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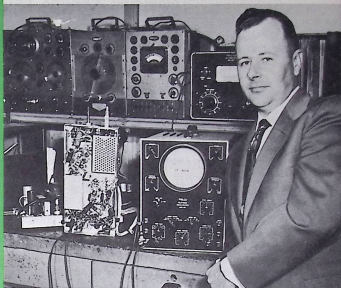
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TELEVISION SERVICE "HINTS AND KINKS"

WE HAVE RECEIVED numerous requests from the service technicians for additional articles containing "Hints and Kinks" on television servicing. The entirety of the following pages contain a compilation of information pertaining to television receivers manufactured within the past year. Most service technicians have a mental file of troubles and fixes for a specific chassis. By matching the type trouble with a certain chassis the technician can quickly isolate the defective component or components whichever the case may be. The object of this article is to assist the technician in this manner and also enable him to have a handy reference of servicing hints and kinks. Information of this type will continue to be published periodically so as to be of maximum usefulness to the service technician.

(Continued on next page)

Television Service "Hints and Kinks"

(Continued from Front Cover)

SOUND BUZZ—TV-70

The following change is desirable in certain areas in the RF's 71 chassis prior to run 13. The following changes should be made:

1. Remove the 12K 1W resistor (33-31243-46) supplying the plate and screen of the 6AU6 SIF tube.
2. Connect a 33K 1W resistor (33-33343-46) from plate and screen of the 6AU6 to B+ 200 volts at the 6V6 audio output tube screen by-pass electrolytic condenser.

BEND AND WIGGLE CHANGES—TV-80

There are changes required in both the RF supply and power supply.

Refer to figures 36 and 37 of the service manual PR-2402 for the H-4 Power Chassis, and PR-2374 for the H-1 Power Chassis. The following changes are required, see figure 1.

1. Replace capacitor C804 with a .001 mfd. 400V condenser part No. 30-4668-35. This condenser was originally a .01 mfd. This has been changed in later production.

2. Remove lead between lug #2 of terminal panel B3 and lug #3 of horizontal centering hold control (R810).

3. Add a longer wire between points mentioned above dressing the wire along terminal panel B3 passing between B3 and B4, continue dressing the lead along B2 passing between B1 and the rear flange of chassis to (R810) horizontal hold centering control.

NOTE: The above changes apply for both the H-1 and H-4 power chassis. The horizontal hold control for the H-4 power chassis is located on the top rear side of the chassis instead of on the rear apron.

Refer to figures 34 and 35 of service manual PR-2374 for the RF-81 chassis and figures 34 and 35 of PR-2402 for the RF-84 chassis. The following changes are required, see figure 2.

1. Remove wire between pin #7 of 12BY7 video output tube and lug #2 of L400.
2. Remove C400 from lug #2 of L400 and wire to pin #7 of 12BY7.
3. Remove wire between lug #2 of L400 and lug #2 of L301.
4. Add new wire between lug #2 of L301 and pin #7 of 12BY7 dressing it around terminal panel B6-4.

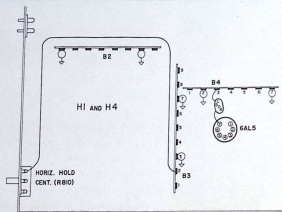


FIGURE 1

5. Remove end of R600 from pin #2 of 6U8 sync amplifier and wire to lug #2 of L400.
6. Add a (.01 400V) capacitor part No. 30-4668-41 from lug #2 of L400 and pin #2 of 6U8 sync amplifier.
7. Add a 1.5 megohm 10% ½ watt resistor between pin #2 of 6U8 and lug #7 of terminal panel B2.
8. Add a 33 mmf capacitor between pin #1 of 6BE6 sync separator tube and lug #1 of terminal panel B2.
9. Replace R306 (100K ohms), wired between lugs 5 and 7 of terminal panel B1, with a 180K, 10%, ½ watt resistor.
10. Wire of 2.2 megohm, 10% resistor between lug #1 of terminal panel B6 and lug #1 of terminal panel B7.
11. Replace R614 with a 27K, 10% ½ watt resistor.

MEDIUM SIGNAL SNOW PERFORMANCE

A reduction in snow in medium signal areas can be achieved by making the following changes. These changes apply to both the RF-81 and the RF-84 type chassis for the TV-80 series.

Refer to the schematic diagram (figure 34 and 35) of the service manual PR-2374 and PR-2402.

1. Resistor R619, a 15 megohm resistor, is changed to 10 megohms + or -10%.

2. Resistor R610, a 330K ohm resistor, is changed to a 470K + or -10%.

3. Resistor R611, a 180K ohm resistor, is changed to 330K + or -10%.

4. Resistor R603, a 22K 2 watt resistor, is changed to an 18K + or -10% 2 watt.

5. Remove grid end of R600 (4700 ohms). Connect a .01 mf 400V capacitor (part No. 30-4650-41) between the end of R600 and pin #2 of the 6U8 sync amplifier tube.

NOTE: It will be necessary to mount a one lug terminal panel near the base of the 6U8 sync amp. in order to support the junction point of R603 and the .01 mf capacitor.

6. Wire a 1.5 megohm + or -10% resistor from pin #2 of the 6U8 tube and pin #7 of terminal panel B2.

PICTURE QUALITY IMPROVEMENT

To correct for objectional following white and possible harshness of picture quality due to television station (in some areas) transmitting signals with over-peaked video, the following change is recommended.

Remove any capacitor that may be wired to pin #1 of 12BY7 video output or the associated lug of the contrast control and a 200 mmf capacitor at the video output socket. Others will have a 100 mmf and 220

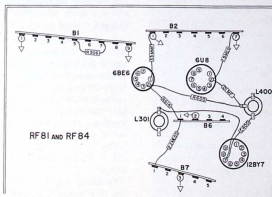


FIGURE 2

mmf capacitor at this socket. And still others will have a 1500 mmf capacitor wired to pin #1 of the video output socket.

IMPROVEMENT OF SOUND PERFORMANCE IN FRINGE AREAS

Improvement in sound performance in fringe areas of TV-80 models can generally be obtained by turning in (clockwise) the I.F. padder located on the tuner, 1 to 2 turns. This padder is designated as TC-512 in Service Manuals. An adjustment made in the above manner will bring up the sound side of the I.F.

In areas where strong signals are received as well as fringe signals, the adjustment should not exceed 2 turns since possibility of deteriorating picture quality might exist.

In extreme fringe areas, further improvement can be made in some cases by adjustment of the secondary of the ratio detector Z400. To make this adjustment, select a weak signal and adjust the top padder (TC-402), on the transformer until the maximum noise-free

signal is obtained. Care should be taken not to introduce audio distortion.

