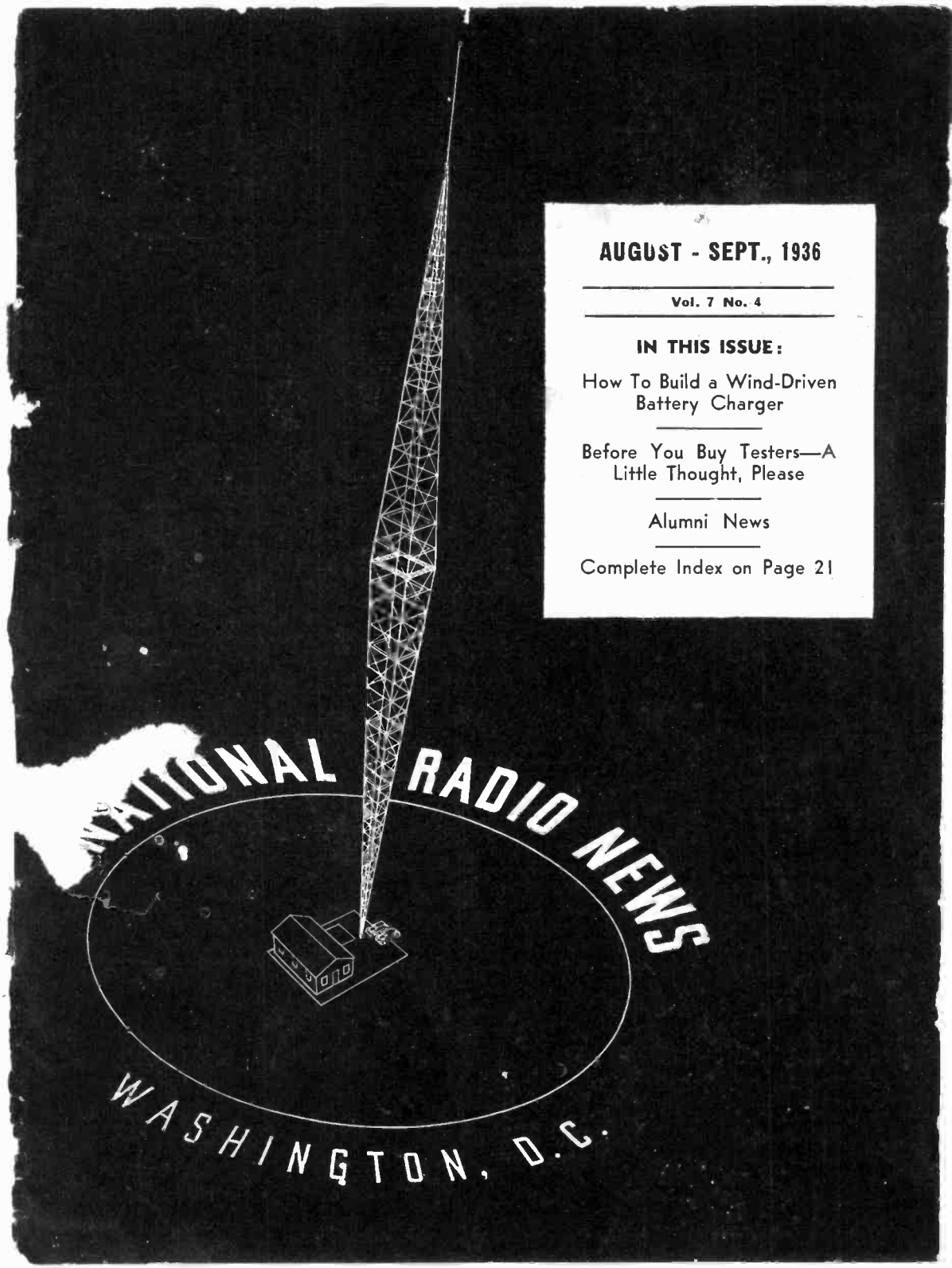


AUGUST - SEPT., 1936

Vol. 7 No. 4

IN THIS ISSUE:

E. R. HAAS

Tomorrow Never Comes!

I HAVE long felt that the fellow who coined the phrase, "Don't put off 'till tomorrow what you can do today," was one of the world's wisest wise men, for as a sure-fire formula for success, he certainly hit the nail on the head.

It has occurred to me that perhaps N. R. I. men may sometimes wonder why I repeat this warning so often; this warning not to "put off." It is simply because of all the reasons for failure, this is, I am firmly convinced, the greatest—and one that we must continually be on our guard against.

Sure, we can always find a good excuse. We can easily convince ourselves that we are too tired (or lazy?), or that we don't feel well, or that it's too hot, or that we have too much to do, or use any of the thousand-and-one reasons to justify our not working *now*—or *today*. But the *reason* is not important. The fact that we are "putting off" is important.

This "putting off" is simply a habit, an attitude that, too oft-repeated, becomes a *fixed* state of mind. First you start by one day saying, "Oh, I don't *have* to do this or do that today. I'll do it tomorrow." A week later you'll say the same thing—and a little while after that you'll repeat the pr[illegible]. Soon, from habit, you'll promise yourself *every day* to do it "tomorrow"—[illegible]fore long, "tomorrow" won't mean "the next day," but will really mean a d[illegible] will never come.

Everyone who ever undertook anything has been faced with this temptation to "do it later," or "some other time." Whether he was eventually a success or a failure, depends on whether the temptation was too much for him or whether he was too much for the temptation. Certainly it would be impossible for an individual to "arrive" unless he was of the latter class, regardless of what other conditions might be necessary for success.

The best—in fact, the only way—to master this temptation is never to succumb to it. The first time you find yourself saying, "Why bother with studying tonight—I'll skip tonight and do twice as much tomorrow evening," that is the very time to go right after your lessons and study twice as hard as you ordinarily would. Soon you'll find you no longer have to fight temptation; it will no longer exist; it just won't ever occur to you to say, "I'll do it tomorrow." Instead, you will find yourself automatically saying, "I'll do it *now*," and actually *doing* it.

E. R. HAAS, *Vice-President and Director.*

How to Build a Wind-Driven Battery Charger

By L. J. MARKUS

N. R. I. Associate Technical Writer

L. J. Markus

Editor's Note: Radio sets operating entirely from a 6-volt storage battery are popular in homes where A.C. power is not available; here the inconvenience of carrying the storage battery to a garage for recharging makes some type of battery charger almost a necessity. In this article, prepared by Mr. Markus from data supplied by Graduate Kenneth A. Stirling, are presented suggestions for building your own wind-driven battery charger. Naturally a home-made charger cannot be expected to perform as efficiently as wind-power units now on the market, but if you have the required parts and the time, the construction of one will prove interesting and instructive.

WITH an old automobile generator, a few old auto parts, a few scraps of wood and some heavy wire you can build a wind-power battery charger which will keep the average Radio battery charged. An easily-made propeller mounted directly on the shaft of the generator turns in the wind, driving the generator at sufficient speed to generate the voltage required for battery charging purposes. Naturally, the stronger the wind, the better the operation of this charger; it is highly important, therefore, that you mount the unit in a location where it will be in the wind most of the time. Never sacrifice breeze to save wire expense. The vane which automatically keeps the propeller facing into the wind is so mounted that it can be pulled at right angles to the generator shaft during storms and high winds, stopping the generator.

The propeller is the most important part of any wind generator installation. It may be necessary to make several blades in order to get one which will match the particular generator you are using and develop sufficient speed in the prevailing winds. A straight grained spruce board about 42 inches long, 6 inches wide and a full inch thick is required. Lay out one inch squares all over the board, then trace in the outline of the propeller. Cut out the propeller around this outline with a coping saw or with an axe and knife.

The next step, the actual carving of the blade, depends upon whether your propeller is to turn clockwise or counter clockwise. The instructions given here apply to a clockwise-rotating propeller; to secure the opposite rotation simply work as if you were looking *through* the page at the propeller diagram. Sketches (see next page) show the cross sectional shape of the propeller at points *A*, *B*, *C* and *D*; note that the front faces of the blade, against which the wind pushes, have flat rather than curved surfaces, the pitch of the surface being less at *D* than at *A*. Try to make the change between these two positions as gradual as possible. Shave the edges down fine, and neatly bevel the center part, around the hub, to meet the blades. Leave only enough wood at the center to give strength to the hub.

Round off the back of each blade in the manner shown in the cross-section sketches, then taper the backs out toward the tips, starting at a point about 4 inches away from each tip. The best plan is to carve a small model of the propeller first, to make certain that you get the desired direction of rotation.

Balancing the propeller blade is the next step. Drill a small hole through the exact center of the hub, and fasten the propeller vertically to some support, using a nail which is just a little smaller than this hole. Spin the blade a few times and note which end comes to rest at the bottom. Remove a little waste wood from the back of the heavy blade until the blades balance. Enlarge the hole in the hub to the size of the generator shaft, then sandpaper the entire surface of the propeller until it is perfectly smooth. Apply several coats of varnish, preferably spar varnish.

The charger unit, consisting of the generator, the propeller and the vane, is mounted on a platform which is attached to the steering wheel of an old auto steering apparatus. Try to get a steering wheel having a hollow center shaft which will allow passage of the vane control cable down to the ground. Bolt the charger platform, a 2 inch by 10 inch by 24 inch piece of

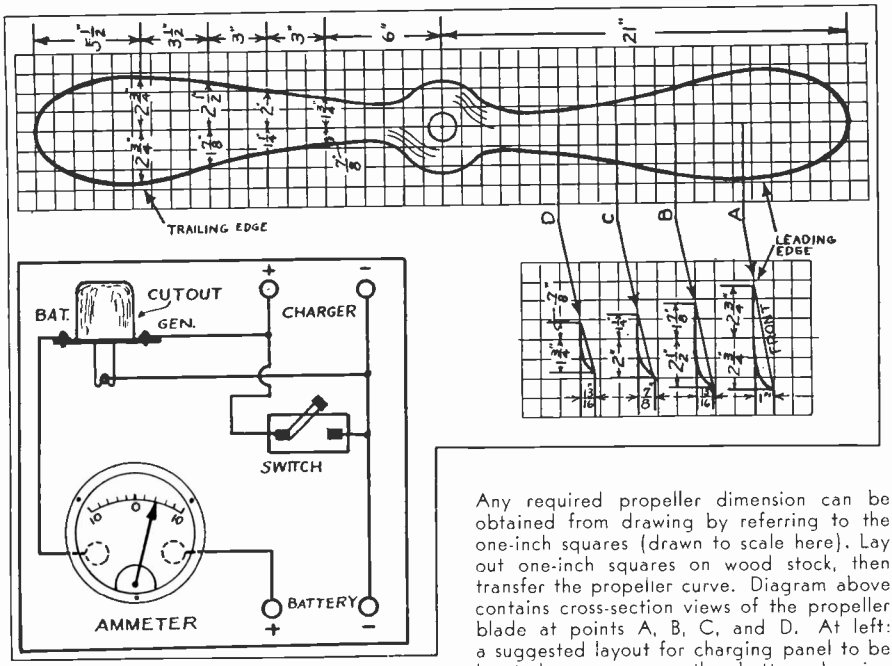
(Page 4, please)

How to Build a Wind-Driven Battery Charger (Continued from page 3)

wood, to this wheel, being careful to balance the platform on the wheel. Cut the vane from sheet iron or plywood, or use the side of an apple box, as you prefer. Suggested dimensions and locations for the different parts are given in the diagrams.

See that the generator is in first-class working order. Clean it out thoroughly with kerosene, giving especial attention to the bearings.

Fasten the steering wheel support to a post, to a building or to a tower which is so located that there are no nearby trees or buildings which will reduce the strength of the wind. Ground the frame of the generator to the steering wheel shaft, and run a wire from the positive terminal of the generator to the bolt on which is mounted a Model T Ford timer roller. This roller contacts a band or ring of copper mounted on the



Any required propeller dimension can be obtained from drawing by referring to the one-inch squares (drawn to scale here). Lay out one-inch squares on wood stock, then transfer the propeller curve. Diagram above contains cross-section views of the propeller blade at points A, B, C, and D. At left: a suggested layout for charging panel to be located near or on the battery-charging bench.

Adjust the brushes so that the generator will turn freely and will start in a light wind. If necessary, turn down the commutator on a lathe until it is perfectly smooth.

To determine the direction in which the generator should be turned, connect a storage battery across the terminals of the generator. The direction in which the generator revolves is that in which it should be driven by the propeller. You can, however, reverse this direction by reversing the connections to the field coils of the generator.

steering wheel shaft but insulated from it by rubber or some other insulating material. In this way current can be taken from the generator without the possibility of connecting wires becoming twisted.

If the generator used is of a type in which the *positive* terminal is grounded, simply reverse the connecting wires to the generator; the important thing is to make sure that like terminals on battery and generator are connected together.

