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RADIO WORLD

Title Reg. U. S. Pat. Off.

VOL. 6. NO. 15. ILLUSTRATED EVERY WEEK

"GREAT EXPECTATIONS," WITH APOLOGIES TO CHARLES DICKENS

3 Tubes DO THE WORK OF 6

Crosley Trirdyn Special, $75.00
With tubes and Crosley Phones $90.75

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SINCE the inception of radio, the results obtained with Armstrong Regenerative Receivers have been the goal of comparison for all others. Trick circuits have been designed to get around the Armstrong Patent hoping to obtain results "just as good." This has resulted in the use of more tubes, necessary without, but unnecessary with regeneration.

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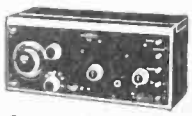

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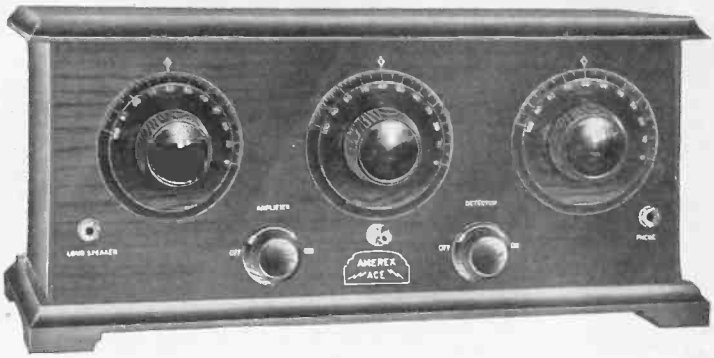

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It is superior to most 5-tube sets no matter how costly in

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Distinct reception on loud speaker with plenty of volume, clarity of tone and the ability to cut out interfering stations at will—these are qualities of the Amerex Ace.

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AMEREX ELECTRIC CORP.

232-B Greenwich Street **New York, N. Y.**

AMEREX ACE

VOLUME SIX OF

RADIO WORLD

[Entered as second-class matter, March 28, 1922, at the Post Office at New York, N. Y., under the Act of March 3, 1879]

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Vol. VI. No. 15. Whole No. 145. January 3, 1925 15c per copy, $6.00 a year

A 3-Tube Portable That Needs No Outdoor Aerial

"Listen in Wherever You Hang Your Hat"

One Stage of RF, Tube Detector, One Reflexed AF Stage and One Stage of Straight AF

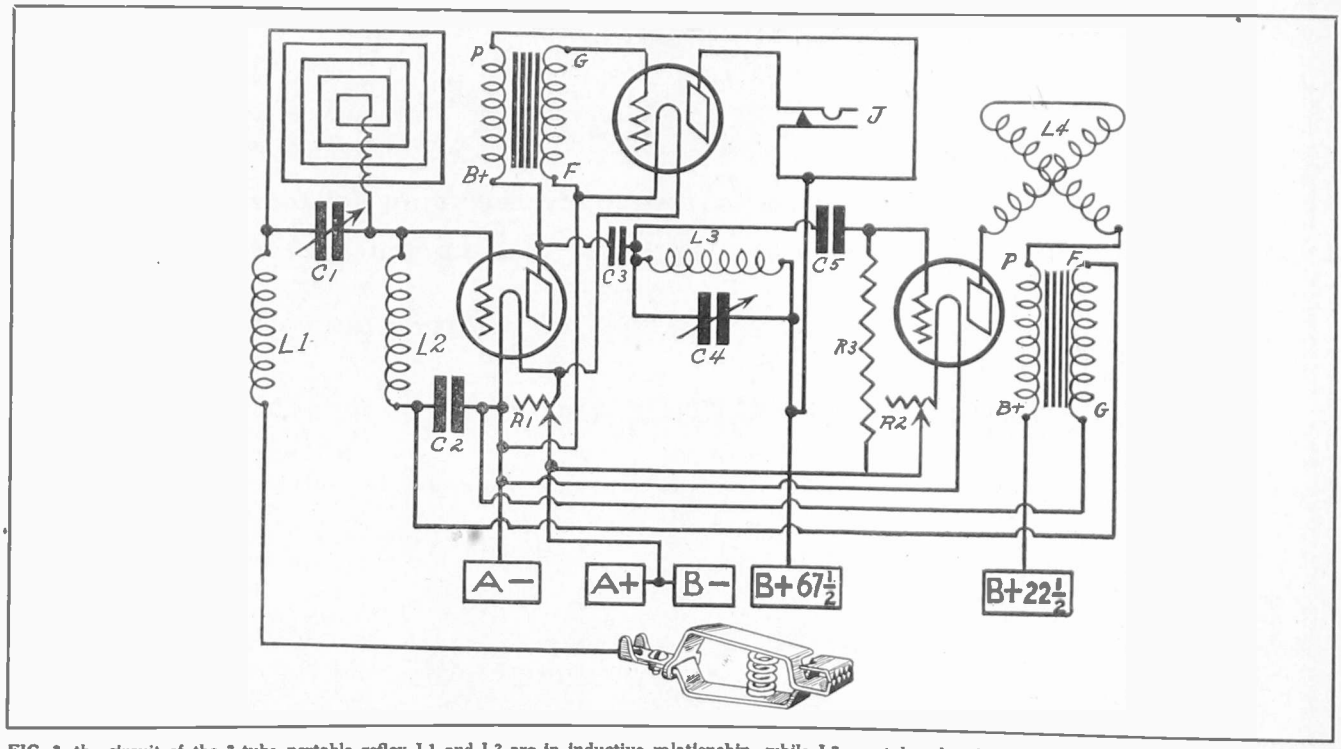


FIG. 3, the circuit of the 3-tube portable reflex L1 and L2 are in inductive relationship, while L3 must be placed wholly outside the field of the primary and secondary coils—at least 4 inches away and at right angles to the other coils. This circuit is unusually sensitive as well as selective when properly tuned.

By Abner J. Gelula

TO the travelling man, the camper, the chauffeur, the tourist and the man at home, this set is dedicated. It has three controls. The range is about 300 miles under good conditions. A loop and a water-pipe ground are used. With a good outdoor aerial and a good ground, the distance reception may be doubled, but in one's travels aerials, unlike bath, don't go with your room.

Physically, there are three tubes. However, because one of the tubes is reflexed, the set has a 4-tube value —one radio stage, detector and two audio-frequency amplifiers.

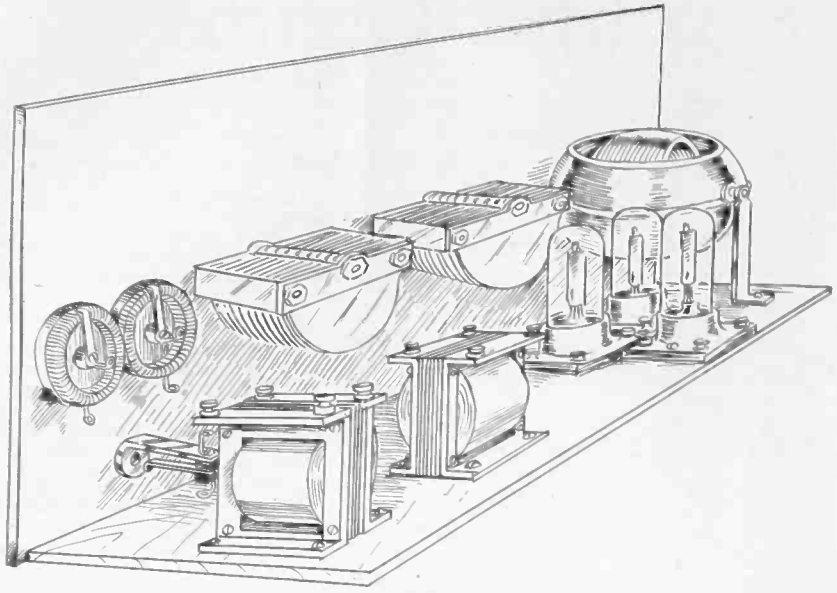
It is unusually selective as well as being very sensitive. With an outdoor aerial, it will receive DX stations quite regularly. However, this set is designed primarily for local reception, i.e., within a radius of 50 miles, on a loop. No speaker operation need be expected unless an outdoor aerial is used.

The set is very compact, therefore the utmost care should be taken in properly placing the instruments so as to prevent interacting currents. Fig. 2 shows the placing of the instruments for the maximum results, with the minimum stray currents which tend to make the set noisy. Note that the transformers are at right angles to each other.

Everything Inside the Set

Fig. 1 gives a perspective view of the panel and case. The entire set is self-contained, no extras to carry. The loop is wound inside the cabinet as indicated by the lines on the right side. Of course, the wires go the entire length of the case. There are 16 turns, the wires

A Set for Those Who Travel



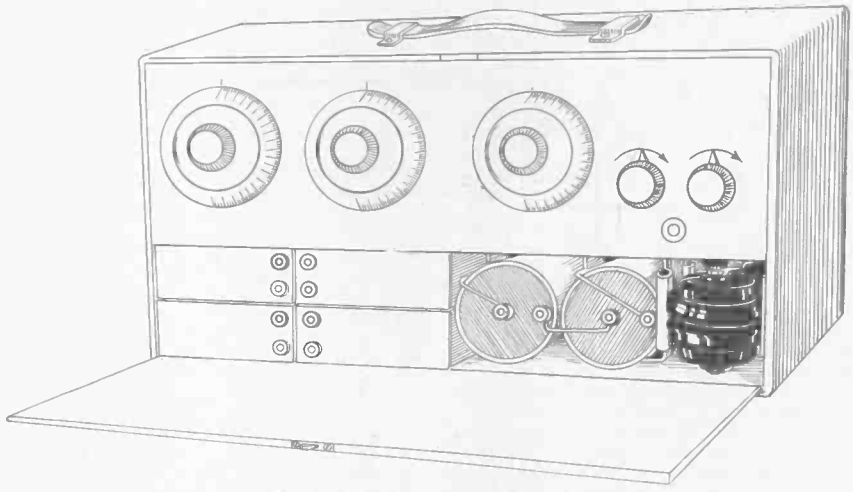
ASSEMBLY PLAN of the reflex

LIST OF PARTS

One loop.
Two 23-plate variable condonsers (C1, C4)
Two AF transformers: 6 to 1; 3½ to 1.
Three sockets
Two rheostats, (R1 , 20 ohms, R2, 30rhms)
Three 199 tubes.
One variometer.
One 7 x 21" panel.
One 7 x 20" baseboard.
Fixed condensers .00025, .001 .0005, (C5, C2, C3 respectively)
One single-circuit jack, (J)
One 2-megohm grid-leak. R3.
Three 4" dials.
Miscellaneous: Clip, coil-forms, No. 22 wire, flexible leads, 5 binding posts, etc.

What the Set Did

IT is in response to a heavy demand that we print herewith data for the construction of a 3-tube portable outfit. This set was thoroughly tested under average conditions that the radio man operating a portable outfit is likely to encounter. With the clip on any ground or aerial connection good distances were brought in. However, on a set of this type distance is not as desirable as volume. On stations of 500-watt power, and receiving within a radius of 35 to 40 miles, loudspeaker volume is attainable. With a good outdoor aerial and the standard water-pipe ground connection distance is obtainable with this 3-tube outfit. Extreme care should be taken in wiring so connections won't loosen.



HOW the set looks in the case

spread out and requiring the entire width of the cabinet, which must not be shorter than 7 inches.

Four small size B batteries are shown, each having a voltage of 22½. Two dry-cell A batteries are also shown. The phones are placed in a compartment at the side of the A battery.

The overall dimensions are 7x21", although the measurements may differ if you happen to have a case on hand and prefer to use that. However, it should be 18 inches at least.

The set itself will be found to be slightly directional, i.e., better reception will result if the loop is pointed toward the station.

In Fig. 3 note the clip. This is used to clip to a ground or counterpoise connection whenever possible.

For the sake of portability, type 199 tubes are suggested. If the set is to be used in the home, storage battery tubes may be used with slightly better results.

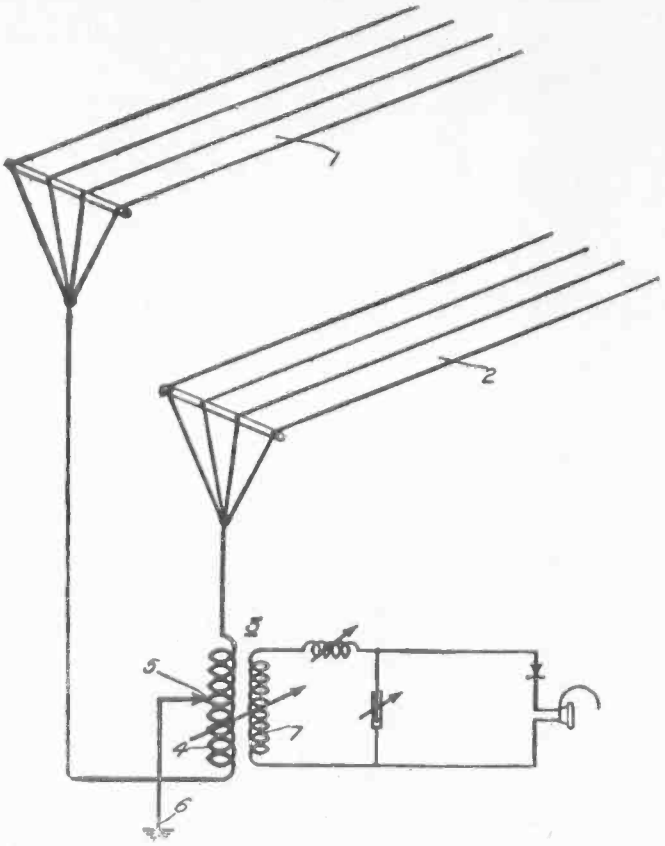
Two audio-frequency transformers are used.

Connect the aerial to the movable (rotor) plates of the condenser C1. Connect the fixed (stator) plates of C1 to the beginning of the stator of the split variometer L4. The end of the variometer stator goes to one side of the grid condenser (C3). The leak is mounted on the clips of the grid condenser. The unconnected side of the grid condenser goes to the grid via the G post on the socket. The beginning of L1 goes to the stator plates of C1 and the end of L1 to the ground. Thus L1 and the variometer stator make a common connection to C1. The side of the grid condenser opposite the grid (that is, NOT the socket side) goes to the stator plates of C2 and the other side of C2 to the A+. Connect A+ and ground.

The A+ goes direct from battery to F+ on the socket of the first tube. The A— is connected to one side of the rheostat R1, the other side of the rheostat to the F— post on socket No. 1. The A+ on battery goes to one side of the amplifier rheostat R2, the other side of that rheostat to both F+ posts on the two AF sockets. The A— on battery goes direct to the F— posts of both AF sockets and to both F posts (marked S2 on same AFT) of the transformers.

B+ on the first AF transformer goes to the 22½-volt B battery. G of that AF transformer goes to the grid of the second tube, F— to the negative side of the A battery. The plate of the second tube goes to the P on the second AF transformer, the B+ on the second AF transformer connects to the 45 or 90-volt B battery. G of the second AF transformer goes to the grid of the third tube. The plate of the third tube connects to the one side of the jack, the other side of the jack to the B+ 45 to 90-volt battery. Connect the negative sides of both B batteries to the plus A binding post.

Double Antenna System Cancels Static, Inventor Claims



DOUBLE antenna system to counteract static.

WASHINGTON.

A METHOD of eliminating static by the employment of two antennas for the receiving set has been invented by Frank Conrad, of the Westinghouse Company, and a patent granted. Mr. Conrad said:

"The receipt of transmitted impulses is frequently seriously disturbed by static charges produced upon the antenna by the passage of wind thereover, these static charges flowing to ground through the receiving apparatus. Similarly the passage of electrostatically charged clouds over the antenna attracts or repels charges from the ground, these also passing through the receiving apparatus and confusing the operator.

Antenna Heights Important

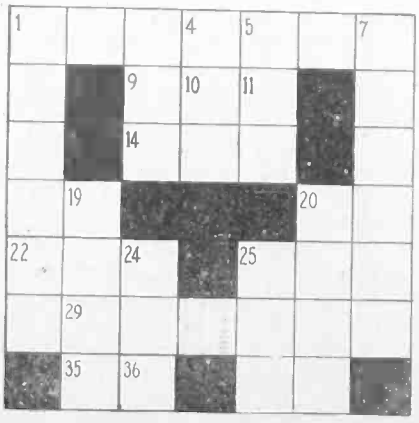
"I find that the static charges and static induction in antennas of different heights is substantially the same, whereas the intensity of the impulse set up in an antenna by incoming signals varies with the height, being much stronger for an antenna of considerable height than for one of moderate height. I make use of this phenomenon in eliminating the disturbing effects of static electricity by employing two antennas for the receipt of messages, these antennas being so associated with receiving apparatus that the substantially equal charges imparted thereto by static influences cancel each other within the receiving apparatus, thus being rendered imperceptible to the operator. The unequal amounts of energy imparted to the antenna by incoming signals fail to cancel each other and thus a residual effect is imported in the receiving apparatus which may be amplified if desirable in order to render it more clearly perceptible to the the operator."

The Diagram Explained

Referring to the drawing, 1 is a relatively high antenna and 2 is a relatively low antenna. These antennas are of the flat-top type, but any antenna of the open-circuit kind may be used. A receiving transformer is shown at 3 and the antenna 1 is connected to one end of a primary winding 4 thereof, whereas the antenna 2 is connected to the other end thereof. An adjustable tap 5 is provided at an intermediate point in the primary winding 4 and is grounded at 6. The secondary winding 7 of the transformer 3 is connected to a receiving set of the usual form.

Assuming equal sizes for the two antennas, the amounts of energy received therein are substantially equal with undesired disturbances, but are quite unequal with transmitted impulses, the high antenna developing much more energy in the latter case. The point of attachment 5 is, under these circumstances, placed at substantially the mid point of the winding 4, so that, with a given static impulse, the upwardly flowing current in the lower half of the winding 4 magnetically neutralizes the downwardly flowing current in the upper half of this winding, the current of both antennas flowing to ground through the tap 5 and the lead 6. As a result, with a static impulse, no flux is developed in the transformer 3, and consequently, no electromotive force is produced in the winding 7 and no effect is produced in the local receiving circuit.

Radio Cross-Word Puzzle



Send your solution to Radio Cross-Word Puzzle Editor, RADIO WORLD, 1493 Broadway, New York City. The names of those sending the correct solution will be published. Refer to Radio Cross-Word Puzzle No. 5.

Horizontal

1. Containers of tubes.
9. For shielding.
10. Direction the signal comes.
14. Call letter of a Kansas station.
20. Old man (radio abbr.)
22. The standard dielectric.
25. Newly-mined metal.
29. Signals often broadcast.

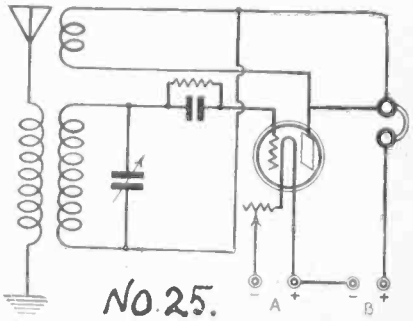
Vertical

1. Sound heard in phones.
4. A set of unconnected parts.
5. England (abbr.)
7. The time of the year reception is worst.
20. Unrefined metals.
24. A part of a wheel.
25. A contraction of over.

Tony Peterson, 517 S. W. Ry. Bldg., St. Paul, Minn.
Frank A. Graf, 62 Lexington Ave., Jersey City, N. J.
I. W. Sells, 136 State St., Auburn, N. Y.
J. D. Burke, 94 3rd Ave., Rensselaer, N. Y.

WHAT'S WRONG HERE?

THE wiring in the accompanying diagram is wrong. If you find what you think is the error, write to Wrong Diagram



Editor, RADIO WORLD, 1493 Broadway, New York City. Mention Wrong Diagram No. 25.

The names of those sending in the correct answers will be published.

Max H. Hopf, Harper, Tex.
R. C. Carter, 9 Pintz St., Dalton, Ia.
Homer Sims, Box 184, Malden, Me.
Milton J. Luther, 544 Logan St., Denver, Colo.
Stanley Aebersold, 1217 Silver St., New Albany, Ind.
Everett E. Lindsey, 805 E. Spring St., Boone.
Charles Zirkel, 539 Liberty Ave., Brooklyn, N. Y.
J. Govendo, 584 S. Orange Ave., Newark, N. J.
Robert Evans, 432 13th St., Brooklyn, N. Y.
Adolo de Miguel, Gloria 197, Havana, Cuba.
Robert J. Fogg, Hillsdale, Mich.

Making Your Set Efficient

By Neal Fitzalan

RADIO cannot be fully appreciated unless every instrument of the set is operating at full efficiency. The noises and crackling sounds that are the bane of the listeners' existence need not be present in the set—indeed, a radio set operating efficiently is as clear and perfect as the original sound. However, to attain this desire the utmost precautions should be observed in wiring, selection of the tubes and the correct application of the A, B and C batteries.

All instruments should be thoroughly inspected and tested before placing them in the set. Sliding contacts should be of such construction as to insure permanent, positive contact throughout the rotation. The contact device must be of such workmanship that wear will have no effect upon the efficiency of the instrument. Pig-tailed connections are good because of the soldered wire contact. However, a *good* sliding contact will not cause the instrument to be less effective.