PRE-ASSEMBLED CIRCUIT USED IN EARLY RUN H-1 POWER CHASSIS

A small number of early run H-1 power chassis (PR-2374) contained a pre-assembled circuit in the horizontal oscillator stage. Failure of a component in this assembly requires replacement of the assembly and the parts affected are R800, R804, C802 and C803 as shown on the schematic of PR-2374.

These parts are standard replacement parts obtainable locally and are not listed in the parts list of PR-2374. For the information of the Field, the parts, values and Philco part No. are listed below:

R800—4.7 megohm—66-5478240
R804—4.7 megohm—66-5478240
C802—.001 uf —30-4650-52
C803—.01 uf —30-4650-58

HUM IN TV-80 AND TV-90

Hum in the above models is due primarily to the following three causes.

1. Misadjustment of the hum bucking control on EM speakers.
2. Hum bucking voltage too low on some EM speakers.
3. Hum pick-up by components and wiring in the first audio stage.

The above causes along with their remedy is discussed below:

1. It must be determined that the hum bucking coil is properly adjusted before proceeding to steps two and three of the above paragraph.

2. If it is not possible to minimize the hum with the control, it is due to insufficient hum bucking voltage on the hum bucking winding, the position of the control under these conditions is always in the counter clockwise position.

To correct this condition it is necessary to add about five turns of #22 enameled wire to the hum bucking winding. This winding can be identified near one end of the field coil.

The additional turns are added around the field coil at the end where the hum bucking winding is located.

Disconnect one end of the hum bucking winding, and to it connect the end of the added turns which will make both windings wound in the same direction. Connect the remaining end of the added turns to

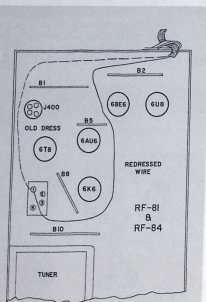


FIGURE 3

the point from which the original end of the hum bucking winding was removed. With the set operating, a position of minimum hum should be found on the hum bucking control. In some few cases it may be necessary to add more than five turns, however, it is desirable to add as few turns as necessary since too many turns make the adjustment of the control more critical.

3. The most serious cause of hum is due to the pick-up by components or wiring of the first audio stage.

The hum is picked up from the B-lead which passes by the 6T8 tube. This lead is a white lead connected to pin #11, of the interchassis cable. This lead should be redressed as indicated in figure 3.

NOTE: It has been a practice in the field to bypass the speaker field with a 500 mfd electrolytic capacitor. Under no circumstances should this fix be used, as this may correct the hum condition, it will however, cause weave to increase from three to four times under non-synchronous operation.

BUZZ-TV-90

There has been some complaint about "hum" or "buzz" in the TV-90 receivers when the volume control is completely turned down. One of the field men located a set with this defect and the trouble was traced to a mistake in wiring at the interconnecting cable socket, J101, on the power chassis. Instead of wiring the fixed bias supply to pin #5 of this socket, it was wired to pin #6, which should BE A BLANK pin according to bulletin PR-2200.

Since both the video output and audio output in the RF chassis are supplied with a fixed bias through the interconnecting cable from the power chassis and depend on C102 (10 uf/50V) to hold the bias supply at signal-ground potential without this connection it is possible for the sync components of the video signal fed to the video output stage to also be fed to the audio output stage. This causes a sync "buzz" (as opposed to a "hum"), which is particularly noticeable at low levels of sound.

This error in wiring is readily identified if the "Buzz" in the sound disappears when the video output tube is removed from its socket. This odd situation is caused by the nature of the wiring and the pin connections on the 6AQ5 tube—pins #1 and #7 are internally connected. Without the tube in the socket

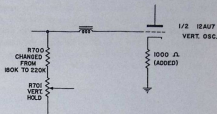


FIGURE 4

and its internal connection, the video at pin #1 will not reach pin #7 and be transmitted through R309 and R414 to the grid of the output stage in the sound section, as it does when the tube is in place.

VENETIAN BLIND FIX

On some of the early J2 and J5 deflection chassis a condition that is sometimes referred to as a venetian blind effect may appear.

This condition usually shows up as a pairing of a group of horizontal lines. At normal viewing these groups of paired lines create a variation in shading in the CR tube picture area, thus, the venetian blind effect. Referring to the schematic of the J2 and J5 deflection chassis in the service manual PR-2471 the changes are as follows; see figure 4.

1. Remove chassis ground from pin #3 of 12AU7 vertical oscillator tube socket and add a 1000 ohm $\frac{1}{2}$ watt resistor (66-2108346), between pin #3 and chassis ground.
2. Change resistor R700, which is wired in series with the vertical hold control, to 220K ohm $\frac{1}{2}$ watt 10%, part No. 66-4228346.

NOTE: Only chassis preceding run #4 for the J2 and run #3 for the J5 do not have the above changes.

SYNC BUZZ IN AUDIO R194-D194 CHASSIS— TV-90

In the R-194 and D-194 chassis, run #3 a sync buzz may be encountered in the audio stages. This buzz is found at times only in the run #3 chassis and is due to the proximity of a lead near the video amplifier stages running to the grid circuit of the first audio amplifier. The particular lead runs from the junction of R-410 and R-415 to R-409 as shown in the schematic of PR-2522, and should be dressed as far away from the video circuits as is possible.

HF-200

ELIMINATION OF BARKHAUSEN OSCILLATIONS IN D-208 CHASSIS

The following changes should be made to eliminate Barkhausen Oscillations in the D-208 chassis:

1. Add a .002 uf—400 volt capacitor, Philco part No. 30-1238-8 of 30-4650-37 between pin #3 and pin #8 of the 6CD6G horizontal output tube. Schematically this capacitor is added from screen grid to cathode of the 6CD6G tube.

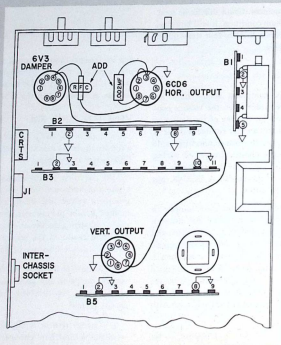


FIGURE 3

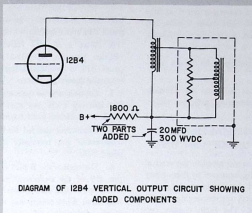


FIGURE 6

2. Remove filament lead between pin #4 of the 6VB damper tube and pin #7 of the 6CD6G horizontal output tube. Disconnect the remaining filament lead from pin #7 of the 6CD6G tube and connect to pin #4 of the 6V3 damper tube. Add a choke part No. 32-4112-51 between pin #4 of the 6V3 damper tube and pin #7 of the 6CD6G tube. Figure 5 is a base layout showing the addition of the above parts.

