

**PHILCO**  
Factory-Supervised  
Service



# the PHILCO SERVICEMAN

VOL. 23 NO. 12

DECEMBER, 1955

RENEW NOW FOR A  
BIGGER 1956 PACKAGE!  
(See Page 6)



**I**F SANTA were in charge of PFSS mailings, you might see a scene such as this at his North Pole Hqs. But since he is so busy filling requirements for your children, we'll keep on mailing from Philadelphia. And, as another year passes on, we want to say **THANK YOU!** for your wonderful support in 1955. Our most sincere wishes to all of you for a happy holiday season and continued success throughout the New Year!

# THE SERVICEMAN'S STAKE IN TV PRODUCTION

For the benefit of those readers who did not see the article below when it first appeared, we are reprinting it by special permission of Retailing Daily.

## SERVICEMEN AIR GRIPES ON NEW TV SETS

There appears to be a growing dislike among television servicemen in New York for many of the new model TV receivers.

The gist of the complaints stems from a feeling that manufacturers, in their haste to beat competition—to turn out more sets, faster and at lower prices—are cutting corners in manufacture. And they feel that the problems that follow as a result of these practices fall directly on the shoulders of the independent service dealer.

One gripe voiced by technicians is against the vertical chassis receivers. Here the biggest bone of contention is the inaccessibility of most of the components. Servicemen say they are hard to reach and awkward to get at, and that the picture tube often has to be removed to work on the chassis—much more often than with the horizontal chassis set.

One serviceman felt that tube life is shortened in a vertical chassis set, since the tubes are mounted on a horizontal plane. In this arrangement, he stated, there is a greater tendency for the element to be pulled out of alignment by the force of gravity.

### *New Circuit Type*

Another complaint frequently heard from servicemen is the growing use of series-string tubes in the new receivers. Here it is a case of a new type of circuit which may make for savings in manufacture, but which are an added headache for the serviceman. In series-string circuits, when one tube goes, it is a matter of trial and error to find the right one, thus causing added labor in servicing.

Printed circuits are still a major cause of complaints, although some servicemen feel that they are gradually

improving in design. They still pose an added problem in soldering, which many repairmen feel is a "pain in the neck."

Perhaps the biggest complaint, however, is that the new receivers are not field-checked thoroughly. Several servicemen feel that the manufacturers' quality-control has become lax in their desire to cut costs. And an even more serious charge was voiced that the manufacturers are leaving gaps in the building of the sets which must be filled by servicemen.

Along this line, it was charged that sets are being put into production too fast—in many cases before all the engineering kinks have been worked out. When this happens, it is charged, the serviceman has to "finish" the set, making up for the corners cut by the manufacturer.

### *No Recourse*

When this happens, it is pointed out, the serviceman has no recourse to the manufacturer, although he may feel that the added work should have been done at the factory in the first place.

Because of these early breakdowns, the consumer often feels that the serviceman is "gypping" him, since he feels he has bought a new set which should be in perfect operating order. The same ill feeling from customers holds true due to the added labor charge necessary in many minor repairs in new sets.

The problem boils down to a feeling that set manufacturers should consider the serviceman more in designing their sets. TV receivers, being complicated pieces of machinery, should be made "with the serviceman in mind," they feel, rather than solely on the basis of economy in manufacture.

**W**hile this is by no means a general consensus of serviceman opinion, it does indicate a lack of faith in the TV manufacturer in some circles. We feel compelled to answer these charges, since Philco's obligation to the serviceman has always been a prime consideration of our engineering and production divisions.

*Objection* is voiced here against the vertical chassis and general inaccessibility of most components—that components are "hard to reach and awkward to get at." That the picture tube has to be removed to work on the chassis.

*Answer:* Philco's vertical chassis, used in the custom 440 series, exposes to the serviceman with removal

of the back cover, 120 components (not counting tubes) such as resistors, capacitors, choke coils and peaking coils. These parts may be replaced *without* removing the chassis from the cabinet. All tubes, except the picture tube, are accessible for servicing with the back cover removed. All normal test points are also accessible *without* removing the chassis. This arrangement proves that the serviceman's problems were not only considered, but the chassis was designed with the serviceman in mind! The picture tube is an integral part of the chassis. Should trouble develop requiring bench service, the picture tube will remain with the chassis as a unit.

