



the **PHILCO SERVICEMAN**

VOL. 22 NO. 5

MAY, 1954

TIME SAVING TIP
ON PAGE 8
(See \$10 AWARD)

SERVICE MAKES SALES GROW AT GARY'S RADIO!

Gary Altmanshofer laughed when we asked him: "Do you find that many of your sales develop from service?" His answer (and we loved it!) was: "I'm more interested in service developed from sales. To me, service is the all-important factor in sales!"

That little exchange started us out on the interesting story of Gary's Radio Service, 2401 11th Street, Columbus, Nebraska, where service makes sales. Now don't get the idea that Gary turns away sales that do not come through service. He doesn't, although the majority of his sales are a result of service satisfaction and leads.

This up-and-coming sales-service operation has been on the march since Gary Altmanshofer opened his doors six years ago. However, Gary has been active in the service business since 1938, with time out during the war as a Signal Corps employee. During this association he spent three months in Philadelphia attending the renowned Philco Training Schools that produced thousands of electronic technicians who helped maintain the war effort. Gary didn't realize then that Philco was to play an important part in his post-war career.

When Gary's Radio Service opened its doors six years ago, a second hand panel truck was the major piece of equipment on hand. Today, a three truck, five man organization with one of the finest test bench layouts we've ever seen (see illustration) speaks for steady progress and apparent customer satisfaction.

In fact, store facilities are classi-

fied by General Appliance, Philco's Omaha Distributor, as so superior that they have arranged to have a number of service meetings there. This is advantageous to the individual technician who is able to absorb new information and discuss his problems in an atmosphere much like his own shop. To aid the proper transmittal of data at these meetings, attending members can utilize Gary's fine line up of

our opening paragraphs, but—it's effective

When a man says . . . "service is of primary importance to sales, because without service a sales organization is doomed" . . . and . . . "you know, there are a lot of good products on the market but without service even the best are no good!" . . . that man has faith in his own beliefs and knows where he is going!



Gary Altmanshofer prepares for another busy day at the service bench and on the sales floor of his highly successful store where service makes sales and both grow!

test equipment and product displays of the entire Philco line.

You are probably wondering by now what there is about Gary's Radio Service that is characteristic of success. In our series of service success stories, we find that in nine out of ten cases the personality factor sets the pace for an operation's progress, and Gary Altmanshofer is no exception. Gary's personality is his service philosophy. It's different as you can realize from

A firm believer in advertising, Gary promotes his business actively in newspapers and on radio. The PFSS diamond is featured constantly as an identification mark in line with his one-line Philco sales and service.

Another question Gary was asked concerned any actual proof that service created sales. His answer was to dig into the files and display customer history cards. Many,

(Continued on page 3)



SUMMER UNIFORMS MAKE SERVICE SENSE

Of course, it's only spring now and we've just completed a long winter season. But try to remember fellows just how rugged last summer was. We'll bet there were times when you felt it couldn't be any hotter *in* a television receiver than it was out of it!

You've got to be comfortable to be efficient. This is especially true during the dreary summer dog days. You know from sad experience that it's just that much harder when you're sweating out a tough fix in your shop or in a customer's home while the mercury hits the boiling point.

Now, we're not claiming that Philco Summer Uniforms have built-in air conditioning—but—their lightweight gabardine construction make them ideal summer wear in any climate, permit you complete freedom of movement and, as we keep stressing, create a definitely professional appearance.

They are practical and you'll find them mighty comfortable when summer rolls in for its short but intense duration. You're a man who knows his business. So make it your business to see your distributor about summer uniforms to step up your customer appeal and add to your working efficiency.

PR-2036 Trousers

PR-2159

Summer Half Sleeve Shirt

PR-2160

Overseas Cap

SEE YOUR PHILCO DISTRIBUTOR TODAY!

PHILCO DELIVERS SPECIAL RESTRICTION TESTER FOR "ONE CALL—ONE HOUR" SERVICE

In keeping with the emphasis of speed, simplicity, and accuracy in the "One Call—One Hour" program, Philco's refrigeration engineers have devised the "Philco Restriction Tester."

This compact instrument provides the serviceman with one instrument capable of these three important jobs:

1. Checking for restrictions in the refrigerant system after the motor-compressor is removed.
2. Metering refrigerant flow during "adding refrigerant" procedures.
3. Providing control for "removing refrigerant" operations.

