

THE GENERAL ELECTRIC UHF-103 TUNER—II



Techni-talk on AM, FM, TV Servicing

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In the last issue the operation of the UHF-103 tuner and its installation on the side of a TV receiver cabinet was described. In this issue a description of the "front panel" type of installation will be included. This is the preferred type of installation since additional holes do not have to be drilled in the cabinet and the UHF control knob becomes a part of the original control knob assembly. Unfortunately the "front panel" type of installation can only be used in receivers known as the "E" line and the "AK" line. Since "E" and "AK" are factory designations, the service technician probably will not recognize them.

Each of these lines of receivers will require its own kit of parts. The "C" kit shown in Fig. 1 is required whenever the UHF-103 unit is installed in the "E" or "Stratopower" line of General Electric receivers. The following is a complete list of these receivers:

GENERAL ELECTRIC "E" OR STRATOPOWER LINE OF RECEIVERS WHICH REQUIRE "C" KIT

Models		
17C125	21C204	21C214
20C107	21C206	21T1
21C201	21C208	21T3
21C202	21C208U	21T6
	21C210	

ASSEMBLY INSTRUCTIONS—"C" KIT

Since only one kit is required for any one model receiver, only those models which use the "C" kit will be described first. The tuner unit must be assembled before installing it in the receiver.

(1) The tuner unit and power supply described in the preceding issue are mounted to the base plate shown at the top right of Fig. 1. Use the No. 6-32 self-tapping screws supplied with the "C" kit. Since these screws are not slotted, it may be necessary to tap each hole with a No. 6-32 tap or a slotted No. 6-32 screw. A cable clamp should be mounted under one of the mounting screws for each unit. The small cable clamp should be used for the a-c lead and is mounted on the same side as the 6AF1 tube. Make sure the insulating tubing fits under the clamp since this eliminates the possibility of sharp edges cutting through the a-c cord. The larger cable clamp should be used for the power unit cable and is mounted under the self-tapping screw closest to the 6AF1 tube. The location of these two clamps is shown in Fig. 2.

(2) Install the flatted end of the extension shaft into the universal joint which is part of the front and gear bracket assembly. Insert and tighten the setscrews in the universal joint, making sure that the shaft does not extend beyond the hub. The smaller size Bristol wrench included in this kit will fit these setscrews.

(3) Place the solid coupling on the tuner shaft and use two setscrews to fasten the end of the coupling about one-half inch from the external rotary switch (S1). Make sure one setscrew is centered on the flatted side of the tuner shaft. The fiber strain relief which holds the transmission lines should be positioned around the coupling as shown in Fig. 2. Slip the insulating tubing over the extension shaft and place the extension shaft into the open end of the solid

coupling. Then fasten the front bracket assembly to the base plate with two No. 6-32 self-tapping screws and insert and tighten the setscrews on the coupling.

(4) The four brackets shown at the top left of Fig. 1 are numbered 1, 2, 3 and 4. Only one of these brackets is used to fasten the rear of the tuner unit to the cabinet. Select the proper bracket according to the following list and mount it to the tuner base plate in the position shown in Fig. 3.

- Model 17C125—Use Rear Bracket No. 4
- Model 20C107—Use Rear Bracket No. 3
- Model 21C201, 2, 4, 6 & 14—Use Rear Bracket No. 2
- Model 21C208, 8U, 10, and 21T1, 3 & 6—Use Rear Bracket No. 1

INSTALLATION PROCEDURE—"C" KIT

The unit is now ready for installation in the cabinet. It will be necessary at this point to determine whether or not any i-f adjustments are required, as these adjustments are not accessible after installation. These adjustments are described under the heading "I-F Alignment" which appeared on page 2 of the Vol. 5, No. 3 issue of *Techni-Talk*.

It is not necessary to remove the chassis of the receiver in order to install the UHF-103 assembly. After removing the cabinet back, drill a $\frac{1}{8}$ in. hole about $\frac{1}{2}$ in. deep in the left side

rail at the point marked "H" in Fig. 3. The dimensions of "H" which is the distance between the bottom of the cabinet and the lower screw on the rear bracket are as follows:

- Model 17C125— $13\frac{5}{8}$ in.
- Model 21C107— $14\frac{1}{16}$ in.
- All Other "E" Models— $12\frac{13}{16}$ in.