*Complaint* that tube life is short-

ened due to horizontal position and gravitational forces.

*Answer:* All servicemen know that, in most tube manuals, the efficient operating position of a particular tube is listed. In these manuals you will find most tubes are listed with *both* vertical and horizontal positioning data. The efficiency and practicality of horizontal positioning has been proven by its use in auto radio sets and airborne radar and radio equipment. The fact that such installations are subjected to considerably more shock and vibration than will ever be experienced in home television receivers proves that horizontal position will not affect a tube's operation. Tube manufacturers, through years of experience and development of

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modern techniques, have developed the necessary tests to determine optimum tube position, and this includes the effects of gravity on tubes.

The *trouble* entailed in locating bad tubes in series string filaments.

*Answer:* Philco continues to use transformer power supplies and parallel filament supplies for tubes. This arrangement does not require hit-or-miss searching by the serviceman and a bad tube is easily located and replaced.

Everyone has no doubt experienced the aggravation of hunting for the burnt-out bulb when a string of series Xmas tree lights went out. To locate the defective bulb requires one good bulb to try in each socket until this string again lights up.

The problem is far more complex in a series filament television set. There are more than twice the number of tubes and with few exceptions, not two alike. If a tube should fail in a Philco, defective tube location will be immediately apparent as all other tubes will continue to function. In a series filament set if one tube burns out, every tube ceases to function until the defective tube is located and replaced.

The Philco method not only aids the serviceman in locating and replacing bad tubes quickly, but benefits the customer by eliminating added labor costs of servicing.

The *problem* of soldering printed circuits and the feeling that they are a "pain in the neck."

*Answer:* Philco uses printed circuit panels, not only in the vertical chassis receiver, but in horizontally mounted chassis, as well.

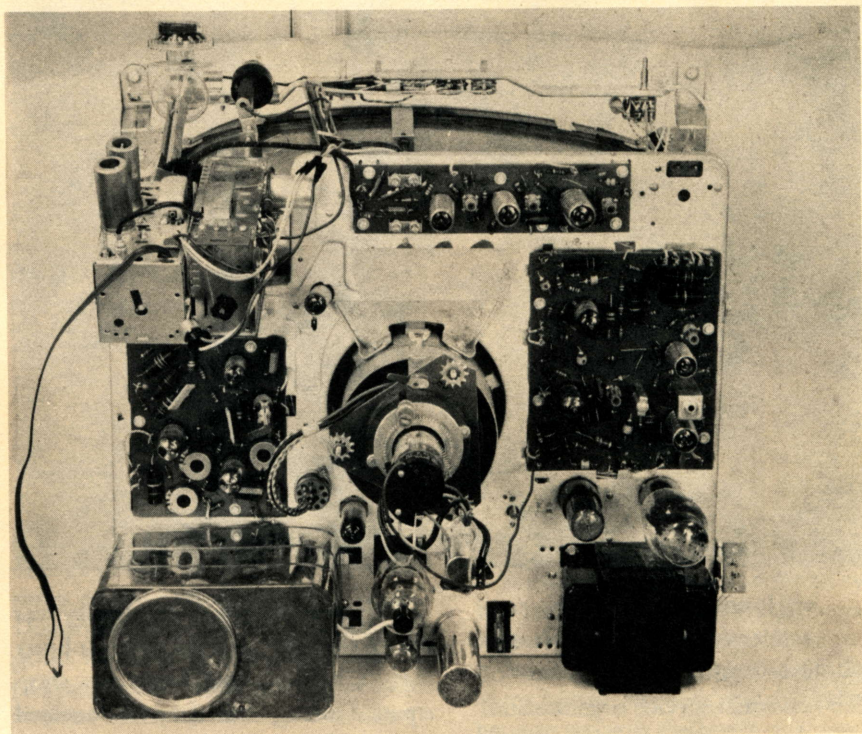
In Philco's printed wiring process *only* the point of contact of a component with the circuit is soldered, making it a far easier job to replace an individual component. This is in direct comparison with other panels where solder covers *all* components on the panel. The Philco process eliminates the excessive amount of heat required to solder an entire panel which can ultimately cause separation between the copper and the bakelite.