In some few cases, weak barkhausen lines might still be noticed. Replace the 6CD6G tube in order to remove these lines.

INCREASED WIDTH IN D-208 CHASSIS

Any receivers which indicate insufficient width in models using the D-208 chassis, the following procedure should be used in determining the cause of and elimination of this problem. It is assumed that several new 6CD6G tubes have been tried, and that no improvement was produced.

1. Observe the input to the horizontal output tube, 6CD6G, by connecting an oscilloscope, through a low capacity probe, to pin #5 of the 6CD6 socket. The wave shape should appear approximately as shown in figure 33 on page 17 of Philco service manual PR-2527.

2. If either the shape or magnitude of the observed wave differs significantly from that shown above, trouble exists in the horizontal oscillator circuit. The following steps should be included in trouble shooting:

- Replace the 12AU7 oscillator tube.
- Check voltages at the oscillator tube socket.

Correct readings appear in figure 44 on page 25 of Philco service manual PR-2527.

(c) Examine the oscillator, charging and coupling circuits to insure that components of the correct value are in use.

3. If the input to the 6CD6 tube appears to be correct, the following steps should be taken:

(a) Check voltages at the socket of the 6CD6 tube. Refer to figure 44, page 25 of Philco service manual PR-2527.

(b) If the capacitor wired between lugs 3 and 5 of the flyback transformer is 68 uuf, replace with 82 uuf-5KV capacitor (Philco part No. 30-1246-6). This change should increase the width.

If an 82 uuf capacitor already exists on the transformer, it can be changed to a 100 uuf-5KV capacitor. Use Philco capacitor 30-1246-2. A check should be

Installation of Studebaker Auto Radios in Trucks

Sometimes it is necessary for the service technician to install an AC2300 or AC2301 auto radio in a Studebaker, 2-R series truck. This requires a deviation from the standard installation and the procedure necessary along with illustrative are listed on the following pages.

INSTALLATION INSTRUCTIONS

1. Remove the large knockout which is located to the right of center of the instrument board. Cut the webs at twelve places with a VERY SHARP cold chisel then knock out the panel from the motor compartment with a rubber hammer. If the edges of the opening are distorted they should be straightened with pliers. See figure 1. Remove the Mortex silencer material as shown in figure 1.

2. Remove the ash tray.

3. Using the paper template under the instrument board lower panel, locate and drill two .177 dia. (#16 drill) holes and one $\frac{3}{4}$ " hole in the lower panel. (See figure 2).

4. Remove and discard the cardboard cover and the two brackets from the sides of the radio. Remove the screw which holds the speaker baffle to the radio housing.

5. Remove the knobs and the bezel from the front of the radio housing. Discard the bezel.

6. Cement the rubber gasket to the front of the radio housing. See figure 3. Seal all holes in the radio housing with adhesive tape to stop draughts.

7. Attach two of the angle brackets to the sides of the radio housing using the screws removed. See figure 3. Remove the two speed nuts from the brackets

at the sides of the speaker and place them on the new brackets.

8. Place the radio in approximate location behind the instrument board. See figure 3.

9. Loosely assemble the grille retainers to the grille using the four self tapping screws furnished. If the radio being installed is AC2301 the push button hole in the grille should be covered with the cover provided. Bend the small tabs at the back.

10. Fasten grille in place with the retainers behind the instrument board. Tighten the screws.

11. Move the radio into place with the shafts and push buttons through the grille and secure with the nuts over the control shafts. (NOTE THESE NUTS ARE USED WITH THE SMOOTH SIDE TOWARD THE GRILLE). Push on the tone lever and the control knobs.

12. Secure the rear brackets using two No. 10 sheet metal screws and the lock washers from the radio package. These are inserted from the bottom.

13. Remove the gasket from the speaker baffle and cut off the brackets from the sides of the speaker baffle with a hack saw. Drill out the hole in the small top bracket with a $1\frac{1}{4}$ " drill. The speaker baffle should be painted black being careful not to get paint into the front of the speaker.

14. Fasten the two remaining angle brackets to the lower sides of the speaker baffle. See figure 3.

15. Screw the top bracket to the flange of the instrument board using the hex head self tapping screw furnished. This screw goes into the right hand hole left by the removal of the ash tray.

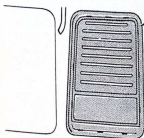


FIGURE 1

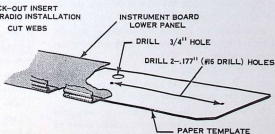


FIGURE 2

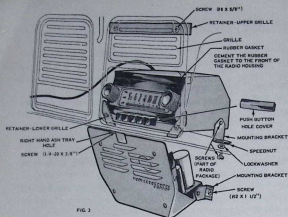


FIGURE 3

16. Using the lower brackets as a guide drill two .177 dia. holes (#16 drill) and fasten the brackets with the two 1½" No. 12 screws. See figure 3.

(NOTE—IF THE TRUCK IS EQUIPPED WITH A FOUR SPEED TRANSMISSION THE SPEAKER UNIT WILL NEED TO BE LOCATED AT THE RIGHT SIDE OF THE CAB UNDER THE GLOVE BOX. THE ASH TRAY CAN REMAIN IN ITS ORIGINAL POSITION. ON RIGHT HAND CONTROL TRUCKS THE SPEAKER UNIT SHOULD BE MOUNTED ON THE LEFT SIDE.)

17. Connect the extension cable to the cable on the radio and pass the other end down through the ¾" hole in the shelf panel and plug it into the power unit behind the speaker. Install the rubber grommet and seal with sealing compound if necessary.

18. Reinstall the ash tray under the glove box.

19. Connect the battery wire to the long post on the ignition switch.

20. Install the ignition coil condenser and the generator condensers as shown in the radio installation instructions.

21. With the radio turned to a station at or near 1400 on the dial, and the antenna fully extended adjust the antenna padder for maximum volume.

While the normal installation following instructions usually results in satisfactory performance, there seems to be an occasional truck that is extremely noisy and additional steps have to be taken to eliminate the noise. We would like to suggest the following:

1. In most installations there is a slight excess of speaker cable. This cable should all be pulled into the passenger side of the dash to give a minimum of ignition pick up from this source.

2. The interconnecting cable between the two chassis doesn't have the shield grounded at both ends. Add a grounding pigtail to the shield on the end which isn't now grounded. Ground this pigtail as directly as possible to the chassis.

3. The fire wall on which the radio is mounted in truck installation is usually heavily covered with paint. To be sure the chassis is making a good ground connection to the fire wall, clean away paint at the point of contact.

4. Watch the dress of the "A" lead. Moving the "A" lead around will usually result in a quiet spot being found. Avoid locating the lead near cable or wires coming through the dash.