Drill a second hole $1\frac{1}{8}$ in. above the first hole for the top screw of the rear bracket.

Before placing the assembled unit into the cabinet, it will be necessary to remove the dial lamp assembly. First remove the channel Selector and Fine Tuning control knobs and then from the front cut the tape which holds the dial lamp assembly in place. Lift the dial lamp clip from the VHF tuner shaft bracket and remove the dial lamp assembly by pulling on the wires which will allow the connector plug to separate. This assembly can be discarded since it is not required when the UHF tuner is used.

The front part of the gear bracket assembly can be swivelled so that the fiber plate with the locating pins may be in any position in relation to the base plate. The correct position for inserting the unit into the cabinet is with the bottom of the base plate up and with the fiber plate at the position shown in Fig. 4. With the gear bracket in this position move the unit slowly forward so that the gear wheels pass over the receiver VHF tuner shaft bracket. Now engage the two locating pins into the two holes in the

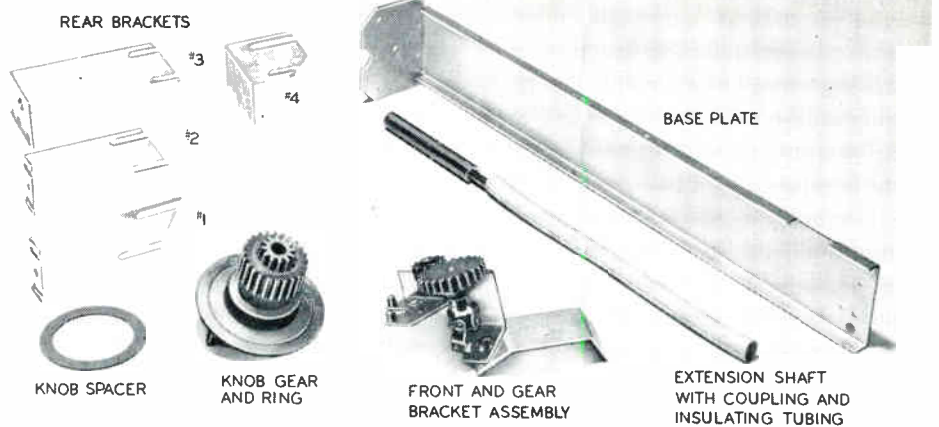


Fig. 1. Photograph of the "C" kit which is required whenever the UHF-103 unit is installed in the "E" or Stratopower line of General Electric receivers.

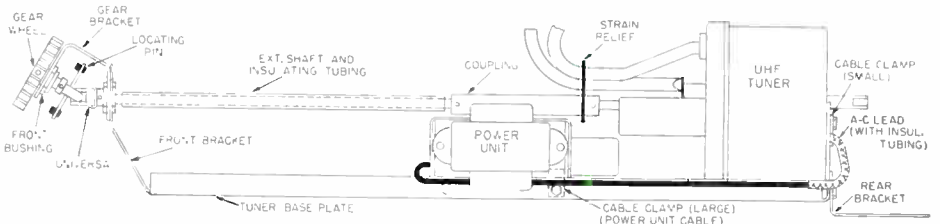


Fig. 2. Drawing of the UHF-103 unit completely assembled with the "C" kit.

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receiver VHF tuner shaft bracket as shown in Fig. 5. While exerting pressure toward the front of the receiver, rotate the complete assembly with the exception of the front part of the gear bracket until the rear mounting bracket will rest on the side rail in the position shown in Fig. 3. Note that the bottom of the base plate faces the top in models 17C125 and 20C107 but faces the left side in all other "E" models. Now fasten the rear bracket to the side rail by means of two of the wood screws and washers supplied.

Secure the locating plate to the receiver tuner plate by means of the two No. 4-40 machine screws and retaining caps as shown in Fig. 6. Mount the retaining caps so the hollow side is toward the back and fits over the locating pins. Slip the knob gear and ring onto the tuning shaft of the receiver so that the gears become engaged.

