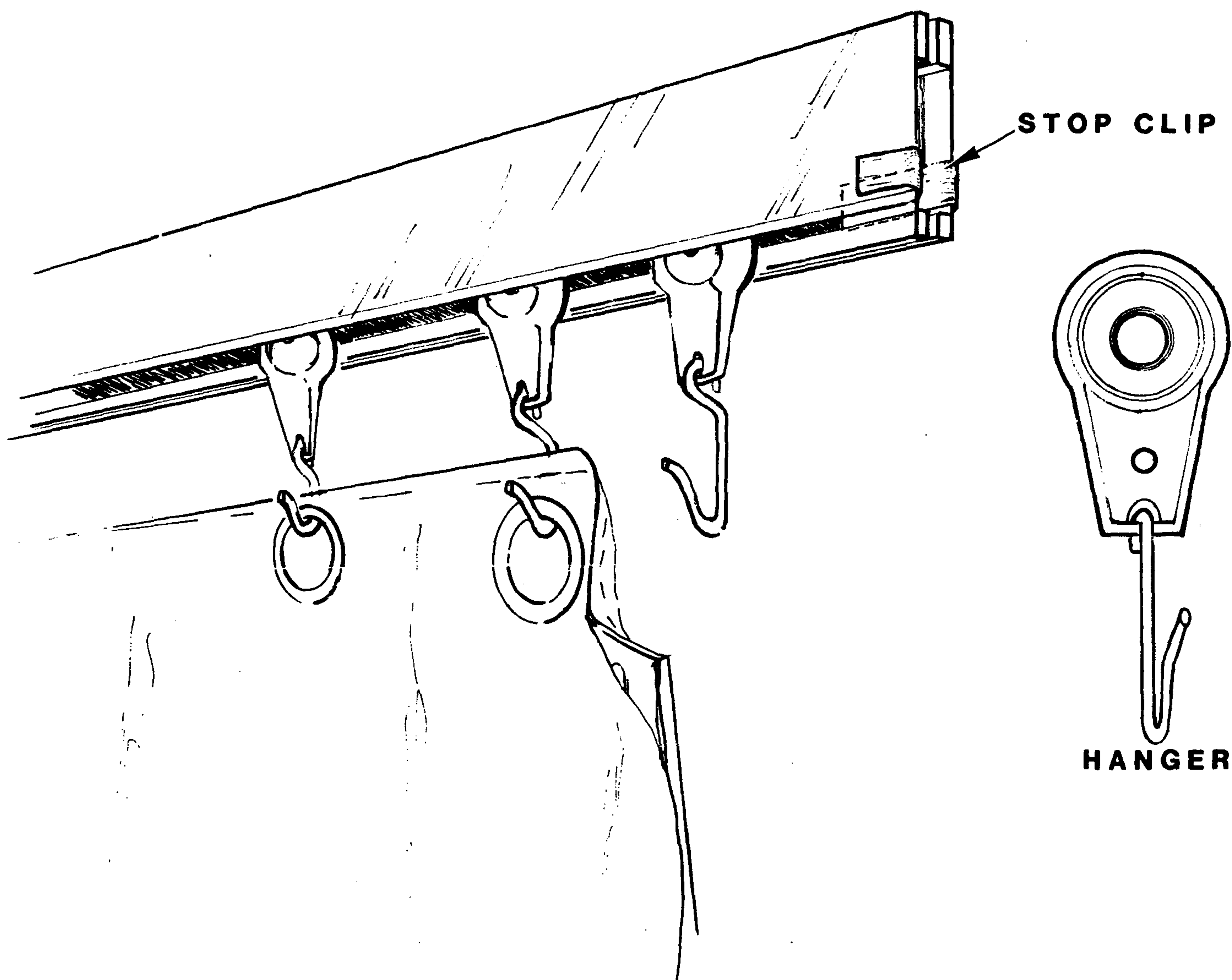


REAR CURTAIN INSTALLATION

Each refrigerator is furnished with rear curtains that are packaged separately to avoid damage in shipment. These curtains are to be installed as shown in the following illustration.

DESCRIPTION	QUANTITY	
	<u>8' case</u>	<u>12' case</u>
Curtain	2	3

Curtains should be installed using ALL hangers so that they will drape properly.



DRIP PIPING

A 7/8 inch O D copper waste outlet extends from the rear at each end of the JVMR coil package to which installer furnished drip piping is to be attached. Both waste outlets should be used to carry defrost water to a drain outlet. The possibility of defrost water overflowing the drain trough, when one end of the trough is lower than the other, is eliminated when both outlets are used.

SPLASHGUARD

The splashguard is shipped factory installed on every JVMR. These splashguards can be adjusted to the floor by loosening the screws which fasten it and allowing the splashguard to drop to floor level and then retighten the screws.

SEALING SPLASHGUARD TO FLOOR

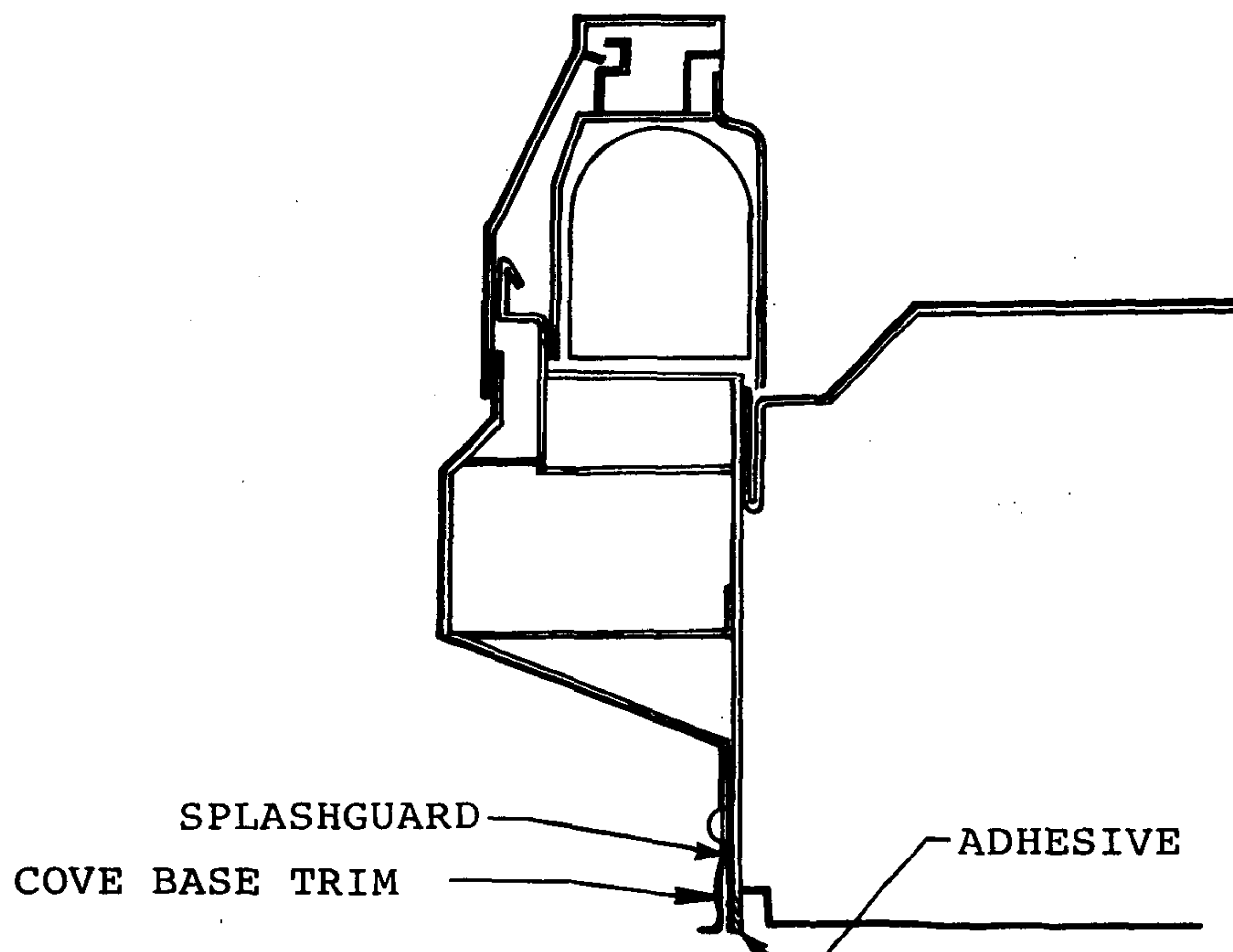
If required by local sanitary codes or if customer desires, the splashguard may be sealed to the floor using a vinyl cove base trim such as produced by Armstrong, Kentile, Johnson, etc. The size needed will depend on how much the floor is out of level.

When installing the cove base trim:

Remove all dirt, wax and grease from the surface area of the splashguard where adhesion will be necessary to insure a good secure installation.

Apply a good adhesive to the cove base trim and allow proper drying time according to the directions supplied with product.

Install the cove base trim to the splashguard so that the trim is flush to the floor.



DECOR INSTALLATION

To minimize servicing difficulties the following criteria should be considered prior to installing any "Decor" structure above these refrigerators.

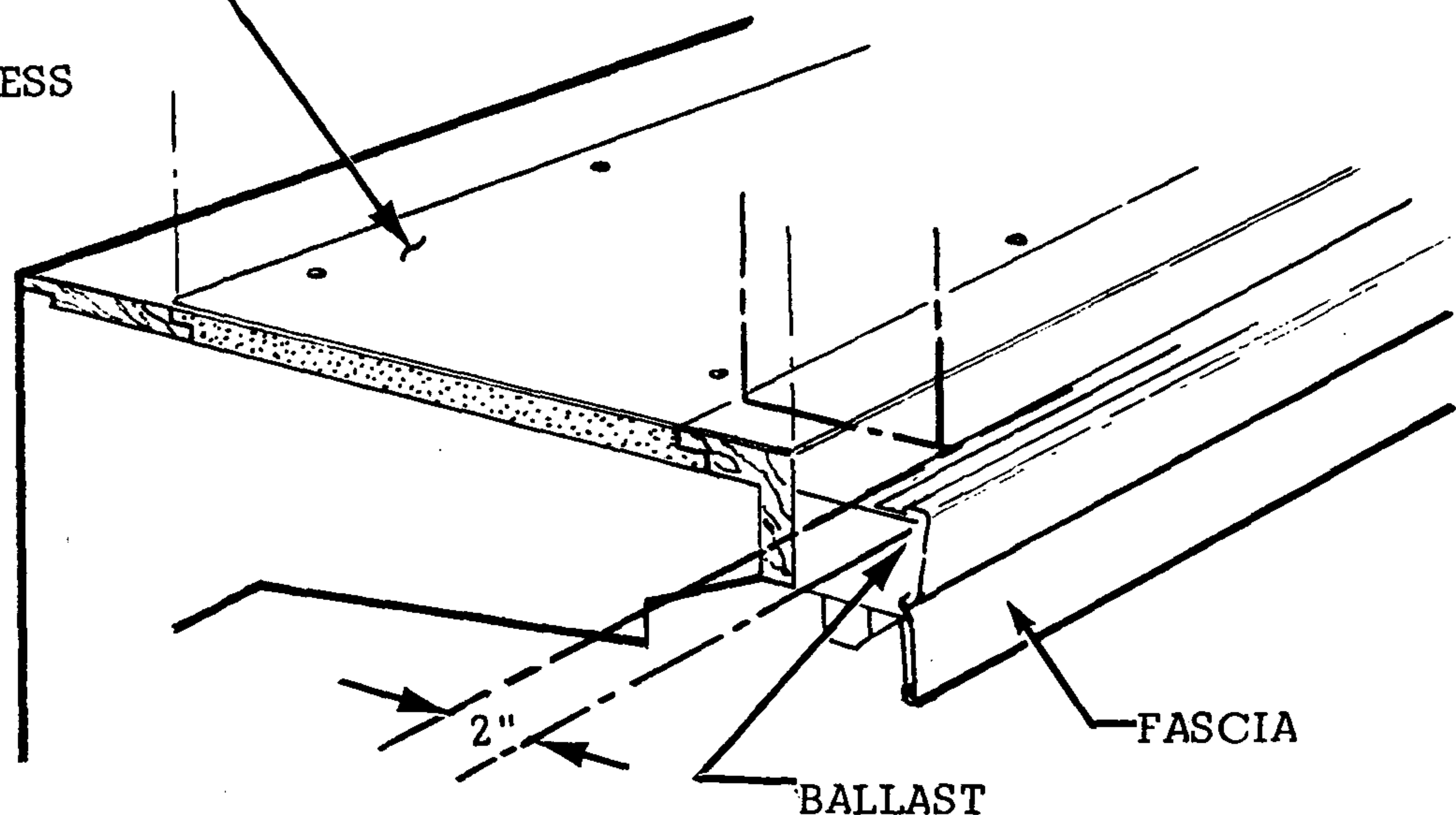
1. Ballast Access:

The lamp ballasts are located behind the fascia and any decor structure should not interfere with removal of the fascia. The fascia is removed by removing the screws along its top and rotating it out and down. The decor should allow at least a 2" clearance for fascia removal.