5. Be sure there is a condenser on the voltage regulator.

6. Be sure the condenser on the ignition coil is located on the battery side of the coil.

These are all the steps we have had to take in any installation of our experience that were necessary to reduce the ignition interference to a satisfactory level.

PARTS LIST

1 Push button hole cover	28-9517
1 Grille	28-9373
1 Retainer—Upper grille	28-9516
2 Retainer—Lower grille	28-9515
1 Rubber gasket	54-8655
4 Mounting bracket	56-9864
4 Screws (#8x½")	1W22470
2 Screws (#12x1½")	1W18467
1 Screw (¼-20x¾")	1W21678
1 Cable extension (20")	41-4185
1 Grommet	27-4099-21
1 Drilling template	78-1282
1 Instruction sheet	78-1288

Call A Cabinet Meeting!

Long rows of solemn men sit around conference tables. They stare at piles of important papers. They deliver decisions of great importance. They are in a cabinet meeting.

At least, that's one kind of cabinet meeting.

When we have a PFSS cabinet meeting, it's different.

A PFSS cabinet meeting consists of two members. One is a PFSS'er, and the other is a cabinet. And, when they meet, you can rest assured that something gets done. Something good!

There are many kinds of cabinets PFSS'ers meet and master, but we thought we would single out the cabinets of the new vertical freezers. Let's meet them—all three.

Of course, there are lots of general procedures in cabinet work, such as removing dents and scratches. Let's limit ourselves to adjustment, removal, and installation of replaceable parts of the cabinet.

Our first encounter will be an easy one. We'll check the door seal gasket. Got to make sure its working properly so that there will be no heat leakage into the cabinet. To check this seal, there are two tests.

We can put a 100-watt bulb in the cabinet and look all around the gasket to make sure it is tight. If no lights shows with the door closed, we can assume the seal is correct.

Another trick is to test the seal with unglazed paper. We can insert a small piece of this between the gasket and the cabinet; close the door and then try to withdraw it. If there is a drag when the paper is being withdrawn, then we know the seal is okay.

If you are one of the wealthy members of the PFSS tribe, one of Uncle Sam's bills can serve the purpose.

So if the seal is not correct, what will we do? We'll adjust the hinges and the strike, and be back in business in no time at all.

Let's see how the V-1445 hinges and strike are adjusted, first.

Hmm, looks like the door hinges are fastened to a special steel tapping plate with machine screws. The tapping plates are fastened to the inside of the door panel.

How do they mount the door on the cabinet?

Seems like it is fastened to the cabinet with machine screw through each hinge into an extra-heavy steel tapping plate. This plate is located inside the cabinet wall.

When the door is put on at the factory, the door is set so that the seal gasket is correctly compressed. Then the hinge-mounting screws are installed through the anchor screw hole of each hinge into the cabinet. See figure 1.

Let's see how to remove the hinge escutcheon. Simple enough; all we do is open the door and unsnap the escutcheon by pushing on its edge with a screwdriver.

Hey, we drifted off course; we were talking about the gasket seal. Better see how to adjust the door hinges and strike so we can make sure we know how to correct for improper seal.

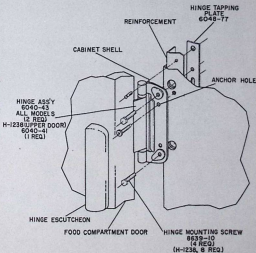


FIGURE 1

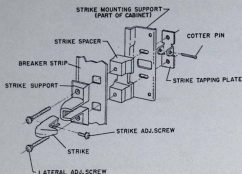
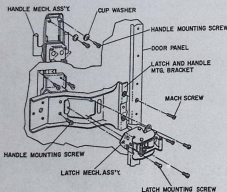


FIGURE 2

FIGURE 3



When adjusting the door on the cabinet, loosen the hinge-mounting screws, close and position the door so that the seal gasket is evenly and tightly compressed. Tighten the hinge-mounting screws to hold the position.

Better put the anchor screw in. If the old anchor screw hole is in line, use it.

But if the anchor screw holes are not aligned with the hole in the cabinet, use the lower spare anchor screw hole in the hinges as a guide for drilling new holes. Drill the new holes with a No. 29 steel twist drill. Now, we'll insert and tighten the self-threading anchor screws. Snap the escutcheon covers over each hinge butt, and we're finished.

Not so fast. That gasket could still be loose. How about the strike adjustment?

To adjust the strike inward or outward, we'll loosen the strike adjusting screw and move it as needed. See figure 2.

We can adjust it laterally, also. Just loosen the two lateral-adjusting screws and move the entire assembly until the nose of the strike just misses the roller when the door is being closed. Tighten all screws after the adjustments have been made.

If we have to take out the entire strike assembly, we have to take out the two lateral adjustment screws; then remove the side breaker strip. Now we'll remove the cotter pin from the strike tapping plate, to release the strike spacer. Remove the spacer and put the cotter pin back in place to prevent the plate from being dropped out of position.

Guess that takes care of the adjustment for the gasket. What happens if we want to replace the door seal gasket on our 1445?

First we'll take out all the door liner mounting screws at the edge of the liner. Next we'll unseat the old gasket from the edge of the door lever. Then position the new gasket so that the molded in curvatures and corners line-up properly with the outline of the door liner.

Slip the rubber flange of the gasket over the edge of the door lever, making sure the screw-holes line-up

with the holes. Then put the lever and liner mounting screws back and we're set.

While we're thinking about the V-1445, let's see how we would remove the latch mechanism. First we'll have to remove the door liner by taking out the screws under the gasket. Then remove the three latch-mounting screws. See figure 3. And, if we want to remove the handle, we'll have to remove the five handle-mounting screws. Then release the handle from the front of the door.

Let's finish off the V-1445 by looking into the subject of door shelves.

The door shelves themselves are very easy to remove. All you have to do is to raise the shelf enough to clear the plastic supports, and slide it endwise sufficiently to release it at one end.

If we want to remove the shelf supports, we'll take a $\frac{3}{16}$ " diameter punch and drive the plastic pin in until it is released. We'll lose the pin in the insulation, so we'll have to use new rivets when the new support is installed.

Sure is easy to install a new plastic support. Figure 4 shows quite plainly how the supports work. All you do is insert the support in the liner and drive the pin into the support to lock it in place.

That's about all for the 1445.

Let's see what gives with its big brothers, the 1945 and the 2545.

First we'll take off the outer breaker strips. Seems as though the outer breaker strip is mounted to an inner breaker strip. This inner job is made of masonite. The outer strip is held in place by tension between its rear and front edge.

Figure 5 is a cross-sectional view of both breaker strips with the insulation between them.

To take off the outer breaker strip, press against the inner bend as shown by the arrow in figure 5. Lift the front edge of the strip from its latched position on the masonite strip.