The procedures issued by Philco on approved methods of replacing and soldering panels has been found acceptable, practical and efficient. With the panels and other component parts exposed to the serviceman as they are in Philco receivers, the soldering problem is eliminated.

*Complaint* of the lack of field tests, laxity in quality control and "engi-

testing under every conceivable reception condition. These field tests are the basis for accurate quality control standards since they point up existing problems which must be overcome in difficult areas.

Television is a highly competitive field. The aim of any TV manufacturer is to produce and sell more sets at competitive prices. But, for



**The Philco 440 chassis. Lift off the back cover and this is what you see... ease of servicing!**

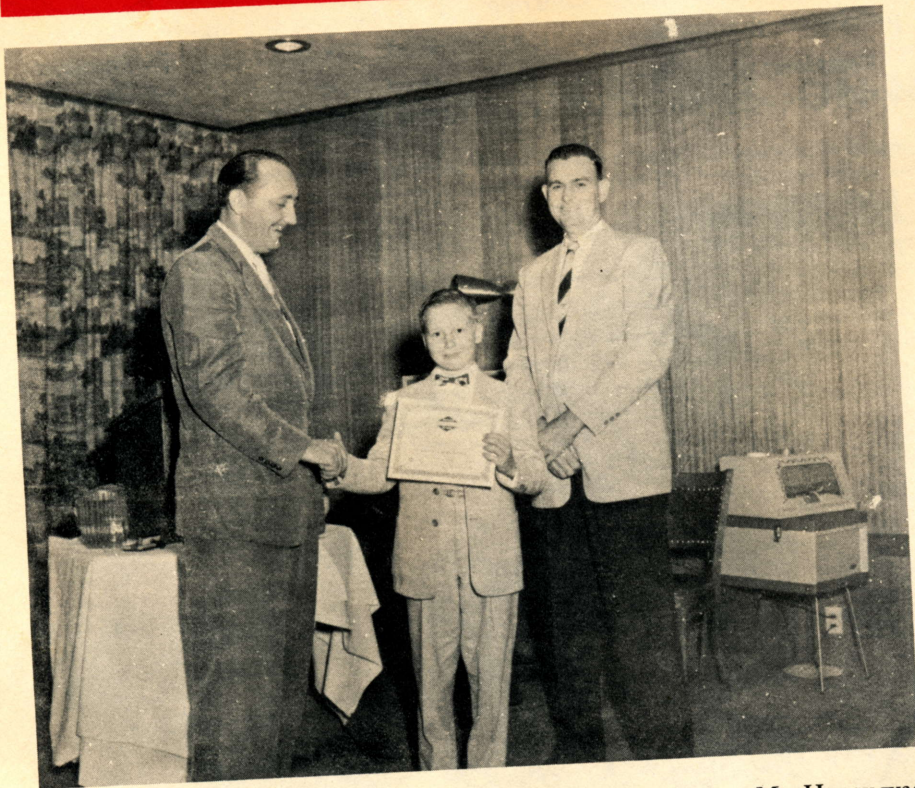
neering kinks."

*Answer:* A tremendous emphasis is placed on pre-production field testing by Philco for the specific purpose of eliminating engineering kinks *before* mass assembly. The famous Philco "Laboratories on Wheels," large vans fully equipped with the most up-to-date testing equipment, roll across American highways seeking out difficult reception areas to test new model receivers and compare them with competition. Their operators are constantly in touch with Philadelphia headquarters, reporting to engineering and production any "bugs" that may present themselves during the long hours of

complete consumer acceptance, this can only be done through strict adherence to sound engineering and quality production. It would be foolhardy for any manufacturer to cut corners, reduce quality and performance in an attempt to stay competitive. The successful manufacturer is one who respects quality, performance, and long service-free life. Anyone can cut corners, but how long can he get away with it?

The facts presented here are only a part of the tremendous effort expended by Philco to produce a television receiver that gives equal consideration to the customer *and* the serviceman.

# 10 -YEAR-OLD BOASTS 5 YEARS SERVICE EXPERIENCE



**M**eet Johnny Elmo Henry, contender for the title of youngest honorary member of Philco's national service organization! At the ripe age of ten he now has behind him five years of solid experience at the bench and in the home.