2. Coil Access:

Should it ever be necessary to service the refrigerator's coil, the top insulated panels will need to be removed. When rear access is impossible, less labor and customer distraction will result if the decor structure is constructed with easily removable panels.

INSULATED PANELS
FOR
COIL ACCESS



SECTION 3
REFRIGERATION

REFRIGERANT

These refrigerators will be equipped for operation on R-502 refrigerant unless otherwise specified on the factory order. The correct type of refrigerant will be stamped on the refrigerators serial plate located at the left hand end on the front assembly.

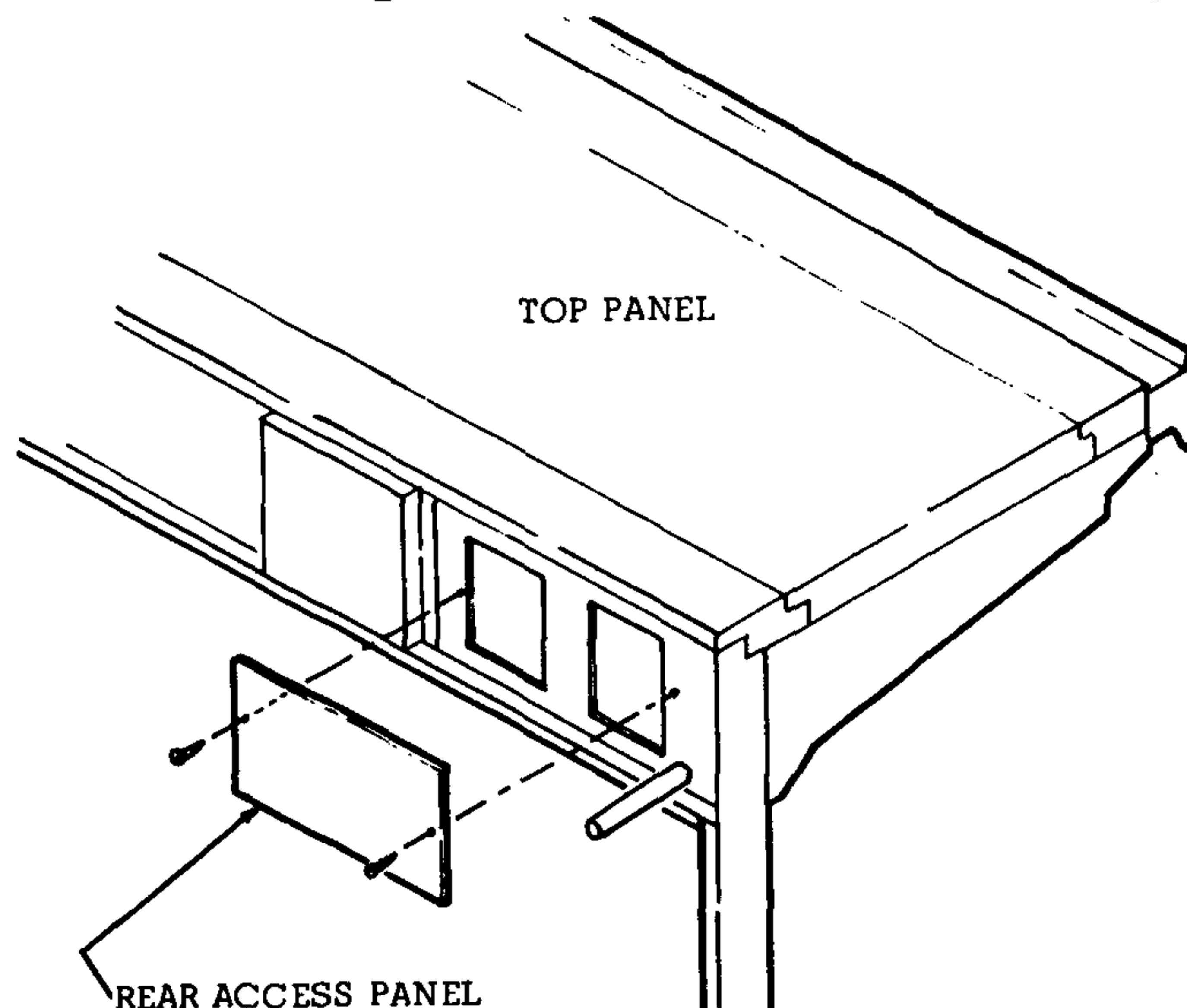
REFRIGERANT PIPING

LINE SIZES:	Liquid Line 3/8" OD
	Suction Line 1-1/8" OD

LINE CONNECTIONS

The refrigerant line connections are located at the right hand end of the coil package.

For access to the line connections, remove the rear access panel. For complete access to the coil, removable panels have been provided on top of the JVMR. Should it ever be necessary to remove the top panels, make certain that their gasket material is all in place when reinstalling.

**MULTIPLEXING**

Piping of refrigerators operating on the same refrigeration system may be run from refrigerator to refrigerator through the end frame openings provided for this purpose. **DO NOT RUN REFRIGERANT LINES THROUGH REFRIGERATORS THAT ARE NOT ON THE SAME REFRIGERATION SYSTEM** or poor refrigeration control and compressor failure can occur.

LINE SIZING

Refrigerant lines should be sized as shown on the refrigeration legend that is furnished for the store (not furnished by Hussmann). If a legend has not been furnished, refer to the Hussmann Application Engineering Manual for guidance.

OIL TRAPS

"P" traps (oil traps) must be installed at the base of all suction line vertical risers.

PRESSURE DROP

Pressure drop can rob the system of capacity. To keep the pressure drop to a minimum, keep the refrigerant line run as short as possible using a minimum number of elbows. Where elbows are required, use long radius elbows only.

INSULATION

For refrigerators with other than KOOLGAS defrost: the suction and liquid lines should be clamped or taped together and insulated for a minimum of 30' from the refrigerator; for refrigerators with KOOLGAS defrost, the suction and liquid lines should not contact each other and should be insulated separately for a minimum of 30' from the refrigerator. Additional insulation for the balance of the liquid and suction lines is recommended wherever condensation drippage is objectionable.

REFRIGERATION PARTS LIST (Sporlan Nomenclature)

CASE MODEL	TYPE OF REFRIGERANT	BALANCED PORT EXPANSION VALVE	DISTRIBUTOR	
			OFF-TIME	KOOLGAS
JVMR-8	R-502	BFRE A C	D115-2- $\frac{1}{4}$ -1	D116-2- $\frac{1}{4}$ -1*
	R-22	BFVE A C	D115-2- $\frac{1}{4}$ -1	
	R-12	BFFE A C	D115-2- $\frac{1}{4}$ -1	
JVMR-12	R-502	BFRE C C	D115-2- $\frac{1}{4}$ -1	D116-2- $\frac{1}{4}$ -1*
	R-22	BFVE A C	D115-2- $\frac{1}{4}$ -1	
	R-12	BFFE C C	D115-2- $\frac{1}{4}$ -1	

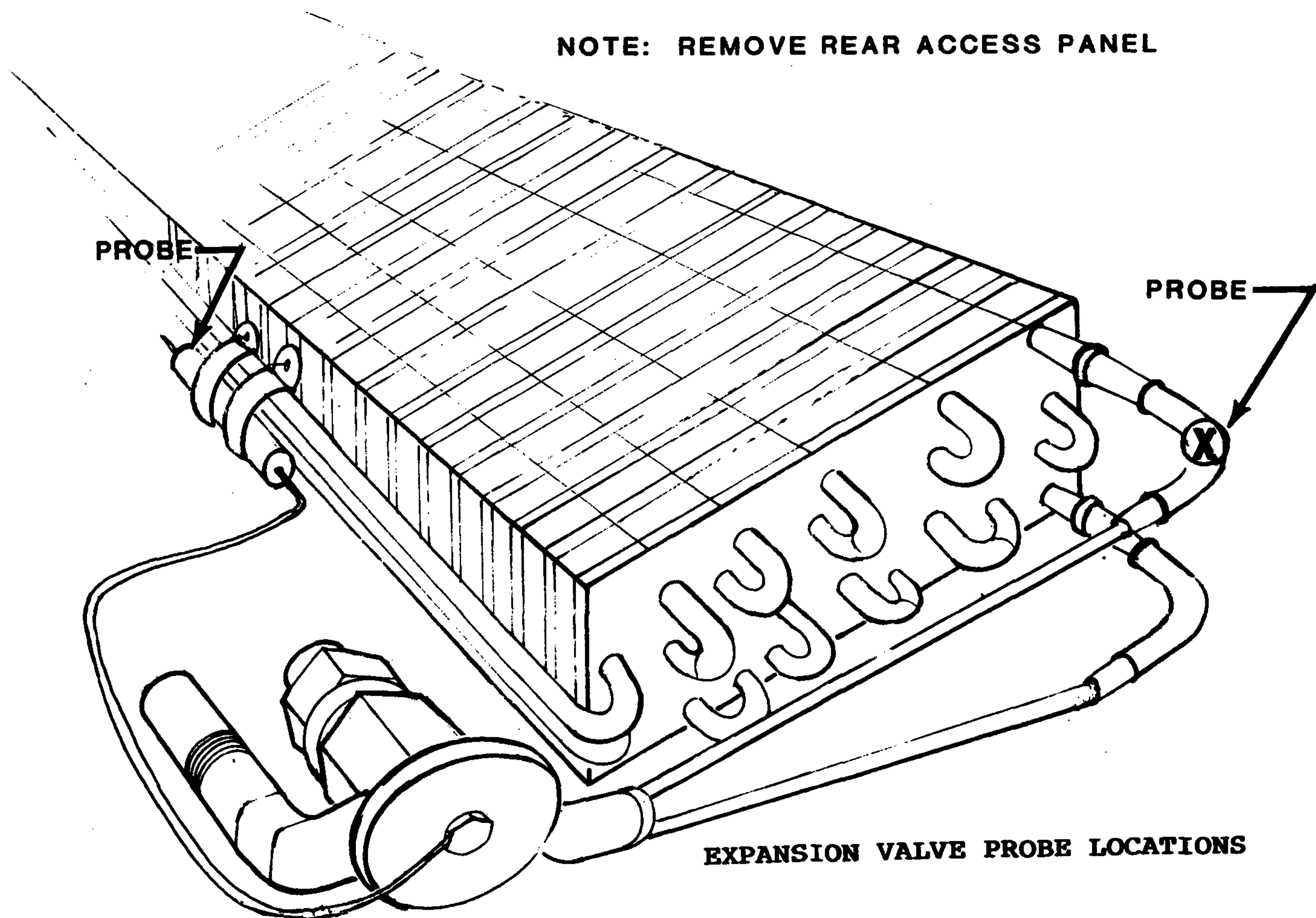
*These refrigerant distributors are provided with a special 3/8" side outlet port which allows the liquid condensed in the coil during defrost to bypass the expansion valve and flow into the liquid line.