In aperiodic windings, it is a safe practice to wind the secondary coil, then put a piece of dry paper over it, winding the primary over the paper. This will not affect the close coupling but will prevent a possible short between wires not well insulated. Play safe and use double-covered wire. Test all fixed condensers before placing them in circuit. A direct short-circuit in a fixed condenser is dangerous, as it is likely to blow out the tubes and short the batteries. The phones in series with a 1½-volt battery, the condenser in series with the phones, will afford a good test. If a click is heard loud and sharp, throw the fixed condenser away. However, due to the utmost sensitivity of the phones, a faint click will be heard with every good condenser, fixed or variable. Solder all leads, if you can solder well. If you are dubious about your ability to solder, use Fahnestock clips for flexible leads, or solderless lugs, with Morsing Bus-Bar Union for bus-bar.

The Batteries

Now for the batteries, the life-blood of the set. The current supplied by the B battery may be likened to the blood in the body. Normally, when the heart (the vacuum tube) is not placed under any strain (incoming signal), the blood (the current) travels through the system (the tube circuit) with an even flow. However, as soon as any action (incoming signal) takes place, the heart (the vacuum tube) responds with greater emphasis, thus supplying the necessary blood (current) to the part of the body (circuit) requiring it.

Although the B battery is the blood of the set it would be of little use without the A battery—the battery that supplies the current for the tube filament. The A battery current may be likened to the food we eat, supplying energy for the work of the body. So the A battery supplies current for the filament which, in turn, emits electrons, which is the energy of the receiving circuit.

In the early days of radio the impression was widespread that the B battery, while necessary for the proper operation of the vacuum tube, did little or no actual work. Nowadays we know differently. How much B battery current a set draws is an important item, and methods of cutting down the drain on the B battery should be interesting to all not already familiar with the subject.

The B Battery at Work

The vacuum tube contains three elements, (1) the filament in the center, surrounded by a wire mesh known as the grid, (2) and this surrounded by the plate, (3) The action of the vacuum tube was discussed in the issue of November 29.

The B battery current flows from the plate to the filament and back through the phones and battery, thus completing the circuit. However, to do this it must jump the space between the plate and the filament. This space is a non-conductor of electricity so long as the filament is cold. However, as soon as the filament is heated by the A battery, the filament shoots off myriads of tiny particles, each perfectly formed, called electrons. Nobody has ever seen an electron, but their effects are well known. They make it possible for the B battery current to flow across the space between the plate and the filament.

However, this current, to reach the filament, has to pass the grid, which is receiving impulses from the aerial. These impulses on the grid change the resistance of the tube to the flow of B battery current and thereby change the current.

Now, when the phones or loudspeaker are actuated, it is the B battery that transmits the current. The incoming current, picked up by the aerial, is fed directly to the grid of the first tube. It is the duty of the grid, in controlling the flow of electrons, to operate the B battery voltage, i.e., transmit the impressed grid energy, which is far too small to operate the phones, to the B battery which, in a way, is applying to the phones the same variations in current as the aerial energy impresses upon the grid.

The use to which the B battery is put determines how long it will last. However, use is not the only thing to be taken into account if you are to figure the approximate life of the B battery.

The quality of the cells of the battery. The larger the cells the more electrical energy they contain, and the longer they last. Size should be proportionate to use.

The amount of current used. The more current drawn, the shorter will be the life of the battery.

The amount of daily use. The battery will recuperate if it has long resting hours between use.

Location of the dry B battery. Dampness will kill a dry battery sometimes quicker than months of hard service. Keep the battery in a cool, dry place. Don't place them near a hot radiator or heater or on the window-sill where dampness is liable to corrode them.

Use a C battery on all amplifying tubes. This not only conserves the life of the B battery but improves tone and valume.

Using a C battery often cuts the B battery drain in half, as shown in the following table:

WD-11 and WD-12

Circuit	B Volts	C Volts	Plate Current, Milli-Amperes
Detector	22½	+1	0.7
Detector	45	+1	1.75
Amplifier	45	0	1.5
Amplifier	67½	0	2.5
Amplifier	90	0	4.5
Amplifier	90	—4½	2.5

UV-199 and C-299

Circuit	B Volts	C Volts	Plate Current, Milli-Amperes
Detector	22½	+1	0.6
Detector	45	+1	1.65
Amplifier	45	0	1.4
Amplifier	67½	0	2.4
Amplifier	90	0	4.0
Amplifier	90	4½	2.25

UV-200 and C-300

Circuit	B Volts	C Volts	Plate Current, Milli-Amperes
Detector	22½	+1	0.75

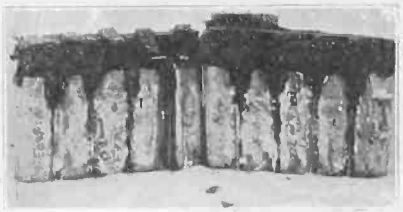
UV-201 and C-301

Circuit	B Volts	C Volts	Plate Current, Milli-Amperes
Detector	22½	+1	0.6
Detector	45	+1	1.8
Amplifier	45	0	1.5
Amplifier	67½	0	2.5
Amplifier	90	0	3.9
Amplifier	90	—4½	2.1

UV-201 A and C-301 A

Circuit	B Volts	C Volts	Plate Current, Milli-Amperes
Detector	22½	+1	0.5
Detector	45	+1	2.0
Amplifier	45	0	1.5
Amplifier	67½	0	3.5
Amplifier	90	0	6.0
Amplifier	90	—4½	2.0

How a Worn-Out B Battery Looks



NOTICE how the cells of an old B battery look when deteriorated.

White Bill Has Little Chance at Short Session

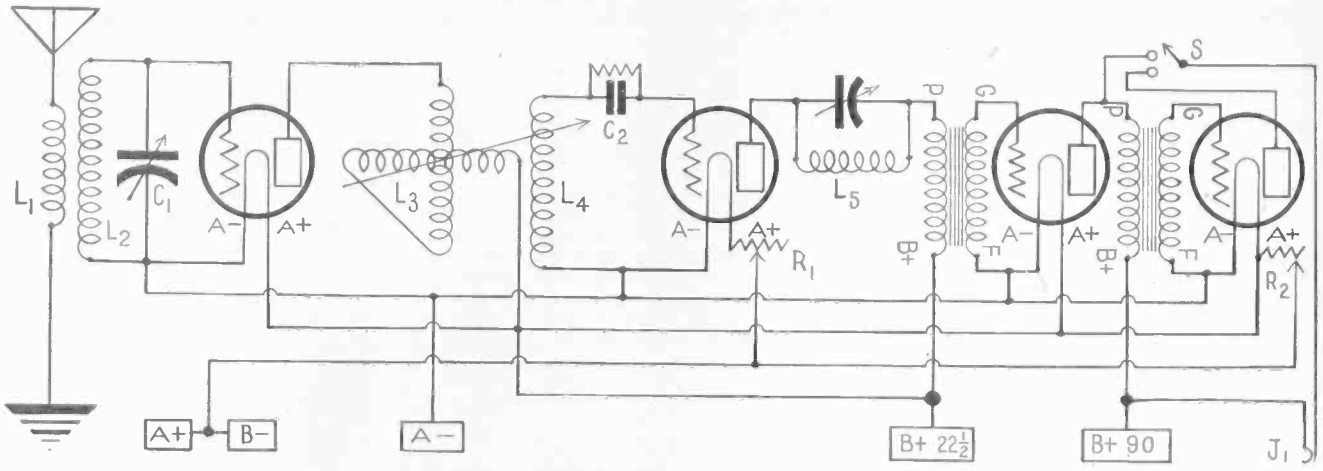
WASHINGTON.

WITH the convening of Congress the interest of radio fans is again becoming centered on legislation providing for Government regulation of radio. Letters are already beginning to reach Senators and Representatives either urging passage of the White radio bill or suggesting some alternative.

Since the present session of Congress is a continuation of the last, all bills carried over are still pending. This applies to the White radio bill.

During the last session, the White radio bill was approved by the House Merchant Marine and Fisheries Committee and favorably reported to the House as an amendment to the Howell bill, which declared for Government ownership of the ether. A request for a special rule for immediate consideration of radio legislation is still pending in the House Rules Committee.

Tim Turkey's Silk Hat Circuit for Dress Occasions



THE HOOKUP (Fig. 1) for Tim Turkey's Silk Hat Circuit. Four tubes are used, one RF, detector and two AF. The coupling transformer is of the tuned type because of the variometer in the circuit. The coil L4, which is in inductive relationship to L3, the variometer, is fastened directly to the variometer. It is very important that the winding be in the same direction as that of the stator of the variometer.

By Tim Turkey

WELL, folks, since you heard from me last I've developed several things, notably my chest expansion and a great system of using four tubes.

TIM TURKEY

Speaking of chest expansion I might say that before I began working on this hookup I could breathe 4½" of air into my lungs, but as, during my four recent weeks of radio development I hauled in 4½" of smoke instead of oxygen, I've got to begin all over again. I'll feel repaid plenty if I hear of good results from using this hookup. There are 5 coils. L1L2 are on one form, L3 and L4 are on two forms hooked together so as to act thrugh inductive coupling, and L5 is joined with the 23-plate variable condenser and is entirely controlled by it. Don't miss that neat system of cutting out the jacks. Switch from tube No. 3 to tube No. 4, or versa-vice, by turning the switch lever from tap No. 1 to tap No. 2, or vice-versa. I think I like this switching over from one stage of audio to the other better than the plug and jack method. It's snappy and works great.

Three controls to this set, but believe me, it sure gives control. I fixed it so that C1 would control the wavelength, L3 the RF coupling and C3 the regeneration. What could be sweeter?

A soft-boiled tube is used for the detector; type 200. Hard-boiled tubes for the RF and AF departments.

What Coils Are Used

Now let's make the coils (or buy them if the bank-book says so). Wind L2 first. 42 turns on a cobweb—I mean spiderweb—form. After the 42 turns are turned, wind 10 turns over it. This coil will then have four distinct and separate leads, two from L1 and two from L2. L3 is any standard, good, everyday and night variometer. L4 equals 35 turns. L5 is 30 turns, spiderweb.

L3, L4 is a trick instrument. Many's the night I lay awake, rolling hither and thither, pounding and propounding my weary brain trying to think up a way of getting these two coils in inductive relationship, and lo, and behold, here is the answer. That little, ordinary variometer became a variable transformer by merely sticking a coil on it so that the winding on L4 would be in the same direction as the stator winding on L3. It's a corking idea, I think.

Keep L5 Out of Field

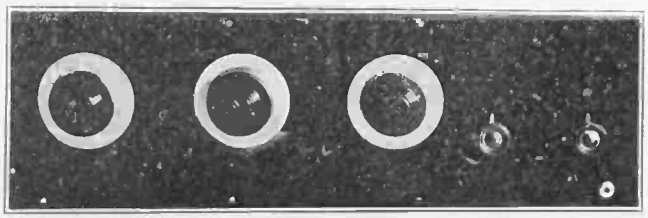
Don't let L5 get into the field, inductively speaking, of any of the other coils, or you'll spoil the whole game. This fact is important enough to get a whole paragraph by itself.

If the filaments are too light, use a storage battery. This idea of using a line-up of dry-cells to supply the necessary juice is hokum when there is a tube drawing one amp. Get a good storage battery, I repeat.

90 volts of B battery on the plates of the hard tubes; 22½ on the plate of the soft tube.

Only three condensers in the whole set: C1, C2 and C3, 23 plates, .00025 mfd. fixed grid condenser and 23 plates, respectively. Hitch up a 2-meg. grid-leak across the C2 condenser. Use a single-circuit jack for the phones at the output of the last stage of AF.

If you haven't a good aerial and ground, get one—I don't mean take your neighbor's—but set one up on the roof yourself. One length, 75 feet long, insulated at the ends, soldered leadin, and everything will be hotsy-totsy. Ground the set to the radiator or even better to the cold water



THE PANEL layout (Fig. 2) for Tim Turkey's Silk Hat Circuit. The control of the circuit is accomplished with two dials. The third dial is merely a final adjustment. Filament control is not critical, although two rheostats are provided, one for detector and one for the amplifying tube. The dials should be of the vernier type.

DX with Great Speaker Volume from 4-Tube Set

"The Set Tuned So Sharp," Says Tim Turkey, "That it Cut the Insulation Off the Coils"

pipe. Scrape the pipe first so that contact will be firm and good.

It's no use telling you the distance I get on this circuit, because you wouldn't believe me. Anyway, here on the Bowery in New York I get nearly everything east of Hong Kong. I get Chicago, anyway, any time I want it. Locals come in so loud that the vibration blew the horn apart. It was reported on East 53rd St., about three miles up, that people had to close the windows when I was receiving, so that they could sleep. However, the set gave volume of sufficient quantity as to be heard in a fairly large house.

Selectivity? I can tune within a quarter of a meter. (I don't mean a quarter gas meter.) However, I don't feed the meter quarters unless the soldering iron needs heat. The set tuned so sharp it cut the insulation off the coils. Nevertheless, I can tune out entirely any local station and get distance.

Is it easy to control? Say, listen. My brother's son, who is about 6 months, two days and an hour old, visited me the other day with his pa, and he (the son) saw the set and immediately began tuning it. He had never tuned a set before yet he cut out WEAF and listened to WOR, cut out WOR and in with WHN, out with WHN and listened to WFBH. His pa complimented me highly upon producing a set that requires so little knowledge to run. But, no fooling, after a couple of evenings of tuning it will be as simple as a Neutrodyne, and it costs much less to build.

In wiring the set connect the aerial to the beginning of L1, the ground to the end of L1. The beginning of L2 goes to the stator plates of C1 and to the grid of the first tube. The end of L2 connects to the rotor plates of C1 and to the negative filament of the first tube. A lead is taken from this point, going to the negative filament terminals of the second, third and fourth tubes. The positive filament lead goes to the positive filament terminals of the third and fourth tubes. At this point on the fourth tube one side of the rheostat is connected, the other side of the rheostat to the positive A battery. The F+ on the second socket goes to one side of a rheostat; the other side of the rheostat to the A+. The plate of the first tube joins to one side of the variometer, the other side to the plus 22½ to 9D B battery. The beginning of L4 connects to one side of the grid leak, and one side of the grid-condenser, the other side of the grid-leak-condenser combination to the grid of the second tube. The plate of the second tube goes to the beginning of L5, the end of L5 to the P on the first AF transformer, one side of C3 to the beginning of L4, the other side of C3 to the end of L4. G on the first AFT goes to the grid of the third tube, F to the negative filament terminal on the third tube. The plate of the third tube connects to one tap on the switch, also to the P on the second AFT. B on the AFT goes to the plus 90 B battery. G on the second AFT goes to the grid of the last tube, F to the negative filament. The plate of the fourth tube goes to the other tap of the switching arrangement. The switch-arm connects to one leaf of the jack, the other leaf to the positive 90-volt B battery.

LIST OF PARTS.

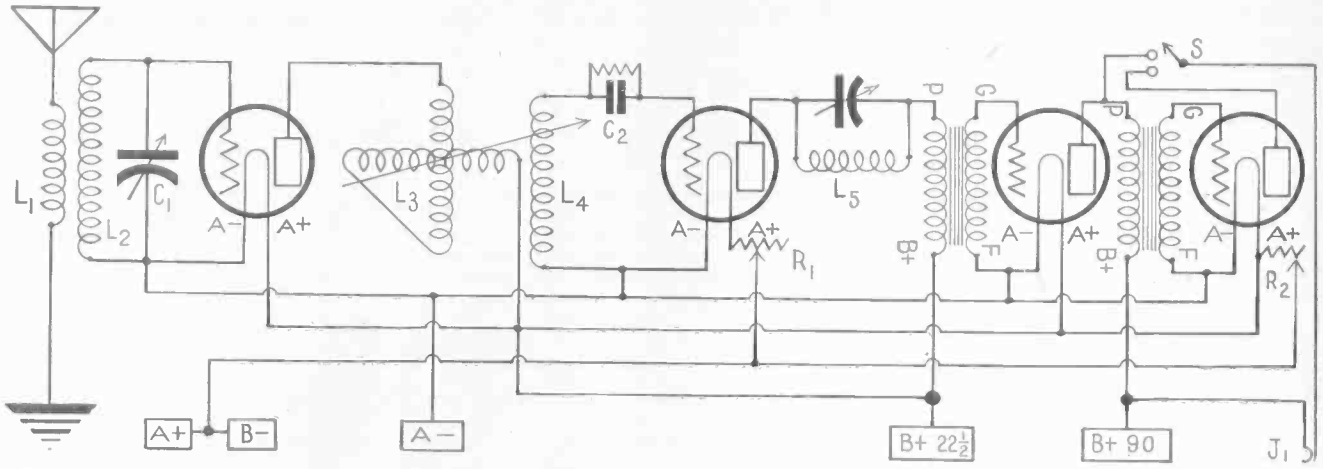
Two 23-plate variable condensers.
Four vacum tubes.
Four sockets.
Two rheostats.
One variometer.
Two AF transformers: 6 to 1; 3½ to 1.
One .00025 mfd. fixed condenser.
One 2-megohm grid-leak.
One single-circuit jack.
Two taps, one switch-arm.
One 7 x 21" panel.
One 7 x 20" Cardboard.
One cabinet.
Three 4" dials.
Miscellaneous: 5 binding posts, x coil forms, No. 22 wire, screws, bolts, flexible leads.

New Device Records Programs

"CANNING" RECEPTION—N. J. Wilcox, of San Francisco, has perfected an ingenious device for recording a radio program. The set is hooked to the dictaphone, without any intermediate device. Mr. Wilcox says the greatest difficulty was in harmonizing the dictaphone with the radio voice vibrations. He is the only person in the country known to have overcome the problem. The President's pre-election speech, on two cylinders, was presented by Mr. Wilcox to the Chief Executive.—(Wide World)

"Locals Come in so Loud that People Three Miles Away Had to Close the Windows to Sleep"

Tim Turkey's Silk Hat Circuit for Dress Occasions



THE HOOKUP (Fig. 1) for Tim Turkey's Silk Hat Circuit. Four tubes are used, one RF, detector and two AF. The coupling transformer is of the tuned type because of the variometer in the circuit. The coil L4, which is in inductive relationship to L3, the variometer, is fastened directly to the variometer. It is very important that the winding be in the same direction as that of the stator of the variometer.

By Tim Turkey

WELL, folks, since you heard from me last I've developed several things, notably my chest expansion and a great system of using four tubes.

TIM TURKEY

Speaking of chest expansion I might say that before I began working on this hookup I could breathe 4½" of air into my lungs, but as, during my four recent weeks of radio development I hauled in 4½" of smoke instead of oxygen, I've got to begin all over again. I'll feel repaid plenty if I hear of good results from using this hookup. There are 5 coils. L1L2 are on one form, L3 and L4 are on two forms hooked together so as to act thrugh inductive coupling, and L5 is joined with the 23-plate variable condenser and is entirely controlled by it. Don't miss that neat system of cutting out the jacks. Switch from tube No. 3 to tube No. 4, or versa-vice, by turning the switch lever from tap No. 1 to tap No. 2, or vice-versa. I think I like this switching over from one stage of audio to the other better than the plug and jack method. It's snappy and works great.

Three controls to this set, but believe me, it sure gives control. I fixed it so that C1 would control the wavelength, L3 the RF coupling and C3 the regeneration. What could be sweeter?

A soft-boiled tube is used for the detector; type 200. Hard-boiled tubes for the RF and AF departments.

What Coils Are Used

Now let's make the coils (or buy them if the bank-book says so). Wind L2 first. 42 turns on a cobweb—I mean spiderweb—form. After the 42 turns are turned, wind 10 turns over it. This coil will then have four distinct and separate leads, two from L1 and two from L2. L3 is any standard, good, everyday and night variometer. L4 equals 35 turns. L5 is 30 turns, spiderweb.

L3, L4 is a trick instrument. Many's the night I lay awake, rolling hither and thither, pounding and propounding my weary brain trying to think up a way of getting these two coils in inductive relationship, and lo, and behold, here is the answer. That little, ordinary variometer became a variable transformer by merely sticking a coil on it so that the winding on L4 would be in the same direction as the stator winding on L3. It's a corking idea, I think.

Keep L5 Out of Field

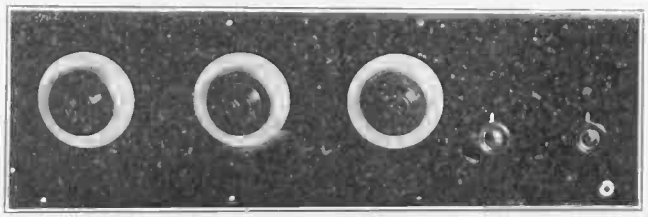
Don't let L5 get into the field, inductively speaking, of any of the other coils, or you'll spoil the whole game. This fact is important enough to get a whole paragraph by itself.

If the filaments are too light, use a storage battery. This idea of using a line-up of dry-cells to supply the necessary juice is hokum when there is a tube drawing one amp. Get a good storage battery, I repeat.

90 volts of B battery on the plates of the hard tubes; 22½ on the plate of the soft tube.