We found Johnny's story a little hard to believe, but Dick Hammil, General Service Manager for Arkansas Radio & Appliance, Philco Distributor in Little Rock, assures us that Johnny is a "hot" technician, despite his youth.

At five, when most kids are playing cowboys and Indians, Johnny was using a volt-ohm meter (he now has a new multi-tester, a gift from his father). Today, with his own tube caddy and work bench, he services all Philcos brought in to his father's shop. Mr. E. P. Henry, a Philco Dealer of Quitman, Arkansas, has a father's confidence in his young son, but also knows that Johnny does quality service work. The lack of call-backs bears him out.

This summer when Mr. Henry was out of the state on a vacation, Johnny stayed behind and kept the shop open. During that time he serviced approximately 20 TV sets, radios and auto radios. With five years of successful electronic service under his belt, Johnny found himself ready for new fields. Thus, Mr. Henry has invested in two hundred dollars worth of tools and gauges and Johnny now includes refrigeration service in his growing bag of tricks.

Service is only a part of this amazing young man's versatility. He has become an expert at rewinding motors and even built an electric welder entirely on his own.

In the accompanying photo you see Johnny receiving an honorary member certificate in Philco Factory-Supervised Service. A long-time Philco booster, Johnny attends all Philco Service meetings at the distributor's, and even accompanies his

dad when he buys parts. At a recent Arkansas Radio & Appliance service meeting, Johnny was introduced to the membership and, at that time, proved his remarkable service knowledge. Manager Dick Hammil asked him several tough technical questions which he answered with no trouble. The questions pertained to television and refrigeration service problems and the performance was not rehearsed.

A fifth grader and practically all "A" student, Johnny takes both school and service work in his stride. Before morning classes he opens the shop and cleans up. When school lets out in the afternoon, he comes around to pick up his tool kit and starts making the rounds for whatever service calls are scheduled.

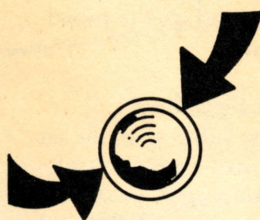
Johnny Elmo Henry is somewhat of a personality around Quitman. It's not hard to see why. We think Mr. Henry deserves a tip of the hat for his far-sighted encouragement of a young boy's talents. As for Johnny himself, we can see a bright future for this ten-year-old dynamo.

## AWARD CORRECTION

The \$10.00 Award in our August, 1955 issue titled "Check on Reefer Running Time," contained an illustration showing two safety pins running through two split type prongs and pinned into the two outer wires of the flat 3-wire cable on the back of a refrigerator.

For the sake of clarity in the illustration, these safety pins were shown untaped where the pins cut into the cable. Obviously, to prevent shock when using this idea, both pins should be well insulated with tape. This statement is made for the record—we're sure no veteran serviceman would make the omission.

# Locating



## Gassy Tubes

*This is the second in a series of articles dealing with gassy tubes. This month we will deal with the symptoms caused by gassy tubes in radio and TV sets, and how to localize the trouble.*

### Symptoms Leading to Suspicion of a Gassy Tube

**D**iagnosing the cause of trouble in any radio or TV receiver begins by operating the set and establishing the relationship between the symptoms of trouble and some functional section of the set. (Of course, this procedure cannot apply when a set is completely dead. In such cases the set must first be restored to some semblance of operation before further checking can continue.) If there is some life in the set, observations on its performance will usually indicate the functional section primarily affected by the trouble. (A "functional section" is any section containing a circuit, or a group of circuits, that performs a basic function; e.g., horizontal sync stages, r-f stage, i-f amplifiers, audio output stage, etc.) More detailed observations and various tests and measurements can then be applied to this particular section until the trouble is narrowed down to the individual defective part.

With the set in operation, the serviceman observes the symptoms of trouble and considers the possible causes of these symptoms. When certain symptoms exist, he needs to consider the possibility of gassy tubes, along with the many other possibilities. Since it is the purpose of this story to deal only with gassy tubes, a list of trouble symptoms that can result from tubes in this condition is given below, to serve as a guide.

#### Radio Receivers

##### Tone distortion:

This trouble can result from a gassy audio, r-f, or i-f tube. Distortion will be more noticeable in the case of a gassy audio tube. In the

audio section, the audio output tube is the one that is most susceptible to gas troubles. In the r-f and i-f sections, the last i-f tube, if gassy, is the one most likely to produce distortion, because the presence of gas in this tube results in overloading the tube by the amplified i-f signal.