At this point it is important that a check be made to assure proper meshing of the knob gear and the idler gear on the UHF tuner bracket. Should the knob ring turn with difficulty or possibly not even engage the idler gear, remove the knob ring and change the relative position of the idler gear. This is accomplished by loosening the two adjustment screws shown in Fig. 6 and then repositioning the gear bracket for proper meshing of the gears. Tighten the adjustment screws and again try the knob ring. If necessary, repeat this procedure until proper meshing is obtained.

The markings on the UHF selector knob ring must index properly. Place knob ring on shaft and rotate the UHF tuner shaft until a position is reached where the screws are *not* in the center of the UHF-RF adjustment and UHF-Oscillator adjustment holes shown in Fig. 5 on page 5 of the Vol. 5, No. 3 issue of *Techni-Talk*. This is the VHF position. Now pull the knob ring out until the gears are not engaged and rotate so VHF on the ring is lined up as close as possible with the pointer on the cabinet. If the pointer is not in the center of the VHF marking, remove the knob ring and loosen the two Bristol setscrews on the knob ring until this outer gear can be turned to the correct indexing position. The larger Bristol wrench supplied in the "C" kit will fit these setscrews.

Fasten the UHF-VHF antenna bracket on the cabinet of the receiver as indicated in Fig. 3. Some receivers will have an area on the top rear cabinet rail indicated for the mounting of this bracket. Be sure to dress the transmission lines as shown in Fig. 3. Do not permit these lines to come near or contact any part of the TV receiver chassis.

Now turn the knob ring to the UHF-1 position and follow the procedure given under the heading "UHF Adjustments" on page 2 of the Vol. 5, No. 3 issue of *Techni-Talk*.

Replace the back and bring the power cord out through notch provided in the back of the receiver. The a-c cord should be knotted just inside to act as a strain relief. Plug the a-c cord of the tuner into the power outlet on the back of the TV receiver. This completes the installation of the UHF tuner unit and the receiver is now equipped to receive up to three UHF stations plus up to twelve VHF stations.

UHF TUNER IN "AK" LINE OF RECEIVER

The "D" kit of parts shown in Figs. 7 and 8 is required whenever the UHF-103 unit is installed in the "AK" or Standard line of General Electric receivers. The following is a complete list of these receivers.

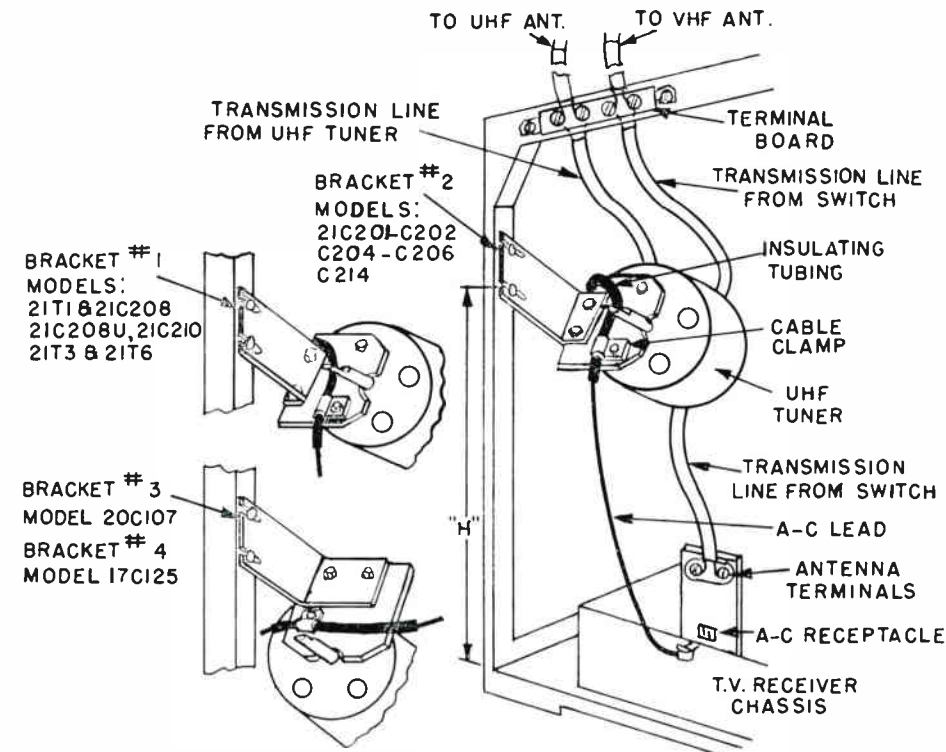


Fig. 3. Rear view of the complete assembly in cabinet showing the positions in which the rear brackets are mounted.

