

PHILCO



SERVICE

Shop Practices and Service Techniques

REFRIGERATION

MAY, 1951



FIGURE 1

Consumer acceptance of Philco products today is second to none in the appliance industry. Owners of Philco appliances expect, and are entitled to receive, expert service which will keep their proud possessions operating efficiently for many years. This is not a one way proposition for the service organization. Prompt, efficient and courteous service is the best advertisement a service organization can hope to have. There is no doubt that a happy customer is only too willing to tell his friends of the dependable service he is getting. This cannot be overstressed. Philco spends large sums of money designing, testing, and building the very best refrigerators, freezers and air conditioners in the world, but this tremendous effort

alone will not suffice. After one of the above appliances is sold, it is the duty of those devoted to service, to see that the consumer is always happy.

The number of servicemen employed full-time to correctly install and service Philco products will depend largely upon the dealer and his sales-promotion activities. If the size of the dealer's business does not justify the full-time employment of a qualified serviceman, a contract should be made with a competent service organization. It is the responsibility of the dealer and the distributor to make certain the service organizations' personnel are familiar with Philco products and the correct procedures of servicing them.



FIGURE 2

Of course, organizing or operating a service shop, whether it be contracted or not, starts at home. Sufficient space should be allotted to setting up work benches, parts bins and cabinets, with ample room for making any major or minor repairs in the shop.

Work benches should have at least one or two securely mounted vises and a good grinding wheel. Various sets of test equipment, as required, can be built into the back board of the bench for easy access. Included with the test equipment on the bench should be several electrical outlets for bench testing or operation of appliances. Several sliding drawers in the bench are handy for safe keeping of tools when not in use.

Large cabinets with divided compartments for spare parts is another very handy storage space for temperature controls, relays, hardware, etc. Systematic stocking of these parts will eliminate a frantic search in an emergency and assist in or-

dering parts that are running low, before they are needed. A small quantity of parts, especially those directly affecting the operation of a refrigerator or air conditioner should be kept on hand. Embarrassing delays of important service jobs can be avoided in this way. In line with this idea, any parts that are removed from a refrigerator or any appliance, for that matter, should be put in a container so that screws or other small parts do not get lost. Figure 2 shows a setup with sufficient storage space and a large counter for customer sales.

A shop set-up similar to the one shown in Figure 1 is ideal. The shop supervisor is right in the shop where he can supervise the work being done by the servicemen, and also have first hand information on the shop operation.

It is not necessary to have an elaborate and expensive supply of tools and equipment. However, each serviceman should have a tool box stocked with any tools required to fix a refriger-

ator or air conditioner. By simply having the required tools, a great deal of valuable time can be saved and much more efficient service rendered.

A simplified practical filing system should be inaugurated for job orders, shipping or receiving receipts and parts orders. For instance, a job order or work sheet should be given to each serviceman for every outside job. This order should include at least the following items; name and address of customer, date issue, model requiring service, service requested and the name of the dispatcher. When the service call is completed, information such as: date completed, service rendered and parts used, time to complete service, plus customer's and serviceman's name. If this is filed, it will be a permanent record of the work done in the shop and also be invaluable reference later.

A permanent record of parts ordered and received should be kept on hand, so that duplication of orders can be prevented. This record will also assist the parts department in ordering parts for stock. There is no substitute for a written record of the operations of the service organization, with respect to service rendered, parts used, and shipping and receiving movements.

When making a service call to a customer's home, there are three very important things to remember. 1 - Promptness, 2 - Courtesy, 3 - Efficiency.

Analyzing the above, it is not hard to see their importance.

Many times a customer will call for service and even though it may not be an emergency, they are on pins and needles until the serviceman arrives.

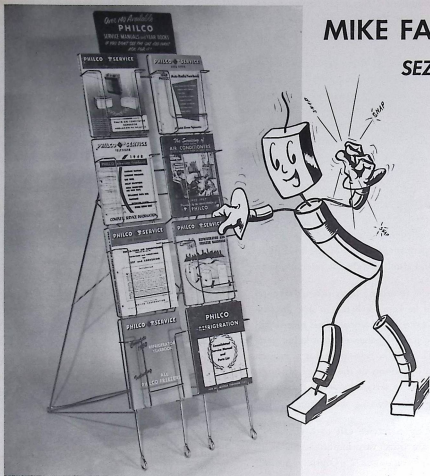
If the serviceman does not arrive at the appointed time a hairdressing appointment or a shopping trip may have to be cancelled. There is no need of going to great lengths about the effects this situation will have. It may sound foolish but just such incidents can have a bad effect on the reputation of the service organization and will also make the task of satisfying the customer much more difficult. If the above mentioned appointments are not cancelled, and the customer goes out, then valuable time is lost and extra expense involved because a "call back" must be made. This also can directly affect the reputation of the service shop.

Courtesy is a prime attribute to a successful serviceman. It is true that some situations and the attitudes of some customers are very trying to the patient serviceman who has come, bent on doing a good job. Enduring all and performing a good service call will soon win the confidence and respect of the most difficult customer. It might be added here that a neat, clean appearance will certainly be of no harm to the serviceman.

As for efficiency, there again it can be said, there is no better advertisement for service than a job well done. A good serviceman will first of all make a thorough examination to determine the reason for failure. It is certainly much better that way than to just tear into a refrigerator or air conditioner and start removing or replacing parts, one after another until the trouble is finally found. A serviceman using the test equipment and knowledge at his command will go a lot farther than the chap that just starts working, without first looking around. Always try to do a good job the first time, and avoid "call backs" that will cause a poor opinion not only of your organization, but of Philco as well.

MIKE FARAD

SEZ . . .



Philco yearbooks have won such a reputation among servicemen for general excellence and usefulness that these publications set the pace for the appliance industry. This reputation has been established because the Philco Service Division permits no short cuts, no penny savings in their preparation and production.

Philco yearbooks are complete because the information contained in them is compiled throughout the production

year. They contain all production changes, fixes and other information for periods ranging from one to twelve years in one complete volume. Whenever necessary they contain photographs, cutaway illustrations, graphic charts and simplified schematics. They are printed on heavy stock, each with a complete index for ready reference and the answer for any service shop question.

See Them at Your Distributors!

PHILCO



SERVICE

Shop Practices and Service Techniques

REFRIGERATION

AUGUST, 1951

PRACTICAL REFRIGERATION

In the preceding issue we discussed heat, and heat transfer by Conduction, Radiation and Convection. The properties of Sensible heat and Latent heat, how Latent heat fusion and Latent heat of vaporization is brought about. The properties of the more common refrigerant in use today, and also the systems used for leak detection of refrigerant.

One of the more important aspects of refrigeration theory is that of pressure temperature relationship. The boiling point of a liquid is directly dependent upon this relationship. For example, F-12 at sea level has a boiling point of 21.6°F, if the pressure on the Freon is increased the temperature at which the freon will boil will be raised, depending upon the increase in pressure. If the pressure on the surface of the refrigerant is decreased the boiling point of the liquid will be decreased in proportion to the decrease in surface pressure. This temperature-pressure principle is made use of in the evaporator of the refrigerator, wherein the boiling point of the refrigerant is controlled by pressure. The condensation temperature of the refrigerant is also dependent upon temperature-pressure relationships, condensation takes place at a higher temperature when the pressure is increased.

BASIC REFRIGERATION

Refrigeration can be defined as a process which will transfer heat from a warm object to a cooler object. A very simple type of refrigerator can be constructed by placing a bottle of refrigerant in an

insulated and tightly sealed box, with the open neck of the bottle protruding through the top of the box. With food placed in this box and a refrigerant placed in the bottle a heat exchange would occur, the freon would boil and absorb heat from the food stored in the box. This type of refrigerator would be very impractical due to the high loss of refrigerant, boiling off into the outside air, it would be necessary to replenish the refrigerant in the evaporator (bottle) in a very short period of time and there would be no control of temperature in this refrigerator. The modern refrigeration system has been designed to make use of an evaporator wherein this boiling takes place. Heat is transferred from the internal portion of the refrigerator to the refrigerant, at which time the latent heat of vaporization takes place and a maximum heat transfer is made. The vapor or gas resulting from this change of state is transferred through the suction line to the compressor in the system. At which point the low pressure vapor is compressed to a high pressure vapor and then transferred to the condenser, at this point a change of state again takes place condensing the high pressure vapor into a liquid form by the ambient air which is at a low enough temperature to cause this change. At this point in the system it is necessary to have a metering device to control the flow of liquid refrigerant to the evaporator, which completes one cycle of refrigeration.