Only three condensers in the whole set: C1, C2 and C3, 23 plates, .00025 mfd. fixed grid condenser and 23 plates, respectively. Hitch up a 2-meg. grid-leak across the C2 condenser. Use a single-circuit jack for the phones at the output of the last stage of AF.

If you haven't a good aerial and ground, get one—I don't mean take your neighbor's—but set one up on the roof yourself. One length, 75 feet long, insulated at the ends, soldered leadin, and everything will be hotsy-totsy. Ground the set to the radiator or even better to the cold water



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"Locals Come in so Loud that People Three Miles Away Had to Close the Windows to Sleep"

Sidelights On the Superdyne

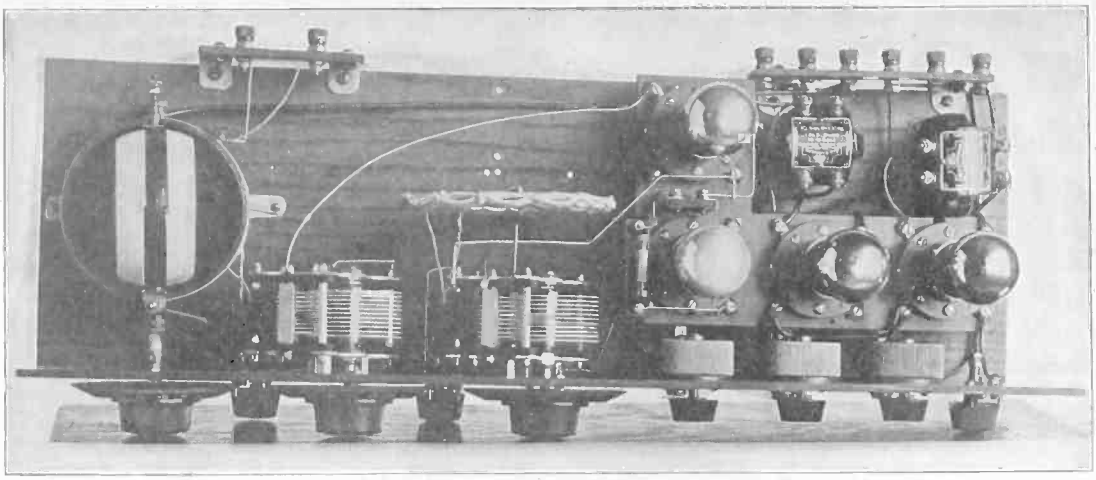

FIG. 1, top view of a 4-tube Superdyne. The grid lead from the RF tube to the variable condenser at left is shown in white, passing behind the plate coil.

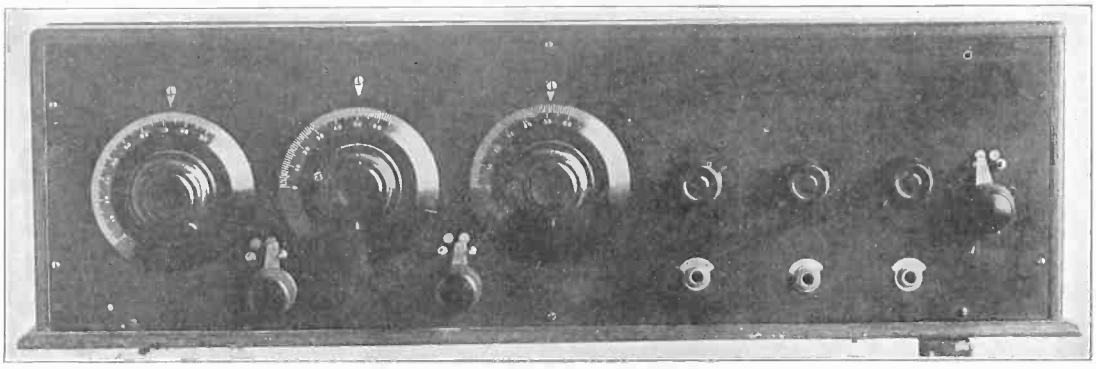

FIG. 2, panel view of a 4-tube DX Superdyne.

GREAT DX, FINE QUALITY FROM 4-TUBE SET

Tickler Dial Not Critical

By Brewster Lee

SO fine have been the results from the 4-tube DX Superdyne that fans all over the country are being won over to it.

One of the tubes is used in a stage of regenerative radio-frequency amplification, one as a detector and two as transformer-coupled stages of audio. Fans are taking great pains in the construction of these sets and many fine-looking specimens are the result. One example is the set made by C. W. Flower, of Richmond, Mich. As he wrote in a letter published recently in the Results Column of RADIO WORLD, he has his plate coil so balanced with the grid coil of the RF tube that they tune in step. Also, the tickler dial is always set at 68 or 70, and he gets marvelous distance, with the volume and tonal quality for which the Superdyne is famous.

Fig. 1 shows the assembly plan as worked out by Mr. Flower. The coupler is at left. To these inductances the aerial, ground, the grid and plate leads of the RF tube are connected. The plate coil is of the low-loss spider-web type and is mounted behind the variable condenser that tunes it. The tube in the rear of the panel is for the radio-frequency stage. The tubes in front, from left to right, are the detector, first audio and second audio. Note that the audio transformers are mounted at right angles to each other, to prevent stray coupling. At left, rear, are two binding posts for connection to aerial and ground. The terminal block at right has binding posts for connection to the batteries. There are three rheostats, one for the RF tube, one for the detector and one common to the two audio tubes. There are three jacks, one for the detector, one for the first audio and one for the second or last audio stage.

The panel layout is shown in Fig. 2. The dial at left is the one controlling the tickler or rotary coil of the Superdyne coupler. Mr. Flower happened to use a reconstructed Tuska coupler, but other good makes work just as well. The dial in the center actuates the 23-plate variable condenser connected to the secondary of the coupler. That is the large winding on the stator. The last dial controls the variable condenser, also 23 plates, that tunes the spider-web plate coil. By adding to or reducing the number of turns on the spider-web this condenser may be made to tune in step with the variable condenser controlling the secondary of the coupler. There are three tap-switches, one of which is entirely optional and which taps the aperiodic primary of the coupler. The other switches are for tapping the secondary of the coupler and the plate coil, respectively.

The wiring diagram for a circuit like this, with the audio stages omitted, is shown in Fig. 3. The aperiodic primary of the coupler, represented by L1, is untapped in this diagram. L2 is the secondary of the coupler, while L3, reversely connected, is the tickler. If the plate coil is connected in conventional fashion, that is, the beginning of the coil L4 to the plate of the RF tube, and the end of L4 to the END of L3, then the reverse feedback is obtained. The beginning of L3, which normally would go to the plate of a tube, is connected instead to the B+ amplifier voltage. The Superdyne effect would also be obtained if the plate coil connections

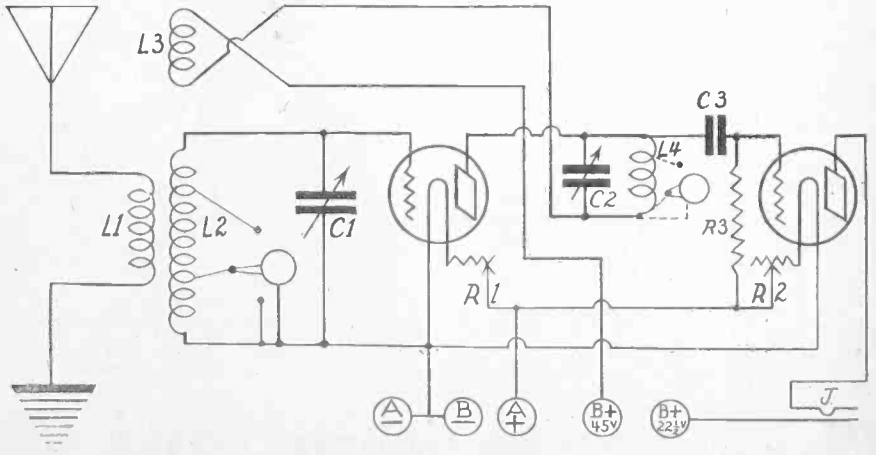

FIG. 3, circuit diagram of a Superdyne like the one used by C. W. Flower, who built the set pictured above. The two audio stages are omitted from the diagram.

Assembly of 4-Tube Set

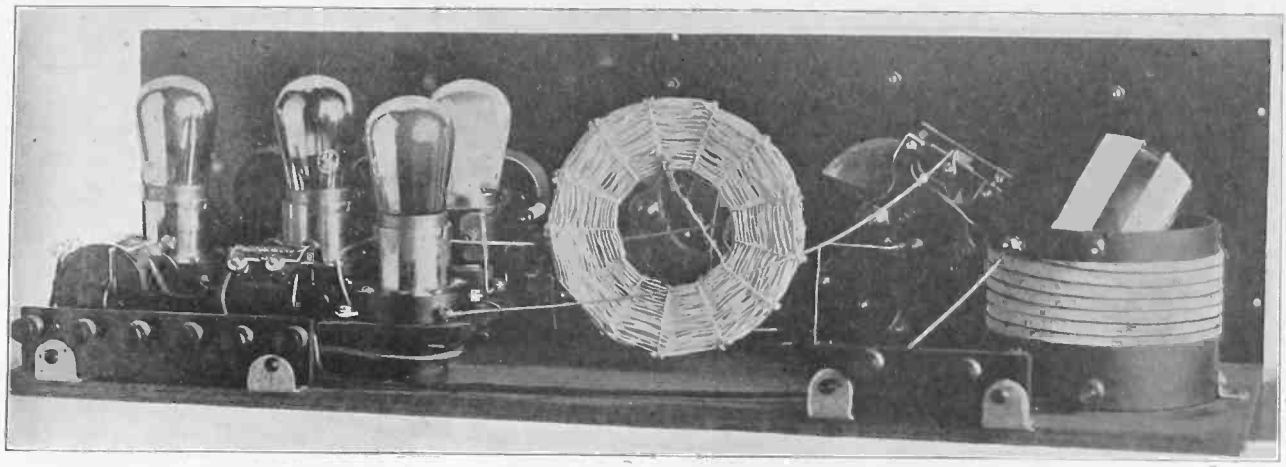

FIG. 4, rear view of 4-tube Superdyne.

were reversed, but the tickler connections made in standard fashion. Sometimes, but not usually, the control of regeneration is improved if that method is used. The different ways of making these connections may be tried by the experimenter. Notice that the grid leak is connected from the grid post of the detector socket to the A+. The jack J is a single-circuit affair, but if a set were being constructed with two stages of audio, this would be a double-circuit jack instead, and the single-circuit jack would be used in the last audio stage. If a jack were to be included for the first audio stage, too, as was done by Mr. Flower, that jack would have to be the double-circuit kind.

What Rear View Shows

The rear view of the Superdyne built by Mr. Flower, Fig. 4, clearly shows the relative positions of the coupler, the plate coil and the binding post blocks. The aperiodic primary is represented by the heavy black lines on the white secondary and consists of six turns. No. 20 double silk-covered wire will do nicely here. The tickler is shown at the angle at which Mr. Flower uses it most of the time. The bold white line from the secondary to the small terminal block shows the aerial lead. The ground lead is not visible.

Telling about his Superdyne, Mr. Flower said:

"During the transcontinental tests I picked up 2LO, London, on Thursday night at 11:38, also the station at Newcastle, Eng., at 11:17, and a German station whose call letters I could not distinguish, as I do not understand German. Also I worked many other foreign stations on the earphones, but could not determine what their call letetrs were, due to my unfamiliarity with the foreign languages. This hookup is the same as the regular Superdyne, except for the grid return of the detector tube, which goes to the positive A, and the use of a low-loss plate coil. The set works just as well with four 201A or 301A tubes as it does with three of these tubes and a 200 or 300 in the detector. I use 90 volts of B battery on the amplifier tubes. I have never had a set that produces the volume that this set does. There is no distortion. The condenser dials tune notch for notch, which makes it an easy matter to log stations. The stations always come in at the same dial settings. I work PWX and the Pacific Coast stations on the loudspeaker.

Care in Wiring

"In wiring the set keep all plate and grid leads well separated and forget the fancy bends. Variable condensers should not be

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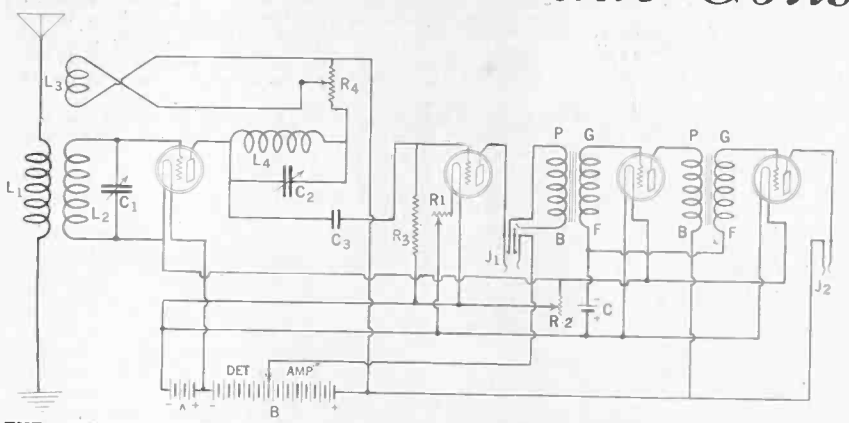
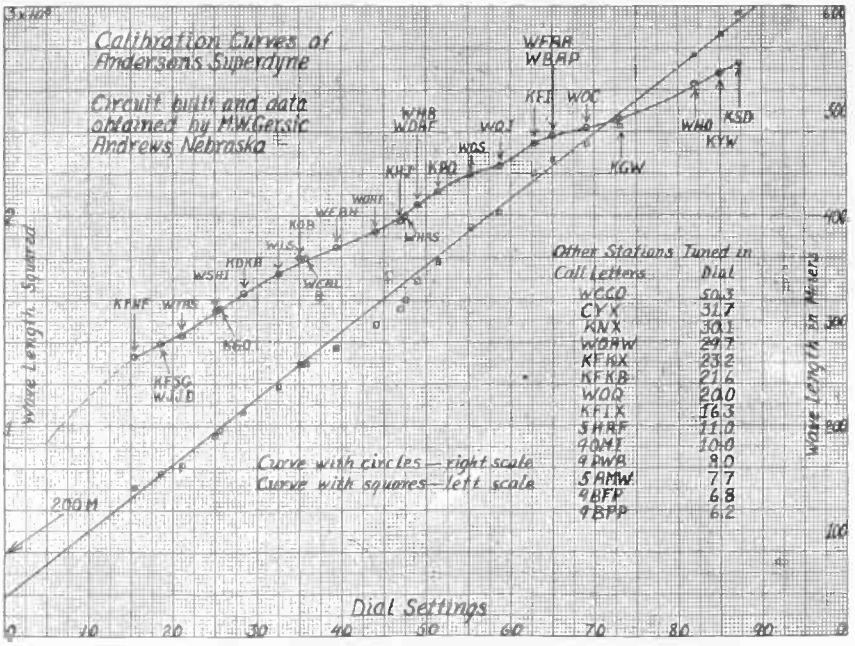
A Superdyne Using Home-Made Coils



THE 4-TUBE SUPERDYNE, using resistance-controlled regeneration. The reverse feedback is obtained by connecting the end of L3, a fixed coupled coil, to the end of the plate coil, and the beginning of L3 to the high B voltage.

A SUPERDYNE may be made without using a variocoupler, the regeneration being controlled by a variable resistance that has a range of from about 1,000 ohms to 100,000 ohms, although a 5,000 minimum will sometimes work satisfactorily. If a 4-inch diameter tubing 3½ inches high is used for the tuning coil, L2 would consist of thirty-one turns of No. 22 double silk covered wire over which the primary, L1, consisting of five turns, is wound for the entire length of the secondary winding. In other words, the turns of L1 are widely spaced. L3 would consist of 3 turns, either above or below the secondary, and spaced therefrom about ¼ inch. The same kind of wire is used for all the windings and all are in the same direction. The variable resistance, designated R4, is connected, one side to the end of the plate coil, L4, the other side to the end of L3, with the movable arm of the resistance, or corresponding variable post, connected to the beginning of L3. Regeneration is controlled by varying the amount of resistance in the plate circuit. The plate coil, on a 4-inch diameter tubing 2 inches high, would consist of thirty-three turns of the same wire. Wind it in the same direction as L1, L2, L3 were wound, the terminal of L4 corresponding to the beginnings of L1, L2, L3 being connected to the plate. Both variable condensers are .0005 mfd., low-loss, normally 23 plates. L4 must not be in inductive relationship to the other coils. In the audio stages a C battery is used. Try from 4½ to 9 volts. C3 is the grid condenser, .00025 mfd., R3 the grid leak, preferably variable, R1 the detector rheostat to match the tube, and R2 the amplifier tube rheostat, controlling tubes Nos. 1, 3 and 4, left to right. The tubes may all be 201A, although the 11 and 12 types will work about as will the 199. The audio transformers may be of any good make, about 5-to-1 ratio for both stages. The Federal 65 and 65A, which are matched, were used with satisfaction. R3 should be a 3-ohm rheostat, in fact may even be omitted without danger, a push-pull battery switch being substituted. This set enables the use of coils all of which are home-made, the home construction of a variocoupler not being an easy mechanical undertaking for some fans. By removing or adding turns to or from L4 the variable condenser C2 may be made to tune in step with C1. The position of the fixed resistance will vary even for the same station receiving the same station, but this is not bothersome.

Curves for Anderson's Superdyne



CURVES of wavelength as against dial settings for Anderson's Superdyne.

By J. E. Anderson

THE 4-tube Superdyne receiver which RADIO WORLD published Nov. 22 and 29 has made a decided hit with the radio fans.

M. W. Gersic, Andrews, Neb., wrote that he assembled the circuit, using, Signal condensers, Benjamin sockets, All-American transformers, Bradleyleak and Frost rheostats. His report convers the results obtained during the four days of trial, and all the stations listed were received on a Magnavox speaker. The volume was good and the quality exceptionally clear, he says. He has built many other receivers of similar type, and he speaks very favorably of this one in comparison.

The data he supplied have been committed to a cross-section paper and are reproduced herewith. On the graph are two curves, one giving the wavelength in meters against dial settings and the other the wavelength squared against the dial readings. The former is the curve in which the observed points are centered in little circles and the latter is the curve in which the points have been enclosed in small squares. The wavelength curve should be a section of a parabola provided the condenser used had semi-circular plates. The wavelength squared curve should be a straight line under the same conditions; and it was drawn to supply additional information about the circuit, and particularly to investigate the lower limit of the tuner.

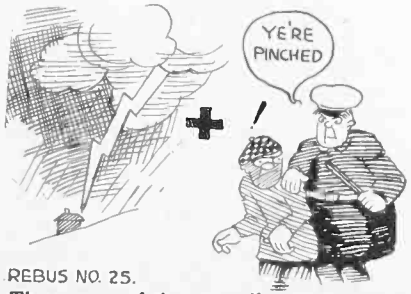
All the stations for which the wave length was given have been placed directly on the curve; and the stations for which the wavelength was not given, but which were tuned in during the four days, have been placed in a column under the curves, together with the dial settings at which they came in. From these values the wavelength may be determined approximately.

The tuning range of the circuit is entirely satisfactory for broadcast reception, KSD is operating on the longest wave in the broadcast range, and this station comes in at 87.3 degrees. There is, therefore, a considerable margin at the upper end of the dial. A turn or two could have been removed from the tuning coil to bring KSD in at about the 95 mark, but in this case it was not necessary because the circuit tunes well below the 200 meter mark.

The lowest wavelength station on the curve is KFNF, operating on 266 meters. Below that point the course of the curves is uncertain. All the six amateur stations come in below this station, but these cannot be placed on the curves directly because the wavelengths are not known. It is probably that the senders themselves did not know, or perhaps they would not have continued violating the law. The best way of investigating the course of the curves at the lower end is to draw the wavelength squared curve. It appears that all the squares follow the line closely enough so that we may assume that the line is straight. The straight line drawn through these points hits the axis of ordinates at a point where the wavelength square is 20,000, or where the wave length is 144 meters.

The Weekly Rebus

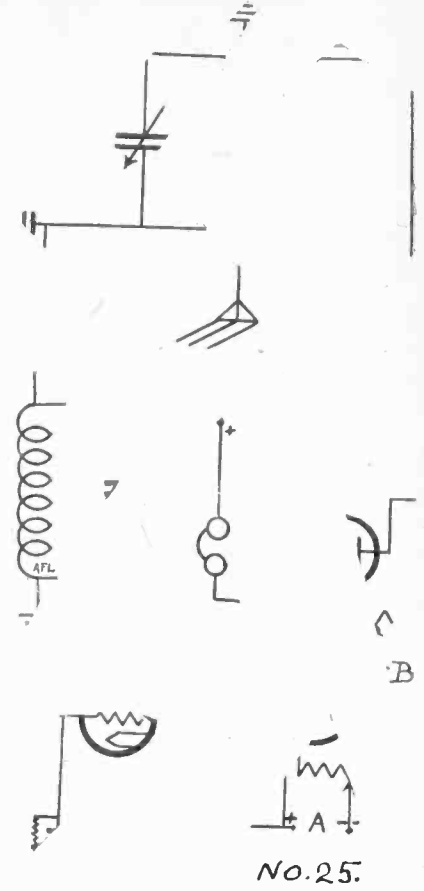
WHAT does this rebus represent? Send answer to Rebus Editor, RADIO WORLD, 1493 Broadway, New York City.