EXPANSION VALVE ADJUSTMENTS

Expansion valves must be adjusted to fully feed the evaporator. Before attempting to adjust valves, make sure the evaporator is free of or only lightly covered with frost, and that the JVMR is within 10°F of its expected operating temperature. Adjust valves as follows:

Attach two sensing probes (either thermocouple or thermistor) to the evaporator; one under the clamp holding the expansion valve bulb and the other securely taped to the evaporator inlet line (see illustration). Some "hunting" of the expansion valve is normal. The valve should be adjusted so that during the hunting, the greatest difference between the two probes is 3° to 5°F . With the adjustment, during a portion of the hunting, the temperature difference between the probes will be less than 3°F (at times as low as 0°F). Make adjustments of no more than one-half turn of the valve stem at a time and wait for at least fifteen minutes before rechecking the probe temperature and making further adjustments.

NOTE: REMOVE REAR ACCESS PANEL



CONTROLS AND ADJUSTMENTS - CONVENTIONAL MULTIPLEXING

Refrigeration temperature should be controlled by a refrigeration thermostat. When the optional refrigeration thermostat is factory installed, it will be installed as shown on the following page. Both the JVMR and the cooler to which it is attached should be connected to the same condensing unit.

Defrost is time initiated and time terminated.

APPLICATION	REFRIGERATION CONTROLS			DEFROST CONTROLS	
	DISCHARGE AIR TEMPERATURE (1)	REFRIGERANT	EVAPORATOR PRESSURE REGULATOR (COOLERS) (2)	DEFROST FREQUENCY	FAILSAFE (3)
Dairy	28°F to 30°F	R-502	46 psig	Every 6 Hours	60 min.

- (1) Measure discharge air temperature at the center of the discharge honeycomb. Set thermostat to open its contacts at the discharge air temperature shown.
- (2) Both the JVMR and the cooler to which it is attached should be connected to the same condensing unit.
- (3) Defrosts are time initiated and time terminated. Both the JVMR and the cooler coils must be defrosted at the same time.

The defrost timer on outdoor condensing units must be a time terminated type and control a liquid line solenoid for pumpdown prior to defrost only. The failsafe setting must be increased 4 minutes to compensate for the pumpdown period.

CONTROLS AND ADJUSTMENTS - MIXED MULTIPLEXING**REFRIGERATION CONTROL:**

Refrigeration temperature may be controlled by either a refrigeration thermostat or a CDA valve (Close on Drop in Air temperature). The CDA valve, if used, will be installed at the condensing unit with its sensor mounted in the refrigerator in the same location as the refrigeration thermostats sensing bulb. For complete wiring and adjustment information refer to the instruction manual furnished with the condensing unit.

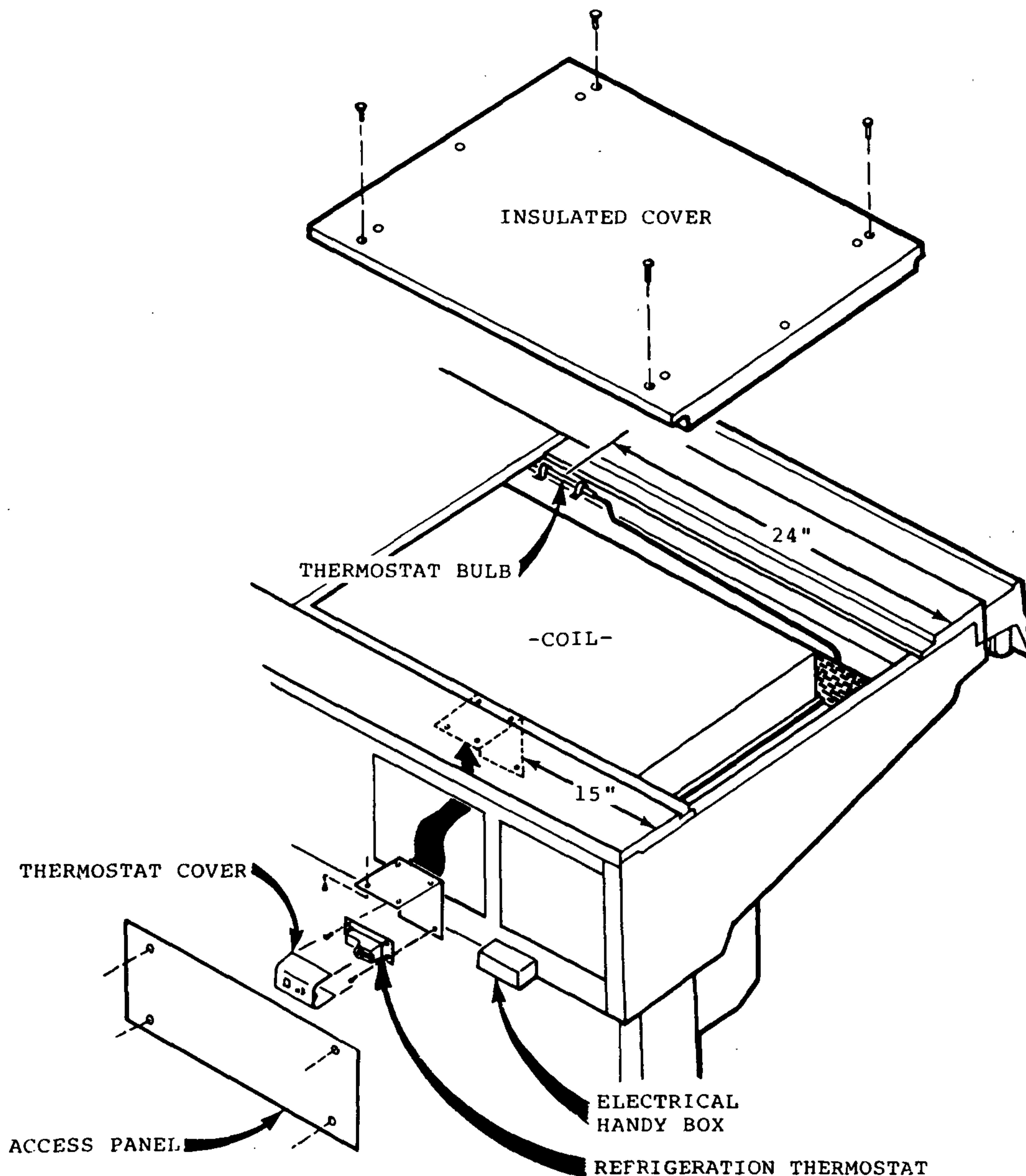
Defrost is time initiated and time terminated.

APPLICATION	REFRIGERATION CONTROL (1)	DEFROST CONTROL (2)	
	Discharge Air Temperature	Defrost Frequency	Length of Defrost
Dairy	30°F	Every 6 Hours	60 min.

- (1) Measure discharge air temperature at the center of the discharge honeycomb. Adjust the refrigeration control (CDA valve or refrigeration thermostat) to maintain the discharge air temperature shown.
- (2) Defrosts are time initiated and time terminated. Both the JVMR and the cooler coils must be defrosted at the same time.

REFRIGERATION THERMOSTAT (OPTIONAL)

Factory installation of the optional thermostat is shown below. The bulb is located above the coil approximately 24" from left hand end of case.

**CDA SENSOR LOCATION (OPTIONAL)**

When specified, the CDA SENSOR will be factory installed in the same location as the refrigeration thermostat bulb. Its leads will be routed into the electrical handy box and identified with a tag.

Refer to the CDA VALVE vendor literature furnished with the condensing unit for wiring information.

SECTION 4**ELECTRICAL****CONNECTIONS**

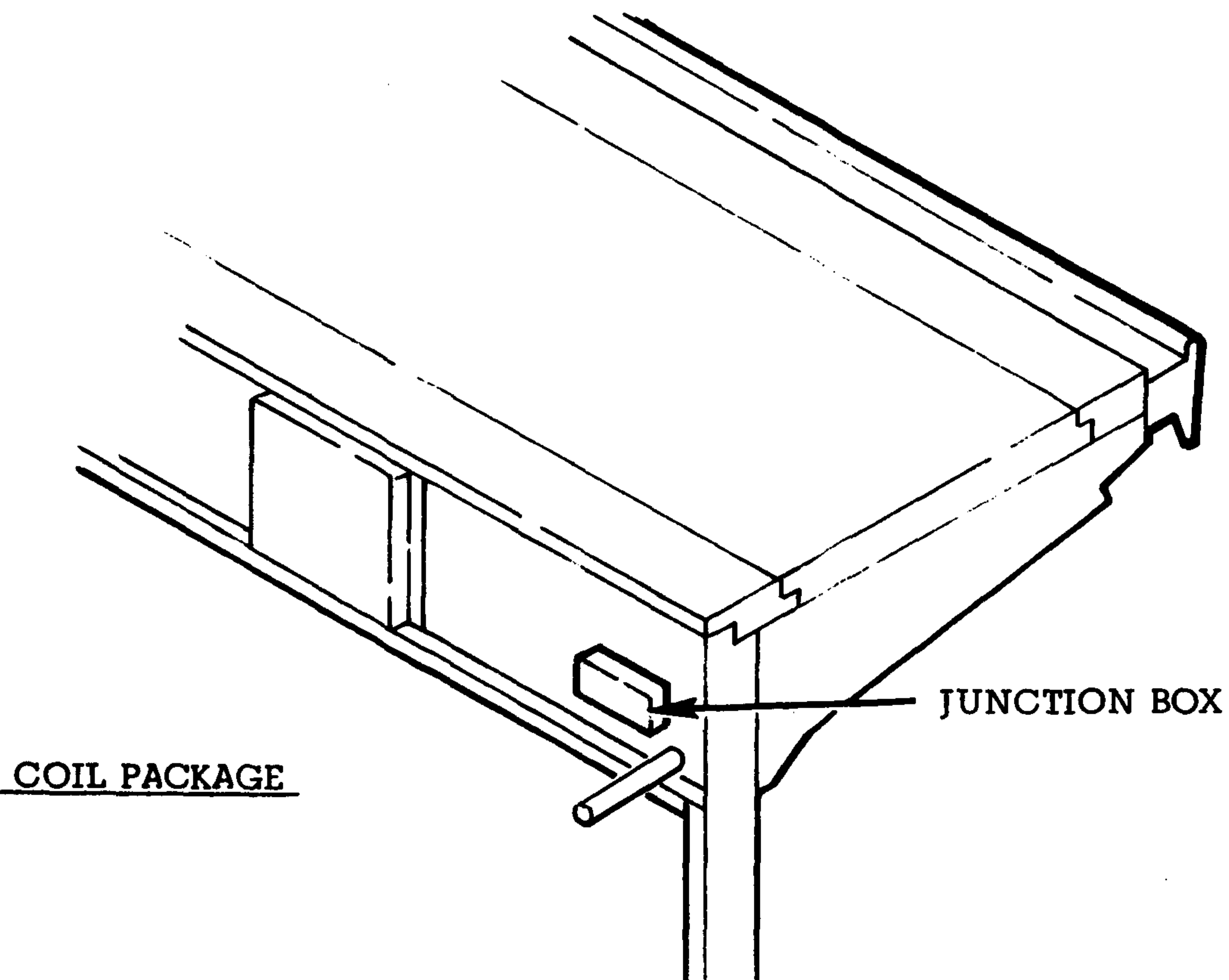
All electrical connections are made in the electrical entrance box located at the rear of the refrigerator at the left hand end as shown below.

WIRING IDENTIFICATION

Leads for all electrical circuits are identified by colored plastic bands which correspond to the "color code sticker" located near the electrical entrance box. Shown below.