Throughout this text reference has been made to high pressures and low pressures. The high pressure portion of the system is from the point of

discharge of the compressor where high pressure gas flows through the condenser, where a change of state takes place changing it to a high pressure liquid and on through the strainer, through the capillary tube to the drier. At this point the high pressure liquid refrigerant boils into a low pressure vapor which flows through the evaporator and on through the suction line returning the low pressure vapor to the compressor.

EVAPORATOR

The evaporator is that portion of the refrigeration system in which vaporization or boiling of the liquid refrigerant takes place. It is in this process of vaporization that the maximum amount of heat is transferred by latent heat of vaporization.

As shown in figure 1 the evaporator tubing circulates the refrigerant through a series parallel path, with this method of circulation a large surface area of the evaporator is utilized for heat transfer plus the feature of a fast freeze section in the left hand portion of the evaporator and a very efficient frozen food storage area in the right hand portion.

COMPRESSOR

The compressor is that component of the refrigeration system in which the low pressure vapor is compressed into a high pressure vapor. The refrigeration system as shown in figure 1 makes use of a hermetically sealed compressor, which is internally spring mounted, and operates with a low crankcase pressure, for quiet trouble free performance.

The Freon gas enters the compressor suction inlet, filling the dome and motor compressor assembly, it is then drawn through the intake valve into the cylinder. It is compressed in the cylinder and passes on through the discharge line under high pressure, the discharge line makes a complete circle around the inside of the dome assembly before passing through the dome wall to the condenser. The circle of the discharge line eliminates vibration and allows the compressor to ride free on its mounting springs.

CONDENSER

The condenser in the refrigeration system converts the high pressure gas that is supplied from the compressor to a liquid refrigerant at high pressure, by removing the latent heat of vaporization, which permits a continuous supply of liquid refrigerant for expansion, in the evaporator. The high pressure gas enters the right side of the condenser at a temperature of 20° to 30° higher than room temperature. This condition allows the air passing over the condenser at room temperature to absorb heat from the condenser. As the gas flows through the condenser, heat is dissipated to the room air which causes the vapor to change to a liquid state.

CAPILLARY TUBE

As a control device in this refrigeration system a capillary tube is made use of to maintain the proper level of boiling liquid refrigerant in the evaporator at all times of operation. A capillary tube (impedance tube) when used as a liquid refrigerant expanding device consists of a very small bore tube, its length being from 5 to 10 feet or more as determined by Engineering requirements.

When a liquid refrigerant passes through a capillary tube, the pressure is gradually reduced to the flash point, at which time a given amount of the liquid refrigerant changes state to a gas. By employing a heat exchanger to sub-cool the liquid refrigerant entering the capillary the amount of liquid changing state can be reduced, and therefore the capacity of the capillary will be increased. It is possible to form a heat exchanger by attaching a portion of the capillary tube to the suction line, which is returning the refrigerant gas from the evaporator to the compressor. In this way the cool gas leaving the evaporator is utilized to sub-cool the liquid refrigerant which is warm when leaving the condenser. The approximate refrigerant liquid, and vapor pressures, and temperatures for a capillary tube heat exchanger, using Freon as the refrigerant. The cool vapor is being returned from the evaporator at a temperature of 0°, it is superheated to 80°F. in the suction line before

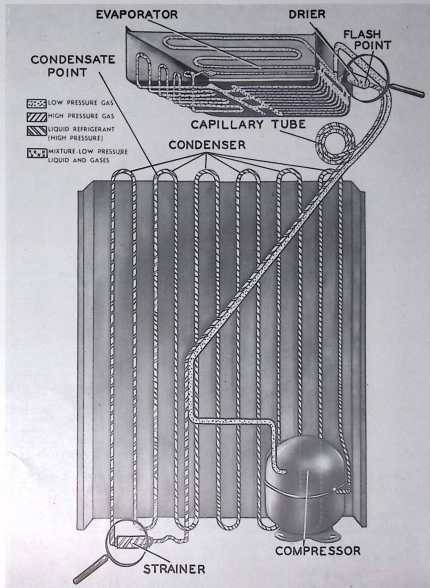


FIGURE 1

entering the compressor. While this transition takes place the liquid refrigerant leaving the condenser at 100°F. and 140 psi, is being cooled to a temperature of 52°F. before the pressure drop is sufficient to reach a point of saturation and finally leaves the capillary tube. It enters the evaporator at a temperature of 10°F. below zero at a pressure of 4.5 psi. If use was not made of a heat exchanger the flash to vapor of the refrigerant would occur shortly after the refrigerant entered the capillary tube. The capacity of the tube, and the cooling effect of the refrigerant entering the evaporator would be greatly reduced.

THE REFRIGERATION SYSTEM

All major components of the refrigeration system have been discussed, it would be well to summarize the complete system.

Beginning with the low pressure gas entering the compressor, the gas passes through the suction inlet of the compressor and is drawn into the cylinder.

Here the low pressure gas is compressed by the piston's action into a high pressure gas. The high pressure gas passes through the condenser where it is cooled and changes state to a high pressure liquid. The liquid refrigerant under high pressure passes from the condenser through the strainer which is used in conjunction with the capillary tube to eliminate the possibility of plugging of the tube by dirt, ice or decomposed solids in the system. The liquid Freon passes through the capillary tube and into the drier. The drier consists of a copper tube and a Silica Gel moisture filter inserted between two very fine mesh screens. Its function is to remove any moisture that may be in the Freon. The Freon passes through the drier and into the evaporator. In the evaporator it is suddenly reduced due to passing from a small capillary tube into a larger evaporator inlet tube. With this reduction in pressure the liquid refrigerant boils into a low pressure gas. Through this boiling action the Freon absorbs heat from the insulated box and its contents. The low pressure Freon gas passes through the suction line which

makes contact with the capillary tube and therefore creates a heat exchange. The heat exchange sub-cools the liquid refrigerant to the evaporator and also prevents liquid refrigerant from passing on to the compressor. The gas passes down the suction line, through the inlet valve and back into the compressor which completes one cycle.

Cycling in reference to refrigeration is the alternate condensing and evaporating of the refrigerant in the system. The object of refrigeration is to maintain a constant and correct temperature for the storage of perishable foods. This is accomplished by the compressor drawing a low temperature, low pressure vapor from the evaporator and compressing it in the compressor to a high pressure, high temperature vapor. This vapor in turn passes to the condenser where it gives up a part of its heat to the room air by means of the radiating surfaces of the condenser. The high pressure liquid refrigerant then enters the capillary tube, and the high pressure liquid refrigerant is metered into the evaporator at which point it boils. The compressor in compressing the refrigerant gas is also reducing the pressure on the return line and low side of the evaporator. This action assists in the boiling of refrigerant supplied from the condenser by the release of pressure. When the refrigerant boils in the evaporator, heat is absorbed and the temperature is lowered until it reaches a predetermined level. As this point is reached, the temperature control is activated, opening the power circuit, stopping the compressor which completes the "ON" cycle of refrigeration.

With the compressor in the "OFF" cycle, the pressure in the low side of the system is no longer being reduced, which causes the refrigerant to stop boiling. When this happens, the refrigerant no longer absorbs heat and a temperature rise results. This rise in temperature will continue until a point is reached which causes the thermostatic control to close the power circuit, which operates the compressor, hence the cooling cycle is started again. Therefore, the control of temperature is maintained and the desired objective of refrigeration is achieved.

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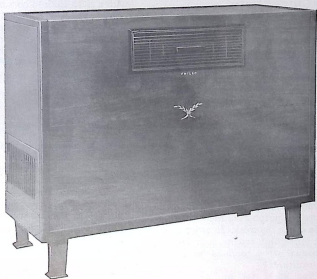
SERVICE

Shop Practices and Service Techniques

REFRIGERATION

SEPTEMBER, 1951

PHILCO AIR-CONDITIONER CABINET REFINISHING AND TOUCH-UP



After the repairman has completed the mechanical work required to return an Air Conditioner to efficient operating condition it is often necessary to make minor cabinet repairs to finish the service call to the complete satisfaction of the customer and the critical serviceman.

These cabinet touch-up instructions have been prepared for use in repairing the various finish

injuries on air conditioner cabinets and other wood surfaces.