To achieve maximum benefit from Philco's motor-compressor program, "guess-work" must be eliminated. Philco's Restriction Tester is a tool for accuracy.

Let's see how the Restriction



Tester makes the serviceman's task easier.

If the serviceman were confronted by a unit with the plate type condenser that ran but did not refrigerate, how would he attack the problem? He would know there are three possible causes of the trouble: a no-pump compressor, a total high side restriction, or a complete loss of charge.

The latter possible cause could be

eliminated by cutting open the system. If charge has not been lost, it will be released. Now there are two choices left. Without a method of testing for a restriction, the only recourse is to replace the motor-compressor and see if the trouble was a no-pump compressor. If the trouble was a high-side restriction, the necessity for a re-call and all the double expense and time destroys the whole idea of the "One Call—One Hour" service. With the Philco Restriction Tester, a rapid accurate test determines the answer, and the serviceman can proceed with confidence.

It is sometimes necessary to add or remove refrigerant from the replacement motor-compressor so that the system will be properly charged. With Philco's Restriction Tester, proper unit refrigerant charge is assured by the accurate metering function of the tester.

SERVICE MAKES SALES GROW AT GARY'S RADIO!

(Continued from page 1)

many times—not just a few isolated cases—he had sold second and even third products to a customer. It is the rule rather than the exception. And the only explanation he could offer to this gratifying sales response was service satisfaction—the rendering of that type of service that so impresses a customer, he will immediately and without hesitation think of Gary's Radio Service when the purchase of a new product is decided on.

Good service by Gary's definition does not include *only* a bare minimum of meeting the customer's requirement. It may mean, and often does to him, free service if warranted. There are many cases where you just cannot draw the line on a



Sales clerk Dorothy Mielak and Gary proudly show off the impressive appliance sales section of Gary's Radio Service.



This recently remodeled service bench area makes servicing a breeze with everything—test equipment, parts and service information—within easy reach. Gary and Paul are collaborating on a service fix here.

particular service job, especially when a little extra effort can win a friend and make a future sale.

It's true that occasional free service does not assure a sale at a later date. Gary told us that at times a run of free service will go on without a nickel coming in and it has discouraged him. Then, just when he's wondering if it's worth the effort, a few of the customers in question will *come back* and, on the basis of that extra attention, put new faith in his beliefs with a major purchase and a sincere "thank

you." Gary insists that it is right to put customer good will above making a dollar every time.

As an all Philco products dealer—one who is 100 percent service conscious—Gary is outspoken regarding his PFSS package. And there's no need to stress how Gary Altmanshofer sits with his Distributor and Philco Service Headquarters. Service Manager Gil Stranghoener of General Appliance rates Gary's Radio Service as one of the top outfits in that part of the country.

Future plans for Gary will follow the successful pattern he has set in the past—a continued heavy concentration on service that he feels will net a gratifying return in sales. His own special recipe for uninterrupted progress has been developed. The ingredients are faith in varying doses—faith in himself in advertising, in his customers, his products and, above all, faith in service as the one and only road to building bigger sales.



Gary and Paul Mielak pose beside two of the three trucks that cover the Columbus area with outstanding service.

