the motor will stall because of the high-pressure load on the compressor. No damage should occur to the motor because the high current drawn when it stalls trips the automatic reset overload in the relay until pressures are balanced.

REFRIGERANT The refrigerant is dichlorodifluoro methane.

EVAPORATOR The freezer evaporator is made of stippled aluminum. Aluminum tubing is brazed to the top, back and sides of the evaporator.

To add mass to the aluminum freezer evaporator to keep the temperature swing under control while the fresh food evaporator goes through its OFF or defrost cycle, a coating of Robertson Compound ("tar") is fused to the top and back of the freezer evaporator. This compound produces a flywheel effect.

WEIGHTED VALVE The purpose of this valve, located on the side of the freezer compartment evaporator, is to maintain a constant pressure differential between the fresh food and freezer sections. The valve is placed in series in the refrigerant line between the evaporators to secure the two different temperatures which exist in the two separately insulated compartments. The weighted valve is purposely designed to operate at about a 60-degree angle from the horizontal. The force of gravity tends to keep the weighted valve closed, and the pressure of the refrigerant on the piston tends to open the valve.

MOTOR COMPRESSOR The sealed-in motor-compressor assembly is internally spring-mounted in the compressor case.

In general appearance, the compressor case is of an "octagon" or "oval" appearance; and the absence of external mounting springs makes it readily distinguishable from the connecting-rod type. A "U"-shaped oil cooler tube extends out in front between the compressor and the condenser mounting. The compressor is a horizontal-shaft Scotch-yoke type rather than the reciprocating connecting-rod type. The motor itself is a two-pole type with a rated speed of 3600 rpm. Four metal glass leads are used to bring power to the motor inside the sealed motor-compressor case. The fourth lead is required because the motor has a protecting auxiliary winding in addition to running and starting windings.

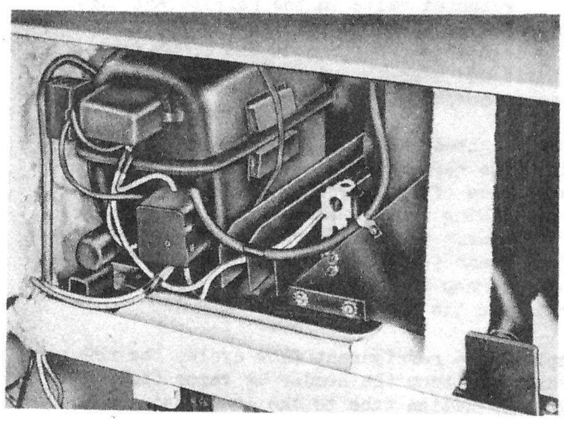


Fig. 36 Motor Compressor

The compressor case is made up of two half-shells welded together. The motor-compressor assembly is suspended by four mounting springs from the top half-shell.

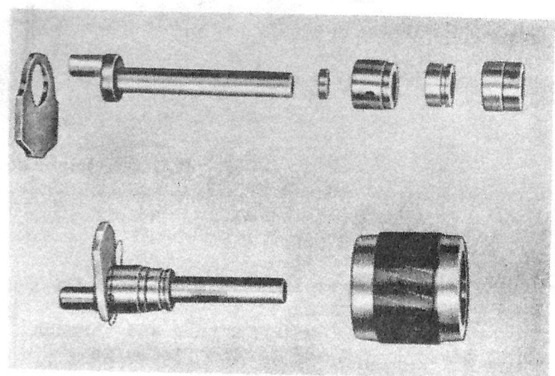


Fig. 37 Rotor and Shaft Assemblies

The motor rotor is pressed onto one end of the horizontal compressor shaft. The other end of the shaft is formed into a crank. As the shaft turns, the crank end actuates the piston through a sliding yoke. The piston moves vertically in a stationary cylinder.

Oil under pressure is circulated to all of the moving parts of the compressor. A small rectangular oil blade rides on an eccentric ring on the shaft and is held in place by a wire clamping spring. As the shaft turns, oil is drawn up from the bottom of the compressor case through a tube. Then it is circulated to the moving parts of the compressor through small grooves and holes. After the oil circulates to the moving parts, it falls to the bottom of the compressor shell and flows through a large tube located in front of the compressor case and under the drain pan support to be cooled. It then flows back into the compressor case. A baffle in the bottom of the compressor case separates cooled oil from the hot oil.