##### Loss of reception on part of band:

Gas in the oscillator tube usually produces its first noticeable effect by causing the oscillator circuit to fail at the low-frequency end of the broadcast band, or to fail on all or part of the highest-frequency short-wave band. If the dead part of the band grows larger or smaller with continued operation, this is a strong indication of a gassy oscillator tube.

##### Gradual fading:

Increasing gas ionization in an r-f or i-f tube causes a very gradual change in sensitivity of the set, sometimes over a period of several hours. Distortion may not be noticeable. A good way to check for distortion is to compare the tone quality of local stations with that of semi-distant stations, while maintaining the same volume level. Local signals may cause overloading of the defective tube.

##### Gradual increase in sensitivity:

This condition is the reverse of the one described above; that is, the gas ionization in an r-f or i-f tube decreases with continued use. The best opportunity to observe the trouble is during a short period of time after the set is first turned on.

#### TV Receivers

##### Tone distortion:

The same causes given for radio receivers also apply to TV.

##### Loss of reception on h-f channels:

Gas in the high-frequency oscillator tube usually shows up first by causing loss of picture and sound on the highest-frequency channel used. If this channel can be received only after a period of set operation, or if it is lost after a given period, this is a strong indication of decreasing or

increasing (respectively) ionization of gas in the oscillator tube.

##### Gradual change in picture width:

This trouble can be caused by gassiness of the horizontal oscillator tube, horizontal amplifier tube, or damper tube. If the picture grows narrower or wider with continued operation, this can be the result of an increase or decrease (respectively) of gas ionization in one of these tubes. It should be kept in mind, however, that if the horizontal oscillator tube is gassy, changes in horizontal sync will also be observed.

##### Gradual change in picture height:

The same causes given above for changes in width, apply to the height except that the latter involves the vertical oscillator and vertical amplifier tubes.

##### Gradual change in horizontal sync:

Failure to maintain horizontal sync can result from a gassy sync separator tube, horizontal oscillator tube, or horizontal amplifier tube. Of these three tubes, the one most likely to become gassy is the horizontal amplifier tube. The reason for its effect on the horizontal sync is that gassiness reduces the input impedance of the amplifier, thus changing the load on the horizontal oscillator. This load changes gradually as the gas ionization increases or decreases during operation, thus causing instability of the sync action.

##### Gradual change in vertical sync:

The same causes described above apply to the sync separator tube in the case of vertical sync troubles, and also to the vertical oscillator and vertical amplifier tubes.

##### Gradual change in picture brilliance:

This trouble can result from changes in gas ionization in the horizontal amplifier tube, the high-voltage rectifier tube, or one of the low-voltage rectifier tubes. These tubes all affect the high voltage to the picture tube.

### Testing for Gassy Tubes

The simplest way to determine whether a tube is gassy is to look into it while it is operating. If it is possible to see through the glass envelope of the tube, any gas ionization having sufficient intensity to affect the tube's operation will appear as a purplish glow between the electrodes. Of course, this visual inspection method will not work for metal tubes, or for glass tubes whose envelopes are mostly opaque. For metal tubes and opaque glass tubes, tests for gassiness must be made by the use of service test equipment and/or substitution of new tubes. Sometimes the tube substitution method can be used while observing the symptoms to see whether the trouble clears up. If the substitution appears to clear up the trouble, a double-check should

be made by returning the original tube to its socket and again substituting the new one.

### Test Equipment Required

Testing for gassy tubes with the set in operation requires a good 20,000-ohms-per-volt voltmeter, or a vacuum tube-voltmeter, which is used to take voltage readings from the grid circuits. If a meter of only 1000-ohms-per-volt sensitivity is available, a limited amount of testing can be done by observing cathode voltage, which serves as a guide to the amount of plate current.

A good r-f and a-f signal generator and an audio output meter provide a quick method of monitoring the output of the audio section separately, or the audio section combined with portions of the r-f and i-f sys-

tem, to detect a change in sensitivity or audio gain and isolate the cause to the audio, i-f, or r-f section. With a steady audio output from the signal generator fed to the volume control, and the output meter connected to the speaker or output transformer, a few minutes of operation will usually indicate whether there is any change in the gain of the audio section. If no change occurs here, the signal generator can be re-connected to supply an i-f signal to the plate of the mixer tube, thus including the i-f section in the test.