If we want to remove the inner breaker strip we have to remove the screws mounting it to the cabinet and liner. See figure 6.

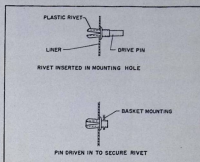
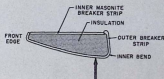


FIGURE 4

FIGURE 5



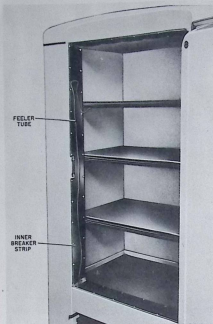


FIGURE 6

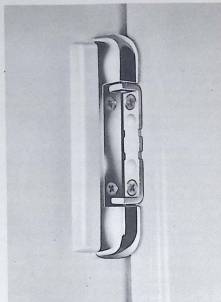


FIGURE 8

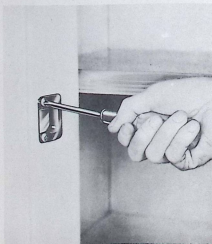


FIGURE 7

On these two big freezers, the door hinges are not adjustable. See figure 7. However, we can remove the escutcheon.

First we have to open the door all the way, insert a screwdriver in the notch, and pry the escutcheon out of its latched position. Then we'll close the door part way and do the same prying on the outside edge of the escutcheon. After both sides are unlatched, pry the escutcheon from the hinge with a screwdriver.

Removing the door liner and seal gaskets on these models is easy. Since the door liner is fastened to the door panel with one screw on each side and a number of spring clips all the way around under the seal gasket, remove them.

Taking out the gasket is done by removing the spring clips at each corner of the door.

If a new gasket is being mounted, make sure it is properly mounted at the corners.

Well, let's finish up our cabinet meeting by adjusting the door strike.

This is done by loosening the strike mounting screws (see figure 8), and moving the strike to the desired position.

MEETING ADJOURNED.

If the unit still does not start, another way of getting it going is to apply heat to the cold control. This can be done by placing a container of warm water in the bottom front edge of the evaporator where the feeler tube clamp mounting screws project through the evaporator. The added heat at this point should cause the contact to close and the unit to start. If this does not occur, check the control for continuity.

When the system is operating properly (as indicated by even frost distribution on the evaporator) temperature readings should be taken. After the temperature has become fully stabilized, normal cut-off and cut-on temperatures as listed in the service manual should be found.

If the temperature is not within range, check the altitude adjustment on the thermal regulator, and the feeler tube dress. If these are proper, it is likely that the thermal regulator itself is faulty and should be replaced.

If the freezer temperatures prove correct, and it is desirable to check the temperature in the food compartment, make sure the plate thermal regulator has been properly reconnected into the system.

The plate regulator controls the flow of the refrigerant through the plate by actuating the solenoid valve.

The feeler tube for the plate thermal regulator is installed in a well on the left hand edge of the True Zone plate. Here it senses both air and plate temperatures.

A rise in the cabinet temperature causes the control bellows and switch to be actuated. This opens the control circuit and de-energizes the solenoid valve coil and allows the plunger to stay down and block the by-pass. With the by-pass blocked, the refrigerant flows through the True Zone plate and cools the cabinet.

If, on the other hand, the unit was operating and the cabinet became cool enough to actuate the control, the contacts of the control would cause the solenoid to be energized and the bypass would be opened. With the bypass open, most of the refrigerant flows through the bypass to the freezer, and only a small amount of vapor would go through the plate.

Wrong refrigeration temperatures in the cabinet could be caused by a bad regulator or by trouble with the solenoid valve.

To check reports of bad temperature in the food compartment, place a quart container of water in the food compartment overnight. (See figure 2.) This ensures a true temperature reading. It is possible that if the reading is taken without something to give an average reading of the temperature, error might be introduced by frequent use of the box just prior to the reading.

In the figure (2) we see two different ways of recording the temperatures. A column type thermometer or the resistance bulb of the 5007 tester.

If the resistance bulb of the tester is used, the water

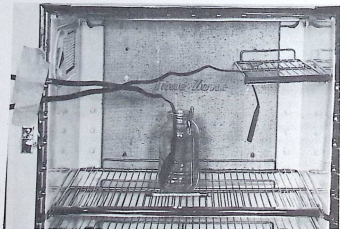


FIGURE 2

must be electrically pure. Impurities in the water will affect the resistance element.

If the temperatures are close to the desired readings, the difference may be made up for by adjusting the altitude setting.

If it is desired to raise the temperature in the compartment, set the knob to a higher number. Cooler temperatures may be obtained by setting the knob to a lower setting.

If the adjustment is made improperly, it is possible that automatic defrosting will be lost.

Another cause for wrong temperatures in the cabinet could be the solenoid valve.

The valve is an electro-magnetic device. The coil controls the position of the plunger, and the plunger controls the flow of refrigerant.

The coil creates a magnetic field when it is energized and this magnetic field attracts the plunger and pulls it up and opens the by-pass.

If the coil of the valve is open, or the circuit energizing it is not operating, the by-pass will remain closed and the plate will receive refrigerant flow whenever the unit runs. This will cause very low cabinet temperatures.

If the coil is continually energized, or the valve stuck open, the plate will never receive sufficient refrigeration and the cabinet will be too warm.

To check the coil for continuity, remove the power cord from the outlet. Take off the lamp housing cover and the regulator mounting screws, and pull the regulator out of its mounting recess. Disconnect the leads and check the coil for continuity.

These are a few of the troubles and their cures for the "Sharp Freeze" automatics.

In the newer type, there are some interesting troubles that can pop up, but by and large they are less complex. Since the newer system has no solenoid valve and its associated circuits, it is bound to be less difficult to trace troubles.

Figure 3 shows the wiring diagram for the newer automatics.

As can be seen, there is only one thermal regulator.

The new system is so designed that the difference in the temperatures of the cabinet and freezer will be maintained during normal operation of the unit.

As in the other type of automatic, tests for cabinet temperature may be made by placing a quart bottle of water in the cabinet and taking the temperature with a Philco 5007 tester.

And, as in the other jobs, the altitude adjustment may be used to compensate for temperatures that are not too far off the desired reading.

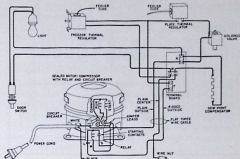


FIGURE 3

One element that is peculiar to the newer automatics is the thermal stabilizer.

The stabilizer is used to give stabilized temperatures in the refrigerator. It is in the circuit only when the motor-compressor is not running. In this way, if the box has not been opened too often, and the unit not running regularly, the stabilizer will introduce enough heat into the cabinet to make sure the unit runs enough to maintain the proper temperatures in the freezer compartment.