"COLOR CODE STICKER"


WIRING COLOR CODE	
LEADS FOR ALL ELECTRICAL CIRCUITS ARE IDENTIFIED BY A COLORED PLASTIC BAND: NEUTRAL WIRE FOR EACH CIRCUIT HAS EITHER WHITE INSULATION OR A WHITE PLASTIC SLEEVE IN ADDITION TO THE COLOR BAND.	
PINK	REFRIG. THERMOSTAT LOW TEMP
LIGHT BLUE	REFRIG. THERMOSTAT NORM. TEMP.
DARK BLUE	DEFROST TERM. THERMOSTAT
PURPLE	ANTI-SWEAT HEATERS
BROWN	FAN MOTORS
GREEN *	GROUND
ORANGE OR TAN	LIGHTS
MAROON	RECEPTACLES
YELLOW	DEFROST HEATERS, 120V
RED *	DEFROST HEATERS, 208V
* EITHER COLORED SLEEVE OR COLORED INSULATION	
<u>ELECTRICIAN NOTE: CASE MUST BE GROUNDED</u>	



SERIAL PLATE AMPERAGES

Serial Plate Amperages are the amperage figures that are stamped on the refrigerator's Serial Plate. All field installed wiring must be sized to the Serial Plate Amperage, however, the actual amps may be less than that specified.

120 Volt, 60 Hertz Electrical Circuits		
Model	Fans	Lights 
JVMR-8	6.0 amps	8.9 amps
JVMR-12	9.0 amps	14.0 amps

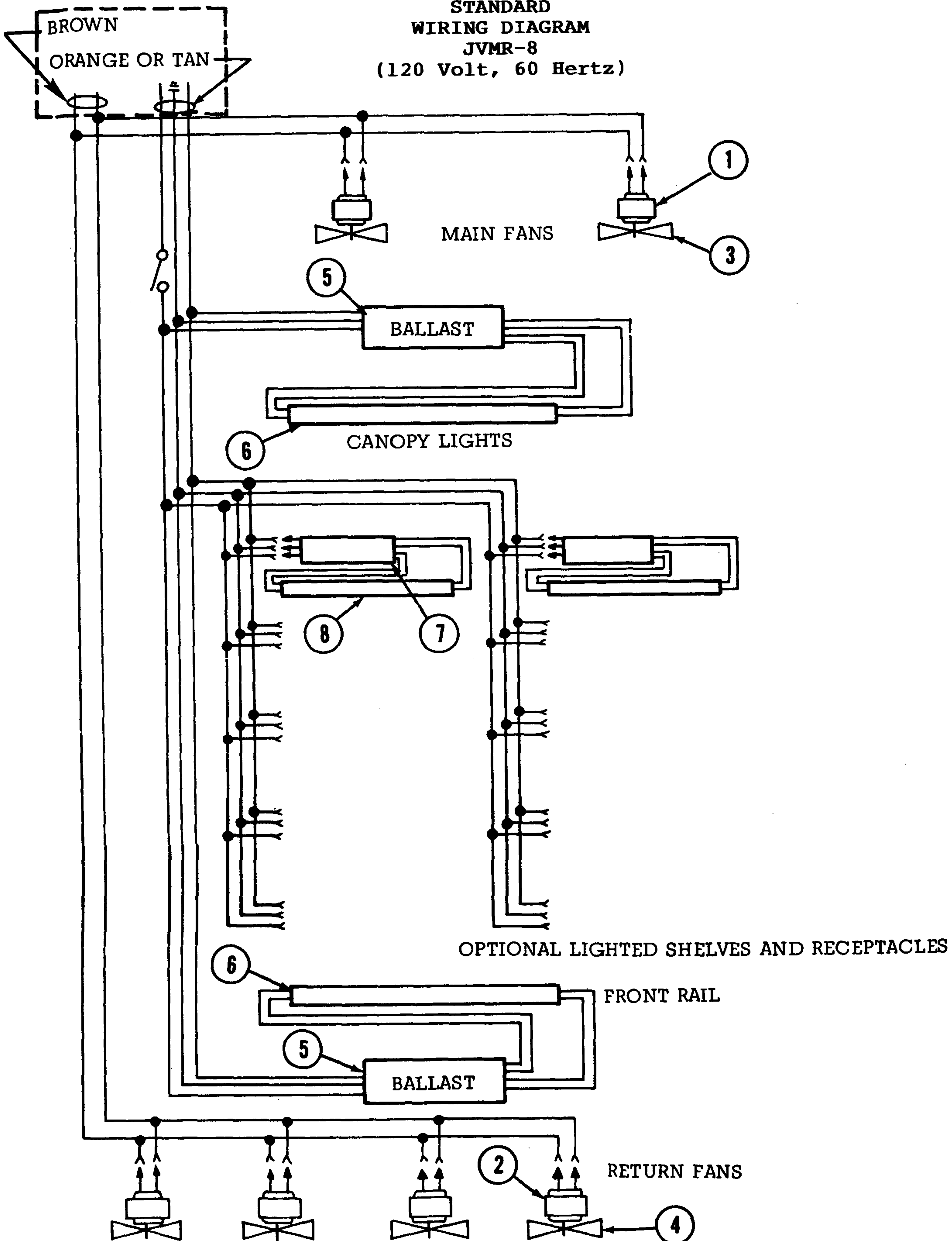
-  The lighting circuit should be separate from the fan motors to prevent the fans from being turned off by mistake when the store lighting is turned off. FAN MOTORS MUST OPERATE CONTINUOUSLY.

The amperage figures shown for the light circuit contains the requirements for the maximum amount of lighted shelving.

In addition to the circuits listed above, the following will also require control wiring from the refrigerators to their condensing units. See wiring diagrams in this section.

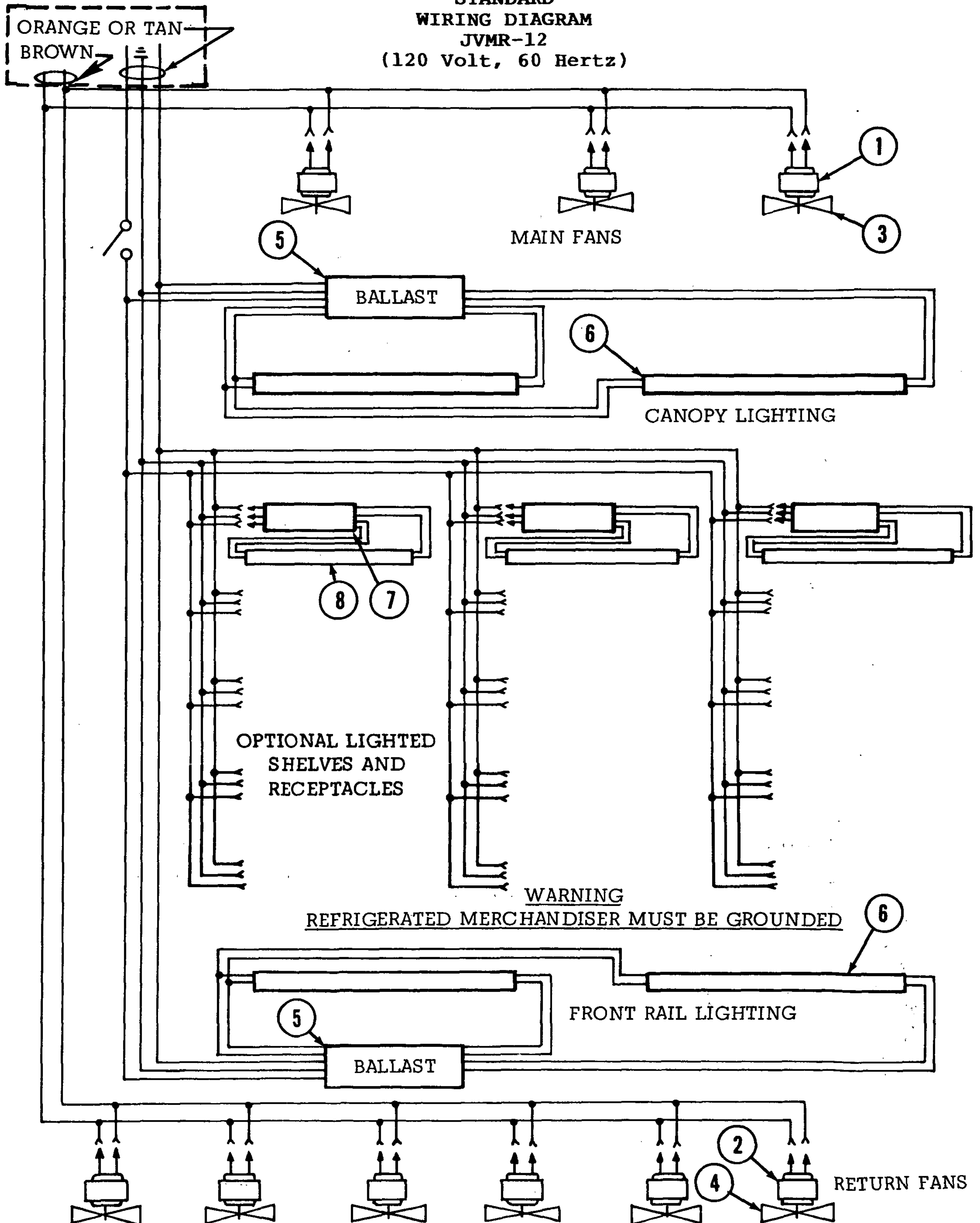
REFRIGERATION THERMOSTAT or CDA SENSOR: Both of these items are optional controls that need to be wired to the condensing unit control panel when they are installed.

STANDARD
WIRING DIAGRAM
JVMR-8
(120 Volt, 60 Hertz)