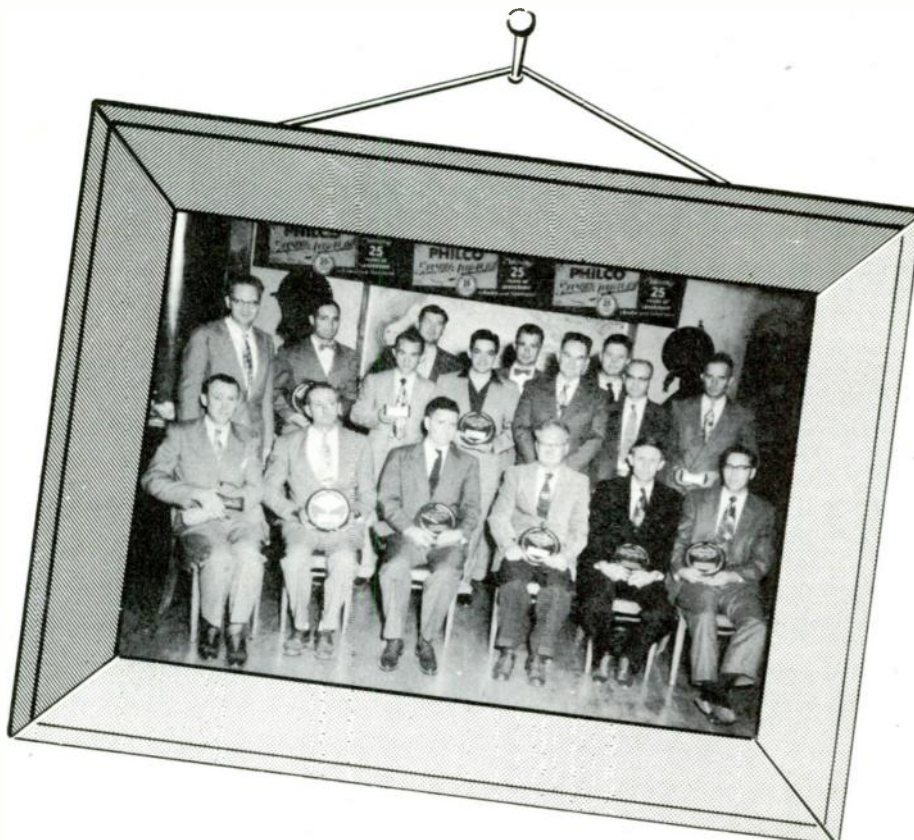


Outstanding service in Kansas and Missouri is no rarity as evidenced by this mass award presentation at Mardick Distributing Company of Joplin, Mo. Top row, left to right: S. F. Robertson, Carthage, Mo.; James Courtney, Neosho, Mo.; Clay Millican, Independence, Kans.; L. D. Evans, Carthage, Mo.; Carl Adcock, Aurora, Mo.; Glenn Kirk, McCune, Kans.; Rufus Miller, Cassville, Mo.; Leon Fugate, Coffeyville, Kans.; W. E. Frazier, Nevada, Mo.; W. D. Mardick, President, Mardick Distributing Co.; Jack Mattingly, Philco SDR; and J. C. Hinkle, Service Manager, Mardick. Bottom row, left to right: Glenn Gregory, Joplin, Mo.; *Chester Bemis, Jasper, Mo.; *Roy Irelan, Joplin, Mo.; *George Scott, Greenfield, Mo.; *Merle Van Gunda, Joplin, Mo.; *J. H. Gulliford, Nevada, Mo.; *Bob Westbrook, Carthage, Mo.; *Sam Yongue, Jr., Miller, Mo.; Bill Hanks, Columbus, Kans.; and Jewel Bowin, Arcadia, Kans.

AWARDS...

* Indicates a Second Year Award Plaque.

Arkansas Radio and Appliance Co., Little Rock, contributes more first and second year Philco Service Achievement Award winners. Standing left to right: Vic Haugeberg, Philco SDR; Carl Evans; *Bill Hill; Ted Riewe, Accessory D. R.; Jack Frost; Bill Squires, Philco Accessory Division; Jimmy Means; Dick Ham-mil, Service Manager; Ben Shannon; *L. M. McPherson. Seated from left to right: *J. W. Gamble; J. E. Clif-ford; James Shell; Glenn Holland; Calvin Martin and Cotton Golden.

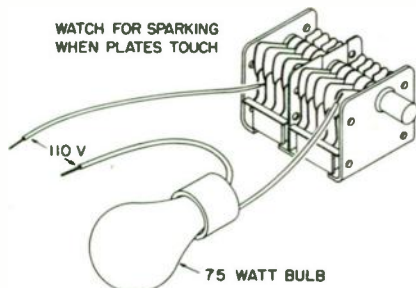


SHOP TALK CORNER

I HAVE had 3 radios in which one or both gang condensers were shorting when nearly closed. I have found a very effective way of locating where plates first touch by putting a 75 watt bulb test light in series with 110 AC power across the plates, then rotate the plate until they touch and watch for sparks.

I would appreciate more sheets like this, as I have a few more ideas to pass on.

W. C. GOODMAN
Erie, Penna.



This is a very good servicing idea, often used as factory procedure. But, we'd like to add one precaution—the cord gang should always be disconnected from the other components such as shunt fed oscillator circuit and so forth.

It has not been my custom in past writing to your department to pass along gripes. However, here are a few that seem a bit constructive that I have picked up in talking to our many good Philco Servicemen in this area.