The stabilizer also is used to prevent frost build-up on the plate refrigerant tube where it passes through the insulation. In the older type automatic, heat exchangers serve this purpose.

Let's take a look at some of the general causes of abnormal temperatures.

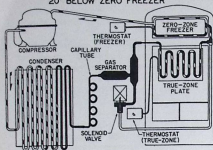
The altitude setting of the True Zone plate thermal regulator may be incorrectly adjusted which would cause the refrigerant to be cut off at too low a temperature.

A solenoid valve that is stuck closed would cause freezing of the foods stored in the refrigerator. This condition may sometimes be corrected by tapping the valve lightly.

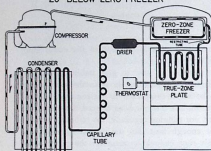
One of the conditions that can be caused by incorrect wiring is that of excessive cooling in the lower food storage compartment.

Color coding and the various component leads should be checked against the schematic diagram to determine

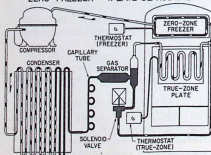
**AUTOMATIC SYSTEM WITH
20° BELOW ZERO FREEZER**



**NEW 1954 AUTOMATIC SYSTEM WITHOUT
20° BELOW ZERO FREEZER**



**AUTOMATIC SYSTEM WITH 20° BELOW
ZERO FREEZER (PLATE DEFOSTING)**



if they are properly wired. An open lead wire or defective coil in the solenoid valve circuit would cause freezing in the lower refrigerator compartment.

If the solenoid valve were stuck open, no refrigerant would be supplied to the True Zone plate, therefore, the refrigerator temperature would rise beyond the normal operating temperatures. This jammed condition can occasionally be remedied by tapping the valve assembly lightly.

A loss of charge from the control feeler tube and bellows would also result in no refrigeration to the True Zone plate. A continuity check would indicate a closed circuit, when normally a warm feeler tube or cabinet temp. would open the regulator contacts.

If the altitude adjustment of the plate control is set for an elevation higher than the actual altitude at which the refrigerator is being used, the food temperature in the lower refrigerator compartment will be higher than the temperature given in the service manual.

A condition which would cause high food temperature would be improper positioning of the control feeler tube in the mounting well fastened to the side of the True Zone plate. If the feeler tube bulb projects beyond the end of the feeler tube well and touches the True Zone plate or its refrigerated tubing passes, the control will sense a colder temperature than it should, thus causing the refrigerant to be prematurely bypassed to the freezer evaporator.

Incorrect wiring of the control or valve assembly may cause the valve to remain in the energized position, the True Zone plate will be starved of refrigerant, therefore, high temperatures will prevail in the lower refrigerator compartment.

A low food compartment temperature could occur if containers were placed adjacent to the True Zone plate. For example, foods in a large dish placed so that the dish touches the True Zone plate would act as an air scoop to block the downward draft of cool air and possibly cause the foods to become frozen.

Manual Correction

PR-2595-J-1149 hinge escutcheons are listed under J-1148

"Home Radio Servicing Hints and Kinks"

This is the second of a series of articles to be published regarding service hints and information pertaining to troubles that experience has shown to occur on various model radios. Changes and modifications which may be given in these articles should not be construed as corrections of inherent weaknesses, but rather are merely improvements brought about by field experience and improvements in electronic circuit design.

48-472—CATHODE BIAS

To insure uniform I.F. sensitivity despite differences in tubes, the cathode bias resistor R-307 from pin #7 of the 14H7 second I.F. amplifier was changed from 47 ohms to 120 ohms.

OSCILLATOR FAILURE

Several cases of oscillator failure have been reported, if the 14F8 oscillator tube is known to be good, condenser C-407 which is a 100 mmf should be checked for short. Also the first I.F. transformer Z-300 should be checked for an open primary winding. The oscillator coil L-404, part No. 32-4019, should be very carefully checked against any possibility of an open.

48-1256

In a few of the early sets, frequency, drift, accompanied by loss of sensitivity, occurred because the 10 mmf condenser, C-407 did not have the proper temperature coefficient. In these sets, C-407 should be replaced by part No. 30-1224-26.

Excessive drift may occur in sets where the trimmer condensers on the tuning gang have the round plates. The difficulty may be corrected by soldering the plates of the trimmer, at the point where it is crimped into the frame of the gang, or by replacing the trimmer with one of the ceramic type, part No. 63-0069.

In some cases there may be some drift, accompanied by loss of sensitivity and increase in interference, caused by changes in the first I.F. transformer, Z-300. Replace the transformer with part No. 32-4160.

48-1262—PARASITIC OSCILLATOR

Several cases of parasitic oscillations were corrected by wiring condenser C-203 directly to the cathode, pin #8, of the 35L6GT.

48-1274-1276—BURNED OUT R-412

There have been reports of burned out R-412. The cause has been traced to sluggish operation of the band switch, which shorts B+ to ground during the switch change cycle. To correct this condition remove the grounded end of the black wire located

between lug #4 of WS-4(F) and ground (ground point near pin #3 of the 7H7 first I.F. amplifier tube), and connect it to the unused lug, #2 of WS-4(R). Then connect a .006 mfd condenser, part No. 30-4591, from this lug to the original ground point.

LOSS OF A.V.C. ACTION

Loss of AVC can be due to shorting of condenser C-335 which is a 100 mmf condenser, which is corrected from the junction of R-323 and R-324 to ground.

Very erratic and noisy performance can be traced to a dirty push button switch assembly. Probably the best corrective for this problem is to clean the assembly with carbon tet.

48-1826—48-1827—PARASITIC OSCILLATION

Several cases of parasitic oscillations have occurred on these models. This condition can be suppressed by adding a 6800 ohm resistor, part No. 66-2688340, in the screen circuit of the 7C5 tube.

49-500, 45-503, 49-506

Squeals, birdies, or motor boating can be caused by defective B- to chassis condensers. In most instances the special inductive capacitor C-303 part No. 30-4644-1 is the cause and should be replaced with a 1 MF capacitor, part No. 30-4527.

49-602

Intermittent oscillators are a primary source of problems to the service technician particularly on AC-DC portables. If after the oscillator tube and associated parts have been checked and are known to be good, the selenium rectifier should be tested. When a portable operates satisfactorily on battery but operates only a few minutes on AC, it is a good indication that the selenium rectifier is weak and not developing the proper B+ voltage.

49-906—Code 122

To increase the audio output, the cathode bias resistor of the 50A5 tube was changed from 220 ohms to 120 ohms.