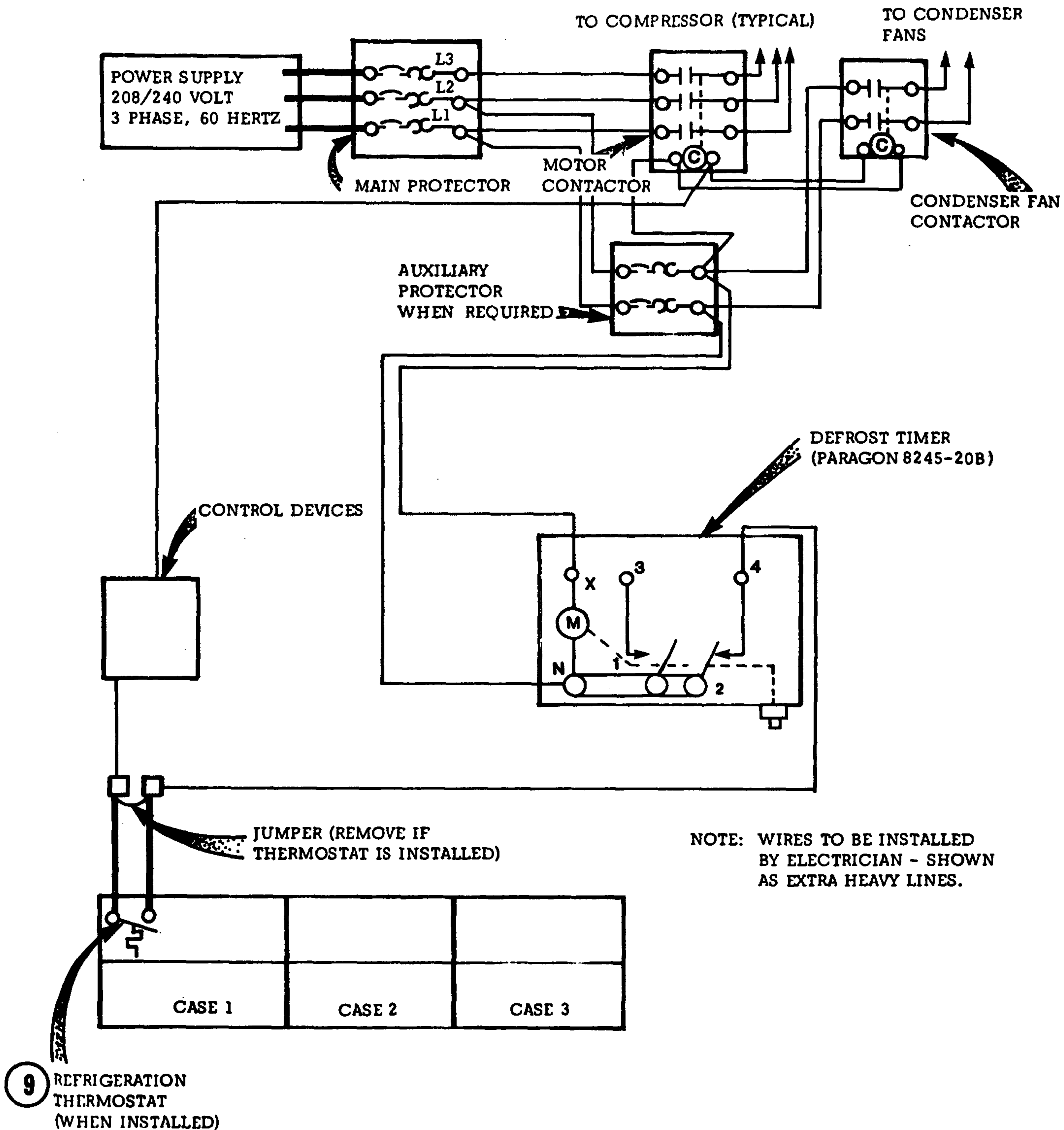


-REFRIGERATOR MUST BE GROUNDED-

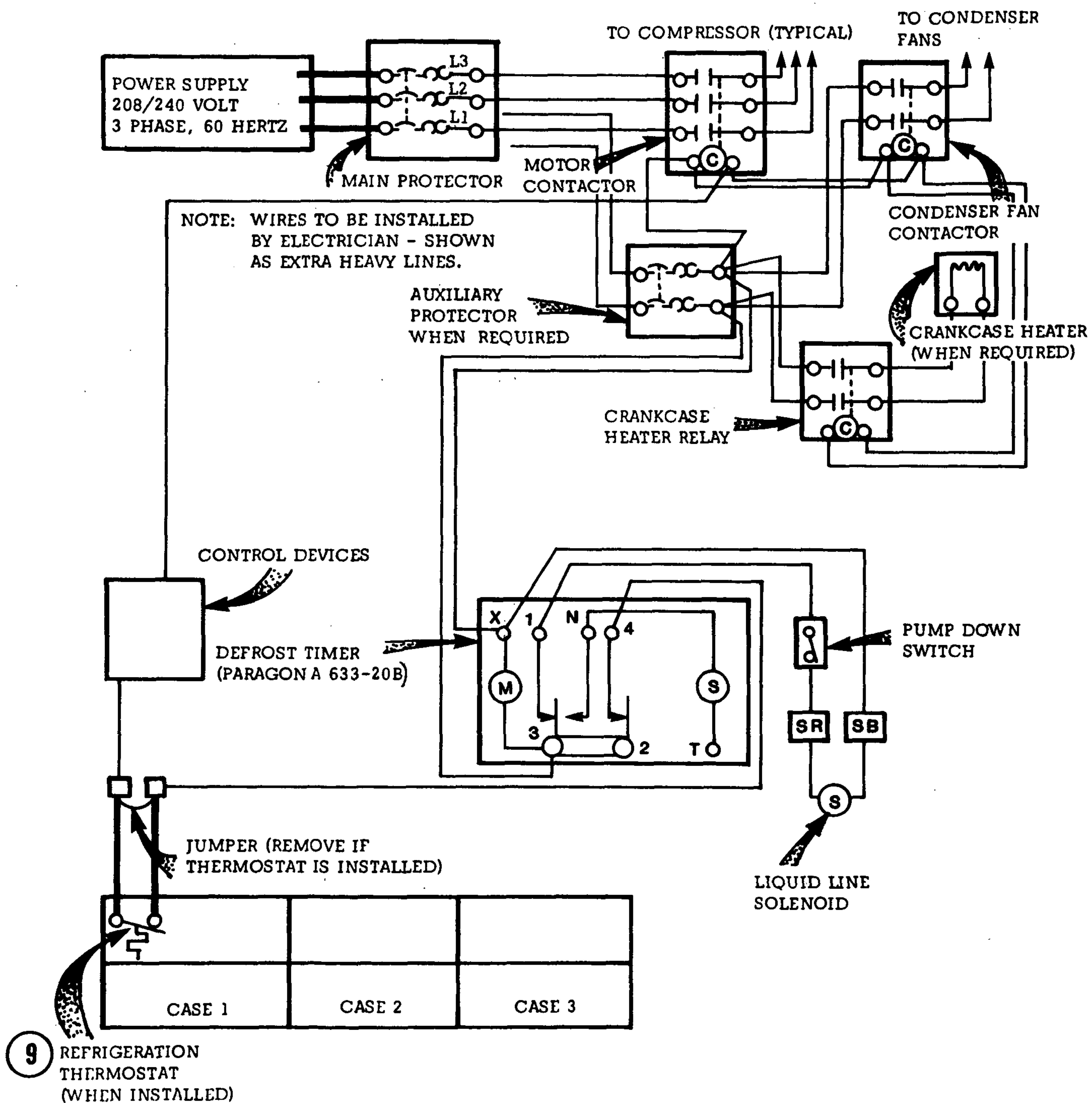
**STANDARD
WIRING DIAGRAM
JVMR-12
(120 Volt, 60 Hertz)**



CONVENTIONAL MULTIPLEXING - INDOOR TYPE UNIT
CONDENSING UNIT & CONTROL PANEL WIRING DIAGRAM



CONVENTIONAL MULTIPLEXING - OUTDOOR TYPE UNIT
CONDENSING UNIT & CONTROL PANEL WIRING DIAGRAM



WARNING
REFRIGERATED MERCHANDISER MUST BE GROUNDED

ELECTRICAL REPLACEMENT PARTS

<u>ITEM NO.</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1.	045781	Fan Motor - 30W CW GE 5KSP51GL-295HS
2.	137883	Fan Motor - 9W CW EMS SPR9EV1 (Return)
3.	327665	Fan Blade - Embossing toward motor 10" 35°F
4.	141071	Fan Blade - Embossing toward motor Morrill FV800 CW 40S (Return)
5.	147091	Ballast - 8' case GE 8G 3900
	137843	Ballast - 12' case GE 8G 1141 WT
6.	137846	Fluorescent Lamp - 8' case F96T12/CW/H.O.
	137847	Fluorescent Lamp - 12' case F72T12/CW/H.O.
7.	140013	Ballast - Optional Shelf GE 8G1075
8.	020725	Fluorescent Lamp - Optional Shelf F40T12/CWX
9.	253451	Optional Refrigeration Thermostat

SECTION 5

USER INFORMATION

STOCKING AND STOCK ROTATION

Merchandise should not be placed in this refrigerated merchandiser until at least six hours after being put into operation and all controls have been adjusted. At no time should any product, displays, or other items extend over the front assembly return grill so as to block or disturb the airflow curtain.

THESE CURTAINS AT THE REAR OF THE JVMR, WHICH CLOSE OFF THE COOLER COMPARTMENT, MUST BE DRAWN AND KEPT CLOSED EXCEPT WHEN STOCKING. ADVERSE REFRIGERATION PERFORMANCE WILL RESULT IF THESE CURTAINS ARE LEFT OPEN FOR LONG PERIODS OF TIME.

To prevent spoilage due to excessive display time, dairy products should be rotated.

CARE AND CLEANING

The store floor will be the interior display area of the JVMR. Since milk and other spillage will occur, the floor should be cleaned and disinfected at least once a week.

When cleaning, use caution to prevent water or other liquids from entering the fan vents located on the interior side of the front assembly.

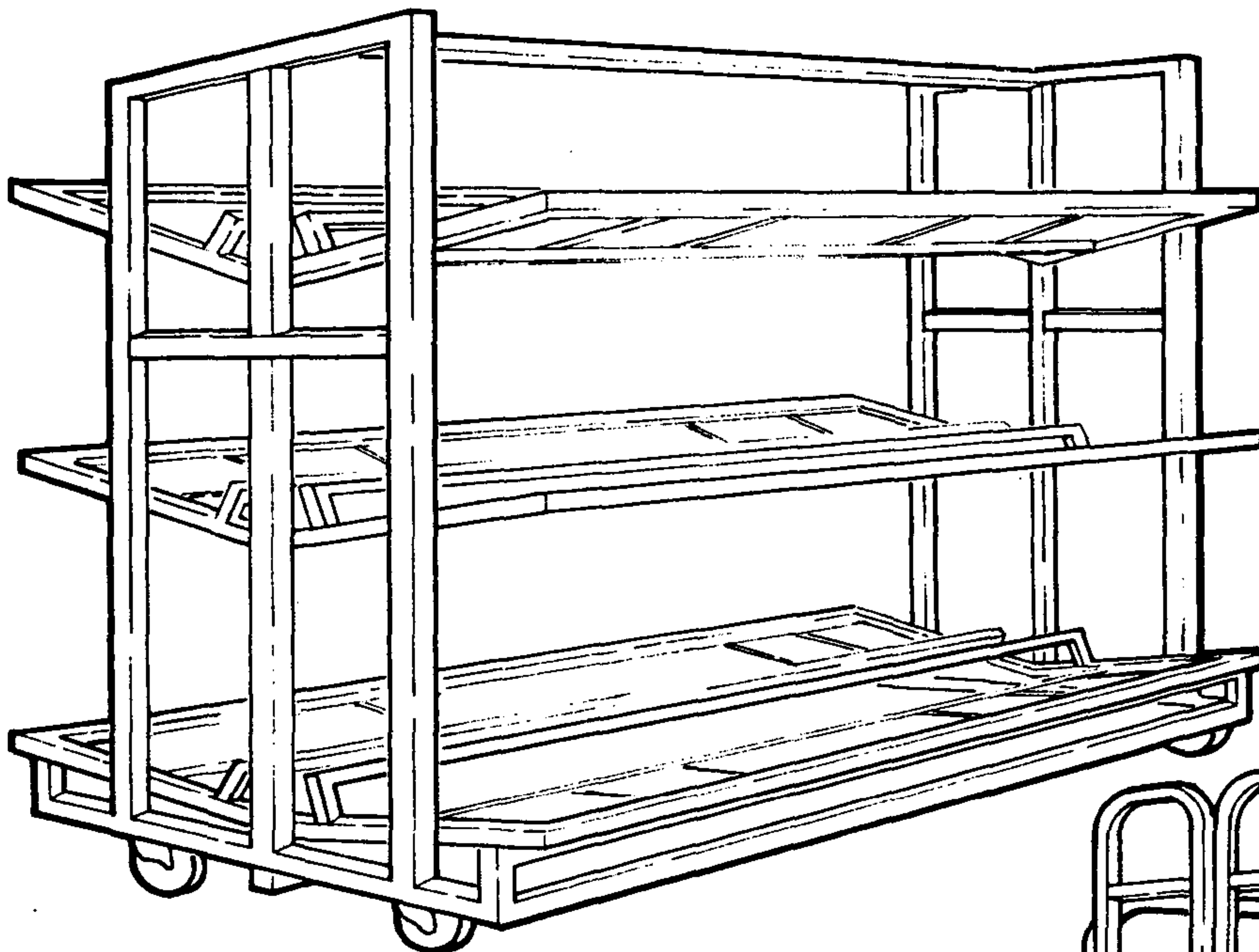
To preserve the exterior finish when cleaning, use warm water and a mild detergent. DO NOT USE ABRASIVE CLEANSERS OR STEEL WOOL SCOURING PADS.