REBUS NO. 25.

The names of those sending the solution will be published.

Scrambled Diagram



NO. 25.

CUT and paste up this Scrambled Diagram. Send your solution to Scrambled Diagram Editor, RADIO WORLD, 1493 Broadway, New York City. The names of those solving this puzzle will be published.

Flower's Set

(*Concluded from preceding page*)

placed less than 5½" apart, from center to center of the shafts, and should be mounted at a 37-degree angle and not square to the panel.

"Here is the list of parts I used:

One 2x10" Radion terminal block.
One 7x24" Bakelite panel.
One 7x23x7½" baseboard.
One reconstructed Tuska coupler.
One low-loss plate coil as described in RADIO WORLD, Aug. 23, page 12.
Two .0005 mfd. General Instrument variable condensers.
Four General Radio sockets.
Three General Radio rheostats.
Eight Eby Ace binding posts.
Two Frost double-circuit jacks.
One Frost single-circuit jack.
One .00025 Dubilier grid condenser.
One 2-megoh mtubular grid leak (Daven).
Three switch levers.
Six switch points.
Six switch stops.
Three 4" NaAld dials.
One 5-to-1 All-American audio transformer.
One 3-to-1 All-American audio transformer (for second stage).
Four 301A tubes.
Three lengths of spaghetti.
Bus bar, screws, hardware, aerial, etc.

NEXT WEEK—RADIO WORLD'S FOUR-TUBE DX SUPERDYNE

One Extra Tube Adds to DX and Quells Radiation

How to Add a Stage of RF to a Single-Circuit Regenerative Set

MUFFLING METHOD USED

By Charles H. M. White
Consulting Engineer.

THERE are more single-circuit regenerative receivers of the tickler coil type in use than any other style of radio receiver. While a well-constructed single circuit regenerative receiver has wonderful efficiency and sensitivity per tube, yet it has the unfortunate ability to create radio chaos in a perfectly quiet neighborhood. One solution of the radiation problem is the use of a muffler tube, but, many fans do not want to go to the expense of a tube which offers them little more than muffling their oscillations adding next to nothing to distance. Other solutions are constantly offered, but most of the experts pass up the best solution, the addition of radio-frequency amplification, making a regenerator of the entire outfit. This method has so many definite DX-getting advantages that its muffling ability is just a sidelight. It preserves the wonderful sensitivity of the regenerative receiver and adds to it the DX and selectivity advantages of the tuned radio-frequency receivers.

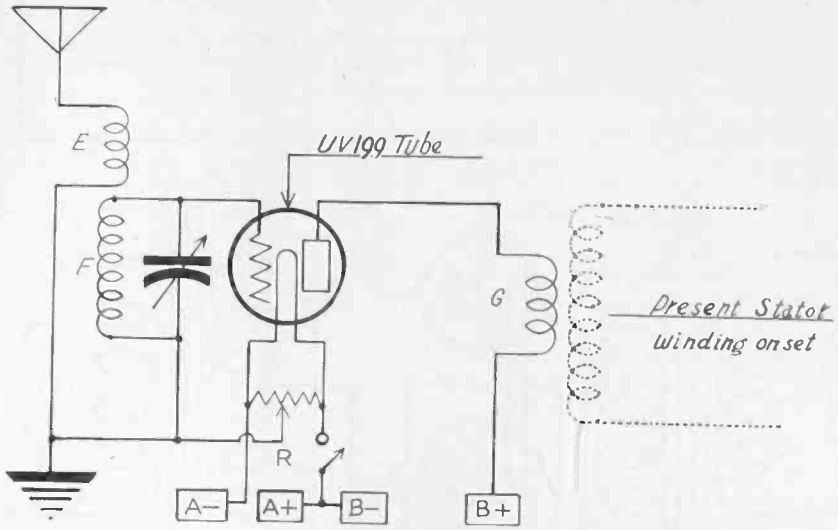
Cost Is Low

The most surprising advantage is the low cost of adding a stage of RF. The major items are, one 199 tube and socket, one automatic self-adjusting rheostat, 199 type; 67½ volts of B battery, three No. 6 dry cells, one 200-ohm potentiometer, and one 17 or 23-plate low-loss condenser, with vernier. The coils E, F, and G are wound with No. 22 DCC magnet wire. The coil unit E-F is wound on a piece of insulated tubing 3" in diameter and 3½" long. The coil E is wound on the top or end and has eight turns in all, while F is wound with 50 turns, leaving ¼" space between E and F. The coil G is wound directly over the stator or main tuning inductance coil of the existing receiver and has 10 turns. It is shown dotted on the diagram because it is wound inside the cabinet of the receiver and lead wires are brought to the terminals g and h.

Try Reversing Connections

To get the best results try the circuit with g and h connected one way and then reverse the connections. Note the difference in control and results. One connection will be found vastly superior to the other. A solid connector should be placed from the ANT. to the GND. posts of the old receiver and another wire should be run from GND. to the terminal j of the radio-frequency amplifier unit, which may be mounted in a separate cabinet. In wiring up this unit be sure to see that the movable plates or rotor of C are connected to the ground side of the circuit.

Do not attempt to use the same A and B batteries for receiver and unit, since the use of separate ones makes the unit very selective and sensitive. Everything in this regenerative RF receiver is ideal and the combination performs nobly under all conditions.



THIS CIRCUIT shows you how to add a stage of radio-frequency amplification to a single-circuit regenerative set. E is 8 turns; F is 50 turns. There is ¼" space between windings. Both coils are wound on the same tube. The aerial connects to one end of the 8-turn coil, while the ground goes to the other. The ground wire also connects to the ground post of the receiving set. One end of the F coil connects to the grid of the tube, the other end making connection with the ground. A 23-plate condenser is shunted across the F coil. The variable arm of the potentiometer connects with the ground line, the resistance of the potentiometer being across the filament and being too high to cause a short circuit. An automatic rheostat and filament switch control the filament current input. Coil G has 10 turns and is wound directly over the stator or tuning coil of the set proper, one lead being brought out to the plate, and the other to the high voltage B battery.

"I Wonder What Became of Alexandra?"

RADIO PARADISE—The laboratory of J. Elliot Jenkins, Chicago radio engineer of international fame. His wife, formerly Miss Alexandra Carlisle, noted actress, is an able assistant to her husband. At the right is a specially constructed condenser with losses that are as near minimum as possible. In plain view, near the condenser, is a wavemeter and oscillator.—(Kadel & Herbert)

Wise Cracks With Radio Whip

DO not send out wedding invitations written in pencil on applause cards.

* * *

DO not tune out a girl because she can't sing—she may be good-looking.

IF the set is in the course of construction in the parlor, entertain company in the kitchen.

* * *

BROADCAST gym exercises at 7 A. M. are like breakfast at midnight.

How to Add a Push-Pull Stage

The Radio University

A Question and Answer Department conducted by RADIO WORLD for its Readers by its Staff of Experts. Address Letters to Radio University Department, RADIO WORLD, 1493 Broadway, New York City.

CAN you give me a circuit for push-pull audio amplification? Can this be used as a third stage without shielding?—Henry Spett, New York City.

The circuit you request is shown in Fig. 70. Yes.

* * *

IN the standard 3-circuit tuner what connection is there between the primary and secondary? —Clifford J. Ihde, Soap Lake, Washington.

No metallic connection, only an inductive relationship.

* * *

I BUILT the Anderson 4-tube Superdyne as described in Radio World, issues of Nov. 22 and 29. I get locals clear and loud, but find it impossible to get distance, even on silent nights. —L. Chwapil, 2057 Orchard St., Chicago, Ill.

If you get locals clear and loud, the trouble, no doubt, lies in the aerial or ground. Look them over, see if there are any breaks in the wires or corroded connections. See that they are well insulated. To get distant stations, the set must be oscillating.

* * *

IN the crystal set described in the issue of Dec. 6, are all coils air core?—H. S. McCormack, 250 Grand Ave., Oakland, Cal.

Yes.

* * *

IS the Superdyne supposed to oscillate when the regeneration is advanced? Should the RF tube have 90 volts or 22½ on the plate?—R. J. Kempton, Presque Isle, Me.

Yes, the Superdyne must oscillate to work correctly. Use 90 volts on the amplifier.

* * *

I BUILT the set described on page 15 in the issue of Nov. 15, but cannot get WNYC with the volume that I get other locals. Can you help me?—Lorenzo Gamarra B., 355 W. 28th St., New York City.

The trouble is, no doubt, that you cannot reach quite as high as 526 meters. Wind 5 to 10 more turns on the secondary coil. Determine the correct number by experiment.

* * *

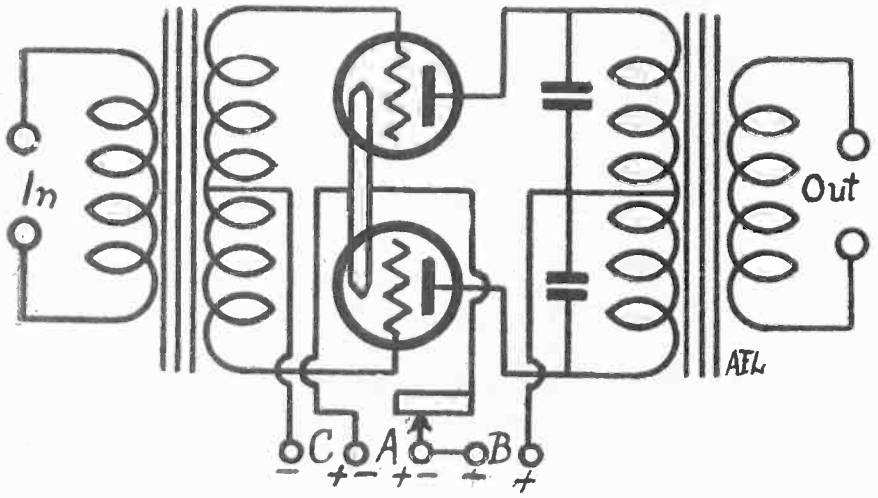
CAN you give me some information on a wavetrap, constructional details, etc.?—Edwin Russell, 13417 Chapelside Ave., Cleveland, O.

The wavetrap is composed of a coil, shunted by a condenser, placed in series with the aerial lead. A 50-turn honeycomb coil is connected in series with the aerial. To one side of the coil a .43-plate variable condenser is connected, the other side of the condenser to the other side of the coil. A variometer may also be used as a wavetrap by merely placing it in series with the aerial.

* * *

I BUILT, some time ago, a 4-tube Superdyne. The only station that I can get with any clarity is WEAF and this was accomplished only after I placed a .00025 variable condenser in the aerial. Can you tell me how I can clear this trouble up? C. Paker, Sea Bright, N. J.

Indications point to the natural wavelength of the coils or the aerial as being too high. Take off a few turns—about 6—and place a .43-plate variable condenser in series with the aerial.



THE PUSH-PULL amplifier (Fig. 70). The input is connected to the posts to which the phones were connected. As a second or third stage of audio amplification the push-pull produces the volume of one extra stage, avoiding distortion.

DOES the beginning of the secondary coil, going to the grid, go to the stator or rotor plates of the variable condenser? (2) In the second RF transformer, does the beginning of the primary coil go to the plate of the previous tube? —Frank G. Gaughan, 31 Village St., Boston, Mass.

Yes, the grid side of the secondary coil always goes to the stator of the variable condenser. (2) The beginning of the primary winding of the coupling transformer goes to the plate of the previous tube.

* * *

CAN a loop be used on a 2-tube set? Can you give me a diagram for such?—Ben Morris, Los Angeles, Cal.

Yes, for a reception of 500-watt stations within a radius of 20 miles the loop may be used. The circuit is shown in Fig. 71.

* * *

CAN I increase my present set, it being of the single-circuit type and consisting of regenerative detector and two stages of audio amplification, to five tubes without disturbing the layout?—L. P. Miller, 204 Rogers Ave., Morgantown, W. Va.

No. If you want greater range and volume build a 4-tube Superdyne. See issues of Nov. 22 and 29 or next week's issue.

* * *

I BUILT Anderson's 4-tube Superdyne and sure proclaim it a wonderful set. However, I don't believe that I am receiving the volume that I should. Can you tell me some way to increase it? (2) Can basketweave coils be used in place of duolaterals in Bernard's 4-tube set, in issue of Dec. 13?—E. M. Miller, 1115 Highland Ave., Knoxville, Tenn.

Look to the aerial and ground system for leakage. Be sure that the set is connected correctly. See that the tubes are all good. A soft tube should be used as detector—type 200. The amplifier voltage should be 90. (2) Yes.

* * *

HOW can I make the coils for the Ambassador set? (2) Is it advisable to use the grid leak on the panel? (3) What causes the home-made Neutrodyne set to whistle even when the dials are in step, for instance, 20-20-20?—Robt. L. Gibson, Reynolda, N. C.

The coils for the Ambassador set are made as follows: The entire set of coils are made in the form of a variocoupler. Primary of 10 turns is wound directly over or next to the secondary of 42 turns. The tickler is the rotor of 35 turns. Use No. 22 DCC wire. (2) No. (3) The Neutrodyne will oscillate when not properly neutralized. As the Neutrodyne provides no control for these oscillations it is necessary that the set be absolutely neutralized. It is best to neutralize the set at low wavelengths and on a distant station.

* * *

CAN you tell me where I can get some information on the construction of the metaform unit? —E. H. Arnold, Unionville, Conn.

In the issue of June 21, 28 and July 6, RADIO WORLD, full information on this circuit was given. The June 28 issue is out of print.

* * *

I WISH to build the 5-tube reflex by Byrt C. Caldwell, issue of Dec. 6. I have 3 Erla RF transformers. Will they be all right? (2) Where does the 6-to-1 ratio transformer go?—I. F. Bruner, 33 E. 32nd St., Kansas City, Mo.

(1) Yes. (2) First stage of AF.

* * *

I HAVE a 5-tube Neutrodyne with a variometer in the plate. How would the low-loss aerial, described in the issue of August 30, work with my set? (2) Is it necessary to have the counterpoise away from the buildings? (3) Would 12 feet be too high for the counterpoise?—Ralph Kendall, box 273, Arvada, Colo.

Very well. Take proper care in construction or you will have trouble in keeping the set from oscillating. (2) No, but do not allow the wire to actually touch any object. (3) Get the counterpoise as close to the ground as possible, not farther than 3 feet away.

* * *

MAY resistance amplification be used in the push-pull method? (2) May resistance coupled amplification be used for reflex circuits? (3) May honeycomb or duolateral coils be used in place of the low-loss coils described by Lieut. Peter V. O'Rourke in his 3-tube reflex?—Richard Smith, 1703 W. 14th St., Bedford, Ind.

(1) Yes, but it would be to no advantage. (2) Yes, but it is not practical. (3) Yes.

* * *

WE are located in a section of Connecticut which seems to be shielded from New York to a large extent. In fact, Chicago comes in louder than New York. Can you suggest a type of set that you believe would be best for this section?—P. M. Boulon, Ridgefield, Conn.

In some such cases no receiver will do what you ask, but try the Neutrodyne, Super-Heterodyne or Ultradyne.

* * *

I INTEND building Caldwell's Reflex Set described in the issue of December 6 and would appreciate your answering the following questions: (1) Are all the RF transformers of the same number of turns? (2) Do you believe that this set is sufficiently selective to tune through local stations and reach out for distance? (3) Should the RF transformers be at right angles to the condenser plates? (4) What method would

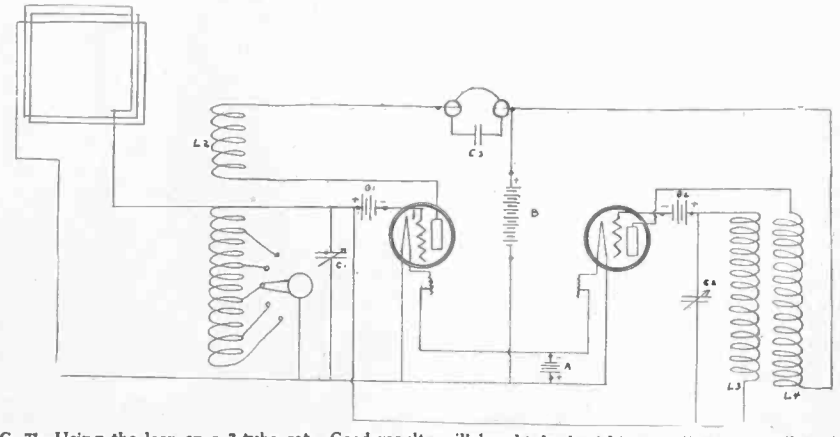


FIG. 71—Using the loop on a 2-tube set. Good results will be obtained within a radius of 20 miles of a 500-watt station. L1 is 48 turns on a 3½" diameter tubing tapped every eighth turn. L2, the variable plate coil, is in inductive relationship with L1. L2 is 35 turns on a rotor. L3 and L4 may be a split Variometer, the rotor in the plate.

Air University from WGBS

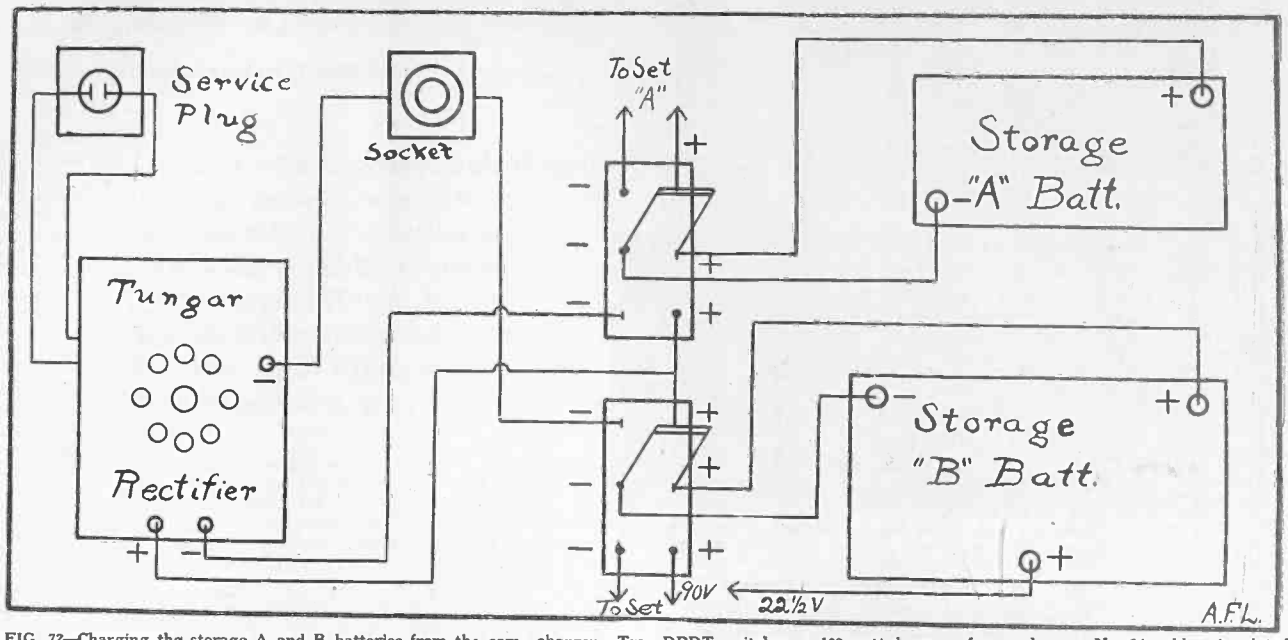


FIG. 72—Charging the storage A and B batteries from the same charger. Two DPDT switches, a 100-watt lamp, a fuse and some No. 14 rubber insulated copper wire is the additional equipment necessary. Extra precautions must be taken to prevent a possible reversing of the polarity of the charger and batteries. The storage A battery should be tested for specific gravity with a hydrometer; the storage B batteries should be tested for voltage with a voltmeter. Keep the batteries always fully charged and you will be rewarded with a continual source of current.

you suggest for mounting tuned RF coils?—William Knight, Jr., 27 Cedar St., New York City.

(1) No. The set may operate more efficiently if the stages of RF have different numbers of turns. Several manufacturers market RF transformers for succeeding stages. But the set will still work well with identical RFT. (2) Yes, unless you live within ½ mile of a broadcasting station. (3) Preferably so. (4) Mount the coils as they are mounted in the Neutrodyne receiver or at right angles to each other.

* * *

WILL it paralyze a 201A tube to hook it up in the circuit without a rheostat?—Herbert J. Hause, 507 2nd Ave., Tarentum, Pa.

No, the tube would not become paralyzed, but the filament would certainly be placed under a strain, cutting down the tube's normal life as much as 75 per cent. If you do not care to use rheostats, the automatic filament control devices on the market will be found very useful. If preferable, three tubes are used in parallel, the omission or a rheostat not then being harmful.

* * *

IN reference to Byrt C. Caldwell's 5-tube Reflex in the issue of Dec. 6: When mounting the coils are they parallel or at right angles to the back of the variable condenser? (2) How may the shield be grounded? (3) Does the number of plates in a variable condenser make much difference so long as the capacity is the same? (4) What changes would be necessary to use 199 tubes?—A. L. Moore, 302 22nd St., Denver, Colo.