Eliminate if possible the fabric loop holding the back to the cabinet. It forces the serviceman to fold back onto the cabinet top, thereby subjecting highly polished surfaces to scratches. Some servicemen rip them off, but in some cases this has aroused the ire of the owner, claiming that if the factory put them on, they should be replaced upon completion of repairs.

Devise a better method of mounting the back, using less screws. This is, indeed, a universal gripe.

Get that blankety blank fuse top-side again like we had in older models.

Hope you will accept this only as constructive criticism.

DAN W. DAMROW
Oak Lawn, Illinois

We can appreciate the fact that these features may require a little more of the technician's time in servicing the receiver, however, the manufacturer must be governed in

such matters by the regulations of the Underwriters Laboratories. Approval of the product for adequate protection against shock hazard governs the placement of the fuse.

The possibility of cathode ray tube implosion must be considered in the method by which the back is mounted. The back must be able to withstand the force of such an implosion without coming loose or permitting any glass fragments to escape. For this reason, the back is firmly fastened to the cabinet.

I would like to express my thanks to the Philco Corporation and the Philco District Service Representatives for the wonderful job they have done and are doing in the training program. I know the two weeks TV training program I attended at Strevell Paterson Hardware (Philco Distributor, Boise, Idaho) was certainly a great value and benefit to me. The great cost and extra effort the personnel and Philco Corporation went through was terrific. I feel very grateful for all that Philco has done for me. I believe the best way to show our appreciation is to purchase just a few more Philco parts, tubes and accessories from our Distributor, and the values are great, too! Thanks again.

FLOYD D. BROWN,
Radio and TV Shack,
Emmett, Idaho.

See the February, 1954, SERVICEMAN for the complete story on the training class conducted by Strevell Paterson Hardware.

I made a pair of wooden long-nosed pliers to squeeze condensers, move parts and wiring to facilitate discovery of intermittent faults. However, the wood breaks too easily. I should like to see manufactured a pair of plastic pliers or metal pliers encased in plastic or having plastic tips to do this kind of work.

I need auto radio manuals for 1938, 1951, 1952 and 1953. I have read references to RF 33, 35, 37, 42, 81A, 84A, 91A, 91R, 94A, 94R. Also

deflection chassis H1 and H1A and S-4627 radio. I don't seem to have any manuals for these. Can you supply them?

I am trying to specialize in Philco products, but it will take a long time for me to find enough Philco users. It makes a big difference in time and quality of service when one can sit down and study changes and idiosyncrasies in sets of one manufacturer. One can never know all there is to know about even one product let alone hundreds of them. Consider for example, dummy plugs, tubes under chassis and the 12B4 tube.

Here's to PFSS and may it prosper!

STUART C. BROWN,
The Specialist,
Des Plaines, Ill.

The pliers which you mention are available. They are made by the General Cement Mfg. Co., #8387 and list price is \$1.65.

All 1938 auto radio models are covered in the 1939 and 1940 yearbooks PR762 and PR795 respectively. 1951, 1952 and 1953 Mopar models are covered by PR1925, PR2408 and PR 2492. Studebaker manuals are as follows:

S-5127-PR1916 S-5123-PR1914
S-5124-PR1915 S-5327-PR2425
S-5323-PR2426

These manuals may be purchased from your local Philco Distributor. If the early yearbooks are still available, your Distributor will have them.

References to RF 33, 35, 37 will be found in 1951 yearbook PR2415; RF 42 in 1952 yearbook PR2416; and RF 81A, 84A, 91A, 91R, 94A, 94R and Deflection Chassis H1 and H1A in the 1953 yearbook PR2519 which should be reaching your Distributor in the very near future. Information concerning the S-4627 Auto Radio will be found in Manuals PR1302 and PR1252.

You will find that your Philco Distributor, PDI in Chicago, will be of great help to you in improving the quality of your service work. Attend the clinics, service meetings and service schools conducted there regularly.

SHOP TALK CORNER . . .

As we are the only service company in our area that services all makes, we have been able to be of assistance to many other servicemen. Our "crazy quirks" file is our biggest time saver as we readily have the answer to most unreasonable problems. If any of the fellows have real meanies we would be happy to answer their letters if they give us model and make info. We do a lot of nose, finger and eye servicing as a preliminary time saving measure and it pays off.

We have three sales and service centers in town, and you'll be happy to note all three as PFSS members. We now have 13 VHF and 1 UHF stations receivable in most local areas. You used to have a pricing chart for service costs. Are they still available?