GENERAL ELECTRIC "AK" LINE RECEIVERS WHICH REQUIRE "D" KIT

Models	
17C113	17T12
17C117	20T2
17C120	21T2
17T7	21T4
17T10	21T5
17T11	

ASSEMBLY INSTRUCTIONS—"D" KIT

(1) Assemble the tuner unit, power supply, and base plate according to the instructions given in step No. 1 under Assembly Instructions—"C" Kit on page one.

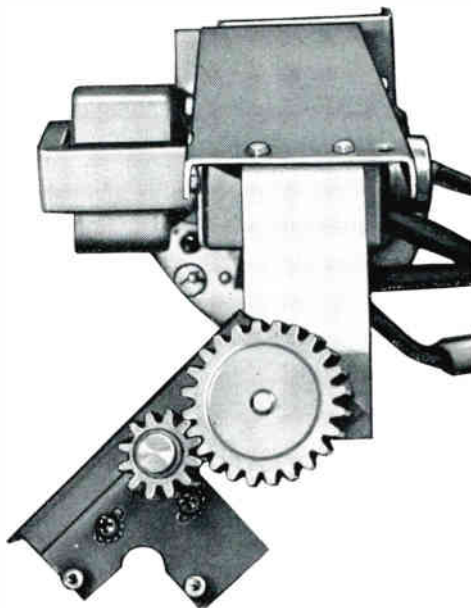


Fig. 4. Front view of completely assembled unit with gear bracket in the correct position for inserting into cabinet.

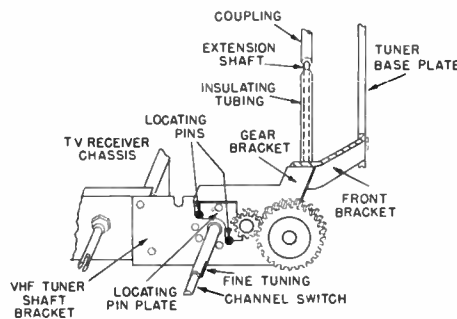


Fig. 5. Gear bracket assembly in position on the receiver chassis.

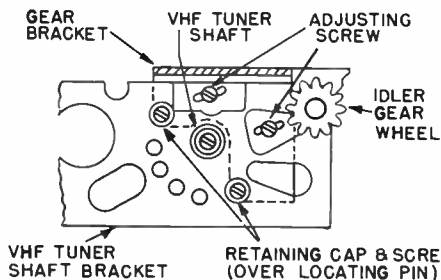


Fig. 6. Gear bracket assembly showing the retaining cap and screws in position as well as the position of the adjustment screws.

(2) Select the proper front and shaft support brackets from the following list:

Model Receiver	Front Bracket	Shaft Support Bracket
17C113, 117, 120 & 17T10, 11, 12	1	2
17T7	2	2
20T2	4	2
21T2, 4 & 5	3	1

(Continued on page 5)

These brackets are shown in Fig. 8. Mount the correct front bracket on the front of the base plate with two of the No. 6-32 self-tapping screws. Use the holes which line up with the bracket holes.

(3) Now mount the guide bracket and the correct shaft support bracket in the position shown in Fig. 9. These two are mounted together with the same mounting screws with the guide bracket on the underside and the shaft support bracket on top. The guide bracket is used on all models except the 17T7.

(4) Install the front bushing to the shaft support bracket by means of the hex nut and lock washer as shown in Fig. 9.