(1) Parallel. (2) To the positive B battery or to the ground. (3) No. (4) 30-ohm rheostats, positive grid return on the detector.

* * *

***KINDLY** tell me what, in your estimation, is the best type rotor to use in the Anderson Superdyne.—J. Kaiser, 2208 Neptune Ave., Coney Island, N. Y.

The unformed rotor gives slightly sharper tuning. A spider-web rotor works nicely, as does a basketweave.

* * *

Can you tell me how to get my 2-tube Harkness reflex to tune below 300 meters?—Anthony J. Pingitore, R2, Irving, N. Y.

Use a 43-plate variable condenser in series with the aerial.

* * *

I WANT to make a very small variometer, the rotor of which is 1⅞". Can you give me the wiring details?—W. H. Johnson, Hilo, Hawaii, Box 605.

Use No. 38 SSC wire. 35 turns on the stator, 35 turns on the rotor. Connect one side of the rotor with one side of the stator. The variometer will then have two leads, one from the rotor and one from the stator.

* * *

I ONLY receive signals when I hold my finger on the aerial binding post lightly. Why?—Joe R. Young, Beaver, Dam, Ky.

Try placing a variable resistance across the aerial and ground binding posts. This should help in clearing up the trouble, which is body capacity. See that stators of variable condenser go to grids.

* * *

IS IT possible to use the basketweave type coil for the Neutrodyne? (2) Will results equal the form-wound coil? (3) How many turns for each

RADIO WORLD'S Broadcast University

Questions and Answers on the Air Every Wednesday Evening at WGBS, the Gimbel Bros. Station, New York City.—Department Conducted by Abner J. Gelula, RADIO WORLD'S *Technical Editor.*

IS IT possible to charge the storage B battery with a Tungar charger? I should like, if possible, to use a series of switches whereby I can charge either the A or B battery at will.—Abner Epstein, 15 Lincoln Terrace, Yonkers, N. Y.

Yes, you may charge the storage B from the regular Tungar charger. See Fig. 72.

* * *

I LISTEN to the RADIO WORLD Broadcast University every Wednesday evening through WGBS. Will you kindly answer the following questions: (1) Will resistance-coupled amplification give as much volume as transformer-coupled? (2) Where is KOA? (3) How can I control the oscillation of my RF tubes?—Henry Charles, 1532 Atlantic Ave., Atlantic City, N. J.

(1) No; about one-half transformer-coupling. (2) The new General Electric Station, Denver. (3) A potentiometer controlling the grid return.

* * *

WGBS doesn't seem to come in as well here as Chicago does, although I am only three miles away from WGBS. Can you explain it?—William Anderson, 124 Beck St., New York City.

Some of the buildings about WGBS seem to be tuned to approximately 316 meters, thus absorbing some of the energy transmitted.

* * *

HOW CAN I increase the volume on my set? I now have two stages of audio-frequency amplification, but even on locals I cannot get loudspeaker volume. You stated over WGBS that you answer all questions.—Anthony Salvador, 836 E. 23rd St., New York City.

Doubtless you haven't hooked up the audio amplifier correctly. You should have at least 67 volts on the plates of the amplifier tubes.

* * *

AS stated in your WGBS broadcast please answer, should the negative B battery, on the type 200 and 201A tubes, be connected to the positive or negative A battery?—Harry Stien, care J. Isaacs, 836 Dawson St., New York City.

Connect B— and A+.

* * *

I CAN'T hear WGBS unless I insert a variable condenser in my aerial. I can get up to 550 meters but only as low as 400. As you stated in your WGBS broadcast, you would answer any questions. Will you please answer this?—Geo. Stienberg, 727 E. 158th St., New York City.

Your aerial or ground leads or both are too long. Keep the aerial under 100 feet, though not less than 60, and ground upder 30 feet in length.

* * *

I GET WGBS, WAHG and WBBR all together. Can I possibly separate them in some way? I certainly enjoy your talks over WGBS.—Jerry Hoffman, Friars Club, New York City.

Insert a wavetrap in series with the aerial. See that the secondary is tuned, 23-plate condenser.

* * *

I WANT good loudspeaker results, using preferably dry-cell tubes. Can you suggest a good circuit, that is not very expensive?—

For loudspeaker operation a regenerative detector with two stages of audio frequency amplification will give very good volume. If three tubes are desired, build the Superdyne, issue of

(*Concluded on page 27*)

Join RADIO WORLD'S University Club

and Get your own number. Put the number on your queries and they will be answered personally the same day as received.

And Get Full Question and Answer Service for the Coming 52 Weeks.

RADIO WORLD, 1493 Broadway, New York City:

Enclosed find $6.00 for RADIO WORLD for one year (52 Nos.) and also consider this as an application to join RADIO WORLD'S University Club, which gives me free information in your Radio University Department for the coming year, and a number indicating my membership.

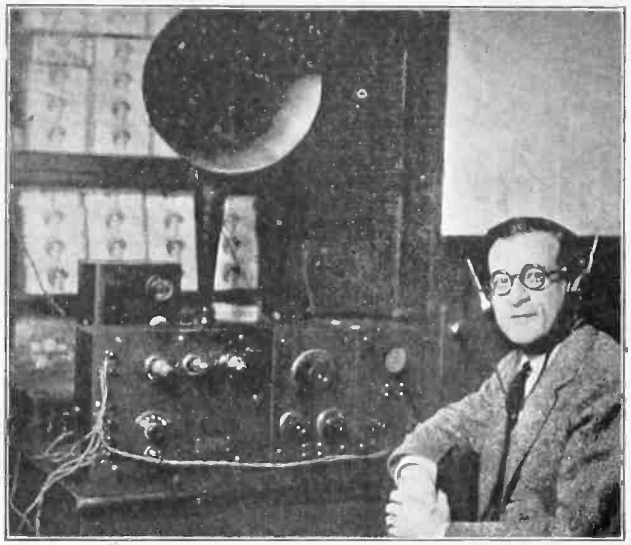
Name .....

Street .....

City and State .....

Telegraph queries will be answered collect the same day as received. Be sure to direct in your query that the answer be sent collect.

Bad Way to Mount Your Tubes



AN EXCELLENT way to ruin a good tube. Horizontal mounting will cause the filament to sag, and the filament in time will touch the grid—and—well, you just buy another tube, that's all.

SHE WINS! Olive Rile, 543 Argyle Rd., Brooklyn, N. Y., won the first radio cross-word puzzle test, conducted by WAHG. She is shown here with her cup. She had over 5,000 competitors. (Fotograms)

QRA? Don't know, but he's a typical amateur hard-boiled owl—sleeps in the day time and "clears the hook" at "nite." Amateurs are now transmitting, in large numbers, on low waves, 75 to 80 meters. Before the days of wavelengths, the amateur paved the way to better transmission and reception. After the discovery of such a thing as wavelength, the amateur was legally allowed to transmit below 200 meters only. However that did not squelch him and he proved that low-wave tranmission and reception was possible and practical. Now on 75 meters it will be the amateur who will light the way with low-wave transmission.

By the Rev. S.

America's Most Brilliant Preacher Whose Sermons Are or... Congregation...

"If one uses the radio merely to preach special doctrinal views he will fail"—"He must not attempt to destroy the faith of any of his listeners"—"It is the American spirit to sympathize with any one who preaches the Universal Good."

MY radio congregation is variously estimated from 500,000 to 2,000,000. It is difficult to visualize this great army. My father preached continuously for sixty years, and throughout his lifetime he addressed fewer people than I reach by radio in a single afternoon.

When it was first suggested that I broadcast my sermons, two years ago, I doubted the efficacy of the new plan for several reasons, and hesitated to adopt it. Many people throughout the country are only too willing to seize upon an excuse for staying away from church, and I did not care to offer them such an opportunity. If my sermons were broadcast from the pulpit in the course of the regular service morning and evening, there was a chance of such a conflict. Some 98 per cent. of the sermons of the country are delivered at practically the same time.

This danger was avoided by broadcasting my sermon on Sunday afternoon, when I preach before the Y. M. C. A. in Brooklyn. The experiment was tried on two Sundays. Success was practically instantaneous. We were simply deluged with letters, thousands of them, testifying to the popularity of the work. The popular appeal was so powerful that the sermons had to be continued, as they have been ever since.

Extended Scope

The scope of the broadcasting has since been greatly extended. A special line to Boston has made it possible to reach the New England States. On the west the Appallachian Mountains present a more or less serious barrier, but the near Middle West is within effective range. I am heard with good results, for instance, in Cleveland. To the south the radius is even more extended, and the sermons are clearly heard in North Carolina. Thousands of letters of appreciation come to me from the Eastern States. And when I visit the cities, towns or villages throughout this vast region I not only meet people who listen regularly to my sermons but are familiar with my voice.

We are coming to understand more fully the possibilities and limitations of broadcasting. It is a fascinating problem which well repays study and analysis. If one uses the radio merely to preach special doctrinal views, he will fail. On the other hand, if he uses radio to broadcast the great basic principles of religion and of the welfare of the world, he finds in it an agency of unprecedented value.

Must Be Judicial

In addressing an audience so large and heterogeneous as that reached by radio, the speaker must be judicial in his attitude. If he preaches narro... his audience tune... he will expound ... intelligently held ... which has no pa... He must not atte... any of his listene...

Now, the Ameri... erant and sympath... in the world. It ... sympathize with ... the universal good ... expresses a symp... life, it will be w... audience is an inte... American public. ... that the speaker ... welfare at heart, ... amount of criticis...

Ameri...

The American ... ligious. Here is ... the unprecedente... which listen regul... day throughout th... troversies in relig... that religion is v... troversies are not ... is merely religio... yond question ou... religious. Radio ...

One of the mos... radio service is th... naire. Thousands ... by mail from the ... out the country. ... are considered. ... some sixty, which ... Sunday. I think ... ion of my great ... that the answers ... most fascinating ...

60% R...

I preach every w... of about 1,200 m... twenty-five minu... the questions som... that the question ... make it possi... le ... audience. scattere... square miles, to t... speak, in the serv...

It is interesting ... cent. of all the qu... great diversified ... with religion. O... are very commen... gence and sympa... often repeated con... is everywhere an i... what will happen ... comes from all cla...

Not Suffic...

We fail to app... side of radio. It is ... heterogeneous nat... think more or less ... ence after all ha... know of a case w... noon a curious c... Hebrews, two K. ... lumbus, two M... Christians meet by ... to my sermon, br... A. It would be ha...

The radio sermo... in general, will ... long as it preserv...

NEXT WEEK—RADIO WOR...

Parkes Cadman

te Air Every Sunday Afternoon from WEAF; Pastor of Central Church, Brooklyn, N. Y.

octrine he antagonizes; m out. Against this, if merely personal opinions seizes an opportunity l throughout the ages. to destroy the faith of

public is the most tol- to be found anywhere the American spirit to one who preaches for f the message broadcast tic and broad view of received. The radio ing cross-section of the he radio audience feels the interests of public will stand an immense

s Religious

le are emphatically re- explanation in part of ize of the audiences to sermons every Sun- ountry. Even the con- matters merely prove uch alive. These con- ays to be deplored. It nergy misapplied. Be- ple are at heart deeply es it.

portant features of the fluence of the question- letters come regularly en audiences through- those which are signed e are boiled down to ttempt to answer each press the general opin- audience when I say hese questions are the f the weekly program.

ous Queries

directly to an audience My sermon lasts for and the answering of rty minutes. I confess e hard work. They wever, for the entire er many thousands of a personal part, so to

note that fully 60 per ns submitted from the audience have to do e whole the questions e. They show intelli- The question most s the future life. There iable curiosity to know r death. The question

ly Appreciated

te, I think, the social ving to unify this great of ours. Good people e. A great radio audi- common sympathy. I e every Sunday after- any consisting of two .s, two Knights of Co- s and several other mmon consent to listen ast from the Y. M. C. o beat that.

s well as broadcasting a general appeal as s dignity and indepen-

"Fully 60 per cent of the queries to me from the radio audience have to do with religion"—"We fail to appreciate the social side of radio"—"The spirit of the speaker in some mysterious manner is actually broadcast."

dence of mind on great jublic questions. It must avoid sensationalism as it would the plague. There is ample evidence to prove this. The great danger threatening radio is that it should seek to be popular in the worst sense.

Has Some Limitations

We must recognize the limitations of the radio. There is the loss of the gesture. Much of the personality of the speaker cannot be broadcast, which is unfortunate. On the other hand, it has been proven, over and over again that if the speaker who transmits is in dead earnest, the spirit of the man in some mysterious manner is actually broadcast. A strong personality gets over.

Programs Carefully Prepared

The preparation of a radio program in broadcasting sermons calls for considerable art. In the great audience will be found those who enjoy a formal service, others who prefer quite the reverse. All these factors must be kept in mind. The program should be popular. There should be music, and good music. I find that a sermon delivered before a congregation broadcasts better than when delivered from the seclusion of a study.

There is a danger in the broadcast sermon, of course, that those who listen in should be merely hearers, not doers, of the Word. It is easy for the man who has listened in to tell himself that he has done his duty by merely hearing a sermon. But, after all is said, there is abundant evidence that the radio has been a great stimulus to the development of life and character.

They Knew Him

The influence of the radio sermon might be illustrated by innumerable stories. One of the most impressive pictures, I think, is that of the radio service held from time to time aboard our battleships at sea. A large congregation gathered on decks hundreds of miles from land have thus followed every word of the sermon, and at the close bowed their heads and repeated the Lord's Prayer at the bidding of an invisible message.

Some time ago I chanced to be motoring alone on a remote mountainside in Pennsylvania when my car suddenly stopped. It was past midnight, and the darkness was unrelieved by a single light. Eventually a car approached, halted near me, and a voice from out of the darkness asked if I had broken down. I answered briefly that such unfortunately seemed to be the case. The reply coming out of the darkness on this remote mountain road was remarkable. "Oh, I know you," said the voice. "You are Dr. Cadman. I know your voice well. I hear you preach every Sunday afternoon by radio."

WOR Opens New York Studio

READY to take their turns at the "mike," after enjoying a party which formally opened the New York City studio, of WOR, Newark, at Chickering Hall. Left to right are, Dai Beueil, pianist; Miss Martin; Edna Kellogg; Penelope Davies; Con Conrad; John Tasker; Harry Osgood; Adam Carroll; Henry Souvaine; Katherine Spaeth; Spencer Armstrong, who made the opening address, and J. Milton Delcamp. (Underwood & Underwood)

SAMSON in minature. Sidney Schulman, 19-months, son of Mr. and Mrs. Samuel Schulman, 3607 Belleplain Ave., Chicago. (Underwood)

RADIO, a la 1925. The radio? Oh yes! It's in the room, right behind the curtain. Loud-speaker? Yes, that's there too.

D'S 4-TUBE DX SUPERDYNE

BROADCAST PROGRAMS

Thursday, January 1

WEEI, Boston, 303 (E. S. T.)—6:30 P. M., Dok Eisenbourg and his Sinfonians. 7, Big Brother Club. 7:30, musicale. 9, Gillette Safety Razor dance orch.

KGO, Oakland, Cal., 312 (P. S. T.)—11:30 A. M., luncheon concert. 4 P. M., concert orch. 8, Bernade Solis, pianist; Frank Miller, baritone; Jenette Genter, viola soloist Bacatolien string quartet; Virginia Treadwell, contralto; Fern Backman, violinist; address, "New Year's Resolutions," by C. S. S. Dutton, minister of the First Unitarian Church, San Francisco; Grace Becker, 'cellist; Selma Mayer, soprano. 10, Henry Halstead's orch. and soloists.

WWJ, Detroit, 517 (E. S. T.)—8:30 P. M., Jean and Theone, song fashions. 10, Jean Goldkette's Victor Recording orch. 11:30, News orch.

WBZ, Springfield, Mass., 337 (E. S. T.)—11:55 A. M., time, weather, market report. 7 P. M., market report. 7:05, bedtime story.

WFAA, Dallas, Tex., 476 (C. S. T.)—6 P. M., Radio Bible Class, Dr. William M. Anderson. 9, singers from church. 8:30, Lee's Foxtrotters.

WGR, Buffalo, N. Y., 319 (E. S. T.)—6 P. M., Hallpryd String Quartette.

WHAS, Louisville, Ky., 400, E. S. T.—4 P. M. Alamo Theater orch. Harry S. Currie, conductor. Police bulletins. Weather. "Just Among Home Folks." selected editorials. News. 4:55 livestock, produce and grain market. 5 time. 7:30 Barney Rapp's orch., Barney Rapp, director. International Sunday scheel lesson. Welfare talk ;news, time.

WCBD, Zion, Ill., 345 (E. S. T.)—8:30 P. M., Mr. and Mrs. Sparrow, tenor and contralto; Grace Windle and Ralph Reed, contralto and barytone; Ralph Reed, barytone; Gerald Mason, cornet; Cassie Bedore, reader; Beulah Myhre, piano; G. R. Sparrow, tenor; Mrs. G. R. Sparrow, contralto.

WDAF, Kansas City, Mo., 411 (C. S. T.)—3:30, The radio trio. 5:50, Marketgram, weather, time and road report. 6, (School of the Air): reading, Miss Cecile Burton. Tell-Me-a-Story Lady. The Hanlein-Knutson Trianon Ensemble. 11:45 P. M. Nighthawk Frolic.

WHN, New York City, 360 (E. S. T.)—12:30 P. M., Chas. Strickland's Palais D'Or orch. 6:30, Vincent Catanese and his orch. 7:10, WHN employment broadcasting. 9:30, Radio Cross Word World Puzzle Contest. 10:30, Al. Wohlman and his Club Madrid orch. 11, Leroy Smith's orch. 12, Ted Lewis and his orch. 12:30, Lou Gold and his orch.

WRC, Washington, 469 (E. S. T.)—6:45 P. M., children's hour. 7, concert by Bernard Levitow's Hotel Commodore Orch. 8, talk, American Automobile Association. 8:30, Lee House Trio. 9:55, time. 10:30, Waldorf-Astoria Orch.

WMAQ, Chicago, 447.5 (C. S. T.)—Program to be announced.

WEAF, New York City, 492 (E. S. T.)—4 P. M., musical program. 6, WEAF instrumental quartet; Stoering string quartet; Waldorf-Astoria orch.; Kiutus Tecumseh, Indian singer; Vincent Lopez and his orch.

WKAQ, Porto Rico, 360 (E. S. T.)—9:30 P. M., musical concert.

KYW, Chicago, 536 (C. S. T.)—2:35 P. M., "New Year's Day Frolic." 8, "Twenty Minutes of Good Reading." 8:20, musical program. 10, anniversary program of the opening of KYW's studio.

WCCO, Milwaukee, 417 (C. S. T.)—4 P. M., "Happy New Year," by Zona Gale. 5:30, children's hour, Gold Medal Lady. 6, Mpls. Athletic Club orch., C. Eddy Fortier, leader. 7:30, lecture, Mame Stevens. 7:45, health talks. 8, Gold Medal radio quartet. 10, Dick Long's Nankin Cafe orch.

WGY, Schenectady, 380 (E. S. T.)—6:30 P. M., dinner music. 7:45, "A Few Moments with New Books," by L. L. Hopkins. 8, program by WGY orch., and Nellie A. Bleakley, pianist. 11:30, organ recital by Stephen E. Boisclair.

WMH, Cincinnati, O., 309 (C. S. T.)—8 P. M., organ selections by Kurt Henkel; Herman Maurer, concertino, and Wm. Schwarz, cornet; soprano solos, Mildred Scott. 9, Woody Beall and his Eastern Hills orch.

Friday, January 2

KFAE, Pullman, Wash., 330 (P. S. T.)—Piano solos, Mariam Zimmerman; cornet solos, William P. Hanson; piano solos, Ivar Melander, Pullman; essentials of successful farm management, Prof. Geo. Severence; present tendencies in automobile design, Prof. A. C. Abell; success or failure with bees, B. A. Slocum; book reviews, Alice L. Webb.

KGO, Oakland, Cal., 312 (P. S. T.)—11:30 A. M., luncheon concert. 1:30 P. M., N. Y. and S. F. stock reports and weather 3, studio musical. 5:30, The Girls' Half Hour. 6:45, stock reports, weather, S. F. produce news, and news items.

WFAA, Dallas, Tex., 476 (C. S. T.)—12:30 P. M., address, Dr. Robert Stewart Hyer. 8:30, Mrs. George S. Watson, soprano, and Mrs. Jesse Lee Johnson, contralto; Mrs. Juanita Blair Price, accompanist.

WWJ, Detroit, 517 (E. S. T.)—8 A. M., setting-up exercises. 9:30, "Tonight's Dinner." 9:45, Public Health Service bulletin. 10:25, weather. 11:55, time. 3, News orch. 3:50, weather. 3:55, market reports. 8:30, The Detroit News orch.; Anne Campbell, Post; Claudine Secor, soprano; Francis Firth, baritone.

WBZ, Springfield, Mass., 337 (E. S. T.)—11:55 A. M., time, weather. 7 P. M., market report. 7:05, bedtime story. 7:30, Hotel Kimball trio. 8, Albert D. Edwards, baritone. 8:15, Hotel Brunswick orch. 8:30, Hope Wright, violinist. 8:45, Joan Stuart, soprano. 9, baritone. 9:15, Edward Morgan, songs and pianologues; Robert Day, reader. 9:30, Hope Wright, violinist. 9:45, Hotel Brunswick orch. 9:55, time, weather. 10, to be announced.