Refrigerant vapor in the compressor case enters a tube brazed to the side of the cylinder bracket and goes into the top half of a muffler

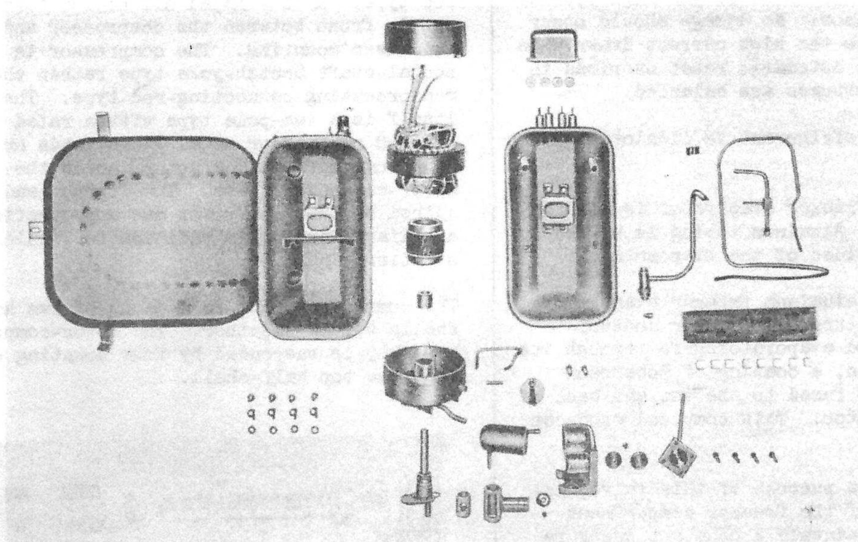


Fig. 38 Motor-Compressor Parts

assembly which serves as an intake muffler. On the down or suction stroke of the piston, the vapor or gas is drawn through a tube and through a slot in the cylinder wall. The piston is hollow, and a hole in the piston side matches up with the slot in the cylinder wall. The hot gas passes inside the piston when the piston is in its suction stroke and then through holes in the top of the piston which are covered by a thin circular plate called the intake valve. The intake valve is held to the top or head of the piston by a rivet in its center. On the suction stroke the valve edges flex up and allow the incoming gas to enter the cylinder compression chamber. On the compression stroke, the intake valve closes off the holes in the piston head. The "up" or compression stroke compresses and then pushes the gas out of the cylinder through a half-circle of holes in the discharge valve plate. On the the outside of the valve plate these holes are covered by a thin circular spring steel valve called the discharge valve. The discharge valve is riveted between the valve plate and the convex center section of a muffle box. This discharge valve is cupped slightly around the outer edge, and it is this cupped edge that bears against the valve plate. When the compressed gas passes through the half-circle of holes in the valve plate, it lifts the edge of the discharge valve and allows the gas to pass into the discharge chamber of the muffle box. From the muffle box the compressed refrigerant gas passes through a tube into the lower or exhaust portion of the muffler. From the muffler the compressed refrigerant enters a tube which takes the gas through the top of the compressor case and into the condenser.