The discharge honeycomb of the coil package should be periodically cleaned by a refrigeration serviceman, approximately ever six months. See "Honeycomb Cleaning" which follows.

ACCESSORIES

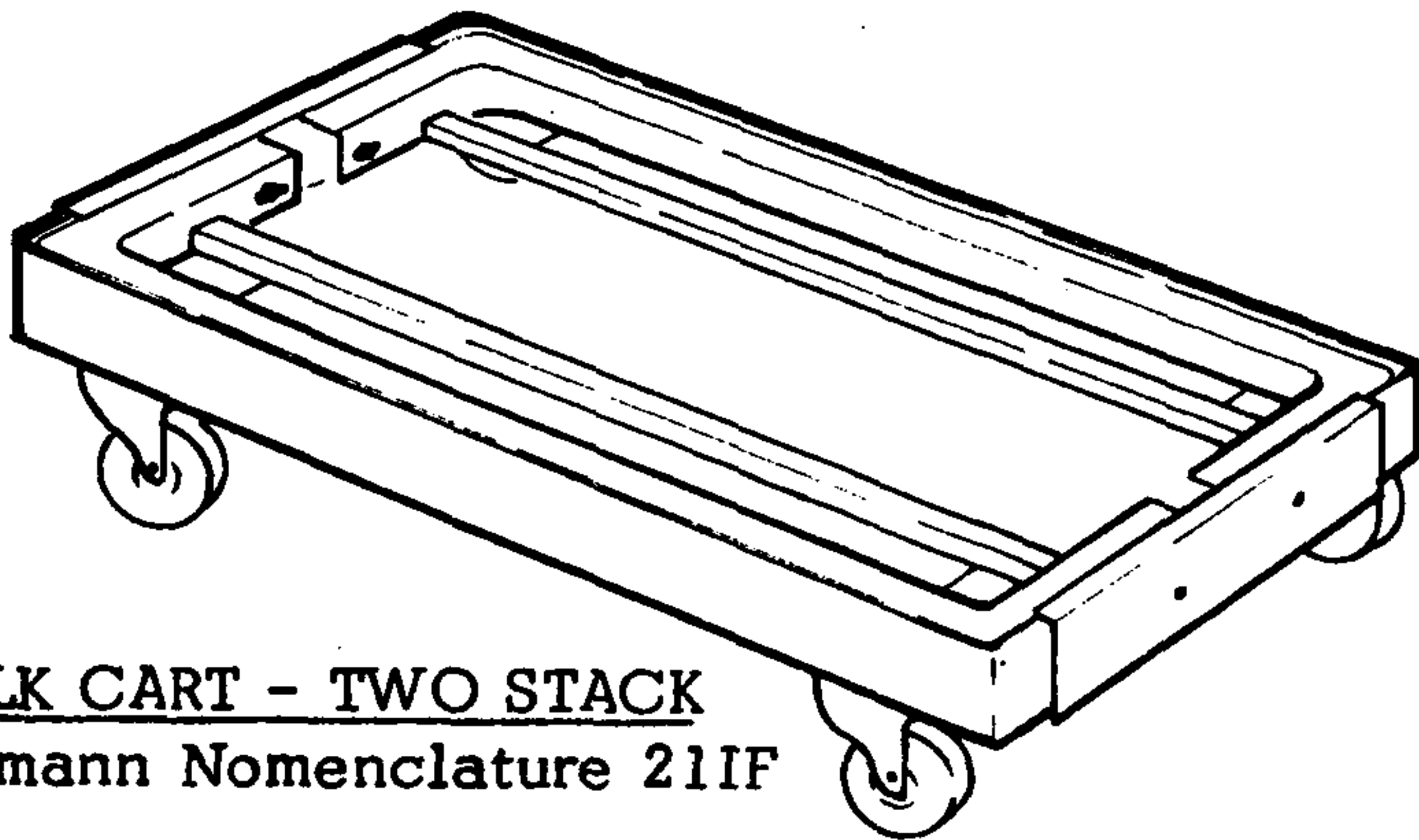
Various display arrangements can be derived by utilizing combinations of shelves and mobile dairy carts. These carts are designed for rapid loading, ease of maneuvering and sales appeal.

When loaded, these carts will easily glide into the JVMR from the rear and can be positioned beneath shelving if so desired.

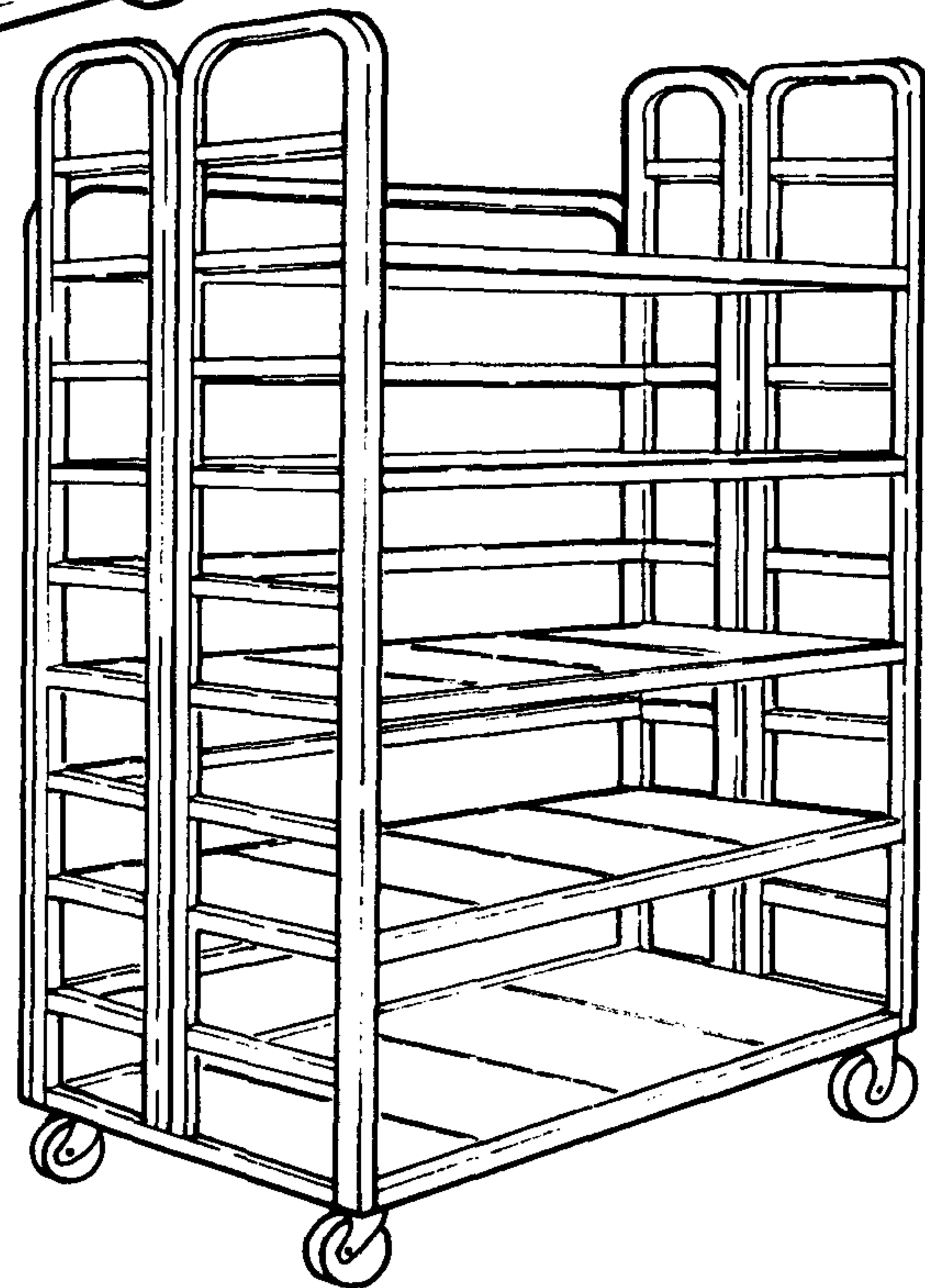


EGG MERCHANDISER - 3 TIER
Husmann Nomenclature 20IF
12 EGG BASKET CAPACITY

A 4 TIER EGG MERCHANDISER (67IF) with a capacity of 16 EGG BASKETS is also available.



MILK CART - TWO STACK
Husmann Nomenclature 21IF



*MILK CART (Cumberland)
Husmann Nomenclature 28IK
270 ($\frac{1}{2}$) Gallon Capacity
Husmann Nomenclature 68IF
180 ($\frac{1}{2}$) Gallon Capacity

*When these milk carts are used it is important that a 24" shelf be installed above them to assist proper air flow.

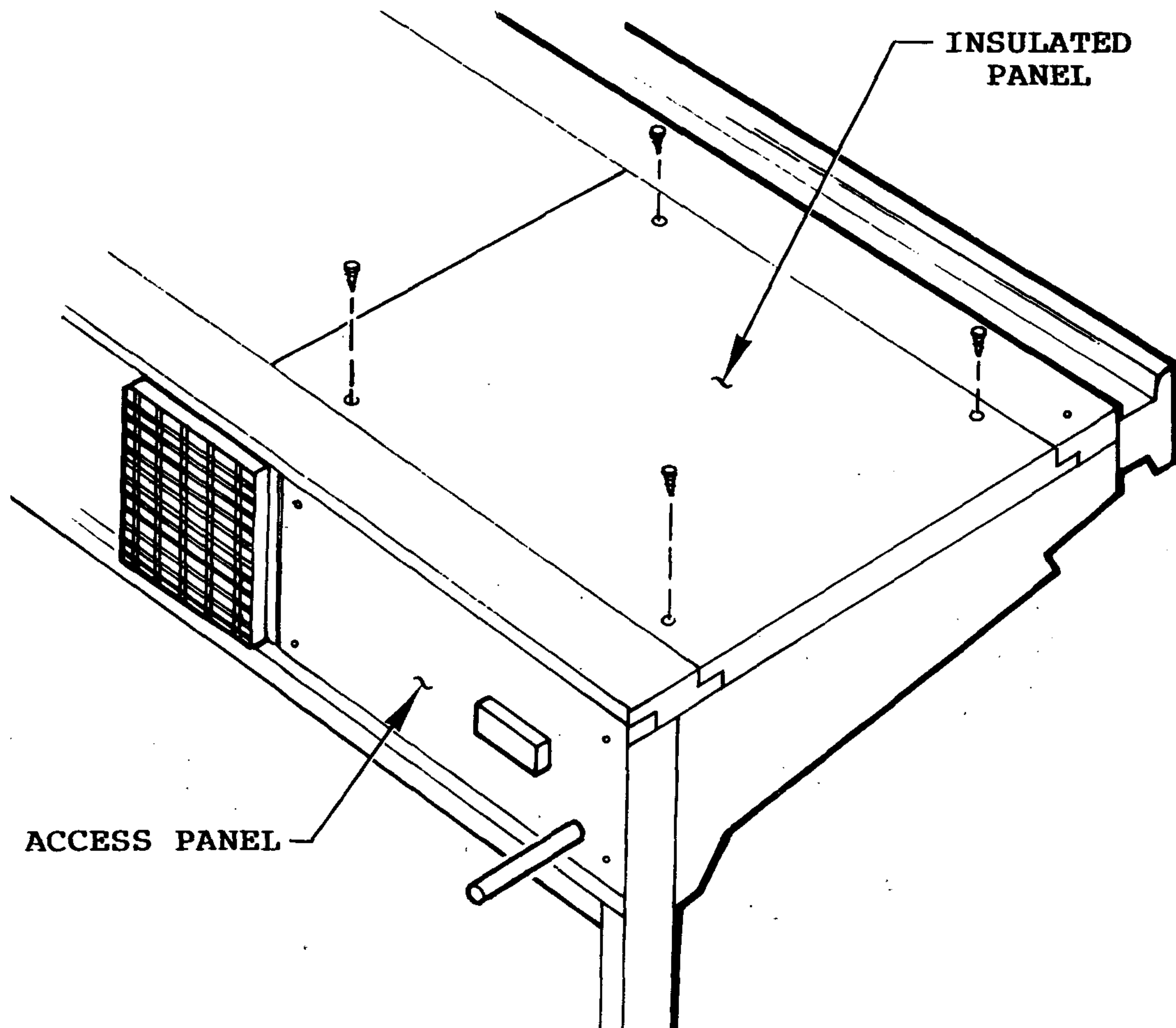
SECTION 6SERVICE TIPSWARNING

ALWAYS DISCONNECT THE ELECTRICAL POWER AT THE MAIN DISCONNECT WHEN SERVICING OR REPLACING ANY ELECTRICAL COMPONENT OF THIS REFRIGERATOR. THIS INCLUDES, BUT IS NOT LIMITED TO SUCH ITEMS AS FANS, HEATERS, THERMOSTATS AND FLUORESCENT LAMPS.