(5) Place the solid coupling on the tuner shaft and use the setscrews to fasten the end of the coupling about one inch from the external rotary switch (S1). Make sure one setscrew is centered on the flatted side of this shaft. The fiber strain relief which holds the transmission line should be positioned around the coupling as shown in Fig. 2. Mount the crown gear shown in Fig. 8 to the flatted end of the extension shaft and install and tighten the two No. 6-32 setscrews. The setscrew side of the crown gear should be closest to the shaft support bracket. Make sure the shaft does not extend

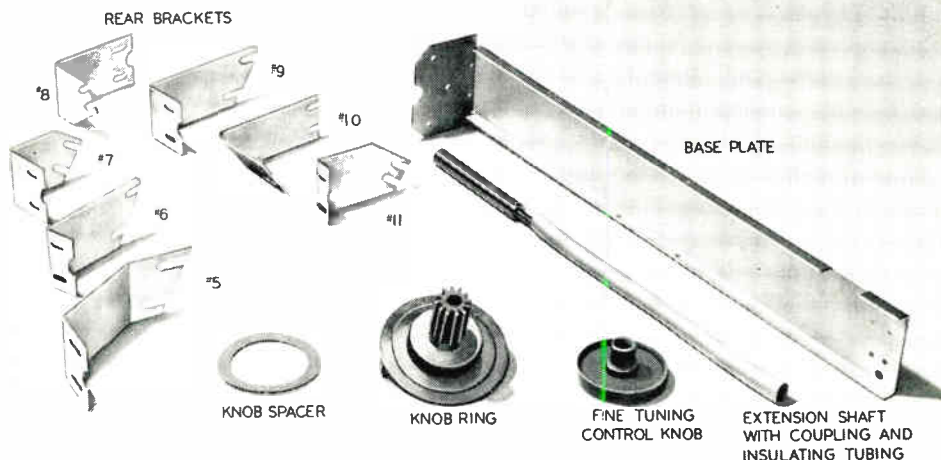


Fig. 7. Photograph of a portion of the "D" kit which is required whenever the UHF-103 unit is installed in the "AK" or Standard line of General Electric receivers.

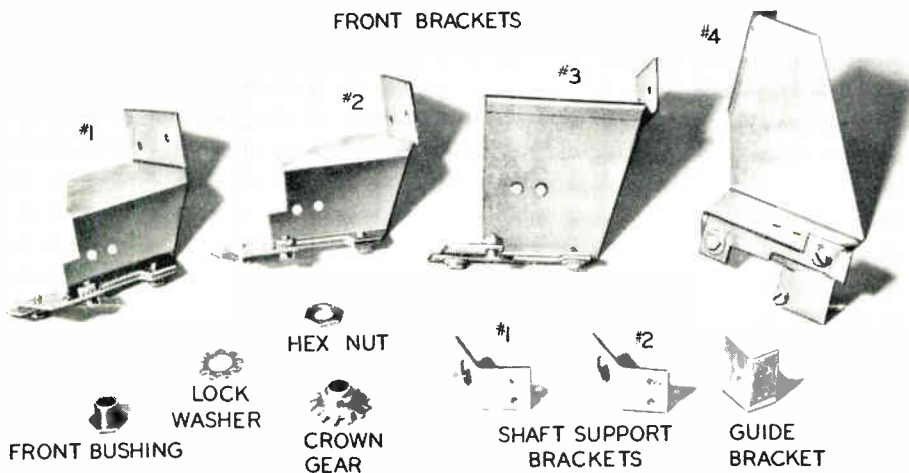


Fig. 8. Photograph of the balance of the "D" kit shown in Fig. 7.

into the channel No. 4 oscillator coil access hole. When properly installed, with the locating pin in the proper hole, the locating plate shown in Fig. 9 should fit snugly against the top and side of the tuning shaft bracket. If this fit is not tight enough when the installation is complete, the UHF unit will rock when turning the UHF Selector knob ring. In this case, it will be necessary to reposition the locating plate slightly. This is accomplished by loosening the two No. 6-32 self-tapping screws which hold this locating plate to the front bracket.

With the UHF unit properly located in the front, exert slight pressure toward the front and lift the rear into position so the rear bracket lines up with the holes previously drilled in the side rail. Now fasten the rear bracket to the side rail by means of the two wood screws on wooden cabinets or two No. 6-32 self-tapping screws on metal cabinets.

Place the UHF Selector knob ring on the tuning shaft so the knob gear engages the crown gear. To insure proper fit between these two gears, it will probably be necessary to loosen the setscrews fastening the coupling to the extension shaft and slide the extension shaft either up or down until a proper mesh is obtained.

(Continued on page 6)

beyond the hub of the crown gear. Slip the extension shaft through the front bushing into the insulating tubing and then into the open end of the solid coupling. The setscrews should then be inserted in the coupling and tightened.