Use heavy copper wire to make connections

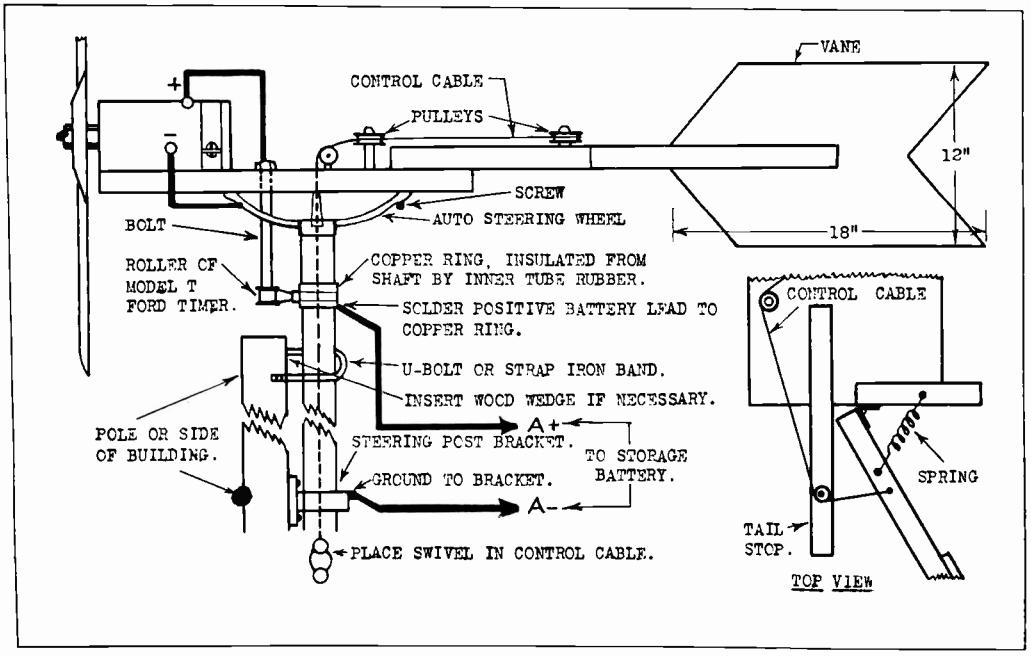
between the charger and the battery. For distances less than 50 feet use No. 8 or possibly a smaller insulated solid copper wire; for greater distances use No. 6 wire.

The vane control cable can be any flexible stranded wire, with a swivel inserted to prevent twisting. Select a spring strong enough to pull the vane over when the control wire is released. A little experimentation will give you the correct spring position. The cable is pulled taut and fastened while the generator is in operation.

to reverse connections to one pole of each pair in order to obtain the correct polarity. If the generator spins freely in a strong wind without delivering any voltage, the field coils are "bucking" each other and should be reversed.

When installing a wind-charger, be sure to make some provision for regular oiling of the generator bearings. Installing large oil caps will reduce the number of oilings required.

Wires from the generator go to a small charging panel on which is mounted the cut-out, an ammeter and a shorting switch. Always short



It is advisable to key the propeller to the generator shaft to prevent it from loosening and slipping on the shaft. If there is a tendency for the blade to wobble on the shaft, apply liquid solder or plastic wood to the inside of the hub.

If you find that the wind-propelled generator does not come up to charging speed in an average wind, try connecting the field coils of the generator in series-parallel or parallel instead of in series. When doing this, however, be sure

the generator terminals (by closing this switch) when you disconnect the battery from the generator; otherwise the high open circuit voltage developed might break down the armature insulation and ground the armature.

Since no two persons will have the same materials on hand, the minor details of this project have been omitted. If you have a good generator with good bearings, and make a good propeller, there should be no need to use gears or a belt to step up the propeller speed.

Tips for Applicants

(From "The Vocational Digest")

BEFORE YOU LEAVE home to interview a prospective employer, remember to:

1. Make yourself clean and neat.
2. Comb your hair.
3. Shave.
4. Clean your teeth.
5. Clean your nails.
6. Shine your shoes.
7. Wear a clean shirt and collar.
8. Replace missing buttons on clothing.
9. Press and brush your clothes.
10. Remove gaudy pins.
11. Carry a clean handkerchief.
12. Wear a hat, or a cap that goes well with your coat.
13. Be sure you know the correct address and the name of the person you are going to see.
14. Be sure you take with you your letter of recommendation or introduction if you have one.
15. Leave early enough to keep your appointment on time.

ON THE WAY to keep your appointment:

1. Review in your mind the details of your past experience, so that you can answer questions without hesitation.
2. Think about what the *employer* needs, and how you can meet those needs.
3. Review in your mind your qualifications for the prospective position.
4. Determine to succeed in getting the position.

The testimony of several young men and women has shown that many prospective positions are forfeited through failure to remember these important details.

WHEN YOU ARRIVE at the place where you intend to apply for a position, it will be to your advantage if you remember to:

1. Check up on your personal appearance before entering.
2. Be on time, but not over ten minutes ahead of time.
3. Leave your cigarette outside.
4. Kill any tobacco or other odor on your breath.
5. Remove any candy or gum from your mouth before entering.
6. Remove your hat or cap as you enter.
7. Ask only for the person you are to interview.
8. Remain outside "Private Office" until told to enter.
9. Refrain from interrupting a conversation.
10. Introduce yourself, present letter of introduction, and state your reason for calling.
11. Stand erect and remain standing until invited to be seated.
12. Sit comfortably in your chair.
13. Do not slouch.
14. Be courteous all the time.
15. Let the employer do most of the talking.
16. Answer questions directly and truthfully.
17. Speak distinctly, and use the best English you can.
18. Do not give the employer a "hard luck" story. Talk about his needs rather than yours.
19. Be willing to take a test to show your ability.
20. Be interested in the possibilities for promotion, but be willing to start at the bottom and work up.
21. Be willing to return for a second interview. INFORMATION from employers shows that the young men and women who are hired and succeed are the ones who remember these pointers.

———*n r i*———

Shop Kinks

The following suggestion was sent in by Student George Boyer, New York City:

"To keep soldering iron clean, place steel wool in spool iron holder. When the iron is hot, insert tip in steel wool, give one twist, and the tip is clean. Saves time and soldering tips."

How about some suggestions from the rest of you fellows, ideas you have worked out and found practical for doing routine jobs easier and better? Write 'em up, place "Shop Kinks" plainly at top of page, and send them in addressed to the editor.

Finds Broader Life In Radio

"I am so proud of my course I just can't keep from dropping you a line. Am on only the 35th lesson and service work is piling up so, I find myself a very busy man. Life for me in the future really looks bright—full of fascinating, interesting work with new friends being made far and near. Last week I received my Model 554A Readrite Signal Generator and Model 720A Set Analyzer, so from that you may guess I am stepping out after the work."

D. P. HIGGINS,
Big Four, W. Va.

The Laboratory Page

The purpose of this department is to furnish supplemental experiments to students who have completed their Home Laboratory Course, but who wish additional laboratory experience. You are not required to perform these experiments, but you will gain increased knowledge by doing so.

Most of the material required will be that received as part of the Laboratory Course. Any other material necessary can be purchased very reasonably and will constitute an investment rather than an expense as it will serve as replacements in service work or be useful in your shop afterwards.

By
George J. Rohrich,
Engineer in Charge
N. R. I. Laboratory

A COIL, condenser, resistor, or vacuum tube acts in a peculiar manner when used alone with a source of power; when combined in various ways, different actions occur. Our object, then, is to observe what will happen under various conditions so that we can utilize the power line to supply power for many useful purposes.

It would appear that substituting the house lighting supply for batteries would render the battery operated set a socket-powered receiver, especially if the same voltages are maintained in each of the circuits. To a certain extent this is true, but we find that simply substituting the house lighting supply introduces an objectionable hum into the loudspeaker, particularly when the power is applied directly to the B, C and screen grid circuits of the tubes. It is necessary to filter the hum, or most of it, out of the current supply before satisfactory operation can be obtained while applying the house lighting current to these circuits.

Power supplied to a house lighting outlet is either *alternating current* (A.C.) or *direct current* (D.C.). A.C. may have to be converted into D.C. for some purposes. This is accomplished simply by inserting the plate circuit of any vacuum tube in series with the power line at any point. The rectifying property of the vacuum tube will then allow direct current to flow into the entire circuit, even if A.C. is delivered by the wall outlet, or it will allow direct current to continue to flow if connections are made in a definite manner. In the latter case the plate circuit of the vacuum tube simply acts as a resistor.

Before giving the details for conducting the experiments to prove that the facts are as stated, it is advisable to include a 110 volt lamp of any wattage rating into the circuit as shown in Fig. 81. (Wires A and B are those sent as Item 55 in Outfit 5BA-1, while the plug *P* is Item 56.) Connect the wire *B* so that one end connects to a terminal of Item 56 while the other end of this wire connects to one terminal of any standard lamp socket. Note that one end of the wire *A* connects to the remaining terminal of the plug *P* and the other end remains disconnected. Now connect the third wire *G* so that one end of it attaches to the remaining terminal of the socket, while the other end of it attaches to a water pipe.

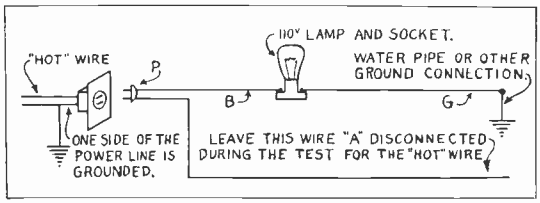


Fig. 81

After the circuit has been wired as shown, place the plug *P* into the wall outlet so that the lamp will light by way of the circuit through the ground. If the lamp does not light then reverse the plug *P*.

Should the plug *P* be removed at any time, take care that it is replaced in the correct position. The plug should be marked so it can be easily replaced in its proper position.

Explanation: The wire *G* now can be removed from the ground and the wires *A* and *G* can be used as a source of 110 volt supply for our experiments, in place of using the wires *A* and *B*. This is because the resistance of any 110 volt lamp with a rating of 25 watts or more will be less than 100 ohms for the amount of current we will use. As our experiments will not require more than 20 milliamperes, we will not lose more than 2 volts across the lamp; we will therefore have at least 108 volts still available across the wires *A* and *G*.

The filaments of 110 volt lamps are made of tungsten wire, which changes its resistance with a change in temperature and, as the temperature varies over an extremely wide range, the resistance also varies over an extremely wide range. For instance, the tungsten wire in a 25 watt lamp has a resistance of 484 ohms when it is hot

(Page 8, please)

and passing 220 milliamperes, yet the same filament has a resistance of only 30 ohms when it is cold and passing one-half milliampere. With 20 milliamperes flowing through the filament, its temperature increases slightly and its resistance is approximately 95 ohms.

From these properties of the resistance wire in the lamp, we can see that it serves better than a fuse for protective purposes in case of a wrong connection, because the lamp will light up when we are overloading the circuit, which we will eventually connect to the wires *A* and *G*, and at the same time no damage is done to the "fuse." The greatest amount of current which will flow is that amount needed to light the lamp to full brilliancy, that is, when the wires *A* and *G* are held together, or when the wire *G* is accidentally or purposely connected to the ground. As the wire *A* will be connected to the grounded side of the power line when the plug is inserted correctly, no harm will result if the end of the wire *A* touches a grounded object.

Power Limiting Panel

The arrangement shown in Fig. 81 has been extended to a practical power limiting panel in Fig. 82. The value of this arrangement has been proved many times in the N. R. I. Laboratory, and I suggest that you assemble a similar circuit for testing purposes. Notice that an extra socket has been added to the wires *A* and *G*. An extra socket has also been added in parallel with the wires *B* and *G* so that either one of two lamps may be used separately or together, by unscrewing or tightening the lamps in their sockets. By using various lamps we can limit or extend the amount of power taken from socket No. 2 while receivers or other power-consuming devices are connected to it.

An example of using Fig. 82 while testing a defective receiver will demonstrate its usefulness. A set is brought to you which blows fuses in the customer's home. Should you connect this receiver to outlet No. 1 in Fig. 82 your fuses also will blow or burn out. However, if you use a single 200-watt lamps (or a combination of lamps that total 200 watts) you can connect the defective receiver to outlet No. 2 and then the lamp (or lamps) will burn brightly. You can then work on the receiver to clear the source of trouble, probably caused by short-circuited wires in the cable or short-circuited windings in the power transformer or rectifier circuit. After the trouble is clear the lamps will glow dimly or not at all and the receiver will operate in a normal manner with approximately 90 volts or more being supplied to it.

Type of Filament	*Rating*	*Current at Rated Voltage*	*Resistance at Rated Voltage*	*Resistance Cold (Approx.)*
Tungsten	**House Lighting**			
	10-watt, 115-volt	.09	1320	132
	25-watt, 115-volt	.22	530	43
	40-watt, 125-volt	.32	390	32
	50-watt, 115-volt	.44	264	22
	100-watt, 115-volt	.87	132	12
	150-watt, 115-volt	1.30	89	7
	200-watt, 115-volt	1.74	66	4
	Auto			
	3-cp., 6-volt	0.6	10.0	1.7
	6-cp., 6-volt	0.9	6.7	1.1
	21-cp., 6-volt	2.0	3.0	0.5
	Flashlight			
	1.2-volt	0.50	2.4	0.6
	2.2-volt	0.25	8.8	2.2
	3.8-volt	0.30	12.7	3.4
Carbon	15-watt, 110-volt	0.14	807	1380
	50-watt, 110-volt	0.45	247	438
	100-watt, 110-volt	0.91	121	258

The table given above lists the approximate resistance and maximum current ratings of various tungsten and carbon lamps. These values are average values and you may find that variations of plus or minus 10 per cent will exist. It is interesting to note that the resistance of tungsten increases with increases of current (and temperature) while carbon decreases.

With the power limiting panel available, I will point out other interesting properties of various devices while connected to a power line, on "The Laboratory Page" of future issues.

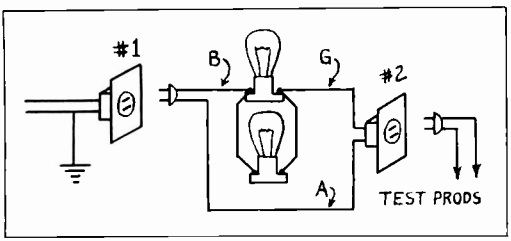


Fig. 82

The Service Forum

Conducted by

J. B. Straughn, N. R. I. Service Consultant

GREBE MODELS AC6 AND AC7 — **OSCILLATION**

Oscillation accompanied by a high plate current on one or more tubes indicates that such tubes are gassy. When in doubt try new tubes. Lack of detector plate voltage is generally due to a burned out 2,500 ohm detector plate resistor. The detector plate condenser between this resistor and the chassis should be checked. Lack of plate voltages may be due to an open in the bias resistors. The 26 bias resistor has a value of 95 ohms while that for the 71A has a value of 695 ohms. The two items refer only to the A.C. 6, insofar as the voltage is concerned.