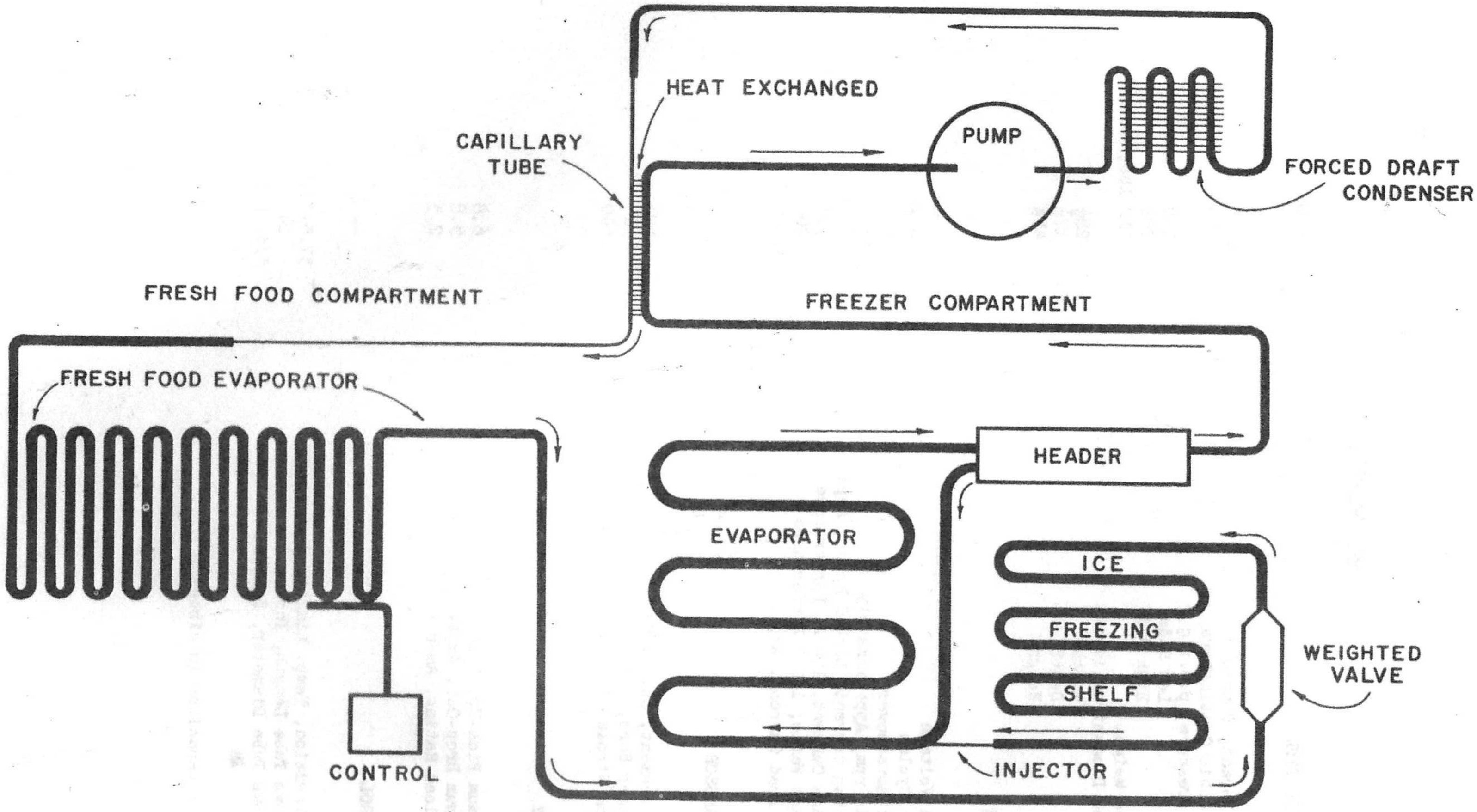
CYCLE OF OPERATION From the compressor hot compressed refrigerant gas goes into the forced draft condenser where it is cooled and liquefied. From the condenser the liquid goes through a capillary tube up into the extruded aluminum fresh food compartment evaporator, or serpentine, where expansion takes place and a vapor-liquid mixture results.

After leaving the serpentine or fresh food evaporator, the mixture goes through a weighted valve before entering the freezer evaporator tubing. The purpose of the weighted valve is to produce a pressure drop and thus a temperature drop in the refrigerant mixture before it enters the freezer evaporator tubing.

Thus, the weighted valve in the refrigerant circuit makes it possible to maintain thirty-five- to forty-degree temperatures in the fresh food compartment and near-zero degree temperatures in the freezer compartment.

From the weighted valve, the refrigerant mixture goes into the refrigerated shelf where there are several passes of tubing. From the refrigerated shelf the tubing runs to the back of the freezer evaporator where the refrigerant passes through an injector and follows a series-parallel path of tubing across the back, sides and top of the evaporator to the header.

To complete the refrigerant flow cycle, the refrigerant goes from the header as vapor back through the suction tube to the compressor to repeat the compression-expansion cycle.



Schematic Diagram - Wall Refrigerator CYCLE OF OPERATION

RELAY The relay is a magnetic device for making and breaking the starting winding circuit and for providing overload protection to the motor. The starting portion of the relay consists of a coil of insulated wire and a movable metal armature. The metal armature is in a vertical position and holds the starting contacts open under normal conditions. The relay coil is wired in series with the running winding of the motor. When the machine is turned on, the initial heavy current through the coil and the motor running winding is sufficient to lift the movable armature by magnetic force which then allows the starting contacts to close. With the starting contacts closed, the motor starting winding is connected in parallel with the running winding to start the motor. As the motor comes up to speed, the current drawn decreases and reduces the magnetic force acting on the metal armature, allowing it to drop and open the starting winding contacts.

The relay is mounted on the end of the compressor by a long screw which passes through the relay and into a threaded hole.

To replace the relay:

1) Turn control to OFF.