(6) Select and mount the proper rear bracket as indicated in the following list:

Model	Rear Bracket
17C113 & 117	7
17C120	8
17T7	10
17T10	6
17T11 & 12	11
20T2	9
21T2, 4 & 5	5

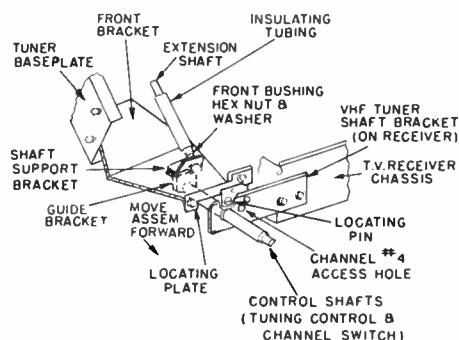


Fig. 9. Front view of the completely assembled front bracket assembly.

The assembly is now ready for installation in the cabinet of the receiver.

INSTALLATION PROCEDURE—"D" KIT

Before the unit is installed in the cabinet, it will be necessary to determine whether or not any i-f adjustments are required, as these adjustments are not accessible after installation. These adjustments are described under the heading "I-F Alignment" which appeared on page 2 of Vol. 5, No. 3 issue of *Techni-Talk*.

It is not necessary to remove the chassis of the receiver in order to install the UHF-103 assembly. After removing the cabinet back, drill a $\frac{1}{8}$ in. hole about $\frac{1}{2}$ in. deep in the right side rail at the point marked "H" in Fig. 10. The dimensions of "H" are as follows:

Model 17T7	—13 5/32 in.
17T11,12	—11 3/4 in.
17C113,17	—13 5/16 in.
17C120	—11 1/4 in.
20T2	—15 7/16 in.
21T4,5	—11 3/4 in.
17T10, 21T2	—Predrilled

Drill a second hole $1\frac{1}{8}$ in. above the first hole for the top screw of the rear bracket.

Move the complete assembly into the cabinet so the guide bracket rests on the Fine Tuning control shaft in the position shown in Fig. 9. Gently push forward until the locating pin contacts the TV receiver shaft bracket and fits

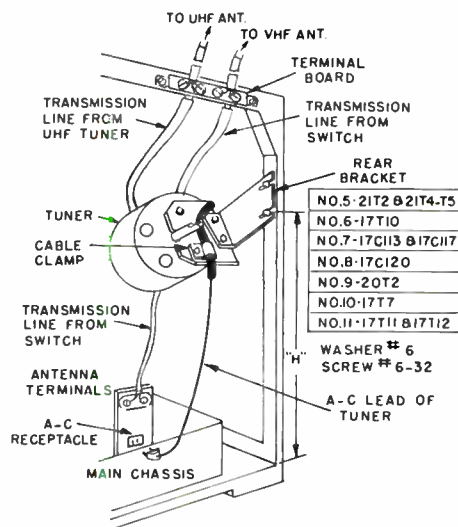


Fig. 10. Rear view of the complete assembly in cabinet showing the position in which the rear brackets are mounted.

What's new!

NEW DESIGN 1B3-GT AND 1X2-A TUBES

(Continued from page 5)
 tained. The cabinet hole in Model 17C113 *only* will have to be enlarged to pass the UHF Selector knob ring.

The markings on the UHF selector knob ring must index properly. Place knob ring on shaft and rotate the UHF tuner shaft until a position is reached where the adjustment screws are *not* in the center of the UHF-RF adjustment and UHF Oscillator adjustment holes shown in Fig. 5 on page 5 of the Vol. 5, No. 3 issue of *Techni-Talk*. This is the VHF position. Now pull the knob ring out until the gears are not engaged and rotate so VHF on the ring is lined up as close as possible with the pointer on the cabinet. If the pointer is not in the center of the VHF marking, loosen the two No. 6-32 setscrews on the coupling which hold the extension shaft and coupling in place. Turn the knob ring to the correct position and tighten the setscrews.

Fasten the UHF-VHF antenna bracket on the cabinet of the receivers as indicated in Fig. 10. Some receivers will have an area on the top rear cabinet rail indicated for the mounting of this bracket. Be sure to dress the transmission lines as shown in Fig. 10. Do not permit these lines to come near or contact any part of the TV receiver chassis.