———*n r i*———

LANG MODEL BA5 — **OSCILLATION AND LOW VOLUME**

This is often caused by a defective cathode to ground by-pass condenser. A .5 microfarad 600 volt condenser will make an excellent replacement.

———*n r i*———

KOLSTER MODEL K20 — **NOISE**

A frying noise in this set is often caused by a defective grid leak. Another having a value of 2 megohms should be installed. The part is located directly behind the 27 type detector tube.

———*n r i*———

KOLSTER MODEL K20 — **OSCILLATION AND HUM MODULATION**

This is generally due to a burned out grid suppressor in one of the R.F. stages. Make sure that the tube in that stage is not internally shorted. Remove the open grid resistor and its shunting condenser and install a 2,000 ohm replacement resistor.

———*n r i*———

ATWATER KENT MODEL 756 — **OSCILLATIONS**

If this receiver oscillates from 1500 to 1800 kc. and cuts out at frequencies higher than 800 kc., replace the R.F. plate by-pass condenser with another having a capacity of .1 mfd.

ERLA MODEL 224 — **EXCESSIVE PLATE CURRENT ON 45 TUBES**

Check the two resistors connected across the speaker field. The one which is grounded has a value of 10,000 ohms while the other connecting to the center tap of the high voltage winding has a value of 6,000 ohms. A burn-out of the latter will prevent any bias from being applied to the control grids, thus resulting in excessive plate current.

———*n r i*———

EMERSON MODEL 250 — **INTERMITTENT RECEPTION**

Check the two dry electrolytic filter condensers in the single case. They have a capacity of 8 and 16 mfd. Due to the physical size of the unit, a factory replacement is advisable.

———*n r i*———

CROSLEY MODEL 706 (Showbox) — **FADING AND OSCILLATION**

If this trouble only shows up when the dial is touched or moved, take out the washer located between the condenser housing and pinion gear. Clean it and the points with which it makes contact with sandpaper and bend it in order to make a better connection.

———*n r i*———

CROSLEY MODEL 706 (Showbox) — **DISTORTED OR DEAD**

A piece of wire soldered on the bottom of the aerial lug and fastened at the other end under the screw on top of the aerial and ground strip may clear up this trouble.

———*n r i*———

CROSLEY MODELS 704, 706 — **HUM**

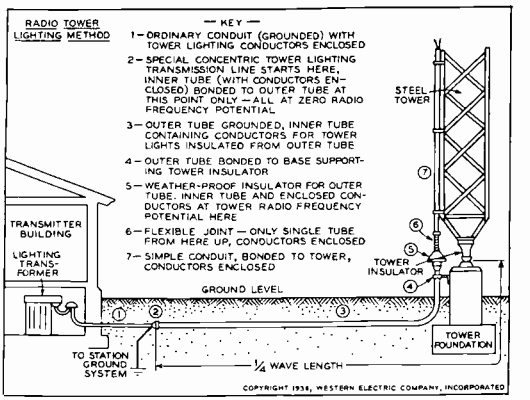
This is generally caused by a breakdown of the .5 mfd. detector plate condenser. A 1 or 2 mfd. 600 volt paper condenser will make a satisfactory replacement. Do not place the condenser near the power tubes or rectifier tubes.

(Page 11, please)

Improved Method of Lighting Radio Towers Found

A NEW solution to the problem of supplying power to lights on insulated Radio towers has been devised by engineers of Bell Telephone Laboratories for the Western Electric Company. It not only has technical advantages over existing methods, but is also simpler and more economical. It has already been applied in the lighting system used on the antenna of Station WWJ, Detroit, Michigan.

The law requires that Radio towers be illuminated for the safety of aircraft. The advertising value of having the lofty structures illuminated has also been a consideration. While batteries of flood-lights on the grounds have been used, lights on the towers themselves are now virtually universal.



Where the tower is itself the radiating antenna, it is, of course, electrically charged. Where it serves as a mast to support the real antenna, it lies in the immediate field of the Radio-frequency energy emanating from the antenna. In either case power lines running up the tower to the lights would collect troublesome and dangerous Radio-frequency voltage if special apparatus such as choke coils, motor-generators, or other provisions were not employed to isolate the power line.

The new method, utilizing a specially designed concentric cable which connects the tower with the light power supply eliminates all other protective apparatus. This cable is composed of an outer metallic tube which is at ground potential over its entire length, and an inner metallic tube insulated from the outer shell except at the end away from the tower where it is bounded to the outer sheath. The length of this line is designed to bear a direct relationship to the frequency at which the Radio tower radiates (¼ wavelength). Within the inner tube are the two insulated conductors which carry the illuminating current. The assembled line is buried in the ground.

As the line approaches the tower, the Radio-frequency voltage on the conductors builds up until, at the point where the conductors commence to rise up the tower, they are at the same potential with respect to the ground as the tower itself.

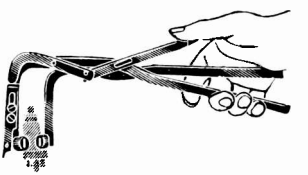
This line serves the important function of an ideal second harmonic shunt, being one-half wavelength long at twice the fundamental frequency. Consequently, it offers effectively zero impedance to this undesired frequency, preventing same from being radiated.

While the WWJ transmitter is a 5-kilowatt installation, the principle of the new lighting method indicates that it is practical for stations up to 50-kilowatt capacity.

—n r i—

It's Here at Last

A DEVICE for which there has been a real need has at last made its appearance. It is called the Tube Extractor (see illustration at right) and is manufactured by the American Radio Hardware Company, 476 Broadway, New York City.



The Tube Extractor

Radio men are enthusiastic about the Tube Extractor. Now you can get into those difficult places to remove tubes—*without* taking the receiver out of the cabinet and *without* burning your fingers or waiting until the tubes cool off. Saves time, temper and tubes. Prices and further information may be obtained from the manufacturer upon request.

The Service Forum (Continued from page 9)

as excessive heat from them will cause trouble. The wet electrolytic condenser may be checked by substitution and you should check the center tap resistor across the 5 volt filament winding. The total resistance should be 50 ohms.

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CROSLEY MODEL 601 (Bandbox) **CONDENSER TRACKING**

It is necessary to align the tuning condensers in this receiver with the shields removed. The additional capacity introduced into the circuit when the shields are replaced upsets the alignment. If the two end condensers are removed from the chassis and a slot sawed in the ends of each shaft with a hacksaw, they may be adjusted with a screw-driver without removing the shields. The center condenser need not be adjusted as the other two circuits may be made to track it.

———*n r i*———

CROSLEY MODEL 601 (Bandbox) SQUEALS

The tuning condensers often slip on their shafts, causing trouble of this sort. By tightening and aligning the tuning condensers this trouble may be eliminated.

———*n r i*———

LYRIC MODEL A-65 RESISTOR TROUBLES

Considerable difficulty has been experienced with the 15,000 ohm 2-watt and 10,000 ohm 1-watt (blue) resistors. A change in value or complete burn-out of the resistors often occurs. Wire wound resistors will prove a satisfactory replacement. If the oscillator does not function over the entire range of frequencies, decrease the bias on the oscillator tube by reducing the value of the cathode resistor.

———*n r i*———

FREED-EISEMANN MODELS NR 65-78-79 **INTERMITTENT**

This is generally due to a corroded connection under the rubber insulation on one end of the 1-watt 500 ohm fixed bias resistor. This resistor is in series with the volume control. Replacement of the resistor should clear up the trouble.

———*n r i*———

SILVERTONE MODEL 1630 **VOLUME CONTROL ACTS TOO QUICKLY**

The insertion of a .0001 mfd. condenser in series with the antenna will oftentimes clear up this trouble. The same effect may be obtained by shortening the length of the antenna.

R.C.A. MODEL R-35, RE-57 **NOISE**

This complaint on these receivers is generally caused by defective resistors and replacement of all of the resistors is a positive cure. The following symptoms will occur when different resistors become defective. No plate voltage on first audio tube. Replace the 70,000 ohm 2-watt resistor in the power supply. No plate voltage on detector tube. Replace the 500,000 ohm 1-watt resistor located near the R.F. choke on the resistor panel. Lack of screen voltage on detector tube. Replace the 1.5 megohm 1-watt resistor located near the detector plate resistor.

———*n r i*———

EARL MODEL 32 **WEAK SIGNALS**

Poorly soldered connections and dust and dirt between the trimmer condensers may cause this trouble. If the mica on any of the trimmers seems to be cracked, install new pieces.

———*n r i*———

DE WALD MODEL 61 **DISTORTED-VIBRATOR HASH**

Check for a short between the cathode terminal of the 41 socket and the positive filament terminal of the 37 socket. Due to the close proximity of these two points, a short may easily occur.

———*n r i*———

CLARION MODEL A.C. 40 **OSCILLATION**

Try reversing the line plug. If this does not clear up the trouble, connect a .01 mfd. 600 volt condenser from one side of the power line to the chassis of the receiver. Then insert the power line in such a way that a spark will be observed when the ground wire is touched to the chassis.

———*n r i*———

BOSCH MODEL 242 **NOISY OR DEAD**

If this action occurs when the receiver is jarred, examine the I.F. transformers, removing them from their cans. It is possible that their leads are shorting to the metal shields.

———*n r i*———

AIRLINE MODEL 7D **DEAD**

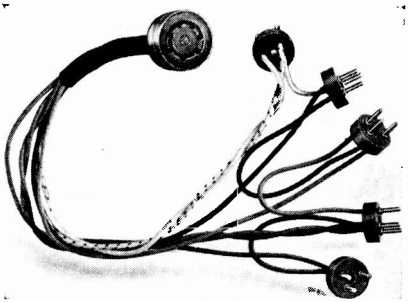
This is often caused by an open in the 4,100 ohm wire wound voltage divider resistor. This resistor is in two sections—25,000 ohms and 16,000 ohms. Two watt replacement resistors may be employed.

(Page 23, please)

New "B" and "C" Battery Adaptor Announced by Eby

Added flexibility in making "B" and "C" connections to sets of the Philco battery types is now made possible by a new battery adaptor recently announced by Hugh H. Eby Company.

Consisting of a socket especially made to fit the plug already in the receiving set cable proper,



The Eby Adaptor

the Eby Adaptor supplies a multiple connector ending in several plugs which fit standard "B" and "C" battery sockets. These adaptors come in two types, applicable to a battery combination where a set connector of either 7 or 8 prongs is now required.

The 7-prong Eby Adaptor supplies ready connection where three 45-v "B's" and two 4½-v "C's" are needed; while the 8-prong adaptor makes connections with an added 4½-v "C" battery. These are the "B" and "C" battery values of the two types of Philco power packs.

The Eby Adaptor is fully described in the new Catalog sheet, which may be had by writing H. H. Eby, Inc., 2066 Hunting Park Avenue, Philadelphia, Pa.

———*n r i*———

Volume Control Replacement Guide Offered

The proper replacement for a defective volume or tone control in practically any manufactured set can be quickly and accurately determined by referring to the extensive listings in the Clarostat Volume Control Replacement Guide recently issued. This 80-page manual represents a thorough review of all available service data and is believed to be one of the most complete compilations of volume control replacements obtainable. Service men may obtain a copy through a local jobber, or by writing on their business letterhead to the Clarostat Mfg. Co., Inc., 285 N. 6th St., Brooklyn, N. Y.

Radio Tubes Mistaken for Bombs

Two of the first metal Radio transmitting tubes developed by General Electric were suspiciously regarded as bombs by Panama Canal officials 13 years ago, and were kept under close watch in the ammunition "dump" there for fear that they were intended to blow up the canal locks.

This was revealed by I. R. Weir of the General Electric Radio engineering department in telling of his experiences while installing a transmitter in Tegucigalpa, Honduras, Central America.

"Arriving at the Canal on my way to Honduras, I found myself detailed for special investigation after the regular custom officials had made their inspection," Mr. Weir said. "I finally found I was suspected of carrying bombs, probably with the intention of blowing up the canal locks. After much argument and explanation, it was agreed that I leave the tubes in the ammunition dump during my stay in the canal zone."

Mr. Weir added that one of the greatest handicaps in his work at Tegucigalpa was the lack of a technical vocabulary among the natives.

"First I attempted to teach them the English words for the various parts of a large tuning coil for the Radio transmitter, but I found this very difficult. So I decided to ask them what each object suggested to them in Spanish. The large tuning coil suggested a sugar mill; the large porcelain insulators, sausages; the insulators used to support the wire were called guitars; the tuning coil wire, a tube of many copper wires; and large rheostats, victrolas.

"After realizing that these suggested words meant more to the native laborers than the correct terms, very little trouble was experienced in building the sugar mill with the guitars mounted upon sausages wound with a tube of many copper wires."

———*n r i*———

In Our Next Issue

The articles "A Trip Thru a Tube Factory," "A Trip Thru the Farnsworth Television Laboratories," etc., in former issues of the NEWS, met with such response on the part of our readers that we've been scratching our heads ever since for ways and means to duplicate them in some other branch of Radio.

At last we've been successful! Thanks to the courtesy and cooperation of the P. R. Mallory Company, Inc., Indianapolis, Indiana, manufacturers of electrolytic condensers, our next issue will include "Sightseeing in an Electrolytic Condenser Factory," by L. J. Markus, recently appointed N. R. I. Association Technical Writer.

RADIO-TRICIAN
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Service Sheet
Compiled Solely for Students and Graduates
NATIONAL RADIO INSTITUTE, WASHINGTON, D.C.