We again offer our help if it would benefit anyone.

JUD PALMER,
Guygar Electronic Sales
& Service,
106 N. Main Street
Excelsior Springs, Mo.

Yes, TV Service charts are still available. Please order them through your local Philco Distributor.

I have a good "battery eliminator" kink coming up soon. Also, ignition noise eliminator in the "works."

I have been a certified Philco serviceman since 1926, and one of the few continuous operators! Radio service since 1926! Now "King" of Car Radio men in San Diego and growing steadily. Operate the busiest one-man shop in these parts. In all these years never have had a bit of complaint against Philco! Own and operate the following enterprises:

Excelsior Radio Electric and Mfg. Co.

Excelsior Radio Electric Co.

Excelsior Drive-In Kar Radioteria
Golden West Trading Post

and operate the Pacific Beach Greyhound Bus depot! (And have room for a few more outfits!)

My nickname is SMILING FRANK! Have built a great reputation for excellent work. Honor my guarantees and get the work out on time.

FRANK BOWERS,
Pacific Beach, Calif.



I would like to go to more service schools or would like to see the Service Clinics have more classes on TV. I attended one service class on UHF tuners last year at Crum Distributing Co. in Decatur. I believe a one-day service class once a month on television would be a great help.

CLIFFORD E. ALLEN,
Allen Radio and Electric,
Monticello, Ill.

Check with your local Distributor (Crum Distributing Co. in Decatur) often. They will be able to give you the schedule of training courses and clinics being conducted regularly.

Your request for "comments" arrived at the proper time. I did not receive a mailing of any kind for January—no PHILCO SERVICEMAN, no SERVICE SUPERVISOR, no manuals—nothing. At Yont Radio and Appliance Co. (Philco Distributors in Dayton, Ohio) I saw a copy of the SERVICEMAN that published one of my letters so am more interested in the January copy than usual. I have received December, 1953, and February, 1954, and my Identification card for 1954, so it is possible that it may have been lost in the U. S. Mail service. If possible, please duplicate the January mailing and bill me if there is any charge.

I like the Philco setup in all ways. Your firm gets about 70% of my business. I get excellent cooperation from your local Philco Distributor and his employees. Their service department has never refused any help possible on service problems.

I think your publications are improving—like the number system for manuals and the change in set-up for the SERVICEMAN. I do no selling except to boost Philco products as I do service work for more than one local dealer. Keep the good work going and if I can increase in '54 as I did in '53 I'll be very happy.

D. N. GAUVEY,
New Lebanon, Ohio.

A copy of the January mailing has been sent out to you, Mr. Gauvey, to replace the one that was probably lost in the mails. It should be reaching you very soon. And, congratulations on your successful 1953!

As an independent service operator my work covers practically every make TV made. Out of all the receivers I have serviced, I find the Philco split chassis idea excellent in chassis removal. Also service check points far better than most makes.

My only complaint is Philco insists on using tubes that are not commonly used in the average set. That makes it very difficult to carry in the standard tube caddy. All my service friends are in full accord.

EDWIN B. JAYCOX, JR.
Berwyn, Illinois.

Please try to stick to standard tubes so I won't have to keep an extra large stock and carry two service boxes up and down five flights of stairs all day. On standard sets I carry one. When the person has a Philco, I carry two. Also, you can help us by using raised centers for miniature tubes. Sometimes it takes 50 minutes just to put a tube in the sockets.

JOSEPH J. LAWRELENKO,
St. John's Radio and
TV Repair,
Bronx, New York.

The aim of any manufacturer, and Philco especially, is to give the customer a good product. Continual research into the engineering problems and technicalities of the television circuit leads us to believe that the tubes used in the Philco set, in combination with the associated circuitry, delivers better performance which is far superior to other types. In the long run, this increases customer satisfaction and, of course, a satisfied customer means more business.

SHOP TALK CORNER . . .

I would like to thank you for this tailor-made opportunity to write in to you. I have been intending to write for some time but something always seems to come up. I think your idea of these forms is great.

I have found PFSS a grand deal and it has done more to sell me on Philco than anything else you might have done. A lot of manufacturers overlook the serviceman or consider him a necessary evil. They don't know he can be their best friend or worst enemy. I know from personal experience that many customers will take a serviceman's opinion of a product above all others.