ACCESS TO COIL PACKAGE

- A. Limited Access to the line connection and expansion valves is provided at the rear of the JVMR through panels located at each end of the JVMR.
- B. Complete Access can be obtained by removing the insulated panels located on top of the JVMR.

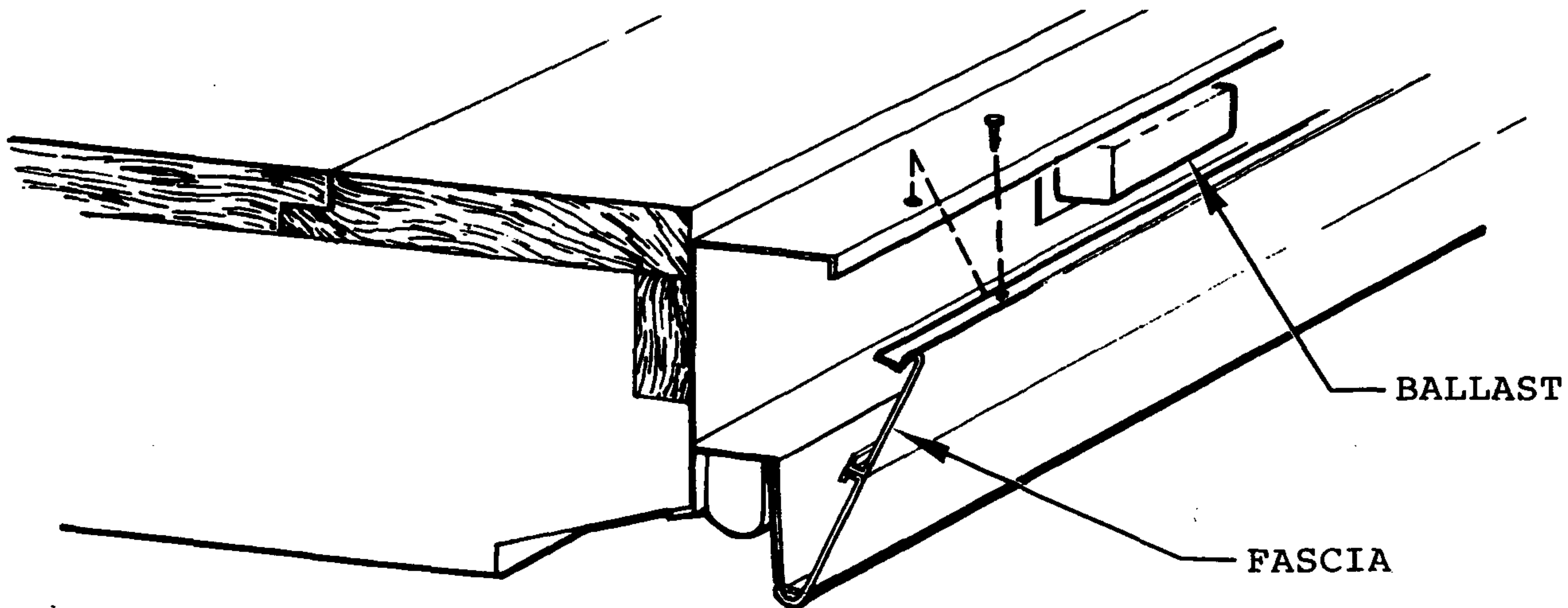
When reinstalling the insulated panels, make certain that the gasketing has not been damaged during either removal of reinstallation.



BALLAST REPLACEMENT (Canopy Lighting)

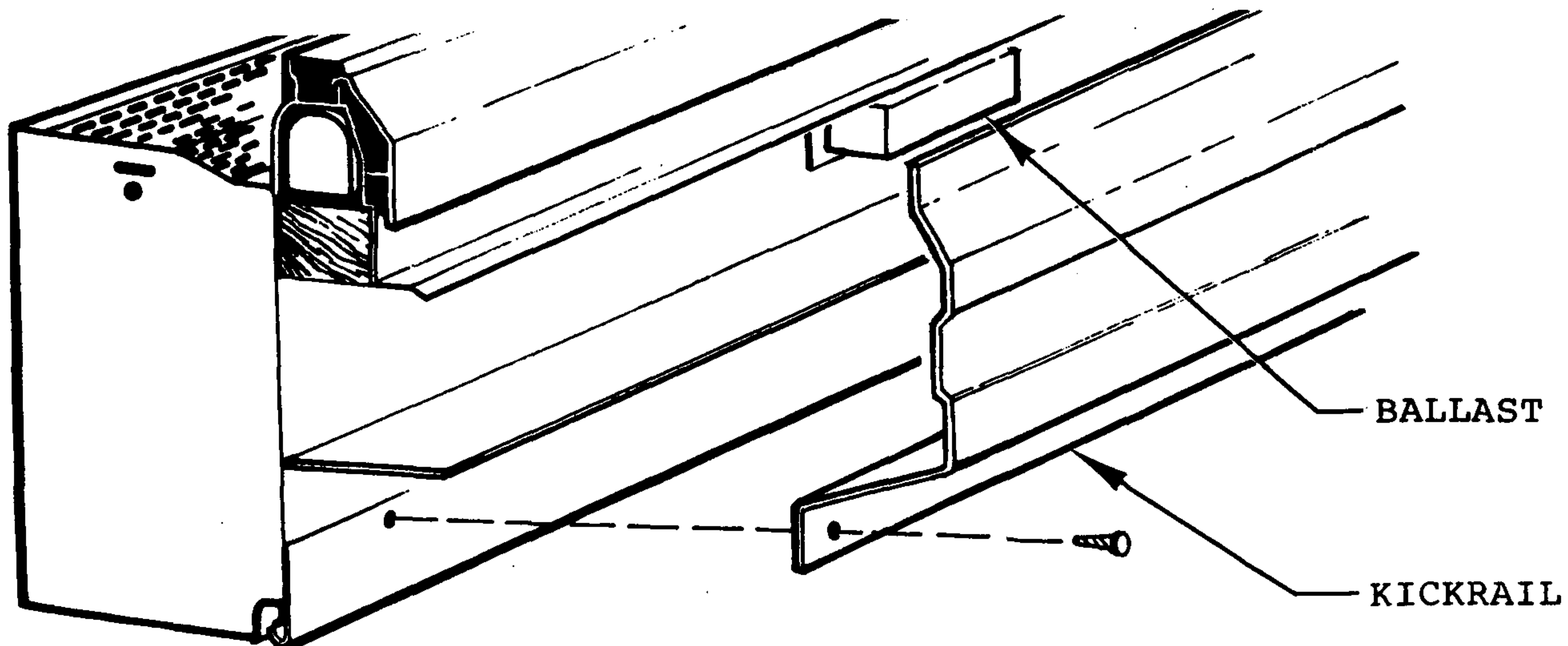
The ballast for the canopy fluorescent lamps is located inside the canopy light fixture at the left hand end of the case. For access to the ballast:

- a. Remove the screws that fasten the fascia to the exterior top of the case.
- b. Pull the top of the fascia forward and rotate it down to remove it from the case.
- c. Replace or service the ballast as required and replace the fascia in reverse order of removal.

**BALLAST REPLACEMENT (Lower Ledge Lighting)**

The ballast for the lower ledge fluorescent lamps is located inside the raceway at the left hand end of the case. For access to the ballast:

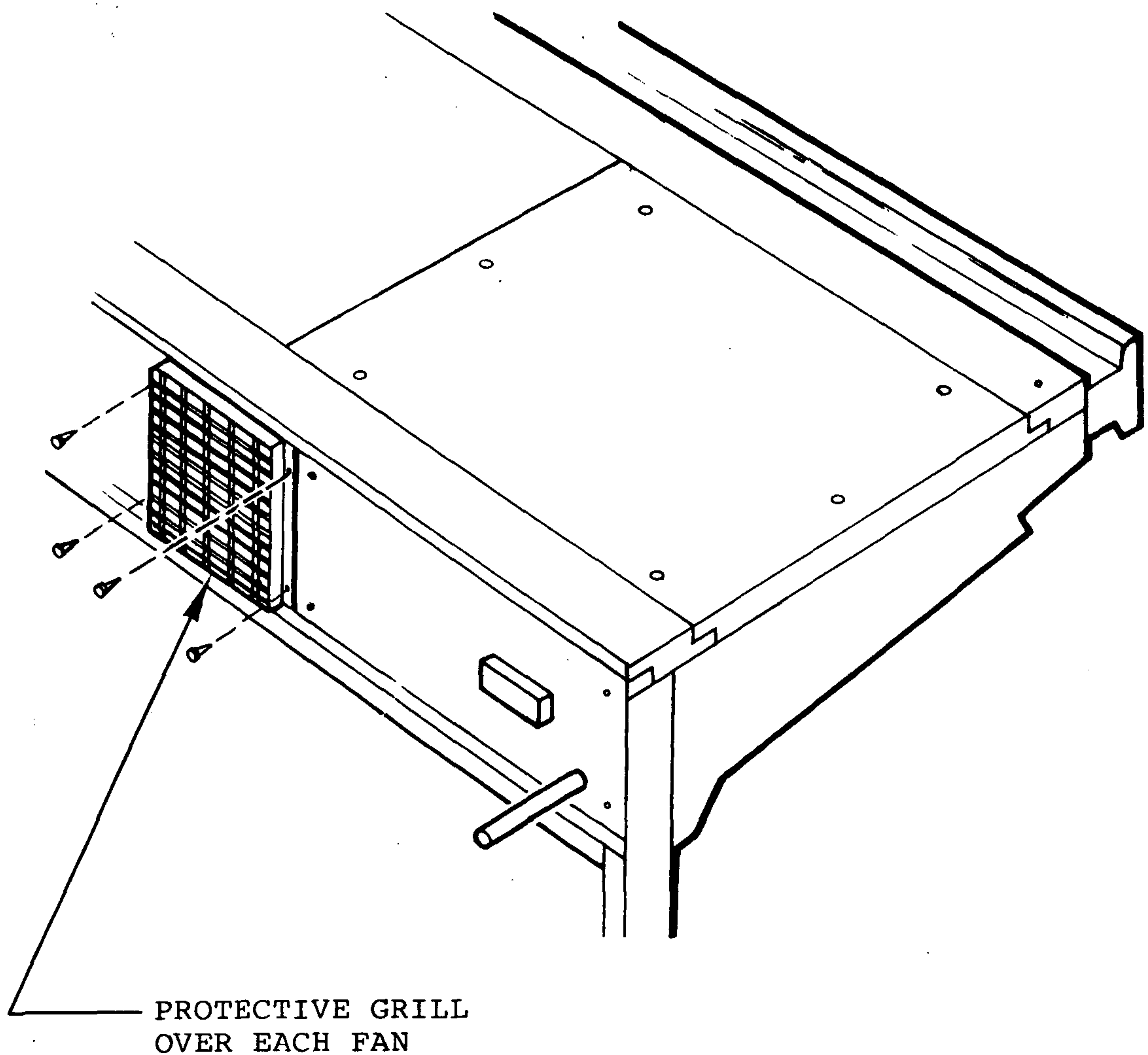
- a. Remove the screws that fasten the kickrail to the front of the case.
- b. Pull the bottom of the kickrail forward and rotate it down to remove it from the case.
- c. Replace or service the ballast as required and replace the kickrail in reverse order of removal.