SPARTON MODEL 636 MX

VOLTAGE-RESISTANCE CHART

Line Voltage : 115 volts

Position of Volume Control: Full with Antenna Disconnected

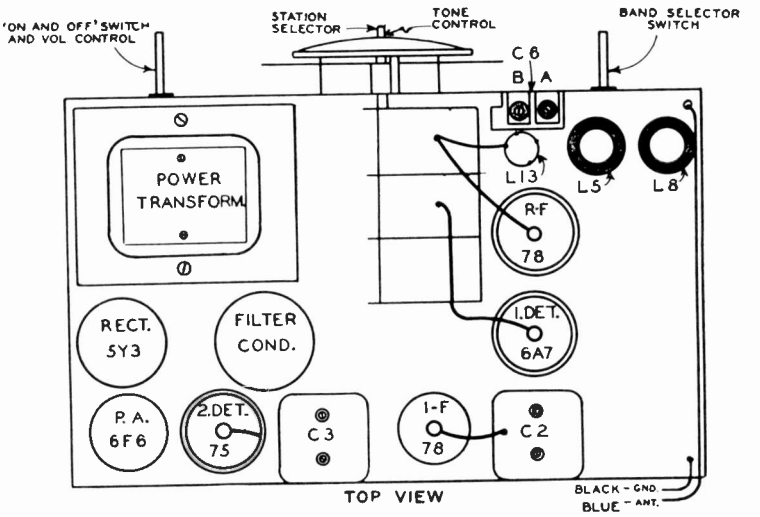
Voltage Tap : 95 to 115 volts

Position of Band Selector Switch: Broadcast

Tube	Function	Measurement	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
			Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8	Grid Cap
78	R-F Amplifier	Volts	*	300	150	0	0	*	-	-	0
		Ohms	0	35000	22500	0	0	0	-	-	1000000
6A7	1st. Det-Oscillator	Volts	*	290	140	290	0	0	*	-	0
		Ohms	0	30000	22000	40000	45000	0	0	-	1000000
6K7	I-F Amplifier	Volts	0	*	300	150	0	-	*	0	0
		Ohms	0	0	30000	22000	0	-	0	0	1000000
75	2nd. Det-A.V.C.	Volts	*	100	0	0	0	*	-	-	0
		Ohms	0	500000	500000	500000	330	0	-	-	1000000
6F6	Power Amplifier	Volts	0	*	360	360	0	-	*	0	-
		Ohms	0	0	30000	30000	100000	-	0	600	-
5Y3	Rectifier	Volts	0	5	-	400	-	400	-	0	-
		Ohms	0	30000	-	0	-	0	-	30000	-

NOTES: Voltage and resistance readings are for schematic diagram shown on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.

* 6.2 or zero volts, depending on twist of filament hook-up wire.



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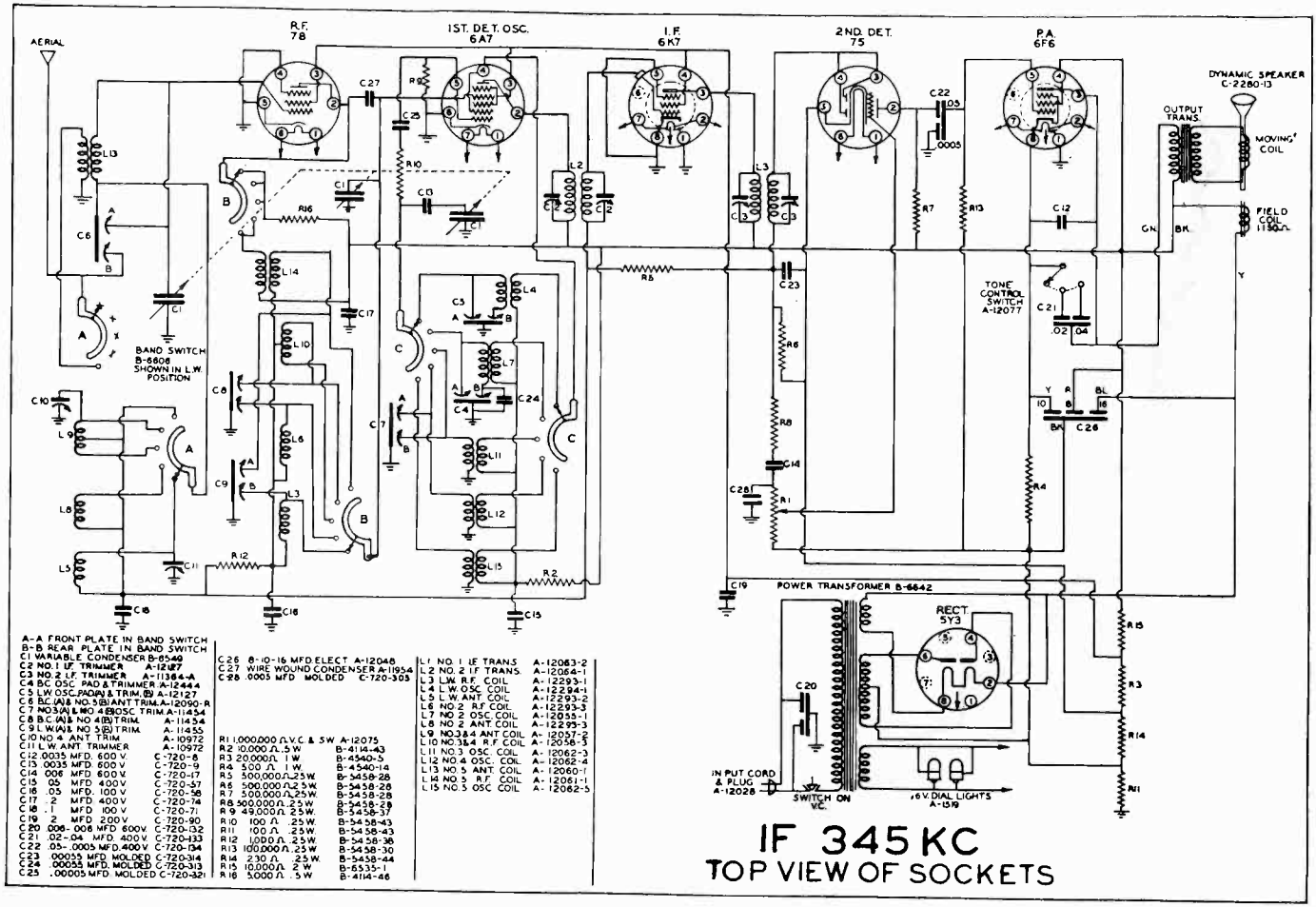
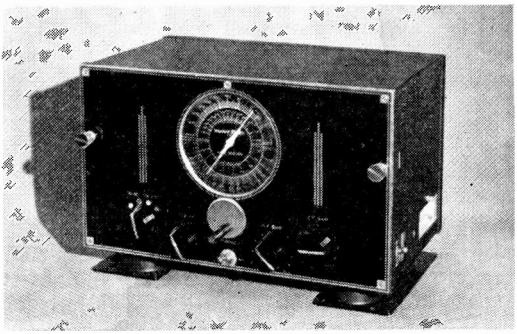


Schematic Diagram—Sparton Model 636 MX

Efficiency of Aviation Radio Improved

IN a single, small and light-weight Radio receiver for aircraft, Bell Telephone Laboratories have combined three important services for the private flyer. Now, in the limited space available aboard the smaller types of planes, this compact unit may be conveniently installed, bringing to the pilot efficient reception in the beacon and the broadcast bands as well as in the short-wave bands employed for communication with ground stations. This new three-purpose receiver is known as the Western Electric 20 type, and is supplied with or without a small remote control unit, which may be mounted on or near the plane's instrument panel. A flexible cable connecting the remote control unit with the receiver, permits installation of the latter in some out-of-the-way corner of the plane.



The new 20A aviation Radio receiver with controls mounted on front panel for direct operation when unit is installed within easy reach of pilot.

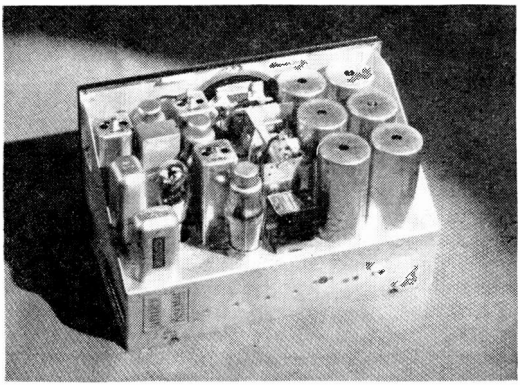
The new receiver is a superheterodyne, with one stage of tuned Radio-frequency amplification, two stages of intermediate-frequency amplification and two stages of audio-frequency amplification. Four separate frequency bands are provided, the first band being 200 to 400 kilocycles, for beacon and weather stations. The second band is from 550 to 1500 kilocycles, for commercial broadcast stations. The third band is from 1500 to 4000 kilocycles for aircraft, police and amateur communications, and the fourth band is from 4000 to 10,000 kilocycles, for aircraft and amateur communications and for foreign broadcast stations.

One form of the receiver has its controls mounted directly on the front panel and is intended for mounting within easy reach of the pilot, whereas the other is provided with a remote control unit on a flexible cable. The diminutive control unit may be mounted flush on the plane's instrument panel, if desired, for convenience and accessibility.

The output of the receiver is 700 milliwatts, which is sufficient to operate as many as six pairs of headphones simultaneously if desired. It is so designed that crystal-controlled reception in either or both of the high-frequency bands may be employed, and for this purpose a two-frequency crystal control unit is available to be incorporated in the receiver. One of the crystals may be used in each of the high-frequency bands, or both may be employed in the same band. The definite day and night frequencies for communications between commercial planes and ground stations make this a desirable feature.

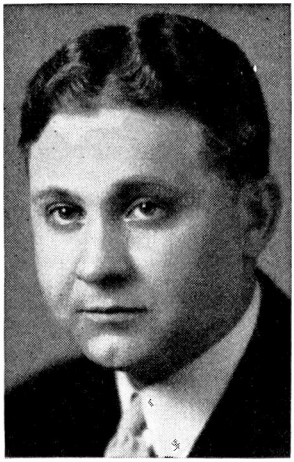
A device known as the "varistor" reduces loud static crashes when receiving weak signals, and the automatic volume control is normally used except for beacon reception, where it might interfere with the performance of the receiver for course indication.

The convenient facilities for transferring from one to another of the four frequency bands available, combined with its other features, make this receiver particularly well adapted for Marine applications, as well as for the use of police and other municipal, county, state and federal agencies. In aviation service, its utility is not confined to the privately operated plane, but it is also well suited for emergency service in transport and mail planes.



Rear view of 20A aviation receiver with cover removed.

Including its complement of vacuum tubes, the receiver weighs only 14¾ pounds and measures only 9 inches high, 14⅝ inches wide and 8¼ inches deep. The unit includes a spot-welded chassis as well as special shock-absorbing rubber mountings and is otherwise constructed to withstand the rigorous conditions of flying.



Joseph Kaufman

Before You Buy Tes

By JOSEPH K

I CAN visualize you and hundreds of other Radio-Tricians saying as they read the title of this article, "How can anyone tell me what I need without knowing the nature of my work or the size of my pocketbook?" Fine—I want you to question my statements, before you invest any money in testers for radio service work. One "ounce" of thought now may prevent many "pounds" of grief in the future, so heed what I have to say.

In servicing radio receivers, your work naturally divides into two branches: servicing sets in the *field* (at the home of the customer), and servicing sets at your own radio *bench*. The successful Radio-Trician must always be fair with his customers, making minor repairs in the field and bringing only the more complicated service jobs to his shop. Clearly then, two distinct types of testing equipment are required: equipment used in the field should be easy to use, light in weight and attractive in appearance, and capable of isolating quickly the most common types of trouble encountered in radio receivers. Testing equipment used at the bench, on the other hand, can be as heavy, as large, and as complex as you desire, provided that the equipment is designed to give a complete analysis of any radio receiver made and performs all functions necessary to restore a receiver to its original operating condition. Precision, wide application, flexibility—these are the important factors to consider when selecting bench equipment. Thus you see that field and bench testing equipment, in the ideal situation, differ widely; most servicemen plan to have eventually a complete array of each type. I do not mean, however, that every serviceman must have both field and bench testing equipment; before starting to buy, you must analyze the contents of your pocketbook and check up upon the flow of money through it in both directions. In other words, figure out if your radio servicing business income warrants the purchase of a complete array of both types of instruments.

Beginners in servicing and spare-time servicemen should concentrate on field equipment first and learn how to use this type of equipment for bench repairs. Only those who plan to make a full-time business of servicing should consider separate bench equipment, for in most cases it is possible to use field equipment for most of the ordinary bench tests with little loss in time.

Field Testers. What does a Radio-Trician need in order to service radio receivers in the home? Well, that depends upon how you tackle radio servicing jobs. If you are using the technique suggested in the N. R. I. Course, you will need: 1, a good multimeter; 2, an all-wave signal generator; 3, a tube tester; 4, a socket adapter analyzer. Personally I believe that the first three items are most important; consider the fourth only if you prefer the socket analyzer method of trouble shooting.

You ask "How much should I pay for each piece of testing equipment?" Tackling this problem from a business angle, the obvious answer is: "Pay in proportion to the years of service which that device will render you." This brings up a very important question, that of the useful life of each type of instrument. A well-designed multimeter and a signal generator should each last you many years; a tube tester and socket adapter will gradually become obsolete as new tubes are developed (at least this is what happened in the past, and new tubes seem to be coming on the market just as fast now as they ever did). You could buy a combination testing instrument containing two, three or all four of these units built into a single compact hous-

ters---A Little Thought, Please

AUFMAN, N. R. I. Director of Education

ing, but I personally prefer to have each tester in a separate cabinet. If all testers are of uniform size, it is a simple matter to fit them into a carrying case for use in the field.

I recommend buying the best multimeter and the best signal generator which you can afford, considering the volume of business which you will have. As for tube testers and analyzers, I would figure out my maximum price for these on the basis of two years of useful life, then buy the best instrument I could get for that amount of money. For example, if I figure that a tube tester would be worth $15 a year to me, I would look around for a model which sold in the vicinity of $30.