I would like to suggest that something be done about the antenna connectors on the back of your set. I have found your hookup very difficult to work with. If the

leads could be lengthened slightly, and fastened to a separate block at the top or side of the cabinet, independent of the back, it would help a great deal. It is always better to remove the back completely to service the set, and this is almost impossible with your present set-up. In order to remove the back the antenna leads must all be disconnected and then the back must be put up near the set for picture adjustments after the service on the set has been completed.

What are you going to do about a jig or power supply for checking your UHF converters out of the set? If we remove the chassis which is our only alternative at present, then the owner has no TV at all, where if we could leave the main chassis there they would at least have VHF while the converter is out.

Again I want to thank you for listening and here's for a grand 1954 for all.

LYNDON E. WILCOX,
Smith Electric Co.,
Lathams, New York.

The back of the receiver on Philco models has been specifically designed so that various methods of connecting the external antenna or antennae or the built-in antenna can be performed easily from the rear of the set, without removing the back. Should it be necessary to remove the back, the antenna leads can be easily removed through the slots in the antenna back.

If the service technician does not have a chassis at his shop from which he can obtain B plus and filament voltage, he can very easily construct a power supply with a B plus output of 240 to 250 volts using selenium rectifiers in a manner similar to the power supply in any Philco B line receiver and a filament transformer.

"ONE CALL—ONE HOUR" FLASH!

The Philco Motor Compressor School for training Philco Distributor Service Managers in the new techniques of "One Call—One Hour" Service is in its sixth week of operation at Service Headquarters, Philadelphia. Already 119 Distributor Service Managers have been carefully trained, both in motor compressor work and in methods to be used for instructing members of Philco Factory-Supervised Service. Thus, the Motor Compressor Change Program announced by Philco in January remains on schedule, with Distributor Training Centers now beginning to open up throughout the country for the benefit of Philco Factory-Supervised Service members.

"One Call—One Hour" Service means better use of time . . . happier customers! The service technician will load his car or truck with small Philco Motor Compressor Unit packages in the morning and will return to the store or shop at night with five or six lucrative replacement jobs behind him. If trouble diagnosis in the customer's home shows refrigerator system failure, he will take out the old compressor, install a new one and have the customer's refrigerator working again and her confidence restored within the hour and with

not even a package or bowl of food removed from her refrigerator.

The service technician is far ahead with "One Call—One Hour" Service. The small compressor unit package weighs about 35 lbs. and can be easily stored in the service shop. Only seven different compressors will do the job that now requires 68 different complete refrigeration replacement units. You can see what this means when making service immediately available—there are no wasted service calls, no frustrating delays and because one man can handle "One Call—One Hour" Service, carry motor compressors with him, complete more service calls in a day's time—he becomes more efficient, his time more valuable, his earning power greater.

Since it can be presumed that the entire refrigeration industry will eventually follow Philco's lead in eliminating the tragedy of refrigeration servicing as we know it today, members of Philco Factory-Supervised Service are in an enviable position—for, with training facilities now at hand, they will be the first in their communities to understand and be qualified to practice these revolutionary service techniques.

Those responsible for Philco's great Service Program are so satis-

fied with the practical results of "One Call—One Hour" Service and of the progress of Philco Training Schools and Distributor Training Centers that there seems little doubt of the original objective being achieved . . . and it is expected that after January, 1955, complete refrigerator units will no longer be shipped back to the factory for repair. This means that after January, 1955, refrigerator system repairs on Philco will be largely done in the home, using the motor compressor change techniques, and the provision of factory replacement equipment will be confined to the motor compressor assembly only.

Thus it is important for every Refrigeration member to get his training in "One Call—One Hour" Service during the months of 1954. The earlier you sign up and receive this training, the better. You have an opportunity to get ahead of everyone else, and "One Call—One Hour" Service is designed to keep you there. We urge you to contact your local Distributor Service Manager now—right now! Ask if the Distributor's Motor Compressor Change Training Center is in operation. If it is, sign up. If it has not opened yet, find out when it will and make a reservation to attend the very first class open to you. Do it today!

QUESTION BOX

QUESTION

What is the purpose of the fuses found on the Philco Electric Ranges?

AL GOLD,
Pittsburgh, Pa.

ANSWER

The fuses are placed there for the protection of the homemaker. They protect her against damage that could be done by defective appliances that might be plugged into the appliance outlets, against shorts in the oven control clock or illuminating lights. The fuses on the range do not protect the range from

defective surface or oven units. These units are fused in the line or house fuse box.