For refinishing and touching-up walnut-finished air conditioner cabinets, the following materials are recommended. They can be obtained in quantities to suit individual requirements from local suppliers of paints and varnishes.

MATERIALS FOR REFINISHING WALNUT CABINETS

Varnish Remover
 Gloss Lacquer (*for spraying*)
 Walnut Shading Lacquer
 Clear Brushing Lacquer
 Walnut Flute Stain
 Light Walnut Stain
 Dark Walnut Stain
 Light Walnut Filler
 Dark Walnut Filler
 Wax-Base Cabinet or Furniture Polish
 Chrome Orange Spirit Powder ($\frac{1}{2}$ Oz.)
 Nigrosine Black Spirit Powder ($\frac{1}{2}$ Oz.)
 Bismark Brown Spirit Powder ($\frac{1}{2}$ Oz.)
 Burn-in Wax Sticks (*Assorted Shades*)
 Burn-in Lamp or Electric Hot Plate
 Burn-in Knife
 Pencil-Point Touch-Up Brush (#6)
 Free-Flow Lacquer Brush (1" Width)
 White Shellac
 Lacquer Thinner
 Lacquer Sealer (*For Spraying*)
 Lacquer Sealer (*For Brushing*)
 Cheesecloth (*Soft or Fine Mesh*)
 Rubbing Oil
 Felt Rubbing Block (2" x 1")
 Steel Wool (Grade 4/0)
 Wet or Dry Sandpaper (No. 320)
 Cabinet Rubbing Compound

The first requirement in cabinet finishing is to understand the nature and purposes of the various materials required in doing the work. In order to acquire skill before attempting repairs, it is suggested that experimental work be done on old cabinets or unused furniture.

In the following procedure, a description of the various materials used in touch-up work and the methods for applying them are given. The various finish defects will be found listed under the separate headings. Under each heading is listed the materials required and the method for applying them in order to repair that particular finish injury or defect.

There are two general types of walnut finishes, light and dark. The walnut stains listed will take care of all light and dark walnut finishes.

RENOVATING DULL FINISHES

To remove handling marks from cabinets, slight packing marks and other surface imperfections due to objects being placed on surfaces, proceed as follows:

1. With a small quantity of rubbing compound and a clean soft cloth, rub the surface following the grain of the wood. Do not rub the edges of the cabinet too briskly as it is easy to remove the finish from these points, which in so doing will require retouching the edges. Rub the surface lightly and evenly until a smooth finish is obtained, then with a clean cloth wipe off all traces of the compound from the surface.
2. Apply cabinet polish, rubbing vigorously with a clean cloth to obtain lustre and a high polish. Philco Furniture Polish, Part Number 45-6584, is ideal for the purpose.

REFINISHING ENTIRE TOP, FRONT OR SIDE SECTIONS OF A CABINET

Use the following procedure to refinish an entire surface of a cabinet, such as a top, front or side section when the wood is walnut. In finishing gumwoods see heading "Finishing Gumwoods".

1. Wash off the old finish with varnish remover if the surface is varnished or with lacquer thinner if it is lacquer finished. The thinner should be carefully applied using a brush. After the old finish has become thoroughly soft, remove by scraping with the grain. After obtaining a smooth surface, dust off with a clean cloth.
2. Apply a uniform coat of light or dark walnut stain as may be required.
3. Allow the stain to dry for not less than one-half hour and then steel wool the surface with light pressure to obtain complete smoothness.
4. Apply a coat of light or dark walnut filler as may be required. The filler coat should be applied with a brush and rubbed well into the grain of the wood. When the filler has set and begins to show a dry flat appearance, rub it into the wood with a cloth pad, always rubbing in the opposite direction to the grain of the wood.

5. Wipe the surface clean of filler, picking out any filler that remains in the corners and crevices.

6. Let the cabinet air-dry for not less than four hours.

7. Apply by spray or brush a coat of lacquer sealer.

NOTE: At this point, when finishing gumwoods, a coat of shading lacquer should be used. See heading "Finishing Gumwoods".

8. Allow three hours minimum drying time for lacquer sealer.

9. With sandpaper, sand to a smooth surface.

10. Apply two coats of spraying or brushing lacquer, allowing two hours drying time between coats.

11. After drying second coat of lacquer for not less than 25 hours, rub down with rubbing compound and felt block to a smooth surface. Wipe clean with a clean cloth.

12. Apply cabinet polish to the surface finish to obtain high lustre.

FINISHING GUMWOODS

In finishing gumwoods, a coat of shading lacquer should be applied to surfaces after the coat of lacquer sealer. The application of shading lacquer is necessary, because gumwoods have hard and soft spots and the first coats of stain do not cover the surface of the wood uniformly. It is, therefore, necessary to use shading lacquer in order to obtain a uniform finish.

When applying the shading lacquer, a spray gun should be used. Allow the shading lacquer to air-dry for at least one hour. The final coats of lacquer as described in "Refinishing Top, Front or Side Sections", can then be applied and rubbed down with rubbing compound. This will be discussed in detail in a forthcoming issue.

REPAIRING OPEN SEAMS OR JOINTS

1. Insert thin wood wedges with an application of hot furniture glue into open seams. For small open seams, plastic wood can be used. This is to fill up the seams before applying finishing coats.

2. Smooth the wedge or plastic wood down even with the surface of other sections. Use a sharp chisel or sandpaper to obtain a perfectly smooth surface.

3. Apply light or dark walnut stain as required.

4. Apply two coats of lacquer sealer, allowing about three hours between applications.

5. Sand the sealer coat with sandpaper to a smooth surface.

6. Apply one coat of brushing lacquer. Allow to dry for not less than 12 hours.

7. Rub lacquered surface smooth with rubbing compound, then polish.

SCALED OR PEELING FINISHES

This type of finish trouble is generally found on solid wood sections of panels and cabinet base sections. To repair such damages, proceed as follows:

1. Sandpaper old finish off and wipe dust from surface with a clean cloth.

2. Stain surface with light or dark walnut stain as required.

3. Apply one coat of lacquer sealer and allow to dry for three hours.

4. Sand surface with sandpaper.

5. Now apply two coats of lacquer, allowing two hours drying time between the first and second coat and 24 hours drying time for the second coat.

6. With felt block and rubbing compound rub down to a smooth surface.

7. Wipe surface clean and apply polish using a soft clean cloth.

SCRATCHED SURFACES

Scratched finishes can be divided into two classes, i.e., "deep" and "surface" scratches. The procedure for repairing such damages differs as will be noted in the following sections.

DEEP SCRATCHES

This type of scratch is one which goes through the finish to the wood. To repair this type of damaged surface:

1. Fill up the scratch with burn-in wax, using the proper color or shade that matches the finish of the cabinet. The procedure for using burn-in wax and knife is given under the heading "Method of Using Burn-in Wax and Knife" to be discussed in a forthcoming issue.
2. After the scratch is filled and the wax is smoothed down to the surface with a hot knife, place some rubbing compound on the filled section and rub down with sandpaper until even.

Caution: When rubbing with sandpaper, it is advisable to wrap the paper around a felt or wooden block in order to rub the flat surface of the cabinet evenly.

3. Wipe the repaired surface clean and polish. In the event that the scratch is very wide and deep, apply two coats of lacquer. Allow two hours drying time between the first and second coat and 24 hours drying time for the second coat.
4. Rub the whole lacquered section using rubbing compound and felt block until smooth; then wipe clean and apply polish until a high lustre is obtained.

SURFACE SCRATCHES

This type of scratch is one in which the surface of the finish is not damaged deeply. To refinish this type of surface proceed as follows:

1. With rubbing compound and felt block, rub the cabinet surface until the scratches on the surface are removed.
2. Apply polish with a soft cloth to restore high lustre.

CHECKED OR CRACKED LACQUER

This type of finish trouble may be described as one in which small cracks appear in the lacquer finish along the grain of the wood, or seams of the matched veneer panel sections. This trouble may be corrected and repaired as follows:

1. Sand down the entire section with No. 320 dry sandpaper. Always sand with the general run of the grain of the wood. Sand until a

smooth even base is obtained for the application of new lacquer finishing coats. Be careful not to sand through to the filler coat.