As field equipment will be displayed before the customer, choose instruments which have a good "eye-appeal." Field equipment should in addition be light, simple to use, and rugged enough to stand hard knocks.

Bench Testers. At your work bench you will likewise need a good multimeter and an all-wave signal generator. A tube tester and a socket analyzer are purely optional, because you can always make comparative tests of tubes with a signal generator and an output meter. Although the under side of the chassis is seldom accessible in receivers in a customer's home when the chassis is in the cabinet, at your workbench you will be working directly on the receiver chassis, and will have access to all parts, wires and terminals. You can use your multimeter for the voltage and resistance tests which ordinarily would be made in the field with a socket adapter analyzer. A tube tester is valuable for checking tubes as they come in from their distributor or for giving service to customers on over-counter sales, but keep in mind that the checker must at least pay for itself during its life of service.

Once I secured these basic instruments, I would gradually add other apparatus, depending upon my particular needs. First, I would put in a power panel which would give me a wide range of A.C. and D.C. voltages. If business in odd voltage receivers warranted, I would put in outlets and power sources for 6 volts, 32 volts, and 110 volts D.C. power for special tests, placing the power converters under the bench.

If I were in the auto radio business I would include a vibrator checker. A Universal loud speaker having variable field resistance and variable input impedance would be useful for many jobs, and would not involve a great deal of expense. Gradually I would add more specialized instruments, such as a condenser checker. Here I have a very definite preference; I want a unit which will check shorts, and leakage resistance at any voltage up to 1000 volts. A capacity checker, for measuring sizes of different types of condensers, should preferably be a part of the condenser checker. This same instrument could then be used to measure very high resistances, above 20 megohms.

As my business developed and high fidelity receivers began to come in, I would add a cathode ray oscillograph and a frequency modulator to be used with my all-wave signal generator. This does not by any means exhaust the possibilities of bench testing equipment. I could add a vacuum tube voltmeter for R.F. voltage measurements, a beat or variable frequency audio signal generator, a resistance-capacity-inductance A.C. bridge, a magnet tester, and a number of other instruments which would improve my ability to render quick, reliable and complete bench testing service. But all these would depend upon the volume of business I did and upon the state of my pocketbook.

I cannot emphasize too strongly the importance of buying separately designed units rather than as a combination, in order that the failure or obsolescence of one instrument would not effect the value of the rest of my equipment. I would buy only those instruments that I could possibly afford or would pay for themselves, and mount them on a neat rack above the workbench, ready for instant use, but still off the working surface of the bench. Now do you agree with me that there is considerably more to this business of picking testing instruments than paging through a catalog and saying "I'll take one of this and two of that"?

Cranford, N. J., Police "Talk Back" to Superiors

The police are "talking back" to their superiors in Cranford, N. J. Until recently they simply had to take orders and never say a word in response, but things are different now.

The reason is two-way police Radio. General Electric engineers have converted a one-way ultra-high-frequency Radio system at Cranford into a two-way affair. Now, cruising patrolmen in the town's prowl cars can talk back to police headquarters. With the one-way system, the patrolmen could only listen to their superiors. Now, in short, they can give as well as take it—in an obedient fashion, of course.

The two-way system provides duplex communication similar to that of an ordinary telephone conversation. The chief of police or headquarter's dispatcher may break in at any time during the patrolman's message. No switching operations are involved as with simplex systems, where even the chief must wait until the patrolman has finished before he can give orders.

The new freedom of speech among Cranford police was gained simply by installing ultra-high-frequency Radio transmitters in the town's three prowl cars and a new Radio receiver and filter at police headquarters.

Transmission from the prowl cars is picked up by the headquarters or "talk back" receiver. The filter permits simultaneous transmission and reception at headquarters with one transmission line and one antenna. The original equipment, all of which is utilized in the new set-up, consisted of three mobile receivers and a 15-watt headquarters transmitter.

New Low Drain Tube Line Developed by National Union

A new line of low current drain tubes has been developed by National Union Laboratories, according to recent advices from their New York headquarters.

"We feel that our Engineering Staff has achieved one of the outstanding contributions to Radio tube manufacture in the development of these new low drain tubes," said Mr. R. M. Coburn, Assistant Sales Manager.

"The full significance of the development can be understood only when it is realized that with these tubes a new high peak of performance is possible in battery and automobile Radio sets with a filament current drain of only 150 milliamperes, as against the usual 300 milliampere drain of types heretofore available."

All types have been designed for operation at 135 volts plate supply and 0.150 ampere filament current, although they may also be used at 250 volts plate supply. The initial five types of the line have been given type numbers, 6D8G ; 6L5G ; 6S7G ; 6Q6G ; and 6N5. All types will be housed in glass bulbs, and will use octal bases with the exception of the special tuning indicator tube Type 6N5.

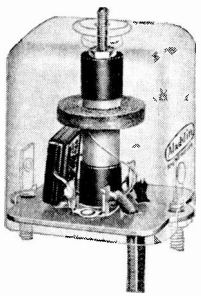
The development of these tube types may be of vital importance in the future construction of automobile Radio sets and battery sets for farm districts. The great operating economies made possible through the low drain tubes should give a new impetus to the use of Radio receiving apparatus in farm homes and throughout the automobile field.

n r i

Wave Trap of New Design

TO prevent code interference from commercial ship-to-shore stations, a unique new type of wave trap has been placed on the market by Aladdin Radio Industries, Inc., 466 West Superior Street, Chicago, Ill.

This wave trap differs from ordinary interference filters in that it is tuned by the movement of the magnetic core of patented Aladdin Polyiron. The movable core varies the



inductance of the coil which in combination with a fixed capacitor tunes to the frequency of the undesired code signals. The rejection ratio of the Polyiron wave trap is so much greater than that of the conventional air-core device that it effectively suppresses interference from code signals before it reaches the first tube of the receiver, without interfering in any way with normal reception of desired signals.

RADIO-TRICIAN
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Service Sheet
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NATIONAL RADIO INSTITUTE, WASHINGTON, D.C.

SPARTON MODEL 516

VOLTAGE-RESISTANCE CHART

Line Voltage: 115 volts

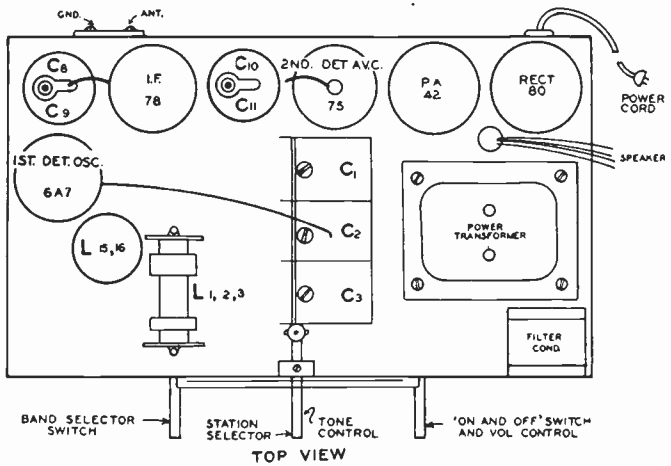
Position of Volume Control: Full with Antenna Disconnected

Position of Band Selector Switch: Broadcast

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Grid Cap
6A7	1st. Det-Oscillator	Volts	0	225	150	210	0	0	0	*
		Ohms	0	500000	500000	350000	20000	250	0	500000
78	I - F Amplifier	Volts	0	0	220	110	0	0	-	*
		Ohms	0	175000	350000	0	500	0	-	500000
75	2nd. Det-A.V.C.-1st. Audio	Volts	0	90	0	0	0	0	-	*
		Ohms	0	*	500000	500000	0	0	-	500000
42	Power Amplifier	Volts	0	310	315	0	0	0	-	-
		Ohms	0	500000	500000	500000	0	0	-	-
80	Rectifier	Volts	0	380	380	0	-	-	-	-
		Ohms	500000	0	0	500000	-	-	-	-

NOTES: Voltage and resistance readings are for schematic diagram shown on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.

* Cannot be measured with Weston No. 665, Type 1.



TOP VIEW

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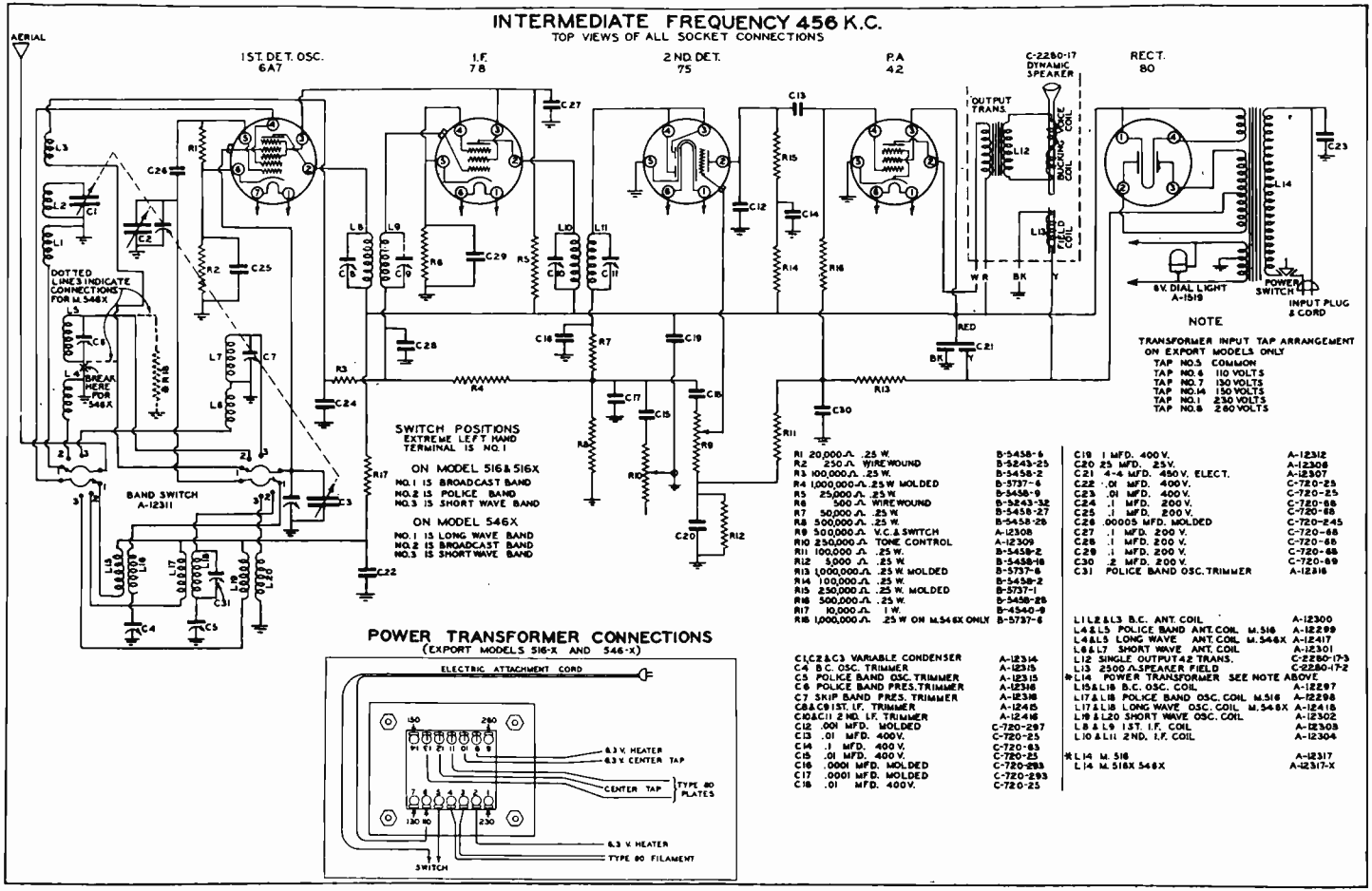


R1	20,000 Ω .25 W.	B-5458-6
R2	250 Ω WIREWOUND	B-5243-25
R3	100,000 Ω .25 W.	B-5458-2
R4	1,000,000 Ω .25 W MOLDED	B-5737-6
R5	25,000 Ω .25 W.	B-5458-9
R6	500 Ω WIREWOUND	B-5243-32
R7	50,000 Ω .25 W.	B-5458-27
R8	5,000,000 Ω .25 W.	B-5458-28
R9	500,000 Ω V.C.& SWITCH	A-12308
R10	250,000 Ω TONE CONTROL	A-12309
R11	100,000 Ω .25 W.	B-5458-2
R12	5,000 Ω .25 W	B-5458-18
R13	1,000,000 Ω .25 W. MOLDED	B-5737-6
R14	100,000 Ω .25 W.	B-5458-2
R15	250,000 Ω .25 W. MOLDED	B-5737-1
R16	500,000 Ω .25 W.	B-5458-26
R17	10,000 Ω 1 W.	B-4540-9
R18	1,000,000 Ω .25 W ON M.546X ONLY	B-5737-6

C1,C2 &C3	VARIABLE CONDENSER	A-12314
C4	B.C. OSC. TRIMMER	A-12315
C5	POLICE BAND OSC. TRIMMER	A-12315
C6	POLICE BAND PRES. TRIMMER	A-12316
C7	SKIP BAND PRES. TRIMMER	A-12318
C8 & C9	1ST. I.F. TRIMMER	A-12415
C10 & C11	2 ND. I.F. TRIMMER	A-12416
C12	.001 MFD. MOLDED	C-720-297
C13	.01 MFD. 400 V.	C-720-25
C14	.1 MFD. 400 V.	C-720-83
C15	.01 MFD. 400 V.	C-720-25
C16	.0001 MFD. MOLDED	C-720-293
C17	.0001 MFD. MOLDED	C-720-293
C18	.01 MFD. 400 V.	C-720-25