WHO, Des Moines, Ia., 526 (E. S. T.)—7:30 P. M., Personnel: The Garber quartet and entertainers; Alma Garber Bridges, soprano and pianist; Miss Ruth Garber, contralto. Mr. Paul Garber, tenor and banjo soloist; Mr. Leon Garber, bass; Mr. Leon Garber, accompanist; Mr. Neil Garber, banjo soloist; Mr. M. P. Garber, tenor; M. L. T. Bridges, baritone soloist.

WHN, New York City, 360 (E. S. T.)—6:30 P. M., Vincent Catanese orch. 7, Harry Richman and his entertainers. 9:30, Radio Cross Word World Puzzle Contest. 9, Dan Gregory and his Crystal Palace orch. 10, fashion chats by Mme. Beile. 10:10, Bob Miller, popular songs. 10:20, "Storage Batteries," by H. B. Shontz. 10:30, Roseland adnce orch. 11, Vanity Club revue. 11:30, Sam Wooding and his orch. 12, Ted Lewis and his orch.

WDAR, Philadelphia, 395 (E. S. T.)—11:45 A. M., Daily. 12:02 P. M., Organ recital, Features from the Studio; Arcadia Concert orsh. 2 Arcadia Concert orch. Playlet. 4:30, Blue Ridge Serenaders, Francis Carroll, blind pianist directing. 7:30, Dream Daddy with the Boys and Girls. 8, "Turning the Pages." 8:10, "Fifteen Minutes with Sam Wingfield, Humor Editor, a weekly humor column. 10, Meeting of the Morning Glory Club. Features.

KSD, St. Louis, Mo., 546, C. S. T.—8 P. M., Program by Leo T. Boylan, pianist.

WHAS, Louisville, Ky., 400, C. S. T.—4 P. M., Alamo Theater orch. Police bulletins. Weather. "Just Among Home Folks," editorials. 4:55, livestock, produce and grain market. 5, time. 7:30, Concert, auspices, Arthur Finding, news, time.

WDAF, Kansas City, Mo., 411 (C. S. T.)—3:30 P. M., The radio trio. 5:50, marketgram, weather, time and road report. 6, (School of the Air): address, Kansas City Children's Bureau. The Tell-Me-a-Story Lady. The Hanlein-Knutson Trianon Ensemble. 8, Star's radio orhc. and minstrels. 11:45, Nighthawk Frolic.

WRC, Washington, 469 (E. S. T.)—4 P. M., fashion developments by Eleanor Gunn. 4:10, piano, Eleanor Glynn. 4:20, "Beauty and Personality," by Elsie Pierce. 4:30, Meyer Davis' Trio. 6, children's hour, by Peggy Albion.

WMAQ, Chicago, 447.5 (C. S. T.)—12:25 A. M., Y. M. C. A. forum. 4 P. M., English diction by Mrs. J. Elliott Jenkins. 4:30, Pupils of Bush conservatory. 5, "The Lullaby Lady," Mrs. Gene Davenport. 6, Organ recital. 6:30, Hotel LaSalle Orch. 8, Weekly Wide-Awake Club. 8:30, musical geography, Mr. and Mrs. Marx E. Obendorfer. 9, Edward G. Taylor. 9:15, musical program.

WEAF, New York City, 492 (E. S. T.)—11 A. M., musical program and talk by Arthur Tuckerman; market and weather. 4 P. M., Suzanne Richmond, soprano; French lessons. 6, WEAF instrumental quartet; Jack Albin's Hotel Bossert dance orch.; children's stories; Happiness Candy Boys; "Astor Coffee" dance orch.; Parnassus trio; Kathleen Stewart and Winifred T. Barr; Meyer Davis' orch.

KYW, Chicago, 536 (C. S. T.)—6:30 A. M., morning exercises. 9:30, late news and comment of the financial and commercial markets. 11:35, table talk by Mrs. A. J. Peterson. 6 P. M., news, financial and final markets; Dun's review, and Bradstreet's weekly review of Chicago trade. 6:35, children's bedtime story. 7, Joska DeBabary's orch. 7:10, Coon-Sanders Original Nighthawks. 7:20, DeBabary's orch. 8, speeches. 9, midnight revue. 11, midnight revue continued; Coon-Sanders Original Nighthawks.

WCCO, Milwaukee, 417 (C. S. T.)—10:45 A. M., Betty Crocker, "Hospitality." 2 P. M., community talk. 2:30, The Gypsy trio. 4, magazine hour, "Snakes Hips," by Nina Putnam Wilcox. 5:30, children's hour. 6, sport hour. 6:30, Dick Long's Nankin Cafe orch. 7:30, lecture. 8:30, surprise program.

WGY, Schenectady, 380 (E. S. T.)—7:45 P. M., health talk. 8, radio drama, "The Little Teacher"; WGY orch. 10:30, program by Ellwood L. Clark, baritone, and Joseph Kreinen, violinist.

Saturday, January 3

KSD, St. Louis, Mo., 546, C. S. T.—8:00 P. M. Program to be announced. 11:30, Dance program by Varsity Club orch

WHAS, Louisville, Ky., 400, C. S. T.—4 P. M. Selections by the Alamo Theater Orch.; Harry S. Currie, conductor. Police bulletins. Weather. "Just Among Home Folks," Readings, editorials. 4:55, livestock, produce and grain market. 5, time. 7:30, Concert, auspices, Mrs. Nic Bosler. News, time.

WDAF, Kansas City, Mo., 411, C. S. T.—3:30, The radio orch. 5:50, marketgram, weather, time and road report. 6, speaker to be announced. The Tell-Me-a-Story Lady. The Hanlein-Knutson Trianon Ensemble. 11:45 P.M., Nighthawk Frolics.

WDAR, Philadelphia, 395 (E. S. T.)—11:45 A. M., Daily Almanac. 12:02 P.M., organ recital, Arcadia Concert orch. 2, features from the Studio. 4:30, Cotton Pickers. 7:30, Arcadia Concert orch.

WHN, New York City, 360 (E. S. T.)—6:30 P. M., Vincent Catanese orch. 7:30, Hotel Carlton Terrace orch. 8, Arthur Stone, blind jazz pianist. 8:10, Anastasia Olympiadoni, dramatic soprano. 8:20, Blanche Vincent and Jack Fagan, songs. 8:30, Strand Roof entertalners. 9, Alfred Dulin, pianist. 9:10, Max Berman, operatic tenor. 9:25, Kathryne Connolly, soprano. 9:30, Radio Cross Word Puzzle Contest. 9:35, Kathryne Connolly, soprano. 9:40, William Morse, banjo. 9:50, Richard B. Gilbert, popular songs. 10, Jimmy Flynn, dramatic tenor. 10:10, Clarence Williams and trio. 10:30, Jimmy Clarke and his entertainers. 11, Leory Smith and his orch. 11:30, Roseland dance orch.

WRC, Washington, D. C., 469 (E. S. T.)—7 P. M., children's hour. 7:15, Irving Boernstein's Orch. 8:15, Bible talk. 8:30, Cornell Musical Club concert. 10:30, Astor Hotel Orch. 11:15, organ recital by Otto Beck.

WMAQ, Chicago, 447.5 (C. S. T.)—6 P. M., Hotel LaSalle Orch. 8:30, Hawaii, Paul P. Hoierman. 9, weekly theatre review.

WEAF, New York City, 492 (E. S. T.)—4 P. M., Dart's Brookdale orch. 6, dinner music by WEAF instrumental quartet; Milstead and Sanchez, popular singers; boys' stories by Fred J. Turner; author's program; Vincent Lopezz and his orch.

KYW, Chicago, 536 (C. S. T.)—6:30 A. M., morning exercises. 9:30, late news and comment of the markets. 10:30, Farm and Home service. 11:35, talble talk by Mrs. A. J. Peterson. 6:02 P. M., news, financial and final markets. 6:35, children's bedtime story. 7, Joska DeBabary's orch. 7:10, Coon-Sanders Original Nighthawks. 7:20, DeBabary's orch. 8, Dorothy Congor, contralto; Dubuque Girls novelty orch.; other artists and detailed program will be announced by radiophone. 9:05, Youth's Companion. 9:35, "Congress Classic." 12, "Congress Carnival."

WCCO, Milwaukee, 417 (C. S. T.)—10:45 A. M., Home Service. 8 P. M., "Fireside Philosophies," Rev. Roy L. Smith. 8:30, program to be announced. 10, Paul Davin's Radisson Hotel orch.

WMH, Cincinnati, O., 309 (C. S. T.)—10 P. M., special program: The Romany reed and string quartet; vocal duets, r. and Mrs. Roy Myers; tenor solos, Sam Pusiteria; clarinet solos, Earl Whiting; accordion solos, Charles H. Partington; violin solos, Eugene Perazzo, David Brinkmoeller, accompanist; piano solos, Mrs. Roy Myers.

WGY, Schenectady, 380 (E. S. T.)—9:30 P. M., dance music by Phil Romano's orch.

WJAX, Cleveland, O., 263 (C. S. T.)—12 P. M., Nite-Caps concert; Austin J. Wylie and his Vocalian Recording orch.; soprano solos by June Farley; piano solos by Tony Emma; Kozlik-Wallace orch.; tenor solos by Arthur Stanbury; Cleveland banjo and mandolin quintet; Kamiki Hawaiian trio; banjo solos by Eddie Conners.

WWJ, Detroit, 517 (E. S. T.)—8 A. M., setting-up exercises by R. J. Horton. 9:30, "Tonight's Dinner." 9:45, Public Health Service bulletin. 10:25, weather. 11:55, time. 3 P. M., News orch. 3:50, weather. 3:55, markets.

KGO, Oakland, Cal., 312 (P. S. T.)—11:30 A. M., luncheon concert. 12:30 P. M., final reading, stock reports and weather. 4, concert orch. 8, "Dulcy," a drama in three acts, by George S. Kaufman. 10, Henry Halstead's orch.

Sunday, January 4

WLW, Cincinnati, 423, E. S. T.—9:30 A. M., School editorial staff, Sunday school publications. 11, services, Dr. Frank Stevenson, Minister. 7:30, services, Dr. Frederick McMillan, Minister. 8:30, concert by the Western and Southern orch.; William Kopp, director. Soloist, Carl Wunderle, Zither.

WHO, Des Moines, Ia., 526, C. S. T.—11 A. M., Church service, Dr. C. S. Medbury.

WCBD, Zion, Ill., 345, C. S. T.—8 P. M., Wiedman sisters, double duet; Erma Reynolds, soprano; Mark Whiteside, barytone and Mrs. R. M. Steel, soprano and tenor; Carl Newcomer, saxophone; Gladys Taylor, piano; Grace Detienne, reader.

KFGZ, Barrien Springs, Mich., 286 (C. S. T.)—9 P. M., old-time hymns and gospel songs. 9:20, South African night.

KGO, Oakland, Cal., 312 (P. S. T.)—11:30 A. M., service, Rev. William Kirk Guthrie. 3:30 P. M., KGO Little Symphony Orch. 7:30, service, Rev. William Kirk Guthrie.

WMH, Cincinnati, O., 309 (C. S. T.)—7 P. M., religious service, Rev. J. J. Castleberry, D.D.

Monday, January 5

WLW, Cincinnati, 423 (E. S. T.)—10:45 A. M., weather; business reports. 12:15 P. M., Williamson entertainment; physical exercises. 1:30, business reports. 3, market reports. 4, Babson reports. 6, dinner concert. 8, The Times Star orhc.; Howard Hafford, tenor; Karl Kirksmith, cellist The Times Star orhc. Senator Echultz in monologues.

KOB, State College, N. M., 36, M. S. T.—7:30 P. M., program, The Ariel Trio.

WHO, Des Moines, Ia., 526, C. S. T.—7:30 P. M., "Care of teeth" by Emma Weisgarber. Mr. Herman A. Breithaupt, Zither soloist. 8, classical program.

WCBD, Zion, Ill., 345, C. S. T.—8 P. M. Fred Faassen, organ; Messrs, Biddle, Hampson, Valkenaar, and Serton, trombone Quartet; Arthur Rendall, clarinet; E. B. Paxton, barytone; Mrs. Esther Cook Rendall, soprano; L. J. Hire, viola; Eleanor Pihl, piano; Mrs. S. H. Depew, reader.

WWJ, Detroit, 517, C. S. T.—8 A. M. setting-up exercises. 9:30, "Tonights dinner." 9:45, public Health service bulletins. 10:25, weather. 11:55 A. M., time. 3, News orhc. 3:50, weather. 3:55, market. 7, The Detroit News orch., Ina M. Lockhart, contralto; T. Stanley Perry, tenor.

WEEI, Boston, 303 (E. S. T.)—6:30 P. M., Big Brother Club. 7, Dok-Eisenbourg and his Sinfonians. 7:30, talk. 7:40, Dok-Eisenbourg and his Sinfonians. 8, program through C. F. Hathaway & Sons. 8:30, Courtney Bird and his "Uke." 8:45, "Buddy's Bostonians." 9:30, Gertrude La Purl Drisko, dramatic soprano; Lillian Breslin,

lyric soprano, accompanied by Alice Walsh Hutchinson. 10, musicale. 10:30, Dok-Eisenbourg and his Sinfonians.

KFGZ, Barrien Springs, Mich., 286 (C. S. T.)—8:15 **P. M.**, Jeanette Richardson, soprano. 8:30, Owen Blake, trombone solo. 8:40, Prof. H. L. Pearson, reader. 8:50, Betty Kelly, pianist. 9:05, Cyril Kellman, clarinetist.

K. G. O., Oakland, Cal., 312 (P. S. T.)—9 **A. M.**, music and lectures 11:30, concert 1:30 **P. M.**, N. Y. and S. F. stock reports and weather. 3, studio musical program, speaker. 4, Henry Halstead's Dance Orch. 5:30, Aunt Betty stories. 6:45, stock reports, weather, S. F. produce news, and news items. 8, educational program. 10, Henry Halstead's Orch.

WDAF, Kansas City, 411 (C. S. T.)—3:30 **P. M.**, The Star's radio trio. 5, weekly Boy Scout program. 5:50, marketgram, weather, time, road report. 6, address, C. H. Cheney; Trianon ensemble. 8, "Around the Town With WDAF." 11:45, Nighthawk Frolic.

WFAA, Dallas, Tex., 476 (E. S. T.)—12:30 **P. M.**, address, Dr. J. B. Cranfill. 8:30, Dallas band, Paul E. Ashley directing.

Tuesday, January 6

WLW, Cincinnati, 423 (E. S. T.)—10:45 **A. M.**, weather and business reports. 12:15 **P.M.**, program by the Delta Omicron Sorority; talk on automobiles by Henry Schlensker; dance numbers. 1.30, business reports. 3, market reports. 4, Mah Jongg lecture; recital by pupils of William Kyle. "What is Evolution." 6, dinner hour concert. 10, The Keefer, Kocker Orch. 10:30, concert program, Pat Berryman, banjo; Leonard Henkel, saxophone; Forrest Bradford, piano.

WWJ, Detroit, 517, C. S. T.—8 **A. M.** setting-up exercises. 9:30, "Tonight's dinner." 9:45, Fred Shaw, pianist and popular songster. 10:25, weather. 11:55, time. 3:50 **P. M.**, weather. 3:55 market reports. 7, Art Black's Pier Ballroom.

KFGZ, Barrien Springs, Mich., 286 (C. S. T.)—10:15 **A. M.**, old-time hymns. 10:35, Mrs. Wm. Hanson, contralto; Mrs. H. B. Taylor, soprano. 10:50, Scripture lesson. 10:55, Mr. Andrew Aragona, tenor. 11:05, studio chapel sermon. 8:15 **P. M.**, organ prelude. 8:20, Radio Lighthouse choir. 8:40, Gertrude Sellards, soprano. 8:50, Charles Garber, saxophonist. 9, Scripture lesson, Pastor W. R. French. 9:10, sermon.

KGO, Oakland, Cal., 312 (P. S. T.)—11:30 **A. M.**, concert. 1:30 **P. M.**, N. Y. and S. F. stock reports and weather. 4, concert orch. 6:45, stock reports, weather, S. F. produce news, and news. 8, Mrs. Floyd J. Collar, soprano; Mabel Mellis Shires, contralto; Mme. Maurice Couchot, soprano; Mrs. Philip Eberhart, pianist; mixed quartet selections, Metropolitan Four; Thelma Werli, soprano; Sylvia Hashpao Spaulding, contralto; Harold Spaulding, tenor; Philip Pedgrift, bass; Vera Parker, accompanist. 10, Henry Halstead's Orch.

WFAA, Dallas, Tex., 476 (E. S. T.)—12:30 **P. M.**, C. E. Osborne, physical director, in health talk. 8:30, musical recital, Edwin Linsman, a basso. 11, Palace Theatre grand organ.

WDAF, Kansas City, 411 (C. S. T.)—3:30 **P. M.**, radio trio. 5, weekly child talent program, Anna June Gerhart, 3 years old. 5:50, marketgram, weather, time and road report. 6, School of the Air; The Tell-Me-a-Story Lady;radio piano lessons, Maudellen Littlefield; Trianon ensemble. 11:45, Nighthawk Frolic.

Wednesday, January 7

WLW, Cincinnati, 423 (E. S. T.)—10:45 **P. M.**, weather and business reports. 12:15, MuPhi Epsilon Sorority; physical exercises. 1:30, business reports. 3, market reports. 4, program from the "Shut-Ins." 6, dinner concert. 8, Billie Waterworth, pianist; Billie Anderson, baritone, trio orch. Vocal duets, Mary Steele, contralto; Fred Raine, tenor; Grace Raine, accompanist. 9, Paul Bachelor's.

KOB, State College, N. M., 360, M. S. T.—7:30 **P. M.**, International code course.

WHO, Des Moines, Ia., 526, C. S. T.—7:30 **P. M.** The Bankers Life Radio orhc., Mr. J. W. Ocker, minstral singer.

WWJ, Detroit, 517, C. S. T.—8 **A. M.**, setting-up exercises. 9:30 "Tonight's dinner." 9:45, public Health Service. 10:25, weather. 11:55, time. 3 **P. M.** News orch. 3:50, weather. 3:55 market

KFGZ, Barrien Springs, Mich., 286 (C. S. T.)—8:15 **P. M.**, miscellaneous program by Spanish department.

KGO, Oakland, Cald, 312 (P. S. T.)—11:30 **A. M.**, concert. 1:30 **P. M.**, N. Y. and S. F. stock reports and weather. 3, musical program and speaker. 4, concert orch. 6:45, stock reports, weather, S. F. produce news, and news items.

WDAF, Kansas City, 411 (C. S. T.)—3:30 **P. M.**, radio trio. 5:50, marketgram, weather, time and road report. 6, School of the Air; speaker, Health Conservation Association; speaker from the Meat Council; The Tell-Me-a-Story Lady; Trianon ensemble. 8, classical music.

WFAA, Dallas, Tex., 476 (E. S. T.)—12:30 **P. M.**, musical program.

Thursday, January 8

WLW, Cincinnati, 423, E. S. T.,—10:45 **A. M.** weather forecast. 12:15 **P. M.**, Woody Meyer's orhc. 1:30, business reports. 3, market reports. 4, French lesson; piano solos by Adelaide Apfel. 6, dinner hour concert. 10, Civel Service. 10.30, Cooper orch and quartet: Grace Raine, accompanist. 11, selections by Church choir; special program by the Milnor Instrumental trio. Doherty melody Boys.

WCBD, Zion, Ill., 345, C. S. T.—8 **P. M.** Messrs. Stewart, Sach, Sourby and HeHaffey, string quartet; Celestial bells, four parts and solos; Sweeney and Naffiger and Mrs. Crowe, ladies trio, Misses Edith Carey, contralto; Mrs. J. D. Thomas, soprano; J. D. Thomas, barytone; Emelia Nelson, piano; Lillian Dettenne, reader.

WWJ, Detroit, 517, C. S. T.—8 **A. M.** setting-up exercises. 9:30, "Tonight's dinner." 9:45 Public Health Service. 10:25, weather. 1155, time. 3, News orhc. 3:50, weather. 3:55, market. 7, The Detroit News orch. 10:00, Dance music by Jean Goldkette's.

KGO, Oakland, Cal., 312 (P. S. T.)—10:40 **A. M.**, classroom instruction. 11:30, luncheon. 1:30 **P. M.**, N. Y. and S. F. stock reports and weather. 4, concert orch. 6:45, stock reports, weather, S. F. produce news, and news items. 8, "Lady Windermere's Fan," a play in four acts, by Oscar Wilde. 10, Henry Halstead's Orch.

WFAA, Dallas, Tex., 476 (E. S. T.)—12:30 **P. M.**, music by Edmund Boettcher, tenor, and William H. McRaven, pianist; address, DeWitt McMurray. 8:30, Frank Davenport and his eight-piece orch. 11, Adolphus Hotel orch.

WDAF, Kansas City, 411 (C. S. T.)—3:30 **P. M.**, The Star's radio trio. 5:50, marketgram, weather, time and road report. 6, reading, Cecile Burton from popular poems and esays; The Tell-Me-a-Story Lady; Trianon ensemble. 11:45, Nighthawk Frolic.