2) Remove front cover at top of refrigerator.

3) Disconnect power cord.

4) Unscrew long screw holding relay to end of compressor.

5) Disconnect relay wires one terminal at a time and place on new relay.

6) Reverse above to assemble new relay.

RESISTOR An external resistor, rated at .6 ohms 20 watts and protected by a removable cover, is held by a bracket to the metal-glass-leads cover.

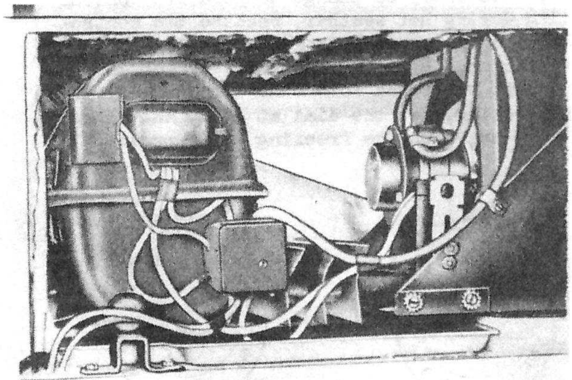


Fig. 39 Electrical Parts

The resistor leads are soldered to the resistor terminals. One lead has an eyelet for attaching to the relay terminal while a twist-type connector is provided for attaching the other lead to the compressor terminal lead.

To replace the resistor:

1) Turn control to OFF.

2) Remove front cover from top of refrigerator.

3) Disconnect power cord.

4) Straighten two ears holding cover over resistor.

5) Pull cover off and lift resistor from bracket.

6) Disconnect lead from relay terminal, and cut lead to compressor.

7) Attach new resistor to relay and to compressor lead using twist-type wire connector.

8) Install resistor and replace cover.

CAPACITOR A capacitor is wired into the starting winding circuit. It is held to end of the condenser mounting frame by a clamping bracket, and its terminals are covered by a removable cover. The two terminals have eyelets in which the standard size relay screws fit.

To replace the capacitor:

1) Turn control to OFF.

2) Remove front cover from top of refrigerator.

3) Disconnect power cord.

4) Pry with screwdriver between top of capacitor cover and holding clamp and pull capacitor out of clamp.

5) Lift off cover and disconnect leads.

6) Reverse above to assemble new capacitor.

CONTROL The control has a constant ON temperature of $37\frac{1}{2}$ F. regardless of the control knob position. The control is mounted to the inner liner dome in the fresh food compartment, and the bellows bulb is clamped to the evaporator near the outlet tube which is the coldest point and where the frost or ice melts last. The ON temperature is set at $37\frac{1}{2}$F to insure that all ice and frost melts from the evaporator before the machine starts. The arrangement of the fresh food evaporator with the control bulb mounted to the rear edge produces a compensating effect for large loads and large number of door openings. The circulation of incoming air around the evaporator rapidly removes the heat

COLD ROOM OPERATION The control dial should be turned to the coldest setting where installations are in cool locations. When the ambient temperature is 55-60 F, the machine may not run often enough to keep ice cream and frozen foods if the control isn't on No. 9. At ambient temperatures below 55 F, no attempt should be made to keep any frozen foods in the freezer.

VACATIONS It is not necessary to turn the refrigerator off during normal vacations (2-4 weeks). However, the control dial should be turned to the coldest position (No. 9) to insure preservation of frozen foods. This will provide temperatures for maximum storage time of frozen foods; and since there will be no door openings, power costs will be low. The home heating system thermostat should be set to maintain room temperatures of 55 F or above.

MACHINE WIRING An "M" type relay is used and is mounted on the left end of the compressor case. In addition to the relay an external resistor is necessary to the motor operation and this is held by a bracket, under a removable cover, to the metal-glass-leads cover. The 1/4 hp machine requires an 86 Mfd. capacitor in the starting winding circuit. The capacitor is held to the mounting frame by a bracket.

The proper resistance must be used in the auxiliary circuit. Without the proper resistance the following conditions will result:

Open resistor -- relay overload will keep tripping and machine will not run.

Resistor shorted out -- relay will not pick-up, overload will not trip, motor may overheat and be damaged.

Large resistor (2 ohms) incorrectly used in place of small resistor (0.6 ohms) -- relay overload will keep tripping and machine will not run.

THE RESISTOR MUST NOT BE SHORTED OUT FOR CHECKING PURPOSES.