2. Wipe off the surface thoroughly with a clean dry cloth.
3. Apply a coat of spraying or brushing lacquer covering the entire section of the cabinet surface on which the checking has developed.
4. Allow the lacquer to dry for one full hour, and then again sand down lightly with dry sandpaper.
5. Again carefully wipe the cabinet surface clean and apply a second coat of lacquer.
6. Allow the second coat of lacquer to dry for 48 hours before sanding and rubbing. Saturate a clean cloth with rubbing oil and thoroughly wet the surface of lacquer to be sanded. With sandpaper and felt or wooden block, lightly sand the lacquered surface in the direction of the grain of the wood, the surface being kept wet by wiping with rubbing oil.

Caution: When sanding cabinet surfaces, extreme care should be taken to have the finish sanded evenly. Sometimes low spots in the wood will cause the lacquer to sink to a lower level. These spots will appear pitted and shiny when the surface is wiped clean and dry. These areas should be sanded until the shiny spots are removed. When sanding any wood surface or cabinet finish, always sand in the direction of the grain of the wood.

7. After sanding, wipe the cabinet surfaces with a clean cloth, then apply rubbing compound and rub down with a felt block until a smooth surface finish is obtained.
8. When the surface is smooth, use a clean cloth to remove all traces of rubbing compound, then polish to a high lustre.

TOUCHING-UP BARE CABINET EDGES

To touch-up cabinet edges, mix some spirit powder "bismark brown" and "nigrosine black" with the shellac for very dark or black edges. Be sure to thin the mixture with shellac to obtain a working consistency. Apply to the edges with the pencil brush. The subject of "Mixing Powder Stains" to obtain color combinations for perfect matching will be discussed in a forthcoming issue.

(TO BE CONTINUED NEXT ISSUE)

PHILCO



SERVICE

Shop Practices and Service Techniques

REFRIGERATION

OCTOBER, 1951

PHILCO AIR-CONDITIONER CABINET REFINISHING AND TOUCH-UP

Part Two



FRANK KENNEDY, Manager
Refrigeration Service

In the preceding issue we discussed the materials required to properly refinish walnut cabinets, the renovation of dull finish, refinishing of the entire cabinet, finishing gum wood, the repair of open seams and joints, repairing of sealed or peeling finishes, procedure for correcting scratches, and the repair of checked or cracked lacquer. In this issue we have outlined the use of burn-in wax and knife and refinishing of ivory cabinets.

LACQUER SHRINKAGE

Lacquer shrinkage is due to the lacquer sinking into the pores of the wood. This type of finish trouble can be identified by the pitted appearance of the finish. The lacquer on a cabinet surface of this type, however, does not break and should not be confused with a "checked" or cracked finish surface. In a "checked" or cracked finish surface, small breaks occur in the lacquer, whereas, lacquer shrinkage merely sinks into the pores of the wood without breaking.

To refinish a lacquer shrinkage surface, proceed as follows:

1. Spread a small quantity of rubbing compound on the finish of the affected section of the cabinet and rub the surface evenly with the grain of the wood. Use the felt rubbing block moistened with cabinet or wax-base furniture polish. The rubbing operation should be continued until the surface finish appears smooth when the compound is wiped off.
2. Wipe the finish surface clean of the compound and then apply the polish, rubbing briskly to obtain a high lustre.

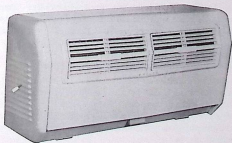
METHOD FOR USING BURN-IN WAX AND KNIFE

Materials required: Assorted shades of burn-in wax; burn-in knife, alcohol torch, Sterno heater or an electric hot plate.

The first step in filling holes, scratches and dents is to select the shade of burn-in wax that matches as closely as possible the color of the cabinet finish to be repaired. Do not select a stick of burn-in wax that is darker in color than the finish to be repaired. Always use a lighter shade of wax, as it can be stained after burn-in to match the finish.

To burn-in any injury, proceed as follows:

1. Heat the burn-in knife. At the same time, hold the selected stick of burn-in wax near the heat source in order to warm it up, which will cause the wax to flow more freely when the hot knife is applied.
2. When the knife is hot, apply it to the wax stick and remove a small quantity of wax.
3. Fill the scratch, hole or dent with the wax, pressing it well into the spot to be repaired and then smooth it out evenly. It is often necessary during the filling-in and smooth operations to heat the



knife several times before this portion of the repairs is completed. Care should be exercised also, to make sure the knife does not become too hot, as it will blister or burn the finish around the spot being repaired. A knife that is too hot will also burn the wax, possibly result in a change of color and a poor burn-in job. The knife should be heated sufficiently to cause the wax to flow onto its flat surface and into the surface of the cabinet to be filled.

4. After filling the damaged section with wax, it should be smoothed down as much as possible with the hot knife and the surface then rubbed down with sandpaper and rubbing compound until smooth.
5. After filling a spot with burn-in wax, it may be found that the wax will have to be grained in order to match the grain of the wood.

To put a grain in the wax, mix a little bismark brown with chrome orange powder, using a little lacquer for mixing. These colors can be mixed to get the proper shade of brown to match the walnut finish. With the shade and mixture ready for graining, apply with the pencil point brush and blend into the burn-in to conform with the natural run of the wood grain.

MIXING POWDER STAINS

Air Conditioner cabinets are finished in shades that can be considered as being either light or dark walnut. Any shade of walnut can be produced by mixing spirit powders, such as nigrosine black, bismark brown and chrome orange in the proper proportions. These powder stains can be mixed in either white shellac or clear lacquer depending on finish requirements. Powder stain mixtures are generally used in cabinet repair work to match the finish around sections that have been worn through to the wood, matching the burn-in wax or filled in sections and touching up small and inconspicuous injuries to the finish.

To produce any shade of brown walnut, place a small pinch of "chrome orange" spirit powder on a piece of paper. Now, wet the pencil point brush in the shellac or lacquer, and dip it into bismark brown powder. Then mix this color with the chrome orange powder on the paper until the desired shade is obtained. The small quantity that adheres to the brush when dipped in the powder should be sufficient for mixing. When mixing any of these powders, use very small quantities.

If a very dark or mahogany finish touch-up is required, the "nigrosine black" powder should be mixed with the "chrome orange" powder. The proper mixing of these two shades of stain colors will produce all shades for touching-up mahogany finished Air Conditioner cabinets and furniture.

IVORY-FINISHED CABINETS

The ivory-finished window-model air conditioner cabinets are constructed of bleached walnut wood sections with a steel panel insert in the front that is finished with baked-on high-gloss ivory Dulux.

For refinishing and touching-up of ivory finished wood air-conditioner cabinet sections, the procedure would be the same as outlined above for walnut-finished wood cabinets. The following materials are recommended:

WOOD TOUCH-UP MATERIALS FOR IVORY CABINETS

Clear Gloss Lacquer (For Spray)
Burn-in Wax (Shaded Ivory Sticks)
Burn-in Knife
White Shellac
Lacquer Thinner
Cheesecloth
Rubbing Compound
Steel Wool (Grade 4/0)
Pencil-Point Brush (No. 6)
Clear Gloss Lacquer (For Brush)
Burn-in Lamp or Hot Plate
Lacquer Flow Brush (1" Width)
Alcohol (For Thinning Shellac)
White Lacquer Toner (Gilbert Spruance No. TL-4436)
Rubbing Oil
Felt Rubbing Block (2"x1")
Sandpaper (No. 400 Waterproof)
Cabinet Polish
Polishing Cloth

MATERIALS FOR IVORY-PANEL TOUCH-UP

Depending on the extent of the damage to the cabinet front panel insert, it is considered best practice in the field to patch or touch-up those panels which have been only slightly marred or scratched. If the panel has been severely damaged, it should be removed and given a complete treatment for scratch and dent removal and then resprayed. Scratches in the finish can be removed by feather-edge sanding, while surface dents will require hammering-out before sanding and respraying. If the steel panel is damaged beyond possible repair, touch-up or refinishing, parts as listed under "Ivory Front Panel Replacement" should be installed.

The following materials are available through local distributors of E. I. Du Pont de Nemours & Company.

233-1088 Duco Primer Surfer
3675 or 3614-G Duco Thinner
Ivory Duco 246-P704-P52636

PREPARATION OF THE PANEL AREA FOR TOUCH-UP

For a linear scratch, sand the surface lightly along the scratch with No. 400 waterproof sandpaper, either dry or wet with residue-free naphtha, until the finish at the edge of the scratch is very thin. Every precaution should be taken so as not to make the area larger than necessary. Finish sanding with a light rotary motion along the edges of the scratch to smooth it down to a feather-edge.