C19	1 MFD. 400 V.	A-12312
C20	25 MFD. 25 V.	A-12308
C21	4-4 MFD. 450 V. ELECT.	A-12307
C22	.01 MFD. 400 V.	C-720-25
C23	.01 MFD. 400 V.	C-720-25
C24	.1 MFD. 200 V.	C-720-88
C25	.1 MFD. 200 V.	C-720-88
C26	.00005 MFD. MOLDED	C-720-245
C27	.1 MFD. 200 V.	C-720-88
C28	.1 MFD. 200 V.	C-720-88
C29	.1 MFD. 200 V.	C-720-88
C30	.2 MFD. 200 V.	C-720-89
C31	POLICE BAND OSC. TRIMMER	A-12316

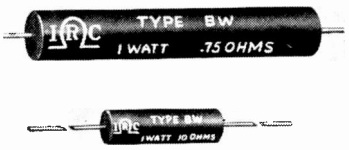
L1,L2 &L3	B.C. ANT. COIL	A-12300
L4 & L5	POLICE BAND ANT. COIL M.516	A-12299
L4 & L5	LONG WAVE ANT. COIL M.546X	A-12417
L6 & L7	SHORT WAVE ANT. COIL	A-12301
L12	SINGLE OUTPUT 42 TRANS.	C-2280-173
L13	2500 Ω SPEAKER FIELD	C-2280-17-2
* L14	POWER TRANSFORMER SEE NOTE ABOVE	
L15 & L18	B.C. OSC. COIL	A-12297
L17 & L18	POLICE BAND OSC. COIL M.516	A-12298
L17 & L18	LONG WAVE OSC. COIL M.546X	A-12416
L19 & L20	SHORT WAVE OSC. COIL	A-12302
L8 & L9	1ST. I.F. COIL	A-12303
L10 & L11	2ND. I.F. COIL	A-12304
* L14	M. 516	A-12317
	L14 M. 516X 546X	A-12317-X

Schematic Diagram—Sparton Model 516

New 1/2 and 1-Watt Insulated Wire-Wound Low-Ohmage Resistors by IRC

An economical, completely insulated wire wound ½ and 1-watt resistor, altogether similar in size and appearance to the well-known IRC Insulated Metallized units, has been announced by the International Resistance Company.

Thus an alternative to the usual carbon or Metallized filament type resistor is now available in power ratings of ½ and 1-watt, and in resistance values of 0.25 to 500 ohms, and 0.5 to 2,000 ohms respectively, with respective lengths of ⅝" and 1½". Completely insulated against short circuits or grounds and against the effects of



IRC "BW" Resistor

humidity, Type "BW" consists of wire wound on a textile core of small diameter, to which wire leads are clamped under pressure for permanent contact, molded at high pressure in a special phenolic compound of excellent properties.

This method of assembly insures low noise levels and permanent contact. The result, the manufacturers state, is a stable, conservatively-rated, small, insulated wire-wound resistor, having all the electrical characteristics and stability of its type, together with compactness and complete protection against abnormal atmospheric conditions.

This new "BW" resistor is fully described in a resistor catalog recently issued, which may be had by writing the International Resistance Company, 401 N. Broad Street, Philadelphia, Pa.

———*n r i*———

A Question

How about it, do you fellows like "Novel Radio Items" or would you rather have this space devoted to something else? "Novel Radio Items" will be continued only if you want it, so let's have some comments.—*Editor.*

NATIONAL RADIO NEWS

FROM N.R.I. TRAINING HEADQUARTERS

Vol. 7 No. 4

August-September, 1936

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T. E. ROSE, Editor
S. M. ARMSTRONG, Managing Editor

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Index

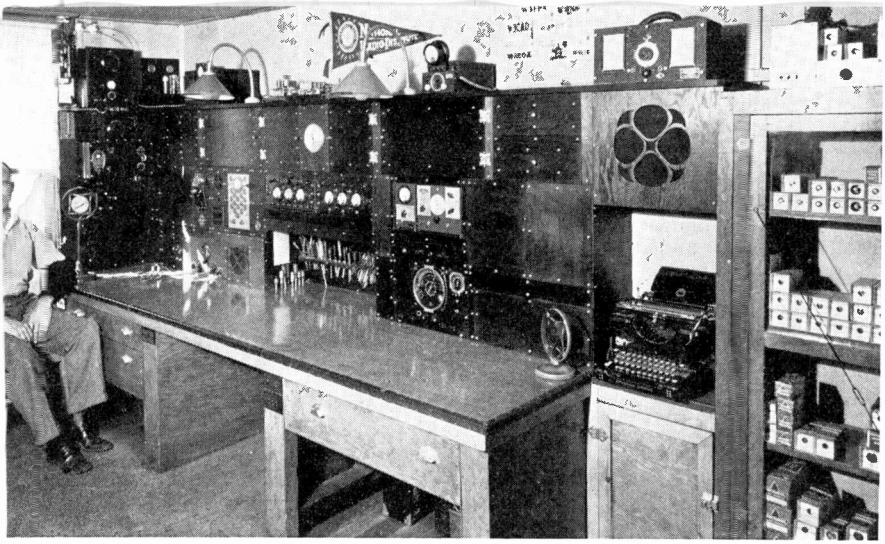


Photo Contest Results

First Prize

We didn't have much trouble selecting the winning photo for this issue of the News. The ten bucks this time goes to Graduate Charles Helmuth, Atlantic City, N. J., who won "hands down." No wonder! Take a squint at the photo of his work-bench above. Mister, that's a shop that *is* a shop!

In submitting his photo Graduate Helmuth informs us that:

"The photo shows only about one-fourth of my shop. On the opposite side I have another bench for grindstone, drills, etc., and a big public address job I built myself, a duplicate of which I sold for $650, so you can picture how big they are and of what quality to bring that price.

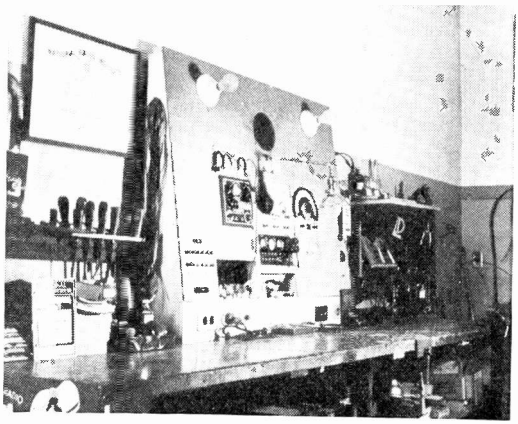
"The photo played a dirty trick on me: my head and the mike ring at left look oval. The photographer said this was due to the camera angle.

"The parts and tube men, who travel all over the state, say that this shop is one of the best three in New Jersey. Not so bad for N. R. I., eh!"

CHARLES F. HELMUTH,
Radio Service & Equipment,
Atlantic City, N. J.

Second Prize

To Graduate William Locke, Wessington Springs, S. Dak., goes second prize of $5 for this issue. The photo of his "Radio Hospital" work-bench and panel appears below. You're not doing so bad, either, Graduate Locke. You ought to be turning out some mighty good work with that lay-out and equipment. Congratulations!



The Service Forum (Continued from page 11)

AIRLINE MODEL 62-99 — GOES DEAD

Try a new 32 type oscillator tube as this circuit is very critical. Not all 32 type tubes, even though they check O.K., will function satisfactorily as an oscillator in this set.

———n r i———

A.C. DAYTON NAVIGATOR — WEAK

If the receiver has good selectivity try 56 type tubes. The receiver was designed for use with special 27 type tubes having a high amplification factor and these are not readily obtainable. The high gain in the 56 type tubes will overcome the trouble.

———n r i———

RADIOLA MODEL 60 — NOISE WHEN TUNING

Make sure that the plates of the tuning condensers are not shorting and clean between them with a pipe cleaner. Also examine the pilot light bracket as it may be shorting to the drum dial.

———n r i———

SILVERTONE MODEL 110 — HOWLS

Replace the two filament wires and the grid wire to the detector socket using flexible rubber covered wire. Solid wire which was used in some of the earlier models will eventually cause trouble of this type.

———n r i———

SILVERTONE MODELS 1152, 1174, 1252 and 1260 — HUM

When one of the usual causes of hum is not found in this set, try reversing the connections to the speaker field, as in many instances this will clear up hum.

———n r i———

GENERAL ELECTRIC MODEL K-41 — OSCILLATION

If the antenna lead is stuffed inside the receiver, feed-back between various stages will occur and oscillations will be prevalent. The remedy, of course, is to keep the aerial lead-in wire out of the receiver cabinet as much as possible.

GENERAL ELECTRIC MODEL H-32 — INTERMITTENT RECEPTION

This is generally caused by a defective .1 mfd. condenser in the A.V.C. grid return circuit. The lead from this condenser is a blue wire coming from the power pack and connecting to the 1 megohm resistor. It is also a good idea to replace the resistors in the A.V.C. grid return and to try a new .1 mfd. screen by-pass condenser.

———n r i———

APEX MODEL 31 — HUM

This is generally caused by an open electrolytic condenser. Trial of a new condenser will, of course, show up the trouble in this part. Should disconnecting the lead to the bad condenser not change the hum level the condenser is open, while if the hum decreases when the condenser is removed it is leaky.

———n r i———

ZENITH MODELS 91 AND 92 — IMPROPER ACTION OF TUNING METER

This trouble accompanied by weak signals is generally due to a defect in the 2,800 ohm and 3,600 ohm bleeder resistors. These are the largest resistors on the resistance strip and should be replaced with 10-watt wire wound units.

———n r i———

STEWART WARNER MODEL 900 A.C. — NO PLATE VOLTAGE ON 27 TUBES

This is generally caused by an open in the 7,000 ohm wire wound resistor. This part is located in the front left-hand corner of the chassis when it is turned upside down. It is sometimes possible to repair these resistors if the break is near the end although replacement is of course best. A 2-watt unit will prove satisfactory.

———n r i———

WESTINGHOUSE MODEL WR-15 — MOTORBOATING

Check for open by-pass condensers by shunting those in the set with others of about the same size known to be in good condition. Pay particular attention to the cathode by-pass condensers. Poor connections between the rotors of the tuning condensers and the chassis are to be suspected. Spring contacts are used and they should be sandpapered and bent to give better contact. The resistors in the grid return of the A.V.C. tube should be checked by substitution.

A Tube Similarity Table

THE introduction of new tubes following types 26, 27, 35, 24A, 45, etc., has been so fast that many servicemen have lost track of the close similarity between the older and newer types. A tube similarity table is presented below. Only the popular cathode or filament voltage tubes—that is, those using a filament rated at 2, 2.5, 5 and 6.3 volts—are shown.

The single, double and triple asterisks (*) are used to indicate similarity between different classes of tubes listed under a given description. For instance, under the descriptive heading we find triode power amplifiers of three different classes, and that the 2A3 and 6A3 have but one asterisk. The 45 and 6D5 tubes have two asterisks and likewise the 31 and 71A tubes have three asterisks, indicating that each of the three classifications has similar characteristics. In fact, there is sufficient similarity to permit interchange of these tubes by changing the filament supply and, in some cases, the sockets. Asterisks for different groupings have no significance; the fact that the diode type 1V tube has one asterisk, and the triode type 30 tube has also, means nothing. The tubes must belong to the same family.

This table will show the relationship between metal tubes and older glass tubes whose characteristics are already known. For instance, the type 6J7, a late metal tube, is essentially the same as the glass type 6C6. It is in turn similar to the better known 57 and 77 tubes. Then, too, the approximate power output of an A.F. amplifier may be determined by noting the characteristics of a tube with which you are more familiar. For example, a 53 type tube has the same characteristics and power output as the 6A6 and the new metal 6N7 tube.

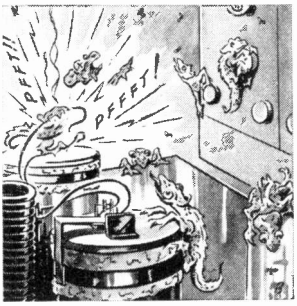
Cut out the table, re-enforce it with cardboard, and keep it handy in your workshop.

TUBE SIMILARITY TABLE
Compiled by Paul H. Thomsen, N. R. I. Staff.

	GLASS TUBES				METAL TUBES	
DESCRIPTION	2.0 VOLT	2.5 VOLT	5 VOLT	6.3 VOLT	5 VOLT	6.3 VOLT
Diodes				1V* - 6Z3*		
Double Diodes Detectors						6H6
Double Diodes Rectifiers		82	5Z3*-80**-83*	6Z4***- 84***	5Z4** - 5W4	
Triodes - Filament	30*		01A*-12A-40			
Triodes - Heater		27* - 56*		37* - 76*		6C5 - 6F5
Triode - Pentode				6F7*		6P7*
Triode Power Amplifiers	31***	2A3* - 45**	71A***	6A3*		6D5**
Triple Grid-Det. Amplifier		57*		6C6*-6D7-77*		6J7*
Tetrodes	15 - 32*	24A*		36*		
Tetrode - Power Amplifiers						6L6
Pentodes - Power Amp.	18 - 33	2A5*-47*-59		38-41*-42*-89		6F6*
Pentagrid Converters	1A6**-1C6**	2A7*		6A7*		6A8*
Pentagrid Mixer Amplifier						6L7
Duplex Diode Triodes		2A6*-55**		6C7-75*-85**		6B6***-6Q7***
Duplex Diode Pentode	1F6	2B7*		6B7*		
Duplex Triode Power Amp.				6E6		
Twin Triodes - Class B	19	53*		6A6*- 79		6N7*
Dual Grid Power Amp.	49	46				
Super Control R.F. Amp.	1A4* - 34*	35-51-58**		6D6**-6E7** 39-44-78**		6K7**
Direct Coupled Power Amp.		2B6		6B5*		6N6*
* ** *** See Text.						