*Next month the third and final installment of this series will deal with the practical application of the principles already discussed, and will cover actual test methods used in the location of gassy tubes.*

## WHAT ABOUT NEXT YEAR?

**T**he continual effort to improve Philco publications requires a knowledge of the reader's preferences of what he wants to see in print. We would like to have your opinions regarding the type of editorial content THE PHILCO SERVICEMAN should carry in 1956.

As you know, THE PHILCO SERVICEMAN is primarily non-technical in nature. We have tried to keep it that way with but few exceptions. The idea has been to give you an opportunity to sound off in any fashion you so desire on service. And, through the years your wholehearted support has made this publication known as "the voice of servicemen" everywhere. Your freely given comments on any service subject have been welcomed, published and discussed by the entire membership.

In the past we have printed letters and opinions that have created some fine "hassles" among the membership. From these controversial subjects we have all learned more about our fellow members and their views on service. We believe this to be a healthy condition and one which should continue.

A number of you have written asking us to include more technical information in THE PHILCO SERVICEMAN. This we do not feel to be practical in view of the substantial quantity of technical data prepared by Philco for its other service publications and manuals. The PHILCO SERVICE SUPERVISOR, along with the regular monthly technical package you receive continue to be the prime source of this type of information.

Some have written and requested articles of a more general service nature regarding store layouts, good business practices, etc. We are anxious to know if this material would be of value to you. Remember, THE PHILCO SERVICEMAN is your spokesman as far as the general field of service is concerned. It is up to you to help us determine what will be included in it for 1956.

Your continued interest will be a big factor in keeping the SERVICEMAN working in your behalf. Address your comments to THE PHILCO SERVICEMAN, P. O. Box 6738, Philadelphia 32, Pa.

## BIGGER AND BETTER!

Your PFSS membership in 1956 will contain more benefits than ever before. It's the biggest and best service package in Philco history!

You'll get—

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- Color TV Service School!
- Distributor Clinics!
- Bigger Promotions!
- Newly Designed Sales Aids!
- Free Identification!
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Dear Mr. PFSS Member,  
Anytown, U.S.A.

Dear Mr. Member:

In whatever you do - whether it is servicing a Philco, selling that service, or in general conversation with customers - you want to make a good impression.

Good work makes a good impression. Politeness, too. And the type of printed stationery you use goes a long way toward making a positive impression. True, it will not always make customers beat a path to your door, but distinctive stationery is effective, cannot be underestimated as a selling tool.

By using attractive Philco stationery you put your business on a professional level. The famous PFSS diamond is printed in sparking blue and yellow on every letterhead, envelope, business card and invoice. Along with your own personal imprint, the tie-in value of this stationery is unmistakable and as such, valuable ammunition in explaining your affiliation with Philco.

You can start 1956 with your best foot forward by placing an order for approved PFSS stationery with your local Philco Distributor right away.

Cordially yours,

PHILCO SERVICE DIVISION

P. S. Part numbers for the Philco stationery line are as follows:

- PR-1957 - Envelopes
- 1958 - Letterheads
- 1959 - Business Cards
- 1980 - Invoice Forms



Authorized Member



Authorized Member

# 10 DOLLAR AWARD!

?????

Some one of you out there is minus a ten-dollar bill this month. There were no ideas submitted that warranted the top award for December. That means the idea you meant to send in (but didn't) could have cost you a ten spot that would come in

mighty handy at this time of the year! Ten dollars reward for the few minutes spare time it takes to put your pet idea on paper is a higher rate of pay than you can earn in equivalent service time. All you have to do is search your minds and we'll bet you

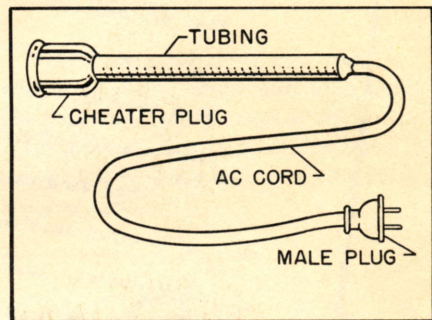
come up with a dozen good servicing tips that have not yet been published and are worth money to you. As a serviceman you are in a highly technical profession. The more you know about the techniques of it, the better qualified you become. Many of you have written telling us how much you think of the Philco award program, how some of the ideas have helped you in your work. How about helping yourself to some easy bucks, and give your fellow technicians the benefit of your ideas. Let us have your entries soon!