For a round spot, sand as above, but use a rotary motion only.

For edges and corners, a straight sanding motion should give a feather-edge; sand very lightly on edges and corners, as the cutting is more rapid on smaller surfaces.

A glue-sized sandpaper should never be used in any of the sanding operations where Dulux finishes are concerned, because particles of the glue will be detrimental to the durability of the final finish. It is also preferable to use a type of sandpaper with light-colored abrasive because sand particles ground into the finish will be covered more easily. After completing the sanding operation, clean the area to be repaired with a clean cloth dampened with oil-free naphtha. In this operation do not confine the cleaning to the damaged spot alone, but take in a wide margin of the area around the spot.

SMALL DUCO LACQUER TOUCH-UP

The following procedure is recommended for the application of small lacquer touch-up patches to Ivory front panels:

1. If the metal is exposed, apply one or two coats of 233-1088 Duco Primer Surfacer. When two coats are used, allow about five minutes between coats. The primer-surfacer should be reduced in the ratio of 150 to 200 parts of 3675 or 3614-G Thinner. No primer-surfacer should be used unless metal is exposed.
2. Allow the surface-primer material to dry for one hour or force dry for 20 minutes at 160 degrees F. with a spot electric heater.
3. Sand the primer surfacer with the No. 400 sandpaper, either dry or wet with oil-free naphtha.
4. Apply by spraying two or more coats of Ivory Duco 246-P704-P52636, allowing a 15-minute interval between coats. The Duco should be reduced 100 parts to 150-200 parts of 3675 Thinner or 3614-G Thinner. Overspray should be avoided insofar as possible. For best results, use the touch-up gun with the nozzle adjusted to give a fine cone-shaped spray with an air pressure of 20 to 30 pounds. A liberal application of 3675 or 3614-G

Thinner should be applied after the final coat to dissolve spray dust.

5. Allow the patch touch-up to dry thoroughly before polishing, otherwise abrasive particles will be grounded into the soft Duco film and affect the color surface finish of the patch. For thin patches allow one hour drying time.
6. To remove spray dust, use du Pont VZ-4081 Rubbing Compound No. 7 Paste Cleaner, No. 7 Polish, or zinc oxide and water, depending upon the coarseness of the spray dust and harshness of the abrasive necessary to accomplish removal. The above abrasives are listed in the order of decreasing cutting power. A patch touch-up of good appearance is obtained by keeping the spray dust at a minimum during the spraying operation so that very little rubbing is required.

BRUSH TOUCH-UP OF SMALL SCRATCHES AND MARS

Brush touching-up of small scratches and surface mars may be made with the pencil point brush. Use Ivory Duco for this purpose.

COMPLETE PANEL RESPRAY

If the damaged area of the panel is large, the preferred method of refinishing is to spray the entire panel with 246-Line Duco, specification P704-P52636. The surface should be prepared in the same manner as for touch-up patching. If the metal is exposed, one or two coats of 233-1088 Duco Primer Surfacer should be applied. The complete panel should be sanded and one or two coats of Ivory Duco applied. In this operation the Duco should be reduced 100 parts of Duco to 100-150 parts of 3675 or 3614-G Thinner. After drying thoroughly, the Duco may be buffed with a sheepskin wheel or polished with polish to increase the lustre. Philco Refrigerator Polish, Part No. 8020-3, is ideal for the purpose.

DISCUSSION OF DUCO COLOR CHANGES

It is recognized that all organic finishes, particularly whites and light tints such as ivory, undergo certain changes in color over extended periods of exposure. At the present time Duco Dulux Ivory Baking Enamel is more resistant to such normal color changes than any organic coating for metal finishing known. The color changes which this finish passes through are somewhat different than other metal finishes. During the early periods of exposure it shows the distinct bleaching to a more white tone.

This takes place within a few hours in bright sunlight but may require several weeks' exposure in diffused light. Subsequently, the finish shows a gradual color change

from ivory to yellowing which is less marked than with other finishes with which we have had experience. Because the finish does undergo slight changes under certain conditions, and because questions frequently raised on this point, particularly by customers, dealers and servicemen, a general discussion of our observations of normal color changes is given herewith:

1. Keeping the ivory finished cabinet and front panel wrapped in paper in the shipping carton for long periods of time, where penetration of natural light is poor and there is no free circulation of air around the finish, is conducive to good retention of original color. Care should be taken to see that the entire cabinet is covered with paper or wrapping to prevent irregular discoloration by exposure to both light and darkness.
2. Normal slight yellowing can be expected if the cabinet is placed in direct or diffused sunlight for long periods of time. The degree of yellowing depends on the intensity and source of light and length of exposure. Moist conditions appear to accelerate normal yellowing.
3. Abnormal yellowing is definitely accelerated by household ammonia, alcohol, smoke and grease fumes.
4. The conditions most conducive to normal yellowing is storage in a dark room where there is free circulation of air around the cabinet. If such storage is absolutely necessary the cabinets should be kept uniformly tightly wrapped with paper or other suitable wrapping material. Any slight yellowing which does occur can be bleached out by exposure to direct sunlight.

STAINING BY HOUSEHOLD POLISHES AND WAXES

Ivory finished air conditioner cabinets and Dulux panels naturally receive occasional slight surface marks

during installation and while in the hands of distributors, dealers and owners. These can usually be removed by proper selection of clean polish. Philco Refrigerator Cleaner and Polish is specially formulated to clean, protect the surfaces of Dulux finishes, and help maintain a lustrous spick-and-span appearance. From your Philco Distributor, order by Part No. 8020-2.

Many common household polishes and waxes contain dye or some other ingredient harmful to either a Duco or Dulux finish. When these polishes and waxes are used on natural wood and colored finishes, the dye or other ingredients have little or no effect. If used on white refrigerators or ivory cabinets surfaces they may seriously affect the finish which cannot easily be corrected.

IVORY FRONT PANEL REPLACEMENT

From your Philco Distributor you can order and obtain panel replacement parts to facilitate fast ivory cabinet panel repairs. Order Panel Assembly, Part No. 4515-2, which includes:

- 1—Part No. 4527-3 Finished Ivory Front Panel.
- 1—Part No. 4581-5 Plywood Panel Insert.
- 1—Part No. 4577-3 Panel Insulator.
- 11—Part No. 1W2478FA2 Assembly Screws.

Working from the rear of the air conditioner cabinet, locate the panel flanges and remove the 22 slotted-head screws which hold it in place.

Prepare the replacement panel, exercising care during assembly so as not to damage the finish surfaces at the front.

Install new panel through rear of cabinet and replace all wood screws.

After installation, polish entire panel with Philco Polish 8020-2 and the cabinet with Philco Polish, Part No. 45-1175.

PHILCO



SERVICE

Shop Practices and Service Techniques

REFRIGERATION

NOVEMBER, 1951

AIR CONDITIONING WINTERIZATION

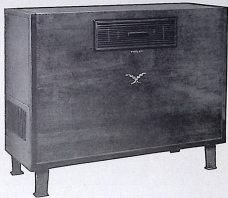


FIGURE - Model 100GC

The coming of winter again causes our flourishing air conditioning installation and service business to fall into its normal winter slump. Therefore, we must look to greener pastures for additional revenue to carry our service organization over to the next air conditioning season. What better way could this be achieved than to do preventative maintenance, on equipment that will be laying dormant through the winter months. Now is the time to think about an Air Conditioner Winterization Program.

1. To usefully employ air conditioning personnel during an otherwise slack season.
2. To increase parts profits for necessary replacement.
3. To reduce summer service calls to a minimum during the busy air conditioning sea-

son, due to competent servicing by your own men.

4. Re-installation in the customer's home can be done at your convenience early next season.
5. The useful service life of the unit can be prolonged by proper preventative measures, handling and storage.

With the frost on the ground and a bitter nip in the air, many air conditioner owners are asking themselves, "What am I going to do with my Air Conditioner for the winter?" Now you are in a perfect position to answer this question for them. By reviewing your installation and service records you will find many prospects for:

1. The sale and installation of a Philco Air Conditioner Cover.
2. The removal of the Air Conditioner from the installation point, clean the equipment and replace the filters. Leaving the air conditioner in the room for re-installation.
3. Removal of the unit from the point of installation, clean and oil necessary lubrication points, do minor preventative maintenance such as cabinet repairs, replace filters, and move the unit to a storage point on the premises.
4. Remove the air conditioner from the point of installation, truck to your service shop for the complete overhaul, cleaning and installation of new filters and storage in your warehouse space for re-installation before May 31, 1952.