The proper "M" type relay must be used in case of replacement. The corresponding 1/4 hp "R" type relay must not be used since it is not equipped with internal connections for the auxiliary winding and the overload rating is too high. While the motor-compressor will start and run using the "R" type relay, permanent damage may occur to the motor windings.

P-36 MOTOR PROTECTIVE CIRCUIT To bring power to the motor inside the sealed motor-compressor case, four metal-glass leads are used. The fourth terminal is necessary because the motor has an auxiliary winding, in addition to running and starting windings, for protection.

Two parallel electrical circuits carry current to the motor running winding. In the regular circuit are the relay pick-up coil and the overload heater. In the auxiliary circuit are several turns of wire in the motor stator slots and an external resistor.

If the compressor is stalled or will not start because of low voltage, the resistance of the auxiliary circuit is relatively high so that most of the current passes through the relay overload heater which is much more sensitive than in previous relays. If the compressor starts and runs, the turns in the auxiliary winding reduce the impedance of that circuit so that most of the current to the running winding passes through it instead of the overload heater circuit. Thus, the auxiliary winding and resistor are for motor protection from low voltage or a stalled condition.

MACHINE WILL NOT RUN If after installation the machine will not run and there is sufficient voltage at the wall outlet, check the following:

Inoperative control.

Inoperative relay.

Inoperative resistor.

Inoperative capacitor.

Open circuit at metal-glass-leads.

Wiring wrong.

An inoperative control can be found by connecting both control leads to same terminal to by-pass the control.

Whether or not the relay, resistor or capacitor is inoperative can best be determined by trying another one known to be good.