(International Newsreel)

"RUBE" GOLDBERG, the nationally famous comic artist, is telling of the eccentricities of Mr. Boob McNutt at WGBS, Gimbel Bros., New York City. "Rube" certainly takes to the microphone.

Farmers Prefer Jazz to Market Reports!

WASHINGTON.

DR. ALFRED N. GOLDSMITH, radio expert and engineer, has learned something new. He has discovered just what type of broadcast programs the farmers desire most of all.

"For a long time I held the belief that the farmers would rather listen in on market reports and agricultural lectures than most anything else," he said. "But I have been set right."

Talking to a farmer from North Dakota a few weeks ago, Dr. Goldsmith asked him what the farmers liked best.

"Why, we like jazz best of all," said the farmer.

"But how about the market reports?" Dr. Goldsmith asked.

"Oh, we farmers don't believe the market reports," he replied. "We think somebody is trying to put something over on us."

Friday, January 9

KOB, State College, N. M., 360, M. S. T.—7:30 **P. M.**, College male quartet; piano solos, Vesta Frisch; vocal solos, Wilburn Patrick. Professor Fabian Garcia. Dr. R. E. McBride, "The Climate of New Mexico."

WHO, Des Moines, Ia., 526 (C. S. T.)—7:30 **P. M.**, the Williamson Bros., banjo, mandolin and Guitar. The Y. M. C. A. male quartet, personal; Rihcard Hyde, boy soprano; Mrs. R. C. Hyde, accompanist.

WWJ, Detroit, 517 (C. S. T.)—8 **A. M.**, setting-up exercises. 9:30, "Tonight's Dinner." 9:45, Public Health Service. 10:25, weather. 3 **P. M.**, News time. 3 **P. M.**, News orch. 3:50, weather. 3:55 market. 7, News orch. Anne Campbell, News poet.

KGO, Oakland, Cal., 312 (P. S. T.)—11:30 **A. M.**, concert. 1:30 **P. M.**, N. Y. and S. F. stock reports and weather. 4, concert orch. 5:30, girls' half hour. 6:45, stock reports, weather, S. F. produce news, and news items.

WFAA, Dallas, Tex., 476 (E. S. T.)—12:30 **P. M.**, address, Dr. Robert Stewart Hyer. 4:30, woman's hour, Mrs. Bessie M. Trible. 8:30, vocal recital by G. Haydn Jones.

WDAF, Kansas City, 411 (C. S. T.)—3:30 **P. M.**, The Star's radio trio. 5:50, marketgrams, weather, time and road report. 6, School of the Air; speaker, Children's Bureau; The Tell-Me-a-Story Lady; Trianon ensemble. 11:45, Nighthawk Frolic.

Saturday, January 10

WWJ, Detroit, 517, C. S. T.,8 setting-up exercises. 9:30, "Tonight's Dinner." 9:45, Public Health Service. 10:25, weather. 3 **P. M.**, News orch. 3:50, weather. 3:55 markets. 7, News orch.

luncheon. 12:30 **P. M.**, stock reports and weather. 4, concert orch. 8, Watsonville Community Orch.; Dr. C. O. Patterson, tenor; Mrs. Wilbur MacFarlane, pianist; the Apple City Quartet; Agnes Ward, violinist; M. Fritz, cornetist; Fawn Post Trowbridge, soprano; address, "The Constitution," by Chas. Wade Snook; musical program of the East Bay Industrial Exposition. 10, Henry Halstead's Orch.

WDAF, Kansas City, 411 (C. S. T.)—3:30 to 4:30 **P. M.**, radio orch. 5:50, marketgram, weather, time signal and road report. 6, School of the Air; speaker to be announced; The Tell-Me-a-Story Lady; The Trianon Ensemble. 11:45, Nighthawk Frolic.

WFAA, Dallas, Tex., 476 (E. S. T.)—12:30 **P. M.**, address, Jack Lockett. 8:30, musical recital by Dr. Richard Mandell, tenor, and other musicians. 11, Adolphus Hotel orch.

Latest Patents

1,517,277. Signaling System, invented by Omar B. Buchanan, of Wilkinsburg, Pa., and assigned to Westinghouse Elec. and Mfg. Co. Provides simple means for controlling the radiation of energy from wireless transmission systems.

1,517,370. Condenser, invented by Ralph E. Marbury, of Edgewood Park, Pa. Provides a method of constructing condensers embodying a solid dielectric, which shall have low power losses and be efficient when used with high frequency currents.

1,517,568. System of Radio Transmission, invented by James O. Mauborgne, and Guy Hill, of Washington, D. C. An improvement in transmitting radio signals whereby a simplification in the equipment required is effected; also more persistent oscillations are obtained in the case of spark discharge methods. A method of obtaining directional sending, and a means of generating extremely low wavelengths.

1,517,569. System of Radio Transmission, invented by J. O. Mauborgne and Guy Hill, Washington, D. C. Provides an antenna capable of efficient radiation for permanent stations of any power occupying materially less space than that required heretofore.

1,517,570. System of Radio Communication, invented by J. O. Mauborgne and Guy Hill, of Washington, D. C. Provides a wave coil wound with a comparatively large number of turns per unit length to secure in a relatively short coil the equivalent condition of a long antenna in its natural electrical period.

1,517,602. Antenna Safety Link. Invented by A. M. Trogner, Takoma Park, Md. Prevents the carrying away of the antenna as the result of an abnormal whipping of the masts such as in collisions, torpedoing, grounding, etc.

1,517,816. Radio Transmitting System. Invented by Ernst F. W. Alexanderson, and assigned to General Elec. Co. Provides a system for transmitting radio signals which will be adapted for high speed telegraphic communication or radio telephony.

1,518,050. Radio Telephone Block. Invented by Walter G. Conger, of Jackson, Mo. Provides a block where a number of telephone receivers may be connected together.

A THOUGHT FOR THE WEEK

THE good year 1925 is bound to add to the sum of human happiness, and who shall say that Radio will not o'ertop all other sciences in great advance and fine accomplishments?

RADIO WORLD

The Link Connecting Radio Fan, Dealer, Jobber, Distributor and Manufacturer

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(Dated Saturday of same week)
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SUBSCRIPTION RATES

Fifteen cents a copy. $6.00 a year. $3.00 for six months. $1.50 for three months. Add $1.00 a year extra for foreign postage. Canada, 50 cents.

Receipt by new subscribers of the first copy of RADIO WORLD mailed to them after sending in their order, is automatic acknowledgment of their subscription order. Changes of address should be received at this office two weeks before date of publication. Always give old address also. State whether subscription is new or a renewal.

ADVERTISING RATES

General Advertising

1 Page, 7¼"x11",	462 lines	$300.00
½ Page, 7¼"x5⅛",	231 lines	150.00
¼ Page, 4⅛", D. C.,	115 lines	75.00
1 Column, 2¼"x11",	154 lines	100.00
1 inch		10.00
Per agate line		.75

Times Discounts

52 consecutive issues	20%
26 times consecutively or E. O. W. one year	15%
4 consecutive issues	10%

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JANUARY 3, 1925

Dense Announcers

SOME announcers still are at their old practice of being very sparing about revealing the precious secret of the station's call letters. It is indeed a form of egotism for an announcer to assume that those who are listening to his precious program that second have been listening since his own charming voice opened the day's audible doings. The failure to give the call letters is also due in large measure to narrow mindedness of the announcer, for he can not see any farther than his own microphone, and has not enough imagination to carry him out of the humdrum of the day's work. These announcers get tired of saying the same thing repeatedly. If somebody is to make a speech the anti-call letter announcer would not think of asking the speaker to interpolate phrases which will contain the call letters. This type of announcer knows it would be impolite to interrupt the speaker with the old rote about "This is station WXZV," hence can think up no alternative. The radio press is repeatedly inveighing against these preservers of the call letter secret, fans write complaining letters, but all to little avail. It only shows that radio is burdened with some stupid announcers and will continue to be so weighted down until the station proprietors themselves take a hand. Reforming a thick-headed announcer is impossible. He is to busy looking in the mirror to have any time left to be reformed.

"Bad Publicity" Given as Reason for Radio's Retardation

Survey Editor, RADIO WORLD:

I NOTICE that RADIO WORLD has started a national survey to determine why radio, the most important invention that ever came upon the face of the earth, should occupy only thirty-second place as an industry, with far more automobiles and phonographs in use than radios, although sets are much cheaper than the other inventions mentioned. I commend you for this undertaking. While it is true radio has grown by leaps and bounds in four short years, that is no reason for remaining contented. You have filled the air with the spirit of progress.

I have given some attention to this subject and will outline my views.

I believe that the failure of radio to rank in its just position is due in large measure to the bad publicity that radio gets. This in part comes from dealers who demonstrate what radio is NOT, by using distorting detecting circuits and heinous audio amplifiers. Thus thousands of persons who never get any closer to radio than that have no other information on which to base an opinion, and they blandly tell you that radio doesn't amount to much yet, and they will wait until something worth while in the radio line is produced.

Another factor is the highly competitive nature of the industry. The manufacturers do not unite as they should to "sell" the idea of radio. They are too busy trying to sell their own particular products. This individual energy is very fine, but with it should go broader undertakings.

A good way to improve this condition is to have the manufacturers, through their association, co-operate to boost radio. This could be done in their ads, by circulars and in demonstrations.

WM. J. CARVER,
700 Ocean Avenue, Brooklyn, N. Y.

THE GIRL'S IDEA

HE—How would you like a crystal set for your birthday?

SHE—Fine, thanks, if the crystal were set in platinum.

Index Vol. 5 of Radio World

From January 1, 1924, to September 1, 1924. Full contents, cross indexed, appeared in Radio World dated Oct. 18. 15c. per copy or start your subscription with that number. Radio World, 1493 Broadway, N. Y. C.

JOIN THE A. B. C.

A. B. C. stands for the American Broadcast Club. Join it today. It involves no dues or payment of any kind, and no obligations. It was founded by RADIO WORLD simply to unite the broadcast listeners and radio fans in general in a common bond to promote their welfare as occasion requires. Send your name and address to A. B. C. Editor, RADIO WORLD, 1493 Broadway, New York City.

Robert Elifritz, 513 S. E. 10th St., Des Moines, Ia.
Francis Goddard, 271 Corey Rd., Brookline, Mass.
Leon Waloz, 615 Madison Ave., Scranton, Pa.
A. B. Kendrick, 47 Butler St., Etna, Pa.
Fred Nutter, 110 Elkins St., Fairmont, W. Va.
Claude C. Powell, 823 S. Elm St., Graham, Tex.
A. L. Boyce, 19 River St., Oneonta, N. Y.
H. Van Ruschen, Salem, S. D.
A. R. Wright, 802 N. Main St., New Lexington, Ohio.
Myron Adams, Box 137, Navarre, O.
A. F. Kupfer, 2412 Grand Central Terminal, New York City.

Fill Out This Coupon

A. B. C. Editor, RADIO WORLD,
1493 Broadway, New York City.

Please enroll me as a member of the American Broadcast Club.

Name .....
Address .....
City or Town .....
State .....

NEXT WEEK—RADIO WORLD'S FOUR-TUBE DX SUPERDYNE

MR. DX HOUND

A Character Created by RADIO WORLD *Artist*

By HAL SINCLAIR

The Radio Trade

ANTENNAPHONE, A NEW AERIAL

A BOON to the radio fan who is up against aerial trouble or who cannot get the best results out of a loop is a device placed on the market by the Antennaphone Company, 90 West Street, New York City.

A metal plate, nicely finished, with ample connecting wire for long stretches on which the telephone is set, constitutes the device. The wire is then attached to the aerial post of the set and the tuning is then accomplished in the usual manner. The loudness of signals can be varied and interference eliminated by partly moving the telephone off the antennaphone plate. This action is similar to rotating the plates of a variable condenser placed between the antenna and the set. The Antennaphone will also work well as a ground and can be added to the regular ground with good advantage. Very good results have been obtained with the Antennaphone and the writer obtained a wonderfully mellow and strong tone in experiments with his set.

(*Tested and approved by* RADIO WORLD)

Business Opportunities Radio and Electrical

Rates: 50c a line; Minimum, $1.00

RADIO OPPORTUNITY—RADIO MANUfacturer offers exceptional opportunity to individual furnishing $50,000 or more added working capital; we manufacture only highest grade radio receiving sets and distribute through well-known jobber to high-class retailers; our products have established a first-class reputation and additional business can be had for the asking; this is not a speculation, but an investment; owners are business men of standing and can give highest references; only individuals of similar standing need apply; no brokers. Box 60, Radio World.

RADIO—EXECUTIVE DESIRES ACTIVE interest, wholesale jobbing, retail; moderate investment in attractive proposition. Box 111, Radio World.

THE OWNER OF A LONG-ESTABLISHED business now carrying radio has opened a branch handling radio exclusively in downtown radio centre and would desire a partner for the radio business only; this man must have retail radio experience; all replies treated in strict confidence. Apply by letter to Box R. S. G., Room 500, Tribune Bldg., New York.

WE GUIDE your patent or secret process to success; tell us what you have; international references. Rubenstein Adjustment Bureau, 236 West 55th St., N. Y. C.

RADIO "B" BATTERIES, ALSO SEMI-DRY storage "B" batteries; like to hear from party desiring manufacture this line. Box 241, 1,180 Fulton St., Brooklyn, N. Y.

AN ESTABLISHED WHOLESALE RADIO distributor wishes to expand their business and is interested in hearing from party with necessary capital this is a fine proposition for the right party; no stock promoters need apply. Box IX, Radio World.

New Corporations

Hoover Radio Corp., New York City, common stock, no par. B. Ginsberg, J. Loeb, S. H. Anderson, Jr. (Atty., S. J. Shapiro, 51 Chambers St., New York City.)

Harkness Radio Corp., New York City, 100 shares common, no par. J. L. Nolan, M. A. Muldoon. (Atty. L. S. Gatter, 36 W. 44th St., New York City.

Receptone Radio Corp., New York City, $10,000. M. C. & A. G. Solomon, G. C. Shapiro. (Atty. L H. Solomon, 200 5th Ave., New York City.)

Rossiter & Co., New York City, manufacture sets; 1,000 shares preferred, $100 each; 2,000 common, no par. T. R. Putsche, R. Del, R. W. Branch. (Atty. M. F. Tompkins, 33 Rector St, New York City.)

Midget Radio Co., Wilmington, Del., equipment, $100,000. (Colonial Charter Co.)

Coming Events

JAN. 19-JAN. 24, INCLUSIVE—Pittsburgh Radio Show, Motor Square Garden.

Literature Wanted

THE names of readers of RADIO WORLD who desire literature from radio jobbers and dealers, are published in RADIO WORLD, on request of the reader. The blank below may be used, or a post card or letter will do instead.

Service Editor,
Radio World,
1493 Broadway, New York City.
I desire to receive radio literature.

Name .....
City or town .....
State .....
Are you a dealer? .....
If not, who is your dealer?
His Name .....
His Address .....

Burton N. Vance, Jackson, Mich.
R. B. Cooper, Henderson, Ky.
Charles Morgan, care Stephen Bros., Shelbyville, Ind.
E. W. Chappell, 61 Brookland St., Sydney, N. S.
Winston Prices, 318 W. 4th St., Williston, N. D.
F. D. Lesia, 1620 Fulton Ave., Detroit, Mich.
H. Kleinsmith, Onalaska, W.
Wallace M. Davis, College Pl., Walla Walla, Wash.
Jose Castro, Luz & Morell, Vibera, Havana, Cuba.
R. Hyatt, Oakdale, La.
W. F. Eastlack, 5315 Pine St., Philadelphia, Pa.
Claude E. Powell, 823 S. Elm St., Graham, Tex.
C. Laurence Sherman, 411 E. Green St., Champaign, Ill.
Roy W. Netling, Rhinelander, Wis.
Jos Ducommin, 1451 W. 57th St., Seattle, Wash.
Melva Steva, Richmond, Mo.
Radio Const'd Laboratory, 71 W. Broadway, New York City.
J. W. Blizzard, Georgetown, Del. (dealer). ....
Chas Charmley, 1316 W. Dayton St., Madison, Wis.
Robert Boggess, Mohall, N. D.
Maurice Kidney, 297 Humphrey, New Haven, Conn.
E. L. Doherty, 801 Jones St., San Francisco, Cal.
Chas. D. Baudenistel, West New York, N. J.
Jay Wagner, 507 E. 108th St., Cleveland, O.
Luiz Lofgren, Rua Maurity 20, Nictherey, Brazil, S. A.
Brown Brothers & Long, Rexbury, N. Y. (dealer).
N. Wynia, Cologne, N. J.
Joe Cornetski, 24 Roberts St., Bristol, Conn.
J. Howard Hill, 119 N. Palm St., Bell, Cal.
Edwin Mann, 1012 Ohio St., Joliet, Ill.
William Gainer, 272 S. Main St., Pittman, O.
Gayle Kavanaugh, Polsgrove, Ky.
C. E. Finley, 340 W. Washington St., Pekskill, N. Y.
Dan Robertson, 2960 Grand Ave., Detroit, Mich.
A. O. Arnesen, Ansley, Neb. (dealer).
Barry C. Hawkins, Highlands, Macon Co., N. C.
Grover D. Johnson, Plainville, N. Y.
H. H. Peffenberger, Pine Island, Minn.
Ernest Tremblay, Quebec, Quebec.
Percy Hansen, Akkron, O.
Wm. Jordan, 242 W. 36th St., New York City.
Richard Newton, 725 W. Fulton St., Grand Rapids, Mich.
Stanley Szurek, 2412 Casmere St., Hamtrack, Mich.
Dick Weiss, 312 S. Elmer Ave., Sayre, Pa.
J. B. Wright, 915 Siloce St., Philadelphia, Pa.
Sidney F. Kullberg, 88 Canton St., Providence, R. I.
A. F. Kupfer, Rm. 2412 Grand Central Terminal, New York City.

How First Permanent Radio Was Installed in Railway Car

THE first railroad car in the country to contain a radio receiving set as a permanent integral part of its equipment is the Baltimore, recently built as a private car for the President of the Seaboard Air Line. Many railroad systems have installed receiving sets for the benefit of passengers, but these were makeshift arrangements and not a regular part of the quipment of the cars.

Extensive tests of the efficiency of the set in the Baltimore made by railroad and radio men compared very favorably with tests of the same set before installation in the car. The radio experts, after experimenting with mileage range, effect of car movement on reception and noting quality of reception were convinced that the results were the best they had heard from a moving train. The trial run was from Chicago to Baltimore.

Installation of the radio was made under direction of Ernest Lunn, electrical engineer of the Pullman Car and Manufacturing Corporation.

Avoids Metal Contact

In applying antennae to Pullman cars it is necessary to make sure that the wire does not come in contact with any metal part of the car structure; also that it is located as far from the roof as possible, in order that the message carrying impulses picked up by the aerial will be as little as possible influenced by metal not a part of the electrical circuit. On account of tunnel clearances being limited on some roads, and as Pullman as well as private cars may be operated over any road in the country, the permissible location of the wire in relation to the car roofs is confined to a relatively small space, which is approximately nine inches horizontally from the upper deck and fifteen inches vertically from the lower.

Various schemes have been devised for supporting the wire, the majority of which have been cumbersome and so conspicuous as to give the car an unsightly appearance. The brackets attached to the car Baltimore were made of flat steel three-sixteenths of an inch thick and about nine inches long, which when applied extended horizontally from the edge of the upper deck roof. At the extreme end they carried porcelain knobs through the centre of which the wire was run, terminating at the brackets located at the four corners of the car roof.

The antenna is in the form of a single wire flat loop, the sides of which are kept at proper tension by means of adjustable strain insulators. The circuit was made continuous by means of jumpers at the corners, which were carefully soldered to insure perfect conductivity.

Connection was made to the receiving instrument by means of a wire connected to a standard lead-in insulator installed in the upper deck. A standard lightning arrester, mounted on the outside of the upper deck, was connected to the lead-in wire. Inside the car a solid No. 8 rubber-covered wire was run from the lead-in insulator to a jack-box placed above the molding immediately over the centre panel. The usual flexible connection was made from the jack-box to the instrument.

The cabinet was mounted on a sponge rubber mat about one-half inch thick, the purpose of which is to reduce the effect of vibration while the car is en route. The table on which the outfit was placed was specially constructed and supported on two removable legs on one side and provided with standard Pullman table hooks on the other. This was done so the equipment could be set aside when not in use and the space left for chairs. In order that occupants of the rooms might enjoy radio programs after retiring, circuits were run from each room to a jack located near the instrument into which the phone or loudspeaker could be plugged.

It is planned to equip other private cars with a similar installation.

"THE BEST AERIAL FOR YOU," described by P. E. Edelman in the November 8 issue. Send 15 cents for copy to RADIO WORLD, 1493 Broadway, New York City.

Worse and More of It in Class B Tangle

WASHINGTON.

THE problem confronting the Department of Commerce in finding channels for Class B broadcasting stations is getting worse, although from the point of view of radio officials, it is just about as bad now as it could be. The trouble lies in providing wave lengths for the new stations, which are expected to be ready to operate by the first of the year. At the time of the Third National Radio Conference, it was thought that the total of Class B stations would not exceed 88, and a plan was devised to care for that number. However, reports from inspectors soon indicated that the total number would go beyond 88.

From present indications, it seems that one of three things may result. These three plans are:

(1) New Class B stations may be assigned Class A wave lengths until there are vacancies in Class B.