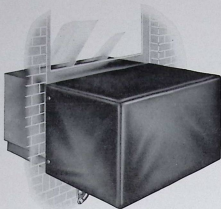


FIGURE 2 — Air Conditioner Cover

THE PHILCO AIR CONDITIONER COVER

This all weather cover protects that portion of the air conditioner that projects out of the window. It prevents drafts through the unit, and keeps it clean during the winter months when it is not operated. These covers are made of heavy gauge water repellant vinylite of a reddish brown shade. They are supplied in two sizes, one for use on 1950 and 1951 Philco Air Conditioners and another size for use on our older model air conditioners. Both covers can be used on many other make air conditioners.

AD-1688 — For use on "F" and "G" model Philco Air Conditioners and many other makes.

AD-1689 — For use on older model Philco Air Conditioners and many other make units.

CAUTION

The Air Conditioner should *never* be operated with a protective cover on it, this will result in damage to the unit assembly. When a cover is placed on the exposed portion of a system the plug should be removed from the electrical outlet and have a warning tag attached to it.

To make a complete and thorough inspection of the air conditioner and all of its components, the

top cover and side panels should be removed, and the following parts checked:

CONDENSER AIR FAN SCROLL ASSEMBLY

The fan scroll assembly is constantly subjected to contact with water and will have a tendency to rust after having been used over a period of time. Should the inspection disclose the assembly to be badly rusted, particularly in the bottom portion, the complete scroll and both end plates should be replaced.

EVAPORATOR AIR FAN SCROLL ASSEMBLY

This assembly is subject to conditions similar to those of the condenser scroll assembly. If an examination shows any of the metal surfaces deteriorated beyond repair, the complete scroll assembly should be replaced, as any air leaks in this assembly will greatly impair the cooling efficiency of the air conditioner.

TUBING

Connecting tubing because of its wall thickness of .035" must be carefully inspected for corrosion or deterioration, not only the exposed portions but also those sections covered with rubber insulation. After the tubing has been inspected and all corrosion has been cleaned the rubber insulation should be replaced. Use rubber tape (not friction)

around all portions that have been opened, and seal the ends of the rubber insulation in place on the tubing by applying a sulphur free waterproofing compound having good adhesive qualities. This will prevent sweating caused by temperature variations within the air conditioner.

CONDENSER AND MOUNTING

Inspection of this assembly may reveal a deterioration of the fins at the bottom of the condenser. In most cases, after the unit has been removed from the housing, the affected portion of the fins can be trimmed off and the exposed metal treated with a good water proofing paint. Before re-installing the unit in its housing, straighten any bent fins and remove all dirt, dust, lint or rustscale that may be lodged between the condenser fins, any restriction will affect the efficiency of the condenser.

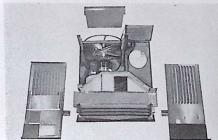


FIGURE 3 — Fan Base and Side Panel Assembly

EVAPORATOR AND MOUNTING

The evaporator assembly is subject to similar conditions as those encountered in servicing the condenser. Treatment for rust and corrosion should be done by following the instructions as outlined under "CONDENSER AND MOUNTING". Field experience indicates that, because of its functional location within the air conditioner unit, the evaporator assembly seldom requires extensive preventative maintenance.

UNIT BASE ASSEMBLY

The base assembly, because of its construction, will seldom if ever, require replacement. However, in certain areas where the humidity of the

air is of a very high percentage through the year, the accumulation of condensate moisture may be such as to remain at its maximum in the sump pan, never allowing the slinger fan or wheel and condenser to dispose of the water accumulation in the sump. It is possible in cases of this kind that the water accumulated in the pan, with the addition of air borne chemicals extracted from the air may have a tendency to cause deterioration of the protective point and form rust deposits which will flake off the metal in crusts, exposing larger areas of the metal to direct contact with the condensate water. The remedy in this case is to disassemble the unit by removing all the components and remove the rust deposits by sandblasting or scraping. The base should then be re-finished with a good water-proof paint before rebuilding the air conditioner. Should the cleaning operation reveal large pits, they should be examined very carefully to determine whether or not they can be filled or if it is advisable to obtain and use a replacement sump pan assembly.

UNIT ENCLOSURE PANELS AND SCREENING

The unit enclosure panels seldom, if ever, require replacement due to deterioration. The side panels may have small rust spots or rust scale accumulations which can easily be removed. The left side panel should be inspected at the screen and covering the open air louvers. The screen, being of a fine mesh, may become clogged with rust, dirt, dust and insects. The rear rain hood panel and screen assembly on older models may require replacement from time to time, because of its location outside the window, being exposed directly to the elements, and it being exposed to the water vapor being discharged through the condenser. It is important that the screening across the bottom of the hood be clean and in good condition. Screening wherever located serves the purpose of filtering the air entering the unit so that insects, lint, and other large dust particles are not drawn into the air conditioner, where, depending on the setting of the controls, it might be possible to gain entrance into the room through the air discharge.

TREATMENT OF RUST AND CORROSION

In instances where the inspection of a unit discloses that one or more parts are rusted or corroded to such an extent that they have failed, or will probably fail in the near future, the necessary replacement parts should be procured and installed.

Should the inspection reveal extensive rust accumulations, or the necessity of replacing several parts, it is advisable to rebuild the unit.

Metal surfaces that are not rusted or corroded beyond repair can be treated and refinished as directed below.

REMOVING RUST AND CORROSION

Small rust spots or corrosive spots on component parts can be removed by using steel wool, sandpaper, or a wire brush. Where the rust or corrosion is extensive, or deeply imbedded, use coarse sandpaper and a wire brush. After the sanding operation, use a rust remover to obtain a completely clean surface. There are several good rust removers on the market and they can be obtained at any reliable hardware or paint distributor. Carefully follow the instructions packed with the rust remover. Usually, the instructions cover only the use of the rust remover on flat surfaces. When it is used where there is a possibility of it being trapped and retained, such as in the corners of the unit base, particular care must be taken to be sure the rust remover is completely cleaned from the surface before painting. After the rust remover instructions have been followed, and the rust is removed, the entire area should be washed with a solution of 50% denatured alcohol and 50% water. This will clean off any rust remover which may still remain on the surface or in any crevices. Wipe the surface as dry as possible and blow compressed air on and around the cleaned surface.

REFINISHING

After the part or parts have been properly cleaned and dried, the exposed surfaces must be covered with an odorless protective paint. In addition to the surfaces from which rust and corrosion have been removed, apply the paint to all metal surfaces from the bottom of the unit base to ap-

proximately 1½" above the base. The paint used should have good waterproofing, quick-drying, and good adhesive qualities. These protective paints can be obtained at any hardware or paint distributor. Carefully follow the instructions supplied with the paint, and if more than one coat is required, allow sufficient time for the paint to dry properly before applying the second coat.

To improve the overall appearance of the unit, a finishing coat of duco laquer can be applied over the protective paint.

ROOM AIR FILTER

Dirty air filters reduce the cooling efficiency of an air conditioner and often effectively hamper ventilation, condensate disposal, and proper mixing of outside air. The filters on all air conditioners are easily accessible and should be checked for free air passage through them.

FAN MOTOR DRIVE BELTS

To insure long life and satisfactory operation of the belts, the motor pulley and shaft pulley must be exactly aligned with the pillow blocks properly set, and the belt must be under the proper tension. The outside faces of the motor and shaft pulley must be parallel with the belt grooves in alignment. With "proper tension", a belt should have about ½" sag when thumb pressure is applied half way between the two pulleys. Shifting the motor base on the mounting plate will permit an adjustment for correct tension.