LOW LEVEL AUDIO DISTORTION

Occasionally, a condition of audio distortion may be experienced at very low settings of the volume control. This may be eliminated by dressing the AM diode lead as far as possible from the 19T8 grid, pin #8. This lead dress removes the possibility of any 455Kc signal being fed to the 19T8 grid and being plate detected. This detected signal, being out of phase with the designed signal, caused the distortion.

AM I-F SENSITIVITY

To improve AM I-F sensitivity a .03 mf condenser, part No. 45-3500-1 should be added from B- to ground in parallel with C-321.

49-1606

Several cases of parasitic oscillations have been corrected by adding a 220 mf condenser from the cathode, pin #8 of the 50C6G output tube to B-. This should be in parallel with R-206.

To improve FM sensitivity the DC blocking condenser C-420 should be replaced by a 220 mmf condenser. Part No. 62-122001001. Also the FM I.F. plate decoupling resistor R-300 should be replaced with a 10,000 ohm resistor, part No. 66-3108340.

49-1613—RUMBLE IN PHONO

There have been a few cases of rumble on this model. To correct this condition a number of changes are recommended. First install a 47K resistor from the high side of the voice coil in series with a 2.2 megohm resistor to the phono input lead connected to J-200. A .015 mf condenser is connected from the junction of the 47K and the 2.2 megohm to ground. Resistor R-213 is removed from the circuit and the lead from the junction of R-211 and R-212 is wired directly to the high side of R-102. This point is bypassed to ground by C-202 which is changed to a .5 mf condenser.

50-520—Code 121

An increase in sensitivity can be obtained by replacing resistor R-301 to a 470K ohm resistor and the condenser and choke assembly C-303 should be replaced with a .1 mf condenser.

50-920—Code 122

Several cases of hum at low volume have been reduced by removing the black wire from the 7B7 tube socket which is connected to the low side of the volume control (B-) and connecting it to the set side of the AC switch.

50-1424

To reduce hum at minimum volume, a wire should be added, between pin # 7 of the 14B6 socket and the low side of the volume control.

50-1724—Run No. 4

To improve response on phono when high modulation records are played the following changes should be made: R-9 changed in value to 6800 ohms, R-7 changed to 18,000 ohms, condenser C-11 changed to a .001 mmf. Also a 100 mmf condenser should be added in parallel with R-9 as a cathode by-pass for phono operation. A 330K resistor should be added as a grid return for phono operation. This resistor is wired from lug #5 to lug #10 of WS-2(F).

51-530—Code 121

To improve sensitivity, the grid return resistor of the I.F. amplifier R-4 should be changed from 1 megohm to a 2.2 megohm resistor.

51-629

To reduce harmonic beat a tube shield should be placed on the 1U5 tube. To improve sensitivity, the oscillator transformer T1 should be replaced to part No. 32-4453-1. The 2.2 mmf condenser C9, was changed to 1.5 mmf condenser.

51-631

To improve sensitivity the following changes can be made: R-1, a 3.3 megohm resistor was removed. R-2 should be changed to a 68K resistor. The filament end of the resistor should be disconnected from pin #7 of the 1R5 and connected to pins #1 and #5 of the 1U4 tube. R-3 was changed to 470 ohms, and was removed from between pin #7 of the 1R5 tube and B-. The filament lead from pins #1 and #5 of this tube to B- was removed and R-3 was wired from pins #1 and #5 to B-.

Condenser C-6A was removed from between B- and the junction of R-5 and terminal #1 of T-1 and its value was changed to .005 mf. The connection from the ungrounded side of condenser C-6B, to terminal #2 of Z1 was opened and C-6A was inserted in series with C-6B.

Condenser C-6B was also changed to .005 mf, its grounded end was removed from B- and was connected to terminal #1 of T-1.

The filament lead between pin #7 of the 1R5 and pins #1 and #5 of the 1U4 was connected to the junction of C-6A and C-6B.

R-6 was removed, was connected from terminal #2 of Z1 to pins #1 and #5 of the 1U4.

SERVICE HINT

The black "A" lead from lug #3 of the on-off switch should be checked for lead dress. The insulation on this lead could be cut by lug #4; this would cause the tube filaments to be lit continuously and would run down the battery or burn out the tubes. This lead must be dressed away from lug #4 and the edge of the hole in the chassis.

51-1730

To reduce modulation hum, condenser C-4 was changed to a .1 mf and condenser C-9 was changed to .006 mf.

To reduce A.V.C. distortion the secondary of the first I.F. transformer, Z2, was returned to B-. A 330 ohm bias resistor was added between the cathode of the first I.F. tube 7B7 and B-. A .05 mf by-pass condenser was added from the cathode of the 7B7 first I.F. tube to B-.

WHO KNOWS?



Who knows what electricity really is and how it really works?

We have lots of books written about the subject and vast records of the stories of men like Ben Franklin, Thomas Edison, and many others who delved into the mystery long ago.

Of course, today we know more about the stuff, but there is still much to be learned.

But why worry about how it works. We have a better and more interesting life because it works and we know how to control it.

Today, electricity provides one of the fastest, most convenient, and most modern means of cooking ever made available to the homemaker. These universal appeals of the electric range have brought about its rapid growth in popularity.

Many of us can remember when cooking with electricity was not too well accepted. There were good reasons for this; reasons that are no longer existent.

One of the reasons was the lack of speed in this kind of cooking.

Over the years, cooking speeds have been stepped up tremendously. We went from wood, to coal, to kerosene, to gas, and then to electricity. But, that last step was not a quick one. Many of us remember when electricity was not considered a fast means of cooking.

In fact, in the good old days, any one of the old style flame type ranges was actually much faster than the original electric ranges.

And why? Well, the original electrical heating elements were very crude and inefficient.

What caused this inefficiency?

Perhaps if we were to follow some of history of the development of the heating elements, we could find out the reason.

A review of the development of the modern heating element is both interesting and revealing.

Oxygen, which causes rust or oxidation, was the great bugaboo in the early days. A piece of iron wire, a nail, or the discarded tin can—all coated with rust—are very familiar to us. Oxidation is the cause of this rust. That is why to preserve iron, we paint or galvanize with a metallic coating.

Why didn't they coat or galvanize the iron heating elements? That was impossible if any efficiency was to be maintained.

When iron is hot or wet, it seems to be most easily oxidized or rusted. If a piece of iron were heated until it was red hot, oxygen would unite with it very rapidly; that is oxidation would be speeded up, and rust would form more rapidly. As oxidation progresses, less and less pure iron remains, and finally the whole mass is reduced to an oxide.

Up until the summer of 1905 electric heaters burned out so frequently that they were practically useless. Apparently, electric heaters of iron were not practical and would never come into general use. However, as is often the case, science uncovered a new metallic alloy, and found it to be perfectly suited to the task of heating.