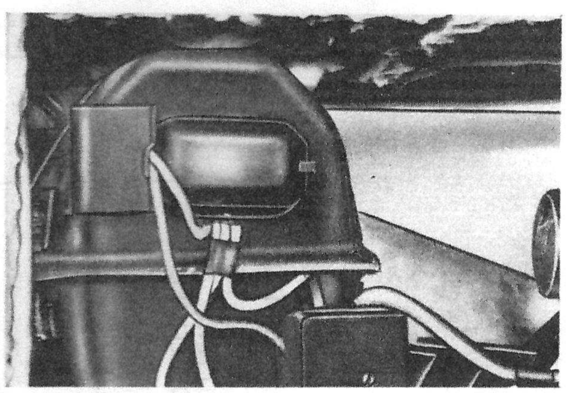


Fig. 45 Lead Cover Terminal

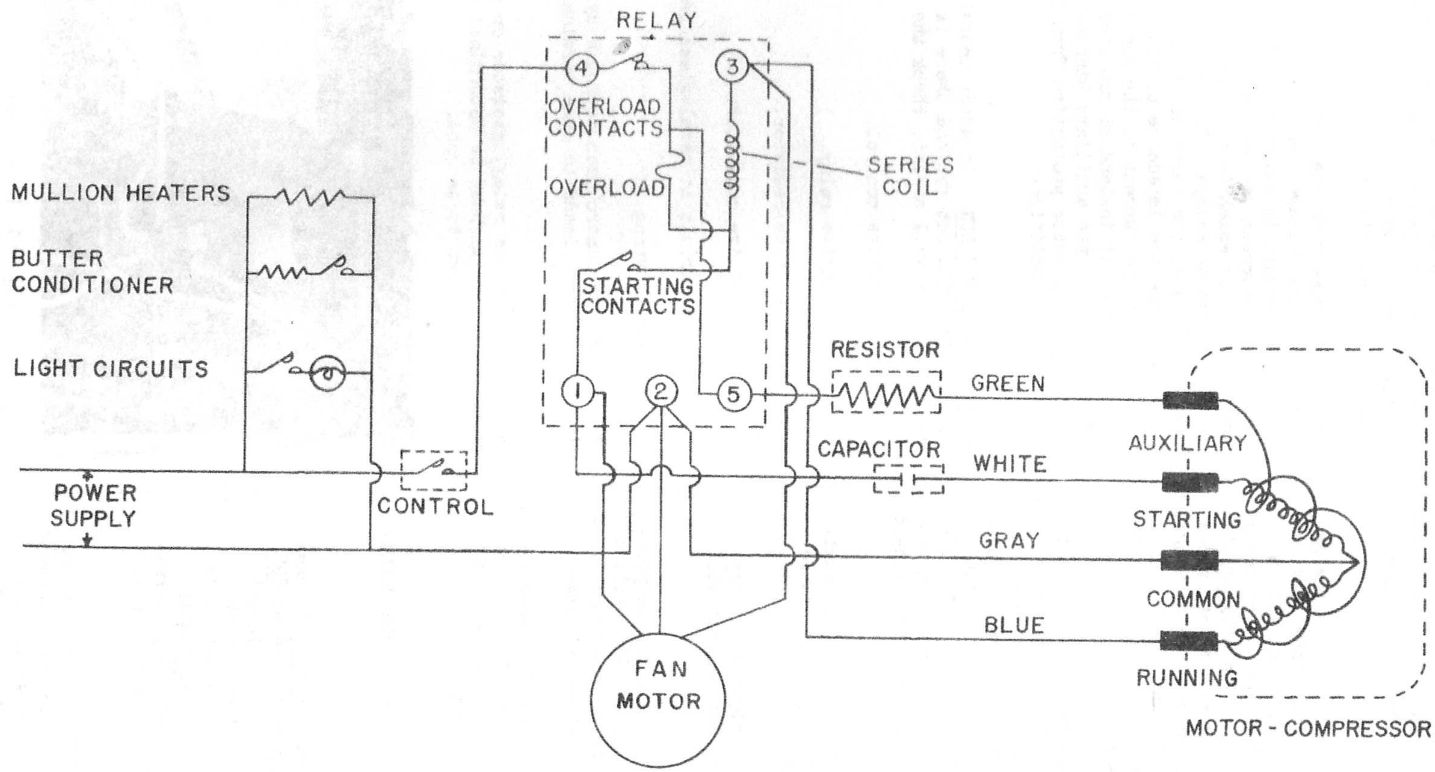


Fig. 46 Schematic Wiring Diagram

If, after trying a new relay, resistor, capacitor and checking the control contacts, the machine will still not run, then look for an open circuit at the metal-glass-leads. If one of the wires is loose, resolder it to the metal-glass-lead. To inspect for an open circuit here, it is necessary to remove the lead terminal cover on the end of the compressor.

The cover is rectangular in shape and held in place by spring clips. To remove, pry up one of the clips with a screwdriver and slip cap off.

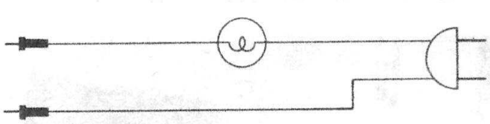


Fig. 47 Series Test Lamp Diagram

The schematic diagram can be followed to check continuity of the windings or when direct-testing the machine. A series test lamp should be used.

There are three electrical circuits inside the compressor case. To check continuity of:

The auxiliary winding -- check between the green lead and blue lead.*

The starting winding -- check between the white lead and the gray lead.

The running winding -- check between the blue lead and the gray lead.

*The green resistor lead should be removed from the #5 relay terminal to prevent getting a circuit through the relay.

If the test lamp fails to light when testing between terminals, the motor winding is open and the machine will have to be replaced.

To direct-test machine:

Turn control to OFF and remove the front cover. Pull the connecting cord from the wall outlet; connect a test cord to the common terminal gray lead and to the running terminal blue lead. Attach one end of a jumper wire to the starting terminal white lead. Plug the test cord into wall socket and momentarily touch the jumper wire to the running terminal blue lead. If the motor starts, look for trouble elsewhere in the circuit. If the motor does not start and run, replace the machine.

In this direct testing method, the auxiliary winding is not used. The machine should not be run very long without protection of the auxiliary circuit and relay overload or damage will occur. Also the starting winding should be energized only momentarily, or damage may result.

After determining that the control, relay, resistor, capacitor, and metal-glass-lead connections are all right and the machine runs when direct tested, then the cabinet wiring should be checked for an open circuit or an improper connection.

<u>FAN MOTOR</u> A two-phase 110-volt, 60-cycle fan motor is provided to insure proper cooling of the condenser. The motor is fastened to a bracket by three screws and the entire assembly is screwed to the condenser mounting. The motor is connected directly to the relay.

To replace a fan motor:

1) Turn control to OFF and remove front cover.

2) Disconnect power cord.

3) Take out three screws holding motor bracket to condenser mounting.

4) Take off relay and disconnect fan motor leads.

5) Remove fan blade and transfer to new motor.

6) Install replacement motor with screws provided.

7) Connect motor leads to relay. There are three wires: white, black and green. Connect the white lead to terminal (1), the black lead to terminal (2), and the green lead to terminal (3).

8) Reinstall relay, plug in power cord, replace front cover and turn control to operating position.