QUESTION

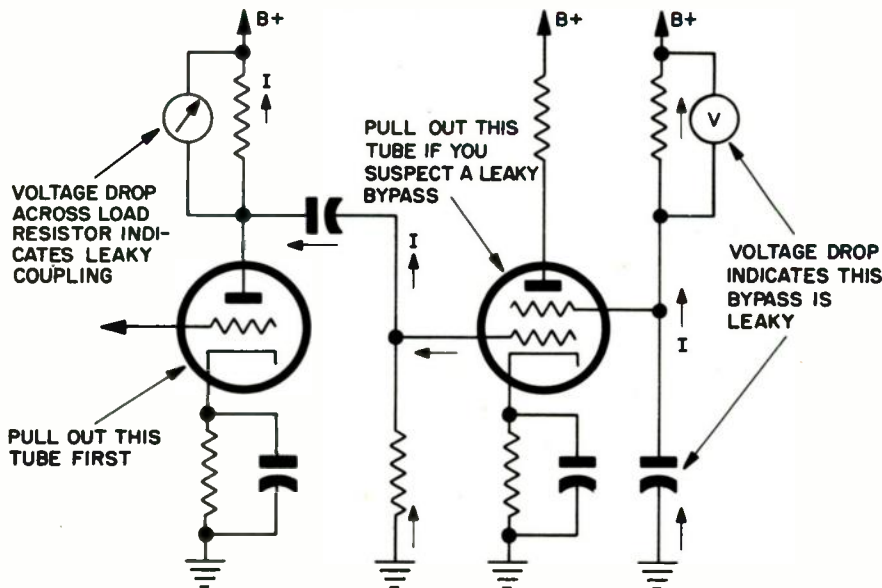
What would cause decreased sensitivity on the low end of the tuning band? I have a radio in the shop with this trouble.

TOM MCLEAR,
Baltimore, Md.

ANSWER

This is usually caused by mis-tracking, or misalignment between the tuning condenser or gang and the coils. The trouble can be located by the use of your signal generator.

10 DOLLAR AWARD!



Gentlemen, prepare to save yourselves some time and a lot of unnecessary work! Ed Holmes, Rocket Television Corp., of Garden City, L. I., New York, sent in this month's winning \$10.00 Award which promises to do just that!

Ed's letter reads as follows:

"How often has a service man cut out a coupling or a by-pass condenser, to check it for leaks, find it OK and then have to hook it back in or insert a new one because of short leads? Many a time he has been fooled because it checks OK on the ohmmeter but actually

breaks down under a higher voltage or a pulse voltage. To eliminate this waste of time I would like to make two suggestions:

"If you suspect a leaky coupling condenser, remove the tube from the preceding stage which will apply the full 'B' voltage to the coupling and, if it is leaky, there will be a current through the grid leak, coupling condenser and load resistor. By connecting a voltmeter across the load resistor a voltage drop indicates this current and shows a leaky coupling. Try to measure the drop across the load

CLASSIFIED ADS

FOR SALE OR RENT:

Owner retiring from small service shop near lake. Elevation 1200 feet, 75 miles from Los Angeles, San Diego, Palm Springs. Good for elderly man wishing to taper off in a warm, dry climate.

Living quarters, drive-in. For more details write:

PAUL J. LANG,
"RADIO"
Route 1, Box 76,
Elsinore, Calif.

TRADE:

Would like to trade a Philco Model 7008 Visual Alignment Generator (for TV and FM) for an oscilloscope.

FLOYD M. WELCH,
Welch's Radio Service,
West Grove, Pa.

We'll be glad to print your classified ads when you have equipment, etc., to sell or swap, at no charge.

However, Philco Corporation accepts no responsibility for the contents of the classified advertisements or the goods mentioned therein.

No correspondence relative to these advertisements or goods should be directed to the Philco Corporation.

resistor instead of the grid leak even though it is smaller in resistance value and has a smaller voltage drop across it. Often the grid of the following stage may be slightly positive under normal operation or may have a negative bias which would override the slightly leaky positive voltage.

"In checking for by-pass leaks remove the tube in the suspected stage, which will apply the full 'B' plus voltage to the suspected condenser. A leak will appear as a voltage drop across the dropping resistor.

"These two simple methods will eliminate unnecessary cutting of components and a messing-up of the factory wiring job, not to mention the time saved. See diagrams below."