FAN BLADE REPLACEMENT (MAIN FAN SYSTEM)

These fans are located at the rear of the coil package behind the protective grills. SHOULD THESE FAN MOTORS OR BLADES EVER NEED SERVICING, ALWAYS REPLACE THE FAN BLADES WITH THE RAISED EMBOSSING SIDE OF THE BLADE TOWARD THE MOTOR.

- a. DISCONNECT POWER TO FANS
- b. Remove protective grill over fan.
- c. If servicing fan motor, remove motor mount casting and disconnect fan from fan harness.
- d. Service or replace parts and replace all items.



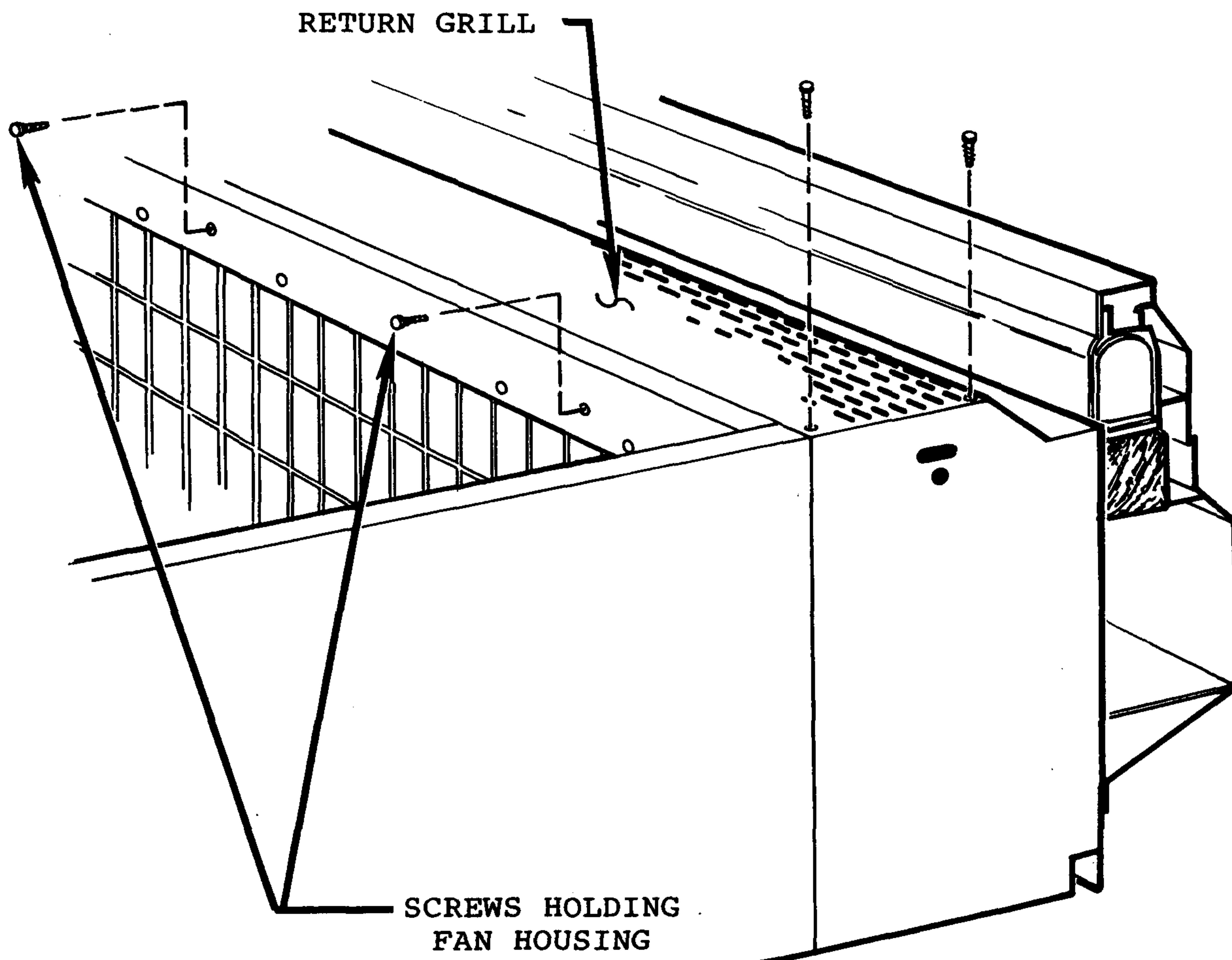
FAN BLADE REPLACEMENT GRILLS (MAIN FAN SYSTEM)

These fans are located at the rear of the coil package behind the protective grills. SHOULD THESE FAN MOTORS OR BLADES EVER NEED SERVICING, ALWAYS REPLACE THE FAN BLADES WITH THE RAISED EMBOSSED SIDE OF THE BLADE TOWARD THE MOTOR.

- a. DISCONNECT POWER TO FANS.
- b. Remove the return grill over fans.
- c. Remove the screws holding the fan housing to the rear of the front package.

There are two fans for every fan housing, remove only the two upper screws as shown below to free the housing.

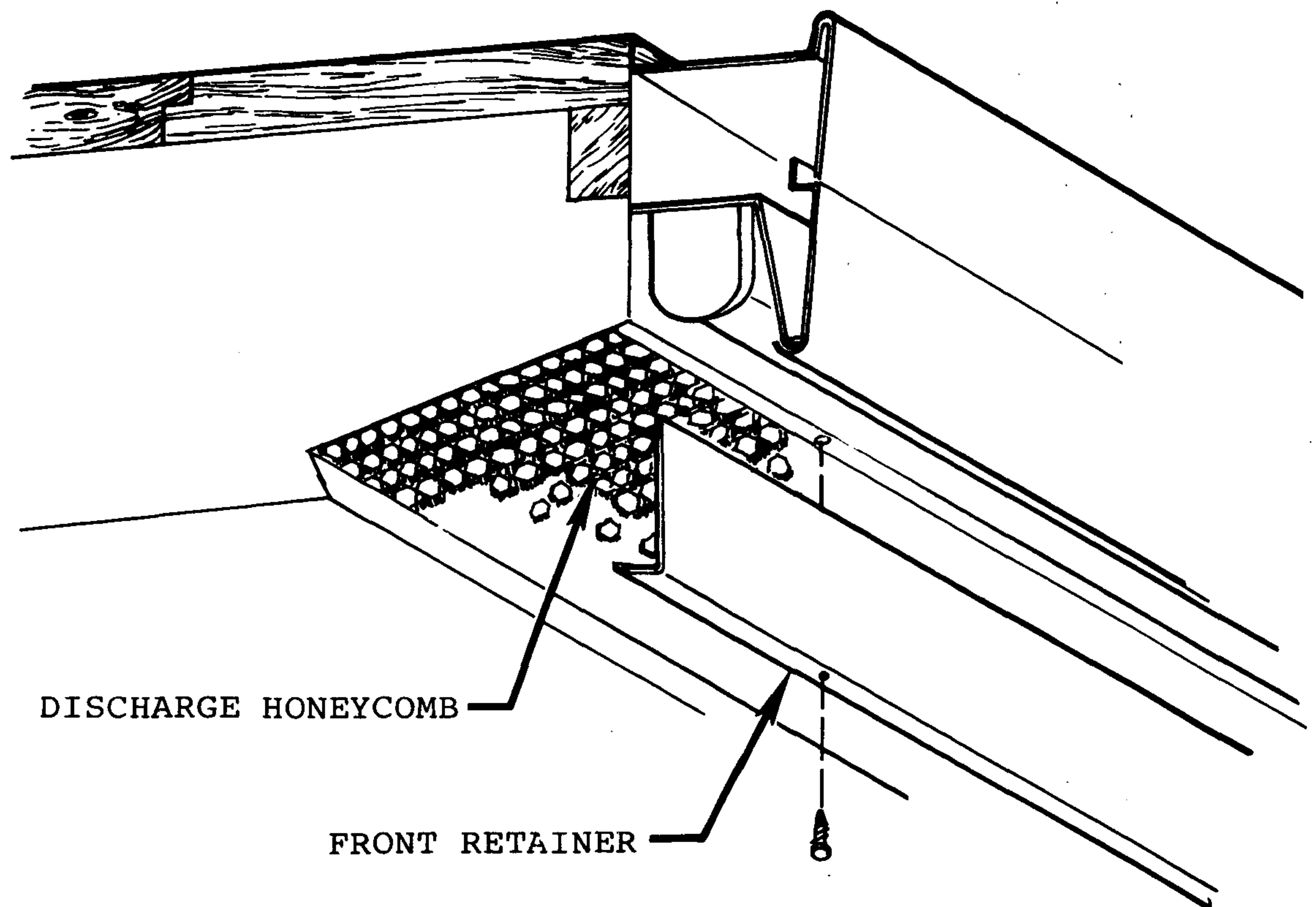
- d. Disconnect the fans from the fan harness and lift the entire fan housing up through the return flue.
- e. Service or replace parts and replace all items.



HONEYCOMB CLEANING

To remove the discharge honeycomb:

- a. Remove the front honeycomb retainer fastened to the interior top of the case.
- b. Remove the honeycomb, pulling down at the front.
- c. Clean or replace the honeycomb. Clean the honeycomb with either a vacuum or soap and water. Be sure to rinse the honeycomb and dry thoroughly prior to replacing it back into the case.



REPAIRING ALUMINUM COIL

The aluminum coils used in Hussmann refrigerated cases may be easily repaired in the field. Materials for repair are found at refrigeration wholesalers.

Hussmann recommends the following solders and techniques:

1. Zinc based 720°F solder. This solder makes a strong durable repair and is also cathodic protection, preventing corrosion of the tubing near the repair. This does not need a coating over the solder area. It may be 95% to 98% zinc with the remainder aluminum. Solders in this group are made by:

Platt Brothers
Box 1030
Waterbury, CT
(203) 753-4194

New Products, Inc.
269 Freeman Street
Brooklyn, NY 11222

Mathiessen and Hegler Zinc Company
Lasalle, IL

Three major differences between soldering aluminum and copper must be followed for best results. a. The heat must be applied on the opposite side of the tube from the solder. b. While keeping the solder molten, wire brush under the solder pool. c. Move the flame back and forth along the tube to prevent melting the tube.

2. Solders with lower melting point (600°F or less). Solders that contain metals other than the zinc and aluminum combination above will require a protective coating. This coating must be flexible to withstand defrosts. Windshield sealant by 3M, sold in auto parts stores, is one good material.
3. Solder/flux the same technique may be used with all these solder/flux systems. Heat from the back side of the tube, keep rubbing the solder on the fluxed repair area until it melts. Continue heating carefully until the solder flows, wetting the tube. Wash flux off with very hot water, dry, coat with windshield sealant. Use two coats and extend coat at least 1" each way from the solder to be sure of good coverage.

Some solder manufacturers are:

#505 Solder and #505 Flux:

Allweld Alloys
2027 Laura Avenue
Huntington Park, Ca
(213) 583-9004

Alu-Sol 45D Multicore Solder:

Multicore Solders
Westbury, CT 11590
(516) 334-7450

Strongset #509 (5) and 509 Flux:

All-State Welding Alloys Co.
Toronto, Canada

Eutector-Alutin 51-S Solder and
Alutin 51 Flux:

Eutectic Corporation
40-45 172 nd Street
Flushing, NY