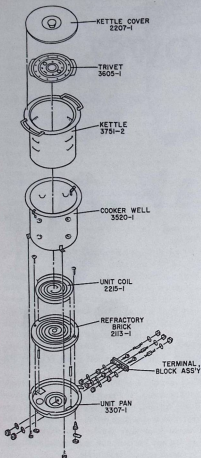


FIGURE 1

Researchers were looking for a metal that could withstand the attack of oxygen.

No metals known at that time could withstand the effects of oxygen and high temperatures. Many combinations of metal were tested, and finally an alloy was discovered that could scarcely be rusted at all. Furthermore, this alloy was found to heat rapidly when an electric current was passed through it. Certainly an ideal material for electrical heating elements.

This alloy is composed of two well-known elements, nickel and chromium. Various combinations of the two metals could be used, but it was discovered that the best results were obtained from an alloy of 4 parts nickel and 1 part chromium.

As a note of interest, we might take into consideration another property of this alloy. Its hardness. It is actually so hard, that at one stage of manufacture it is necessary to employ diamonds.

How do they use diamonds? Diamonds are used to assure the correct diameter of the heating elements. Holes are bored in the diamond, and the wire drawn through the hole to assure uniformity and correctness of size.

The melting point of the alloy is around 2800 degrees fahrenheit.

There is another side of this heating element story that is often overlooked. We did not say that the new alloy does not oxidize. Quite to the contrary, it does.

But, unlike the oxides that flake off and leave the metal underneath to be oxidized, this oxide clings to the metal like a skin that adheres strongly to the metal. Same thing that happens to aluminum.

This oxide is very dense and prevents the penetration of oxygen.

And so, the old style heating elements—those made of iron, pure nickel, or a nickel-copper alloy—were replaced by the new nickel-chromium elements and cooking by electricity was on its way.

To the men who came up with this alloy we owe a great debt. Without their contribution, cooking with electricity may never have gained the place it has today. Perhaps without them, the progress of cooking would have stopped at—"to kerosene, to gas."

Now that we've taken a look at the heating element's development, let's see how the element is used.

As we know, the heat generated by the element is dependent upon the voltage and the current, as well as conduction characteristics.

The heating element's resistance is caused by internal friction within the conductor itself, and is constant for a given length of a certain type of element.

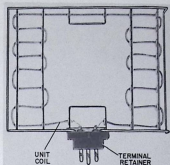


FIGURE 2

Therefore, various lengths of heating element are used for different applications.

If the heating element were used in the straight conductor form, its length would be too difficult to handle. Furthermore, the element would be weak and easily broken. Therefore, to overcome both of these difficulties, the coiled form of heater has been developed. This form gives very good concentration of heat, strength, and flexibility of application.

This flexibility of application gives designers and engineers greater opportunity to produce the fine ranges Philco has become renowned for.

To control the heat output of the heater elements, there are three methods which can be employed. The method used is determined by the location and purpose of the element. They are: (1) intermittently connecting the entire element to the supply, (2) changing the amount of voltage to the element, and (3) by changing the effective length of the resistance wire in the element.

The first method is used in oven operation, and the last two are used together to control the surface elements.

The above figure (2) shows an oven broil-griddle unit. It shows the nickel-chromium resistance heating wire wound into coil which is used to produce heat for either grilling or broiling.

The unit has two separate coils, each with one separate terminal and each connected to one common terminal.

On the broil-griddle unit the main coil is rated at 2200 watts, and is always actuated whenever broiling is being done or the griddle is in use.

The other coil is a lighter one, that is, it is rated at a lower wattage. This coil consumes only 1300 watts. It is used in various ways. It is always on for griddle high and for broiling during which time it is used with the higher wattage unit.

When the griddle is set to low, the 1300 watt coil is out of the circuit. This smaller coil is used in the oven as a booster coil to give the inimitable "Balanced Heat" to Philco's ovens.

The bake coil at the bottom of the oven and the smaller coil at the top give the Philco ovens rapid initial heating and their cycling as a unit maintains the constant, even heat necessary for the cooking Philco ovens have become famous for.

The coils are carried and supported in the oven unit frame by small porcelain bushings. These bushings are held by spring clips.

All the coils used on Philco ranges are not held in this way, however.

In the "Deep Well Cooker" (figure 3), the coil may be of the open type. In this particular adaptation of open coil elements, a ceramic brick is used to mount and support the coils.

Well, that was a quickie story about heating elements in Philco ranges.

Progress is continually being made by Philco's engineering department, and maybe one of these days an alloy even better will turn up.

Never can tell what tomorrow will bring, for when you come right down to it—WHO KNOWS?



This month . . .

CHARLES E. FRICE, Parts and Service Manager for R. E. Harris, Inc., Philco Distributor at San Diego, Calif. Charlie has had a full background of service experience, both in radio and refrigeration doing residential and commercial work. During the war he held the position of supervisor of radio and electrical inspection for Consolidated Vultee Aircraft at San Diego and Tucson, Arizona. In 1945 Charlie returned to San Diego and began his present association with R. E. Harris, Inc. Charlie is sold on the service profession and feels we should all get out and push. He tells how in the following remarks.

Your Service Manager says ...

History will record the advancement made by our great and free America over the past few years, but we that are living during these progressive times should stop and reconnoiter our position in our chosen industry as well as the industry itself.

In looking back a few years, our service profession was very low and many people enjoyed stepping on us in their climb to a higher position in their profession. As an example: the many adverse articles in national magazines and local newspapers. True these writers had facts behind their stories, but those they were writing about were by far in the minority. This same type of minority could have been found in any other industry had they cared to look, but the electronic and appliance service profession made a good "story."

Due to this long period of adverse publicity and no period of favorable publicity, the already suspecting public was satisfied that the service profession as a whole was dishonest.

About four years ago, one of the manufacturers in our industry introduced one of the most revolutionary plans ever attempted by any manufacturer in any industry . . . *Philco Factory Supervised Service*. This plan contained a multitude of possibilities for the service industry to raise its head high in the professional field. A position well deserved but never before had there been a plan to attain it.

In the years to follow, Philco has poured out a wealth of information to the service profession which has been envied by many but equalled by none. But several manufacturers, tho, I'm sure not intentionally, counteracted this plan by announcing to the American public, "Get Factory Service."

All in all, we in the service business have come a long way. Our position is far brighter today than it was a few years ago. Now let's stop and take a look at ourselves and our business. There is no standing still in our age. We either go forward or backward, and certainly we don't want to go backward. So let's take stock. Could we study new business policies and practices and better ourselves? Could we work a little harder at keeping up with the technical advancement made today? Could we work a little harder at keeping up with the changes made by manufacturers? Could we make ourselves more presentable in keeping with our profession? And could we rearrange our shop to be more presentable and easier to accomplish our job in?

Yes, let's go forward to the finest profession in our land.