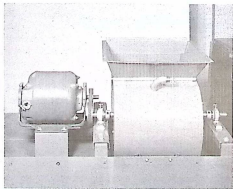


FIGURE 4 — Base, Motor, Pulley, Fan, and Housing Assembly

PHILCO



SERVICE

Shop Practices and Service Techniques

REFRIGERATION

DECEMBER, 1951

SERVICING THE PHILCO REFRIGERATOR

It is time again for the salesman to look to the new redesigned merchandise for information to augment his sales ability, but we of the Service Division and service business, who are the secondary salesmen, must continue to improve our knowledge of the products that have been sold and installed in the consumers homes. We must continue to look for quicker and more efficient means of returning an inoperative piece of equipment to economical service. Even though our business is dependent on the salesman's ability to convince a customer he or she is buying the right piece of equipment for their needs. We are the people who do the real selling by assuring the customer that they haven't made a mistake in buying a piece of equipment which they are unable to have service maintained on in an emergency. It is a compliment to you, the Service Man, that the Philco Corporation has sold and will continue to sell many thousand refrigerators, freezers and air conditioners.

Salesmanship is a very complex and complicated trade. The salesman meets each customer and sells them one piece of equipment for their home. If that piece of merchandise is among the very small percentage that fails in a short period of time, it is the serviceman who re-installs the customer's confidence in the manufacturer, and indirectly assists in the sale of many pieces of merchandise.

Word of mouth advertising is still and always will be the best advertising scheme available. A satisfied customer will oftentimes praise a product that they have purchased, providing it is doing the job it was meant for. But if that job is not being done, you can be sure that many more ears will hear a sad, sad, story that will be detrimental to further business.

Philco Factory Supervised Service has in the past and will in the future, endeavor to augment your knowledge of Philco products so that you will be in a better position to render quick, efficient and economical service on any refrigerator, freezer or air conditioner in your territory.

In accordance with our policy of informing you of the latest developments and changes made in Philco Products we have compiled here a few of the changes that will effect the servicing of our products.

ALTERNATE TEMPERATURE CONTROL FOR FREEZER MODELS EH-121 AND FH-81

It has become necessary to use an alternate temperature control in Freezer Models EH-121 and FH-81, be-

cause of a shortage of the standard type. This is a temporary measure, and will effect approximately 6000 freezers. This control differs from the standard type in that it is in two parts; the switch (a 3-position toggle type) is separately mounted. The use of the alternate control resulted in the following production changes:

1. A stamped aluminum escutcheon plate is placed over the standard escutcheon plate, covering it in cases where it may be required for future repairs.
2. A special chrome nut was used for mounting the toggle switch.
3. A switch mounting plate was used, because the hole in the control mounting bracket is too large to accommodate the toggle switch.
4. A new bell-wiring harness and a new switch lead wire used to connect the switch.

If the alternate control must be replaced, use the standard temperature control, Part No. 5530-83. To remove the alternate control switch, proceed as follows:

1. Remove and discard the special chrome nut.
2. Remove and discard the bell-wiring harness.
3. Remove and discard the stamped aluminum escutcheon plate.
4. Remove the toggle switch.
5. Remove all leads from the toggle switch.
6. Remove the switch mounting plate.
7. Replace the standard escutcheon plate.

The alternate temperature control is mounted at the rear of the motor-compressor, on a bracket held in place by one of the compressor mounting bolts, to remove the alternate control, proceed as follows:

1. Remove the control mounting bracket.
2. Remove the alarm lead from the control (this lead is part of the bell-wiring harness).
3. Remove the switch lead from the control.
4. Remove and discard the lead between the control and the terminal block.
5. Remove the control.

The procedure for installing the standard temperature control is given in PR-1922-B. When replacing the alternate temperature control with the standard type, the following additional steps are necessary:

1. Use the switch lead, to connect the standard control to the terminal strip.
2. Install wiring harness Part. No. 6258-4, in place

of the alternate bell-wiring harness that is used on the alternate switch assembly.

NOTE: Wiring harness Part No. 6258-4 must be ordered along with the standard control if the standard control is to replace an alternate control.

FREEZER CONDENSER FAN MOTOR REPLACEMENT FOR FREEZER MODELS EH-121 AND FH-81

Both freezers manufactured this year by Philco use a small fractional horsepower General Electric fan motor for condenser cooling. These motors are warranted by General Electric for a period of one year from the date of installation of the freezer in the customers' home. Should the fan motor fail within this period of time, as a result of normal usage, they will be replaced, no charge, by the General Electric Company. The part numbers of these motors are as follows:

	PHILCO PART NO.	G. E. PART NO.
MODEL EH-121 Condenser Fan Motor	5104-5	5KSP51AL35
MODEL FH-81 Condenser Fan Motor	5104-6	5KSP51AL23

When turning in the defective motor to our distributors, you will fill in completely Warranty Material Return Tag Form PR-1126.

The exchange plan listed below applies to the motor only. **WHEN RETURNING A MOTOR IT SHOULD HAVE THE BRACKET, MOUNTING SCREWS, FAN AND FAN SPEED NUT REMOVED.**

The General Electric exchange plan on these motors is as follows: When the motor fails within the one year period, as stated above, it should be turned over to your Philco Distributor to be tagged with a General Electric Motor Repair or Replacement Tag, Form #FM-174 and sent to the nearest motor exchange depot. Our Philco Form #PR-1126 will be retained by the distributor for record purposes.

If a motor should fail after the one year warranty period, General Electric will bill you through the distributor for replacement costs. All replacement motors carry a full new motor warranty.

When installing a replacement motor in these freezers, make certain that the motor mounting bracket is not bent and that the motor shaft is not below horizontal. This can be checked with a small pocket level. The replacement motor should be installed with the leads leaving the motor housing from the top. This is important for proper oil circulation within the motor.

The distributor will endeavor to maintain a small stock of these motors on hand at all times and by following the above exchange plan, you will receive prompt service and motors can be replaced with a minimum of delay.

AIR CONDITIONER UNIT REPLACEMENT PART NUMBERS

Due to incorrect part numbers listed in the 1951 Air Conditioner Service Manual, PR-1926-A, there has been some confusion regarding replacement unit shipments.

The following correction should be made on Page 7 of the Specification Section covering the 100-GC Air Conditioner.

Replacement unit part number 4010-38 should be 4010-14.

Replacement unit part number 4010-39 should be 4010-31.

It is imperative that the above correction be made on the Specification Sheet or this bulletin inserted in the Service Manual for permanent reference.

If units are ordered by the incorrect part number, it requires a great deal of time and expense to rectify the error, not to mention the additional delay of a unit urgently needed.

OPERATION OF PHILCO AIR CONDITIONERS ON 208 VOLT, 60 CYCLE POWER

The only "G" model Philco Air Conditioner designed and manufactured specifically for operation on 208 volt power is Model 100-GC-19. Model 75-G-11, the ¾ H. P. window model designed for 230 volt, 60 cycle operation, may be operated on 208 volt, 60 cycle power by installing an additional capacitor, between terminal No. 2 of the starting relay and terminal No. 4 of the control switch.

The additional capacitor, Part No. 4270-20, is the standard running capacitor, as used on 1950 and 1951 model 1 H. P. air-cooled consoles. The small bracket by which the capacitor is attached to the side of the bottom pan, is an integral part furnished with the capacitor. Two leads, approximately 8" long, are furnished also. It is necessary to remove the eyelet from one of the capacitor leads and skin back the insulation from both leads 1" from the end. Two additional pieces of #18 gauge stranded rubber insulation wire should be connected to the capacitor leads from the switch and relay terminals shown.

It is recommended that the wire joints be made using a standard soldered splice. In order to have the installation of this part comply with Underwriters Laboratory specifications, the spliced joints should first be taped with electrical rubber tape. This in turn should be over-wrapped with friction tape.

MODEL 100-GC-11

The 230 volt, 60 cycle 1 H. P. console may be operated on 208 volt, 60 cycle power through a G. E. Buck-Boost Transformer, G. E. Part No. 61 G 69. When connected to 208 volt, 60 cycle power, this transformer will deliver proper outlet voltage for operation of the air conditioner. Wiring instructions are furnished with the transformer.

MODELS 150-FCW, 200-FCW AND 200-GCW

The 1½ and 2 H. P. water-cooled air conditioners manufactured last year and the 2 H. P. model manufactured this year may all be operated on 208 volt power by connecting them to a G.E. Buck-Boost Transformer, G. E. Part No. 61 G 70. This transformer, when connected to a 208 volt power supply, will deliver 230 volt output to the air conditioner. Wiring connections should be made according to the diagram furnished with the transformer.

REDESIGNED DEFROST HEATERS FOR DUPLEX REFRIGERATORS

Both the upper and lower defrost heaters used in early production of Models F-818, F-1018 and F-1218 refrigerators have been redesigned to achieve better automatic defrost performance.