Novel Radio Items

—BY L.J. MARKUS—



RADIO FRIES LIZARDS in Hawaii! One of the many problems of technicians at Radio station KGMB of Honolulu is that of preventing lizards from frying themselves on the high voltage wires of the transmitter. The two-inch long lizards are welcome guests, however, for they eat annoying mosquitoes.

—*n r i*—

Ultra-Short Waves Cure Snake Bites!

The Pasteur Institute of Paris is now experimenting with ultra-short waves as a cure for snake bites. Already, it is said, considerable success has been obtained.

—*n r i*—

Dangers of Radio!

Radio reports on horse races proved almost disastrous to a certain barber in Sweden who had heavily backed a certain horse. So elated was the barber when news of his horse's victory flashed over the air that he gave a violent jerk, cutting off one of his fingers with the razor. The customer, thinking perhaps of his own neck, departed hastily.

—*n r i*—

Why Radio Sets Go Dead!

A policeman solved the problem of why Radio sets in a section of New York's Harlem suddenly became silent, by arresting a 17-year-old boy who had been cutting down the copper aerials and selling them to a junk man.

—*n r i*—

Noises for Sale!

For those who want more noise — peculiar noises like those made by train crashes, whining dogs, earthquakes, wild animals, bugle calls— a series of twenty phonograph records, each containing dozens of different headache-producers, is now on the market. Radio dramatists and theatrical producers are prospective customers.

Spirits Broadcast in Canada!

Radio station CKCL of Toronto, Ontario, recently placed on the air a spiritualistic seance lasting 1½ hours. During the broadcast, conducted by a world-famed medium, voices which presumably came from spirits were clearly heard, and weird blue lights were seen traveling around the studio walls—so say the reports!

—*n r i*—

Radio Calls Volunteers to Fire!

In at least one city in France, short-wave Radio calls volunteer firemen to headquarters when a fire alarm is turned in.

—*n r i*—

Movies Use Noiseless Whistle!

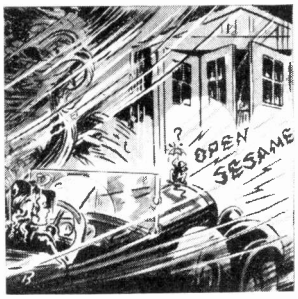
A whistle whose frequency was so high as to be inaudible to the human ear was used recently by movie technicians to direct a giant St. Bernard dog. Although no impression was made on the sound track, the dog's sensitive ears instantly picked up the high frequency note.

—*n r i*—

"Mikes" Protect Miners!

Microphones in a British coal mine pick up any noises caused by sliding rocks. The amplified sound then operates a relay which sounds a warning.

—*n r i*—



CODED RADIO SIGNALS OPEN GARAGE DOORS! Touch a control on the dash as you drive up to your garage and Presto! the doors open swiftly, silently, automatically; at night the garage lights flash on as well. Radio is the secret; a tiny spark coil transmitter mounted on the car transmits coded impulses to the receiving antenna buried in the driveway. These impulses are picked up and amplified by the receiving set, then fed to a selector which determines whether the proper car is signalling. If the code is correct, relays then operate the electric door opener. If the car lights are on, the transmitter sends different code which turns on garage lights, too!

STOLEN GOLD detected by Radio! Employees of a Mexican gold mine must pass through a large coil of wire before leaving the mine. The coil is connected to a balanced high frequency Radio oscillator; even the smallest piece of precious metal upsets the balance of the apparatus and produces squeals in the headphones worn by the guards.

N.R.I. ALUMNI NEWS

Baltimore Chapter Wages War On "Free Test" Operation

IN a recent issue of the *Baltimore Bulletin* a topic of national interest came to light. Free test calls, presumably to gain access to the home, has been a major issue in the Radio servicing field for some time. So National Headquarters desires to report the feelings of one group of Alumni members.

Here is how the Baltimore Local attacks the problem:

"The Baltimore Local has decided to take an active part in the eradication of 'Free Test Call' operation. The Local has purchased mimeograph equipment and each member of the Local who has a servicing business in a locality infested by a 'Free Tester' will be supplied with circulars for distribution in the area, acquainting the public with the methods of these supposedly 'Free Test' operators.

"In the State of California, this evil has been definitely stopped by the enactment of a law known as 'California's Unfair Practices Act.' Assembly Bill No. 1870, Effective July 1, 1935.

"Here are three sections of California's unfair practices act, for the information of the various associations and others interested in ways and means of combating unfair practices. This act, which became a law in California on July 1, 1935, offers a real solution to the problems confronting the Radio dealer, jobber and service man. It is not confined to the Radio business, but covers all kinds of businesses, and the local and state officers of the various associations, who will devote some of their time contacting other business associations in their cities and states, bringing it to the attention of their representatives and senators, may be very instrumental in having such a law passed in their states."

"Section 1. It shall be unlawful for any person, firm, or corporation, doing business in the State of California and engaged in the production, manufacture, distribution or sale of any commodity, . . . or service or output of a service trade, of general use or consumption . . . with the intent to destroy the competition of any regular established dealer in such commodity, product or service, or to prevent the competition of any person, firm, private corporation, . . . who or which in good faith, intends and attempts to become such dealer . . . by selling or furnishing such commodity, product or service at a lower rate in one section, community or city or any portion there.

"Section 3. It shall be unlawful for any person, partnership, firm, corporation, joint stock company, or other association engaged in business within this state, to sell, offer for sale or advertise for sale any article or product, or service or output of a service trade, at less than the cost thereof to such a vendor, or give, offer to give or advertise the intent to give away any article or product or service or output of a service trade for the purpose of injuring competitors and destroying competition, and he or it shall also be guilty of a misdemeanor, and on conviction thereof shall be subject to the penalties set out in section 11 of this Act for any such act.

"The 'cost of doing business' or 'overhead expense' is defined as all costs of doing business incurred in the conduct of such business and must include without limitation the following items of expense: Labor—including salaries—rent, interest on borrowed capital, depreciation, selling cost, maintenance of equipment, delivery costs, credit losses, all types of licenses, taxes, insurance and advertising.

"Section 13. The legislature declares that the purpose of this act is to safeguard the public against the creation or perpetuation of monopolies and to foster and encourage competition, by prohibiting unfair and discriminatory practices by which fair and honest competition is destroyed or prevented. This act shall be literally construed that its beneficial purposes may be subserved."

National Headquarters wants to hear from members and Local Chapters on the subject of "free test call" operation. Your urgent cooperation is requested. Write—E. A. Merryman, Secretary, N. R. I. A. A.

Keeping Abreast of the Times

By J. F. Hornbrook
Editor "Philcam Key"

WHAT is the benefit to be derived from membership with an organization of Radio service men, such as our Local Chapters of the National Radio Institute Alumni Association? Have you ever asked yourself that question, or have you ever pondered on what you can possibly gain from such a unit? Needless to say the most of us have at one time or another given this subject some thought, but how many of us have really answered that question?

It is not my intention at this time to give any statistics as to the number properly answering the question, but I will outline a few of the benefits one gains by associating with others of the same profession.

None can deny that such an association will be of beneficial value, especially in a profession such as Radio, where developments are so rapid the benefits are bound to be of untold value. Let us consider a man who has graduated from the N. R. I. At the time of his graduation he undoubtedly was an expert Radio man. He had both practical and theoretical knowledge and, above all, was right up to the minute with this knowledge. But how many new developments have been made in the realm of Radio since his graduation, and what steps has he taken since that time? If he has kept up with his studies all well and good; if not he will soon find himself among the many that *used* to know all about Radio. That is one of the many things our organization has to offer graduates, an opportunity to keep abreast of the times, with little effort and expense on his part.

By being associated together it is easy to obtain factory engineers from time to time to explain the new and coming developments. These lectures always prove valuable and make clear many hazy ideas we have on Radio devices coming on the market.

Another feature is the exchanging of service problems . . . meeting in a round robin fashion to discuss various methods of obtaining and repairing Radios, and learning different methods of approach in the selling line. All this can be gained by convening with a group of jolly good fellows, all from the same Alma Mater and all with the same purpose in mind.

———*n r i*———

Philadelphia-Camden Chapter

SURPRISING things do happen. Our chapter received a letter from R. B. Murray, Executive Secretary, that plans were made for P. J. Dunn, National President, and Mr. Murray to attend one of our meetings. Well, the smoke has cleared and both of these gentlemen have had the opportunity to see us in action, here in Philadelphia.

Both "Pete" and "Bob" had the opportunity to give us the latest on what is going on in N. R. I. Alumni circles. Their talks were well received. National Headquarters also made arrangements for Mr. Dan Fairbanks of the International Resistance Company to attend this meeting and give us a splendid talk on resistors. We wish to express our thanks to Mr. Fairbanks and National Headquarters for making this interesting lecture possible.

The success of our Local Chapter publication, the "Philcam Key" is growing by leaps and bounds. We especially want to thank the following advertisers for their cooperation in helping to make this publication a success:

CENTURY RADIO COMPANY,
120 North Seventh St.

DUPLICATING SERVICE COMPANY,
1011 Chestnut St.

M & H SPORTING GOODS COMPANY,
512 Market St.

RADIO ELECTRIC SERVICE COMPANY,
N. W. Cor. 7th & Arch Sts.

We sincerely hope our members will patronize these firms as they are behind the Philadelphia-Camden Chapter 100%.

Alumni member, Joseph Strano, recently announced that he was going to take the "final leap" into the sea of matrimony. Were we boys surprised! We rather expected that something of the sort was in the offing . . . Joe has been going around lately in a "dream." The "gang" express their very best wishes to the bride and groom.

The Philadelphia-Camden Chapter is looking for more energetic men who wish to associate themselves with our cooperative shop plan. Meetings are held every Thursday evening at 2433 Kensington Avenue, Philadelphia. Clarence Stokes or Charlie Fehn will be glad to explain just how this plan operates for the benefit of Alumni members. Both students and graduates are invited.

Interesting Radio-Phonograph Combination

Built By Graduate C. H. Siddall

ALUMNI member, C. H. Siddall, 635 Crescent Drive, Azusa, California, recently sent National Headquarters the results of his experimenting with Radio-phonograph combinations.

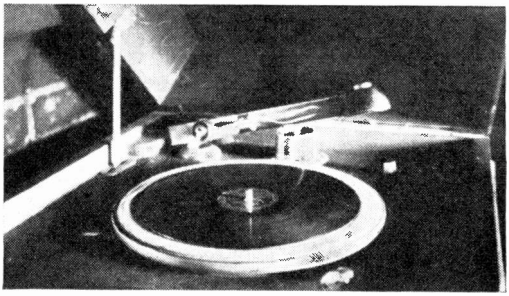
The photographs on this page show the results of Member Siddall's work. The cabinet was built entirely by hand and was entered in the Los Angeles County Fair, where it captured a blue ribbon and silver cup. The intricate grill and molding work would no doubt tax the imagination of any cabinet maker.

In Siddall's own words, your reporter will give you the more intimate details of this outfit. In his letter, Siddall stated:

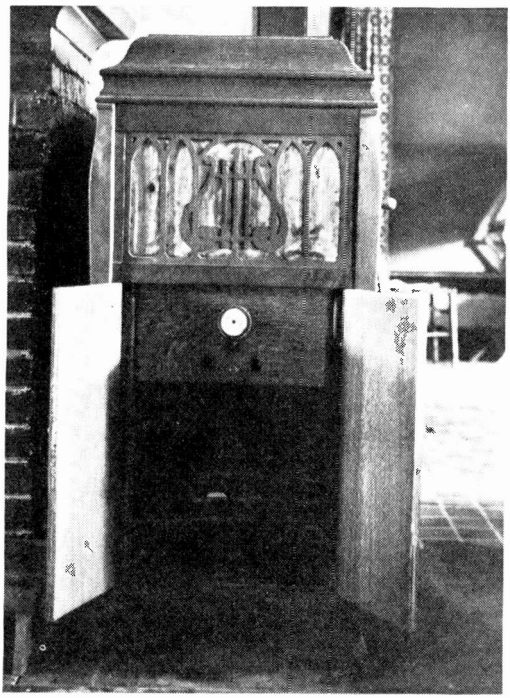
"This year I built the Radio, a five tube superheterodyne, using 2A7, '58, 2A5, and an '80, from my own circuit.

"The grid cap of the 2A6 is connected to the center of a double pole double throw switch, one pole in grid circuit, one side to the Radio volume control and the other side to the matching transformer. I used a Western Electric 4A theatre pickup with 500 ohms impedance.

"The pickup arm was built in night school. I turned the base, swing pin and rocker-pin bushings in the steel lathe (also the bearing cover).



Phonograph pick-up and turntable. Note pick-up arm which graduate Siddall built himself.



The prize-winning cabinet, built entirely by hand

"A printers cut was melted and poured for the counterweight. By countersinking two holes from the outside on each side of the arm, the weight keeps the sides from spreading and the weight cannot fall out. It is balanced to put 1½ ounces on the record.

"The controls—center knob tuning; left hand, volume and switch; right hand, tone. The switch is for changing from phonograph to Radio. The phonograph volume control is mounted on the motor board to the right of the pickup.

"I have a two circuit jack mounted on the speaker baffle board and use a solid steel plug. With the plug 'in' the speaker circuit is open and the line is closed. The line runs to three other rooms where a dynamic or magnetic speaker can be plugged in . . .

"The set has very good tone as I use an 8 inch speaker mounted in the old horn and it does not 'boom'."

National Headquarters wishes to thank Member Siddall for reporting on his experiments. We hope that other members will be encouraged to send photographs and stories of the work they are doing. Alumni men are always anxious to learn what the other fellows have accomplished. Let us hear from *you*.

Baltimore Chapter

Our Chairman, Mr. Gralley and Mr. Giese, Editor of the Baltimore Bulletin, recently made a business trip to National Headquarters.