Now turn the knob ring to the UHF-1 position and follow the procedure given under the heading "UHF Adjustments" on page 2 of the Vol. 5, No. 3 issue of *Techni-Talk*.

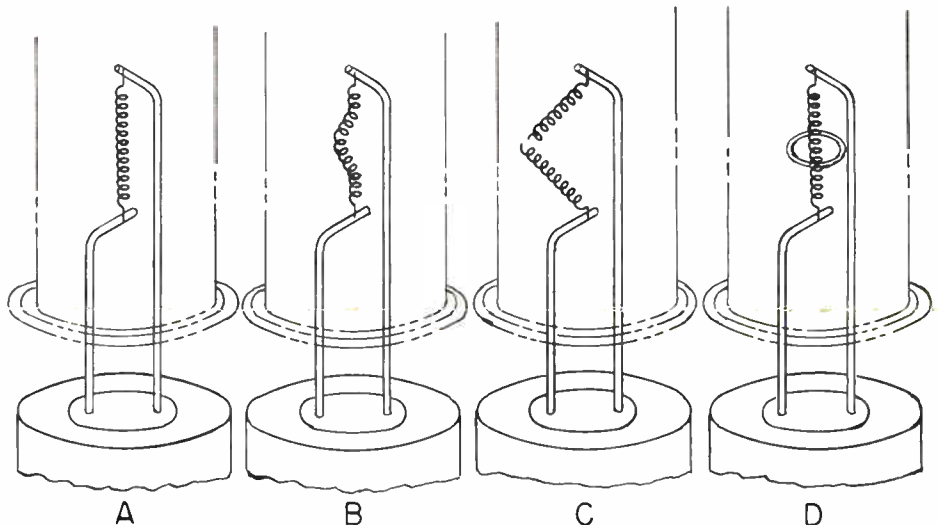
Replace the back and bring the power cord out through notch provided in the back of the receiver. The a-c cord should be knotted just inside to act as a strain relief. Plug the a-c cord of the tuner into the power outlet on the back of the TV receiver. This completes the installation of the UHF tuner unit and the receiver is now equipped to receive up to three UHF stations plus up to twelve VHF stations.

There are two types of high-voltage rectifiers which are used extensively in TV receivers. These are the 1B3-GT and the 1X2-A. The life of these two rectifier tubes has in some cases been considerably shorter than was expected by General Electric engineers. Numerous tests indicated that the shortened tube life was caused by the filament "bowing" and shorting to the anode structure. This "bowing" is shown below in drawing B and C. The normal filament structure previously used in these tube types is shown in drawing A; B illustrates the "bow" which may develop in this type filament after a few hundred hours of operation and C shows an extreme bow which results in tube failure due to a "short" between the filament and anode structure.

Tube failure due to this "bowing" has become more serious in newer type receivers which produce 15-18 KV for the HV supply. It was found that the high amplitude wave form applied to the anode produced an electrostatic "pull" on the filament. This was due to the difference in voltage potential during the negative going portion of the wave form. Since the "bow" always occurred on the side opposite the filament sup-

port rod, it was found that a small ring attached to this rod would neutralize most of the electrostatic field. The position of this ring is shown in drawing "D."

This type of construction developed by General Electric engineers for 1B3-GT and 1X2-A tubes has resulted in a much longer tube life. This is recognized as an important advantage. However, the placement of this ring around a portion of the filament causes a voltage difference to exist between this ring and different portions of the filament since the ring acts as a grid. In actual operation in a TV receiver, this causes approximately a 50-volt reduction in the output voltage which is relatively unimportant since it represents such a small percentage of normal anode voltages. It does, however, affect the readings obtained on various tube testers due to the comparatively low voltage applied to the elements. Some types of tube testers may show a low reading on brand-new, perfectly good tubes. A test check has been made on a number of tube testers now on the market and these tests indicate that General Electric 1B3-GT and 1X2-A tubes should not be considered "bad" unless they check in the *lower half* of the "replace" scale.



WARNING NOTE!

Do not make an electrical connection between any chassis and the UHF-103 chassis because this would connect the insulated control shafts of the television receiver to one side of the a-c line.

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