(2)—Class B stations may be required to divide time two, three or even four ways, so as to allow the new stations to come in on the air.

(3) Stations may be placed closer together on the wave length band, thus creating new channels.

Among the objections to the first plan are that Class A channels should be reserved for Class A stations. To the second, Class B stations will naturally object. The third plan, it is feared, may result in increased interference.

"THE ONE AND ONLY"

I WISH to thank you for answering my several questions. Your magazine is the one and only radio magazine. There are more interesting radio news and hookups in the thirty-five pages than in any other half dozen magazines on the market. We experimenters take a great interest in the various hookups that are published.

We look forward to the day RADIO WORLD comes out as some do for pay day.

W. HUBLER,
535 Aransas Ave.,
San Antonio, Texas.

"ROUSING DORMANT NEUTRODYNES," by Charles H. M. White, noted radio authority. Send 15 cents for November 22 issue, RADIO WORLD, 1493 Broadway, New York City.

How to Purchase a Radio Set

By Dr. C. B. Jolliffe

Physicist, Bureau of Standards Radio Laboratory

WITH the return of good radio weather and the long evenings of winter, many persons are thinking of taking their first step into the realm of radio by buying a radio receiving set, and others who already have a set may wish to get a better one. To many persons the question naturally arises, "What kind of a set shall I buy?" Radio is a technical subject, and many salesmen in radio stores are fond of using technical terms without realizing that they are not understood. In selecting a set a person is nearly always confronted with a long list of names and detailed descriptions of special circuits. To the average person these names and descriptions mean nothing, and most persons do not care to undertake the study necessary to find out the meaning of them, nor is it necessary to make this study.

The fundamental purpose of a receiving set for broadcast reception is to deliver to the user a complete and faithful reproduction of the program that is being produced in the studio and being sent out by a selected broadcasting station. Most persons are not concerned how this reproduction is accomplished. For this reason, the primary considerations in selecting a receiving set should be: "Can the stations desired be received and are the programs delivered with good quality and without extraneous noises?"

Limitations on Distance

The American public has been led to believe that it is possible to receive any broadcasting station at any time and at any place. With the present power of broadcasting stations this is far from the fact. It is true that stations located on the Pacific Coast are sometimes heard in the East, and some of the European stations were heard in America during the international tests. The reception is not reliable, and when received the signals are usually mixed up with noise, and the volume is so variable that identification of the station is usually a matter of luck and guesswork. The purchaser of a receiving set should temper his expectations, for there are many excellent pro-

Expert Discusses Buying Set

grams being sent out from stations nearby. With the best modern receiving sets, under good conditions and at night, it is possible at the present time to obtain loud speaker reception from stations within a distance of approximately 1,000 miles. Such reception is subject to large variations in volume (called fading) and noise. Where constant intensity is desired this range is very greatly reduced.

The matter of quality of reproduction of the program is usually within the receiving set. Most first-class broadcasting stations send out a signal that contains a faithful electrical reproduction of the program, and it is up to the receiving set to transform this into a faithful sound reproduction.

Favors Actual Test First

As with phonographs and other musical instruments, the only reliable test, available to the purchaser of a receiving set, is to listen to it and compare it with others, paying attention to quality, ease of adjustment, and the ability it has to select one station and reject all those which have nearly the same frequency or wave length. Such a listening test should preferably be conducted with the complete apparatus that is to be used with the set, and under room conditions that simulate the conditions in the home.

The appearance of the set may be a factor with many persons but this depends on the individual. Many companies are manufacturing sets that are completely self-contained and not out of place when put with the best furnishings, but it should be noted in passing that the exterior of the set has nothing to do with its operation.

All of us cannot afford the best sets available. The simple crystal set which can be purchased for as low as $2, will give fine service if used near a broadcasting station. It cannot, except under very unusual conditions, be used to operate a loud speaker, but its quality of reproduction in head phones is extremely good. This set is strictly a set for local reception. To be sure the stronger distant stations are often heard on crystal

Regenerative Sets Approved

sets but like long distance reception on the more powerful receiving sets it is usually unsatisfactory. Here as with all sets it is necessary to distinguish between simply hearing a station, and hearing it with sufficient volume to really enjoy the program.

"The Most for the Money"

Next above the crystal set in price and performance, and the lowest-priced sets equipped with electron tubes, are the so-called regenerative sets. Most of the one, two and three-tube sets are in this class. They have been very popular and many persons are now operating them with good results.

They are, however, trouble-makers, that is, if improperly operated, they cause squeals and whistles in the neighboring receiving sets. The fact remains, however, that they give the most for the money invested and in sparsely-populated districts, give excellent results. Very careful instructions on how to operate such sets without producing disturbances should always be obtained, for they can be operated so as not to cause trouble.

Such sets, however, are in general not entirely satisfactory when it comes to tuning in one of two stations operating simultaneously on frequencies or wave lengths not far separated, that is, they are not very selective.

Super-Heterodyne vs. Neutrodyne

More complicated and expensive sets are required if this is desired. Such receiving sets may be put in two general classes, radio-frequency amplifiers and superheterodynes. Choice between the two is largely personal. The distance limit of reception with either of these types of sets, when properly designed and built, is given by the background of noise which is always present in any radio receiving set. Satisfactory reception and amplification only is possible when the receiving signal is stronger than the noise. Most of the radio-frequency amplifiers, including Neutrodynes, operate from an overhead antenna and so are not readily portable. The antenna, however, need not be very extensive. A few feet of wire around the picture moulding along the side of the wall, or elsewhere, is all that is necessary. A larger antenna will probably extend the range of the set somewhat, but will likewise increase the noise. Practically all Super-Heterodyne sets use a coil antenna (loop). When provided with tubes operated from dry cells they are readily portable. Many sets of both classes are so designed that they can be used with either a coil or an overhead antenna.

What Kind of Tubes?

The type of tubes for which a set is designed is often times a factor in the purchase. There are sets which may be operated entirely from dry cells, and others which require storage batteries. When using storage batteries, facilities for charging should always be provided and the batteries should be so placed and wired that their care is not laborious. If properly cared for, they will last a long time. Dry batteries, on the other hand, require no care but when exhausted they must be replaced. The time which dry cells will last depends on the extent of use of the set and this cost of upkeep should be considered.

Purchases should be made only from reliable business concerns whose interest in the customer does not necessarily cease when the money is in the cash register. Another point in this respect is the price that is quoted on a receiving set. Advertisements often state a price without what are termed "accessories." These accessories are essential things, that is, antenna equipment, tubes, phones, loud speaker and batteries. The set is inoperative without them. Therefore, before comparing prices, be sure they are on an equal footing in that all sets are complete.

RADIO WORLD'S QUICK-ACTION CLASSIFIED ADS.

10 CENTS A WORD. 10 WORDS MINIMUM

BARGAIN in Radio parts. Write, D. J. Bishop, Littleton, N. H.

THE IDEAL FOUR PHONE BINDING POST made of ¼ brass polished nickel, tapered holes on bevel corner. Weight of cord guarantees good contact. Eliminates jacks, multiphone plugs and soldering. Low loss simplest and best. Radio dealers write. 75c a pair, prepaid. Ideal Mfg. Co., 27½ Grant Ave., Endicott, N. Y.

CROSLEY one-tube set complete with tube head phones, batteries and aerial. Only $27.25. Fried Radio Agency, 515 E. Rusk, Marshall, Texas.

LOW-LOSS INDUCTANCE FORMS—Linen Impregnated Bakelite. 50c each. The Kehler Radio Laboratories, Abilene, Kansas.

158 GENUINE FOREIGN STAMPS, Mexico War issues. Venezuela, Slavador and India Service. Guatemala, China, etc., only 5c. Finest approval sheets 50 to 60%. Agents wanted. Big 72-p. Lists Free. We Buy Stamps. Established 20 years. Hussman Stamp Co., Dept. 155, St. Louis, Mo.

AGENTS—Write for free samples. Sell Madison "Better-Made" Shirts for large Manufacturer direct to wearer. No capital or experience required. Many earn $100 weekly and bonus. MADISON MILLS, 564 Broadway, New York.

DINING & SLEEPING CAR CONDUCTORS (white), Exp. unnecessary. We train you. Send for book of Rules and application. Supt. Railway Exchange, Sta. C, Los Angeles.

PATENTS—Write for free Guide Books and Record of Invention Blank before disclosing inventions. Send model or sketch of your invention for our prompt Examination and Instruction. No charge for the above information. Radio, Electrical, Chemical, Mechanical and Trademark experts. Victor J. Evans & Co., 294 Ninth, Washington, D. C.

RADIO WORLD'S CLASSIFIED DEPARTMENT. If you want to buy, sell or exchange anything, use RADIO WORLD'S Quick-Action Classified Department, 10 cents per word, 10 words minimum, RADIO WORLD, 1493 Broadway, N. Y.

COMMERCIAL TYPE RADIO APPARATUS, by M. B. Sleeper. Mailed on receipt of 75c. The Columbia Print, 1493 Broadway, N. Y. C.

Air University

(Concluded from page 15)

Dec. 27. It gives volume with remarkable clarity. Otherwise build the 4-tube Superdyne.

* * *

I HAVE a crystal set of the one-slide tuning-coil type. My aerial is 140 feet long. WCK was on 360 meters. Recently they changed their wave to 273 and I cannot get them at all. Can you tell me what the trouble is?—H. A. Wendell, 4529 N. Market St., St. Louis, Mo.

Your set will not tune as low as 273 meters. Your aerial is too long. Take off 40 feet. Use

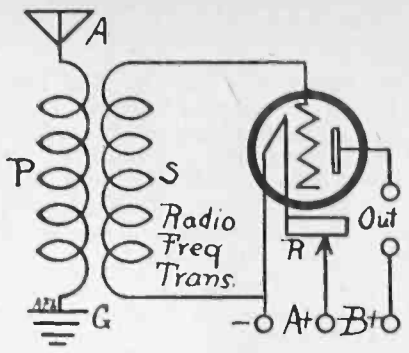


FIG. 73.—How a stage of RF is added to your present set. The output is connected to the aerial and ground binding posts and the rotor, if the hookup be of the 3-circuit type, is placed at maximum coupling. There will be no noticeable difference on local stations, but the distance will certainly be improved with the RF addition. a 43-plate variable condenser in series with the aerial lead.

* * *

WILL YOU kindly print a diagram showing how to add a stage of RF to a 3-circuit tuner?—Abbott Copeland, 57 W. 75th St., New York City.

See Fig. 73 for an untuned stage.

BRAINARD FOOTE, noted radio authority, describes his favorite receiver in Radio World, issue of Oct. 18. One stage of impedance RF, one transformer RF stage, crystal detector and two audio stages. Four tubes. Great quality set. Send 15 cents for copy of issue or start subscription with that number. RADIO WORLD, 1493 Bway., N. Y.

Likes This Hookup

ON July 26 you published a hook-up by Byrt C. Caldwell. I made one of these sets and have been using it for the last few nights. I do not want a better set. It has got them all beat, even the Super cannot come up to this one. When static is bothering Supers and other hookups here, this set goes right on and no static or other noises are heard.

I am using a fifty-foot cage antenna and thirty-foot cage lead-in as per instruction on antennas as published in RADIO WORLD for Aug. 30.

I have built and experimented with all kinds of hookups for the last four years and have found nothing better.

GUSTAVE SIMMONS,
Columbus, Mont.

NEXT WEEK—RADIO WORLD'S FOUR-TUBE DX SUPERDYNE

Whittemore Resigns

WASHINGTON.

LAURENS E. WHITTEMORE, Secretary of the Interdepartmental Radio Advisory Committee, has resigned to Secretary Hoover to become effective on January 1, at which time he joins the American Telephone and Telegraph Company in their research department.

RESULTS

WHAT Results Did You Obtain from Constructing Sets or Parts Following Data Published in Radio World? Write to Results Editor, Radio World, 1493 Broadway, New York City

RESULTS EDITOR:

IN Radio World I note with interest your replies to questions regarding the Radiola III as described for fan construction in the October 4 issue. With this set I get the following stations clearly on loud speaker, with volume varying according to the weather: WBZ, Boston; WEAF, New York; WAHG, Richmond Hill, N. Y.; WCAP, Washington; WSB, Atlanta; Ft. Worth and Dallas, Texas; Denver; Winnipeg; PWX, Havana; Providence, R. I.; and several New York stations whose call letters I do not remember offhand. These are the distant stations that come in with good volume. It goes without saying that Cleveland, Cincinnati, Omaha, Davenport and other stations at similar distances come in well, too, with the exception of KYW, Chicago, which I cannot get on loud speaker, and only fairly well on headphones, although KSD, 546 meters, St. Louis, comes in well, as does the Detroit News' station on 526 meters. Have had Oakland, San Francisco and Hollywood on loudspeaker.

As to selectivity, I get WGR, KDKA and WBZ without any interference from each other, which some of the Neutrodynes around here do not do. I can separate WQJ, 448 meters, from Winnipeg, 450 meters, sometimes absolutely without interference, sometimes with a faint undertone from the other.

At present am using 100-foot aerial, the entire south half of which runs 8 inches above the roof of the building, and the northeast half runs from that point up to a six-foot chimney. Am using radiator on third floor of apartment building for ground. Considering the difference in tubes, I find this set compares favorably with most of the home-made Neutrodynes I have seen.

I might also mention that during the International Tests I got two English stations, while my mother got Brussels and some French station on headphones on the first two tubes. How is this for distance?

Of course this little set has its limitations and faults just as all others have, but on the whole I consider it fairly efficient.

R. K. WHEELER,
c/o Baur Carbonic Co.,
Standard Ave. at Division St.
Indianapolis, Ind.

[Herbert E. Hayden described the detector circuit only, to which two audio stages may be added for speaker operation, as R. K. Wheeler did.—Editor.]

* * *

RESULTS EDITOR:

I am a reader of your valuable magazine and take great pleasure in trying out the various circuits that appear. I have just completed the 1,500 mile 2-tube circuit by Herman Bernard, published in your July 26 issue. I constructed my own low-loss coils and am using R.C.A. low-loss variable condensers. Also I added two stages of audio-frequency amplification. Now, if I told you what results I am getting and you published this letter the radiophans would say, "He's a D.X. Nut." So I am only going to say I get 1,000 miles on the loud speaker almost any night and locals come in with too much volume. Here's to Herman Bernard!—J. B. Dagenhardt, 505 E. 9th Street, Chester, Pa.

Steve Says

"Here's My Idea of a Regular University Department."

THE MAN in the store said my set could get averything from Zion City to eczema, but all I get is a whistle. What stations?—Orville Boobe.

You were listening to the Katz Canary Bird Co. station KUKU.

DOES it make much difference to which battery I attach the funny thick wires?—Joe Sapp,

Not much, only about $4 per tube.

WHERE does the grid return?—I. Wanner Noe.

Write to the Reparations Committee. Maybe it goes back to Germany.

I BUILT the 4-wheel-brake clutchoflex as shown in your issue of Sept. 33 and can only get about ninety-five stations.—Wotta Hogg.

You are certainly getting poor results with your clutchoflex. Try a two-slide crystal set and advise how it works out.

MY HUSBAND won't leave his old 1-tube set, located in the parlor, to take dinner.—Mrs. Meals.

Just tap the family budget for a 12-tube super and place it in the dining room.

IN REGARD to my neutrosimp which I am building from plans I got from the Radio Blaah, will you advise if a rheostat will do instead of the 11-plate variometer in the intermediate circuit, or should I use a vernier binding post?—I. Lee Teknikal.

STEVE POWERS.

The Carpentry and Plumbing Side of Set-Making

By Ralph C. Powell, Jr.

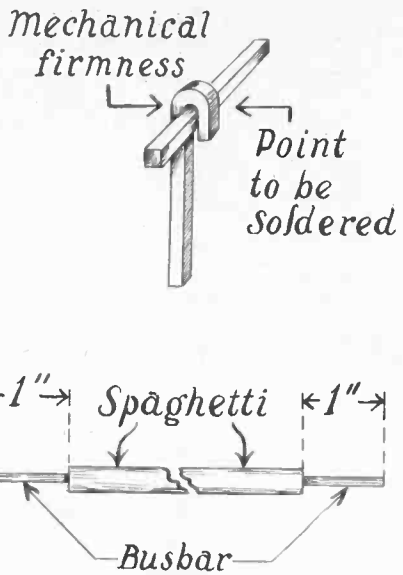
Assistant Engineer, Station WGBS

A COMPLETE plan is necessary before starting to build a set. The dimensions of the instruments to be mounted on the panel must be taken and a drawing made on heavy paper upon which is marked every screw hole or shaft hole. When this has been done the dials and binding posts should be drawn with a compass so that the effect of the arrangement may be noted. If this is not done it may be found that dials are touching binding posts or the jacks do not clear the baseboard. If panel-mounting sockets are to be used it should be ascertained beforehand whether the rheostats are small enough to fit in front of them. Make sure that the condenser plates will not make contact with other parts of the receiver.

When the panel layout is complete make a list of all the instruments and check over their positions to see that none have been omitted. If provision has been made for all of them the paper template may be glued to the panel. Care should be taken to lay the panel on a flat surface when punching and the holes marked off with a center punch or other sharp pointed tool. The holes should be made deep enough so that the drill will not slip when the hole is being started. It is a good plan to drill every hole in the panel with a smaller sized drill so that the larger one will start in the proper place.

Mark Positions of Parts

The instruments may now be mounted on the panel and made fast, but before any connections are made a diagram of the entire circuit should be made on a large sheet of paper showing all the instrument in the position they are mounted in this particular set. Start with the battery leads and mark off each point to which they are to be connected. Suppose a Neutrodyne is being wired. The positive 90-volt lead will run from binding post to second stage jack to first stage jack to by-pass condenser to third Neutroformer to second Neutroformer. The negative filament lead runs from binding post to amplifier rheostat and from rheostat to the posts marked F— on the first,



HOW TO USE SPAGHETTI

The Use of Tools

lead is brought from the point where the negative filament connects to the rheostat to the post marked F— on the detector socket. When all leads have been marked off in this manner it will be found that one piece of wire may be used for several connections, thus simplifying the procedure and reducing the number of soldered joints. So no connections be forgotten it is best to number them and connect in order. This may seem like a great deal of unnecessary work but it really saves time and makes for efficiency.

In order to do neat work it is necessary to have the proper tools. Get the following:

One very small screw driver for adjusting set screws on rheostats and dials.

One long narrow screw driver for tightening screws where the space is too small for the hand.

A pair of long-nose pliers for bending and cutting bus wire and spaghetti.

A set of spintite wrenches for tightening small nuts on sockets and rheostats.

A hand drill and drills sizes 6/32", ¼", 3/8" and ½". Other drills may be used but these are essential.

One countersink for drilling the panel where flat-head screws are to be used.

A pair of shears.

It is desirable to use an electric soldering iron. The iron should be allowed to heat to the proper temperature. Then file the end of the iron until all traces of corrosion are gone. Then dip the iron in the paste and apply solder to the end while the paste is running. Rub off with a piece of dry cloth and if the surface of the iron is not evenly covered with a film of solder, file again to remove the rough spots and repeat.

When the entire end surface of the iron is tinned it is ready for use. It will be found that between times when the iron is not in use the surface will become dull. This is caused by oxidization and the film may be removed by rubbing lightly with cloth. A well-coated iron melts solder instantly upon touching it and makes the solder run quickly to all parts of the joint without burning the spaghetti or insulation on the parts themselves.

It is good practice whatever kind of paste is used to wip the joint with a rag dampened with alcohol to remove all traces of flux.

When making joints it is best to form a small hook in the end of the wire and pinch it tightly against the wire to which it is to be connected. This insures a good mechanical joint and will hold the wires in place while the solder is hardening. It is very necessary that the wires be kept from moving while the solder is molten, since a slight movement will cause the solder to crystallize and raise the resistance of the joint considerably. It is just as necessary to heat the parts to be soldered as to heat the solder itself, for if this is not done the solder will not adhere tightly to the parts but rather form in a lump resting on the joint, doing no good at all. Always use as little solder as possible, depending upon the screws or hooks in the wire for the joint's mechanical strength. Solder is not a strong metal.

When spaghetti is to be used the connection should be measured with the spaghetti alone, all proper bends being made. A length of bus wire is then slipped into the tubing and cut so that there is an inch to spare at both ends. Then, without connecting the wire at any point, bend to the proper shape.

"THE INSIDE STORY OF THE TUBE," by Abner J. Gelula. What happens on a tube. What tubes to use for different circuits. Send 15 cents for copy of November 29 issue to RADIO WORLD.

BRAINARD FOOTE, noted radio authority, describes his favorite receiver in Radio World, issue of Oct. 18. One stage of impedance RF, one transformer RF stage, crystal detector and two audio stages. Four tubes. Great quality set. Send 15 cents for copy of issue or start subscription with that number. Radio World, 1493 Broadway, N. Y.

WIRELESS IN THE HOME. By DeForest. Sent postpaid on receipt of 15c. The Columbia Print, 1493 Broadway, N. Y. C.

INDEX TO VOL. 5, RADIO WORLD

A complete index covering all the articles that appeared in Radio World from Jan. 5 to Sept. 20, appeared in Radio World dated Oct. 18, mailed on receipt of 15c., or start subscription with that number. RADIO WORLD, 1493 Broadway, New York City.

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