In reporting the trip in the Local Bulletin, Mr. Giese writes:

"An interesting description of the school was given us by Mr. Dowie, Chief Instructor, and with the helpful cooperation of our National Secretary, Bob Murray, we were able to purchase at a very reasonable figure, mimeograph equipment for local use.

"We had the opportunity of meeting many members of the staff, including Mr. Haas, Mr. Thomsen, Mr. Straughn and many others. We also experienced the pleasure of meeting Margaret Starkey, the charming young lady who assists our National Secretary in the Alumni administration duties. To say we had a swell time at National Headquarters would be putting it mildly."

A committee of two, Mr. Jensen and Mr. Rathbun were selected last meeting to confer with the officers of the Radio Service Mens' Association of Maryland, inviting them to join with the Local in an endeavor to stamp out the so-called "free test call" method of servicing in Baltimore.

Now that we are located in our new headquarters at the New Howard Hotel, 8 N. Howard Street, Baltimore, a new system must be devised for the members to obtain books, as we are unable to keep the library at the hotel.

In the very near future each member will be supplied with a list of all books in the possession of the Baltimore Local and members desiring a particular book may drop a card to Mr. A. Grollman, the Librarian, and he will bring it to the following meeting, or if a member so desires he may call at Mr. Grollman's home, 1731 Ruxton Avenue.

Mr. Markus of the N. R. I. Staff, honored us with a talk on "Opportunities in Electronics" that proved mighty interesting and helpful to our members. For the first time, our Alumni group is giving some real serious consideration toward electronic devices in order to boost our incomes. There are plenty of opportunities in this field for energetic N. R. I. men, as Mr. Markus so ably pointed out.

Students and graduates living in the vicinity of Baltimore are urged to get in touch with our Local Chapter. Meetings are held regularly the first and third Tuesdays of every month at the New Howard Hotel, 8 N. Howard Street. Full information concerning our Chapter activities may be obtained by writing Mr. E. O. E. Gralley, Chairman, 623 Gutman Avenue, Baltimore, Maryland.

Chicago Chapter

We are trying out an idea, while not new, has not as yet received a thorough trial in our Chapter. Our speaker, Mr. Kidd was unfortunately not able to be present at one of the recent meetings, so Chairman Bennett heroically leaped into the breach and produced a spontaneous lecture which would do credit to a professional speaker. His extemporaneous topic was "Intermittent Reception," and we defy anyone present to truthfully say he didn't get a lot out of it.

Since that worked out so admirably we learned that the members could spend a most interesting and profitable evening by themselves, so now a volunteer is always ready to step into any emergency. Mr. Kidd was still unable to show up at the last meeting so Mr. Balsamello officiated and gave the boys some new slants on "Localizing Trouble with an Oscillator." The next time such an emergency arises Mr. Dickten is ready with a discourse on "Refrigeration," at which he is a shark.

From time to time we have mentioned other Chapter activities as reported in their various papers, sometimes quoting parts of articles and occasionally reproducing entire articles verbatim. That our members have been very much interested is evidenced by their requests to the officials who receive these publications for the loan of their copies. As a result, the suggestion has been made that a subscription price be made to members of other Chapters or individual N. R. I. Alumni men who may be interested, and that we inquire as to the possibilities of obtaining subscriptions to publications also.

We are highly in favor of the idea, and since it is a cooperative activity we believe that the price should be made to cover only the additional expense, therefore we have tentatively decided on a price to N. R. I. A. A. members in other cities of 25c per year.

We hope to hear from the other Locals in the very near future as to whether they are willing to reciprocate and what their prices may be. We can guarantee a number of subscriptions for each such magazine as soon as we can obtain this information, and are ready to take care of any number of subscriptions from other Locals. By sending 25c to Mr. Saumel Juricek, Secretary,

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Toronto Chapter

Our first summer executive meeting was held in Chairman Stollard's home. All members were present with the exception of Mr. McLean who was out of town.

The discussion concerning winter activities progressed rapidly with an abundant of ideas. After much discussion it was finally decided to put on a raffle once a month during the winter, prizes to be of a desirable nature (Radio parts and equipment). It was also suggested that we could obtain these prizes from the large Radio parts dealers in Toronto in exchange for advertising space in the Canadian Radio-Trician, explaining that the money raised would be spent later in their merchandise for the club.

After investigating the American Local Chapters of the N. R. I. A. A., it is very obvious that each Chapter specializes in some particular line of endeavor, such as short wave, Micro wave transmission and reception, Television and experimentation, etc. As the Toronto Chapter is composed of a large number of service men, it has been decided to specialize in all forms of testing equipment and servicing technique.

The Toronto Chapter is planning on moving to new headquarters within the next month or so. Perhaps some of you members have some suggestions to make. Any one knowing of a good place for the club, please phone Chairman Stollard, La 4202, 77 Kenwood Avenue, Toronto.

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Chicago Chapter

(Continued from page 29)

4223 N. Oakley Avenue, Chicago, your name will be placed on our subscription list.

Chicago Alumni and students, we are offering you an opportunity to benefit yourself and your chosen profession. It has been proved over and over again that an alert organization is of inestimable value in enhanced prestige to the profession and increased knowledge of its members. If you are not regularly attending our meetings, why not give them a trial? You will find a good crowd of fellows at the Hotel Sherman. We meet the first and third Fridays of every month.

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Folks who never do any more than they get paid for, never get paid for any more than they do.—ELBERT HUBBARD.

National President on Tour

Mr. P. J. Dunn, National President, has recently informed National Headquarters that he will use his vacation again this year to contact a number of the N. R. I. Local Chapters.

Mr. Dunn will in all probability visit Pittsburgh, Detroit and Chicago. If time permits, he will also visit other Local units while on vacation.

"Pete" deserves a genuine vote of thanks from every member of the Association for his unselfish interest in promoting the welfare of our organization. He has liberally spent his own time and money to make these trips in the past. This, we believe, proves that we have a real loyal president at the head of our organization.

Mr. Dunn will keep in constant contact with National Headquarters to assist in the administration work while on tour.

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Directory of Chapters and National Officers

Baltimore—I. A. Willett, Secretary, 2411 Arunah Ave., Baltimore, Md.

Philadelphia-Camden—Clarence Stokes, Secretary, 2947 Rutledge St., Philadelphia, Pa.

New York—L. J. Kunert, 66-11 74th St., Middle Village, L. I., N. Y.

Buffalo—T. J. Telaak, Chairman, 657 Broadway, Buffalo, N. Y.

Toronto—Ed. Witherstone, Secretary, 363 Nairn Ave., Toronto, Ont., Canada.

Chicago—Samuel Juricek, Secretary, 4223 N. Oakley Ave., Chicago, Illinois.

Pittsburgh—Albert Maas, Secretary, 9 S. Howard Ave., Bellevue, Pa.

Detroit—F. E. Oliver, Secretary, 218 Alter Rd., Detroit, Mich.

NATIONAL OFFICERS FOR 1936

President—P. J. Dunn, 713 N. Fulton Ave., Baltimore, Maryland.

Vice-President—Ed. Witherstone, 363 Nairn Ave., Toronto, Ont., Canada.

Vice-President—Clarence Stokes, 2947 Rutledge St., Philadelphia, Pa.

Vice-President—Earl Bennett, 1408 Brown St., Evanston, Ill.

Vice-President—Edward Meyer, 4517 Alaska Ave., St. Louis, Mo.

Secretary—Earl Merryman, National Headquarters, Washington, D. C.

Executive Secretary — R. B. Murray, National Headquarters, Washington, D. C.

S. O. S!

Sometime ago Student Allen Hayworth, via The Mailbag, asked for advice whether he should as a matter of policy undertake the repair and servicing of electrical appliances as a sideline to Radio Servicing. Contributors to The Mailbag, we feel, gave Student Hayworth as valuable advice based on experience as could be obtained. Now another student requests help on another problem of the Serviceman:

"Couldn't we have a discussion in THE NEWS relative to charges for services rendered in Radio work? For instance, what would most servicemen ask for a defective resistor-by-pass condenser replacement job, a replacement volume control job, or a filter replacement condenser job, etc? It seems servicemen hold this information as something sacred.

"Hoping for some action in this respect, I am,"

ALEXANDER KAPES,
Hazleton, Pa.

Well, let's give Student Kapes the "action" he hopes for. Any N. R. I. man who has had experience in service work is qualified to give Student Kapes the advice he wants. Address all letters on this subject to The Mailbag.

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Observes Improvement

NATIONAL RADIO NEWS has shown such marked improvement in the last year that I feel I must in some way express my appreciation. I read it from cover to cover and always find many interesting articles. It is a real supplement to N. R. I. training, and you are to be complimented on the fine job you are doing.

ALLEN MCCLUSKEY,
Birmingham, Ala.

A Suggestion

"THE NEWS is the most useful Radio literature I have read in years. Why spoil its value by printing service notes on both sides of the same sheet?

Many of the boys either have or intend having a 3″ x 5″ or 4″ x 6″ service file (R.C.A.) or similar. The practice of printing on both sides makes one side useless, unless we rewrite most of the notes."

EDWARD M. SCHMINKE,
Irvington, N. J.

Several other contributors feel the same way about it, friend Schminke—and so do we. Notice that we have made this improvement in this issue. Thank you and the others for the tip.—Editor.

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N. R. I. Hams Who Have Reported Since Last Issue of the News

E. W. Oberzil—W8NYH—Cleveland, Ohio.
E. J. Lagonterie—HJ1ABP—Colombia, S. A.
C. L. Leipold—W2JRB—Bay Shore, L. I., N. Y.
Vaino Kestila—W9WPG—Virginia, Minn.
Robert Jensen—W9UQE—Lake View, Iowa.
H. K. Conn—W8LYB-WVHK—Westport, Pa.
H. F. Sturm—W8PTJ—Huntington, W. Va.
James M. Summey—W4DJX—West Greenville, S. C.
Frank L. Du Pont—W8MSV—Arnold, Pa.
Floyd Nicholson, Jr.—W5FQM—Pampa, Texas.
Don Thomas—W8PPI—Dayton, Ohio.
Nelson Cameron—W8PNB—Mars, Pa.
Walter C. Missimer—W3DRE—Wilmington, Del.
William Lorainy—W8PWV—Cleveland, Ohio.
J. H. Crawley—W4DNS—Memphis, Tenn.
Charles Fink—W2BXD—New York, N. Y.
Robert Lawrence—W9RPD—Fargo, N. Dak.
Paul Tipton, Jr.—W7FVE—Soda Springs, Idaho.
Milton D. Haines—W5FSP—Artesia, N. Mex.
Paul A. Fortin—W1HZO—Waterville, Maine.

Master Antenna System Becomes Engineering Job

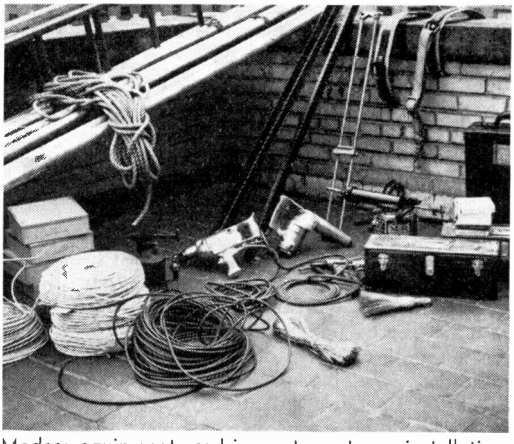
(Courtesy of Technical Appliance Corp.)

ONE more indication that Radio has attained its majority and is no longer any man's job, is evidenced in the thoroughness with which antenna systems are now designed and installed. This is especially true of the master antenna systems—those elaborate installations serving dozens of Radio sets in large apartment houses, hotels, hospitals, club buildings and so on. The day of the chap with just a smattering of Radio has drawn to a close. In his place we have the specialist, properly trained in the theory and practice of Radio, in whom the public can place full confidence.

A master antenna system, costing several hundred dollars or more, must be properly designed and installed to warrant the heavy investment. Hence such work is left to skilled Radio men. In New York City, as well as in other leading cities, hundreds of master antenna systems are already in use with excellent results. Several Radio concerns are specializing in master antenna system work, and have crews of men trained for the job. The skilled crews are provided with the necessary equipment and tools. They go on the job with ladders, safety belts, ropes and tackle, tool boxes, electric drills, adjustable templates for positioning holes, blow torches, electric stoves, pitch kettles, and the necessary wires, cables, insulators, outlets and couplers.

The main thing in master antenna installations

Only trained men employed for installation of master antenna systems.



Modern equipment used in master antenna installations

is skill and care. The men wear safety belts which hook on to suitable anchors in the walls, when working in hazardous locations. They use electric drills for making holes in brick and other masonry walls. Having previously studied the building and plan for the master antenna, the men know just where to start and how to go from one step to the next in a systematic order.

The master antenna system as designed and manufactured by Technical Appliance Corporation of New York City, known as the TACO System, comprises a common aerial, supported between some lofty central structure such as a water tower or pent-house or mast, and one or more iron-pipe masts placed at the parapet or edge of the roof; a twisted-pair cable downlead; and taps and couplers for each apartment or room to be served. As many as 25 sets can be served on a single aerial and transmission line, there being as many aerials and transmission lines as there are multiples of 25.

The downlead cable and the ground wires are passed through cracks in the roof proper, said cracks being filled with hot tar or pitch. On the job, the men use an electric stove for heating the kettle of tar or pitch. The jobs are neatly done, and there is every reason why they should last for years with little if any maintenance.

The owner of a multiple-family dwelling, such as an apartment house, saves in maintenance and trouble when a master antenna system is installed. He gets back his investment the first year. And then there is the added attractiveness by way of offering tenants or guests suitable outlets for connecting their Radio sets, without the need of invading a jungle of wires on the roof.