The below tabulation shows the old and new part numbers of top and bottom heaters.

Top Heaters

MODEL NO.	OLD PART NO.	NEW PART NO.
F-818	6474-4	6474-10
F-1018	6474-5	6474-11
F-1218	6474-6	6474-12

Bottom Heaters

MODEL NO.	OLD PART NO.	NEW PART NO.
F-818	6474-1	6474-9
F-1018	6474-2	6474-7
F-1218	6474-3	6474-8

All Model F-818 refrigerators manufactured have the old top and bottom defrost heaters. All Model F-1218 refrigerators have the old top heater. 1218's starting with serial number 1GA110032 have the new type bottom heater installed. The serial plate style block of these refrigerators will show the letters PD. All Model F-1018 refrigerators manufactured in Philadelphia have the old top heater installed. (Philadelphia models can be identified by the letter "P" in the style block preceding the second letter). Models F-1018 manufactured in Philadelphia starting with serial number 1FH104126 have the new type bottom heater. These can be identified by the style letters "PC" appearing in the style block of the serial plate. All 1018's manufactured to date in Connorsville have the old type top heater. Connorsville production of this model starting with serial number 1FE110026 have the new type bottom heaters installed. These can be identified by the letters "RC" in the style block of the serial plate.

Both the top and bottom heaters are longer than the previous types and they are completely interchangeable. It should be noted that the heat deflectors are no longer needed with the new type bottom heaters.

To assure contact with the top plate of the evaporator, the flatness of the top heater should be checked before installation. This can be done by laying the top heater on a flat surface, such as a smooth desk or table top. Should any warpage be apparent, the elements should be carefully bent so that it contacts the flat surface at all points. Before installing this top heater, the grommets should be slipped over the ends. These can be positioned against the inner cover plate after installation.

The wiring connections at the ends of both top and bottom heaters should be covered with Scotch electrical tape, similar to that used in production. The tape should cover only the rubber plug and not be wrapped around the ends of the element sheath. When installing the top heater, any ice remaining on the top of the evaporator top plate should be removed and the plate thoroughly dried.

DUPLEX REFRIGERATORS — REDESIGNED DEW POINT COMPENSATOR

The center rail heater used in early production of Models F-818, F-1018 and F-1218 Refrigerators has been re-designed. The heater used in early production refrigerators was a dual six watt element. The new re-designed heater is a single element which has a 12 watt rating.

Listed below are the old and new part numbers for the dew point compensator.

MODEL NO.	OLD PART NO.	NEW PART NO.
F-818	6490-2	6490-17
F-1018	6490-3	6490-18
F-1218	6490-4	6490-19

DEFROST THERMOSTAT OPERATIONAL CHECK

For best defrost performance it is necessary that the thermostat be set at its highest point of efficient operation which is 53°F.

All F-818 Model Refrigerators shipped from the factory have their thermostats pre-set at 53°F. All Model F-1018's which have stamped on the style block of the refrigerator serial plate the letters RB, PB, or better, such as RC or PC, have the thermostats pre-set to a cut-off temperature of 53°F. All Refrigerator Models F-1218 with style letters PB, or better, have been pre-set at the factory for 53°F. A very few Duplex Refrigerators have a low setting of 43°F and should be checked for the proper cut-off defrost thermostat temperature. If there is doubt as to the temperature setting of the defrost thermostat, the following procedure is recommended for test purposes.

Equipment

One thermometer (etched stem type)

One can of thermal-mastic compound, Philco Part No. 8902-9 (this thermal-mastic conducting seal is used in the AV-75 Philco Freezer to cause a temperature transfer to the secondary refrigerator system.) (PERMAGUM CANNOT BE USED FOR THIS PURPOSE)

One watt meter

With the refrigerator operating and stabilizing an evaporator temperature of approximately 0°F, insert the thermometer in a small portion (one or two ounces) of thermal-mastic compound and affix to the wall of the evaporator. Hold the thermometer in a horizontal position by resting on an ice-cube grid or support it in some other convenient manner. It should be affixed to rear righthand side wall in close proximity to the point of contact of the Thermostat Feeler Tube Clamp. The thermometer should be located in such a manner that the scale can easily be read. The use of a flashlight may be necessary to assist in reading the thermometer scale.

TEST PROCEDURE

1. Install the watt meter in the A. C. line, plug the refrigerator into the watt meter and check the evaporator temperature (if the test is being made on a new refrigerator it will be necessary to

operate the refrigerator until the evaporator temperature is drawn down below 23°F, to actuate the thermostat and close the switch contacts.

2. Manually rotate the defrost clock control clockwise to 1 A.M., then slowly advance the control to the point where the defrost heater draws the current, as observed on the watt meter. This will occur at approximately 2 A.M. on the clock. The indication on the watt meter will be shown by the heater elements drawing between 800 and 1,000 watts at the start of the defrost cycle.
3. Permit the defrost cycle to continue automatically through its heat cycle. Within a period of 12 to 15 minutes the defrost thermostat should cut-off the heaters.
4. Observe the watt meter to determine the end of the heat cycle which will be indicated by an excessive drop on the watt meter. Immediately take a reading of the thermometer which is embedded in the thermal-mastic compound.

If the above check as indicated by the thermometer reading shows that the thermostat has a cut-off temperature of 43°F, it is of the early production type and should be re-calibrated at 53°F.

All current production refrigerators should have a cut-off temperature of 53°F at the end of the heat cycle.

DEFROST THERMOSTAT BENCH ADJUSTMENT

Equipment

One Test Bath Tank (A large crisper pan makes an ideal bath container)

One Thermometer (Preferably of the etched stem type)

One Test Cord (A simple test cord should be made up using a low wattage lamp, connecting it in series with the thermostat to indicate the cut-on point and the cut-off point and also the continuity of the thermostat switch contacts).

A fixed temperature bath of 53°F can be made up by using a large crisper pan, fill the pan with luke warm water to a level of 4" or 5", add ice to the water to draw the temperature down to 53°F. Water should be stirred to give an even temperature in the bath. After temperature has been reached, remove the ice or isolate with a piece of screen so that the Feeler Tube of the thermostat to be calibrated does not come in contact with it. Temperature should be maintained throughout the test period.

ADJUSTMENT PROCEDURE

1. Connect the control to be reset in series with the test cord.
2. Increase the temperature adjustment screw on the thermostat, until the control is activated to close the circuit and light the test lamp at the room temperature.

3. Immerse no less than 6" of the Feeler Tube into the test bath for a period of at least one minute to stabilize the Feeler Tube temperature.
4. Slowly decrease the temperature adjustment screw on the thermostat until the control is activated to open the circuit and turn the test lamp off. At this point the control will be adjusted to approximately 53°F.

For adjustment of the control Part Number 5604-1, which is supplied by Cutler Hammer, turn the temperature adjustment screw counter-clockwise to increase temperature.

For control Part Number 5604-2, supplied by Ranco, turn the adjustment screw clockwise to increase temperature.

DOOR END PANEL

We have received numerous requests from the Field for the part number of the scuff plate, which covers the top of the refrigerator compartment door on all Duplex Refrigerators. The proper description for this part is **DOOR END PANEL**.

MODEL NO.	PART NO.
F-818	6353-1
F-1010	6353-2
F-1218	6353-3

PERIODIC CLEANING OF DUPLEX REFRIGERATORS

Although the two-door refrigerator models manufactured by Philco this year incorporate a complete automatic defrost system, it is recommended that periodically the customer "shut down" the refrigerator for a thorough cleaning.

During this time, the customer should clean out both the evaporator and the food compartment with a mild solution of warm water and baking soda. This is nothing more than normal good housekeeping procedure to minimize the possibility of either having spilled or having left small particles of food in the evaporator. For sanitary purposes the evaporator should be cleaned out and wiped dry before again starting the refrigerator. This procedure will serve a two-fold purpose. It will eliminate the possibility of obnoxious odors and also offer an opportunity for the customer to remove any accumulation of small icicles and ice puddles in the interior of the evaporator. These small ice formations are perfectly normal and should be expected as a result of automatic defrosting.

The frequency with which the customer should perform this cleaning operation will be dependent upon usage conditions. We feel that an average of approximately once every two months should suffice.

When complaints are registered regarding the formation of excessive "icicles", the customer should be advised to go through the foregoing procedure. The instruction books accompanying these refrigerators now being shipped have been revised to include a paragraph recommending this periodic cleaning.