# 5 DOLLAR AWARD!

## Tubing Saves Time, Temper

Five dollars for the Idea Award of the month goes to Angelo Zarlengo, Zarlengo Electric Shop, 114 Liberty St., Lowellville, Ohio. "I am enclosing a hint which has been helpful to me and which I hope will help other servicemen. "I have found when repairing certain Philco television receivers, that it is hard to plug the gyp (cheater) cord in back of the chassis. Usually

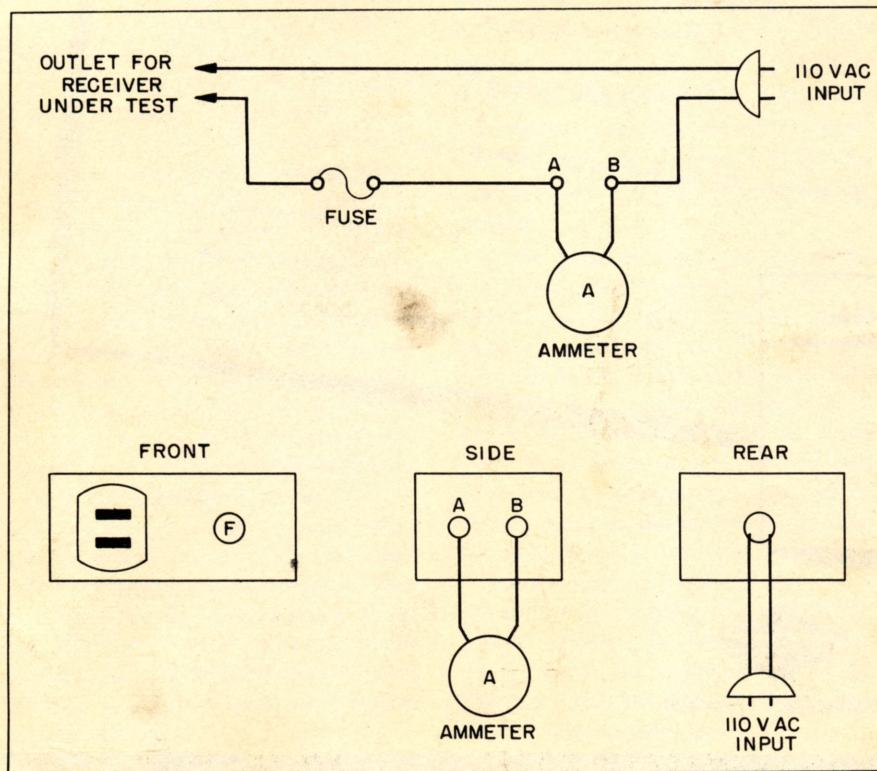
it is too far in to reach and there is not enough room for my hand to do its work. "I took a length of fibre tubing 1/4" x 7", and removed the 110 volt male plug from the end of the gyp cord which is plugged into the wall receptacle. I then slipped the cord through the tubing, clear to the end of the female plug. Then I poured cone cement in the tubing and replaced the male plug at the other end



of the cord. This, I find, makes it easier to plug in as you are working from the outside of the chassis. It also saves a lot of time and your temper as well."

# 2.50 AWARD!

## LINE FUSE TIP PAYS OFF



E. R. Holland, Holland Electric Co., 614 Pecore St., Houston, Texas, earns \$2.50 for the following idea. "Enclosed is my idea for eliminating worry about blown line fuses. There is always a question in the service technician's mind regarding blown fuses—and that is whether the set is drawing too much current, or if the fuse is weak and a surge current blows it. It may also help determine whether a larger fuse (within limits) should be used to protect against further failure. "On the enclosed schematic, I have eliminated size of the fuse as every a-c ammeter has various ranges and each serviceman would be acquainted with them."

Join the  
**MARCH OF DIMES**  
January 3 to 31