

A GOOD DX SPECIAL CIRCUIT—(In This Issue)

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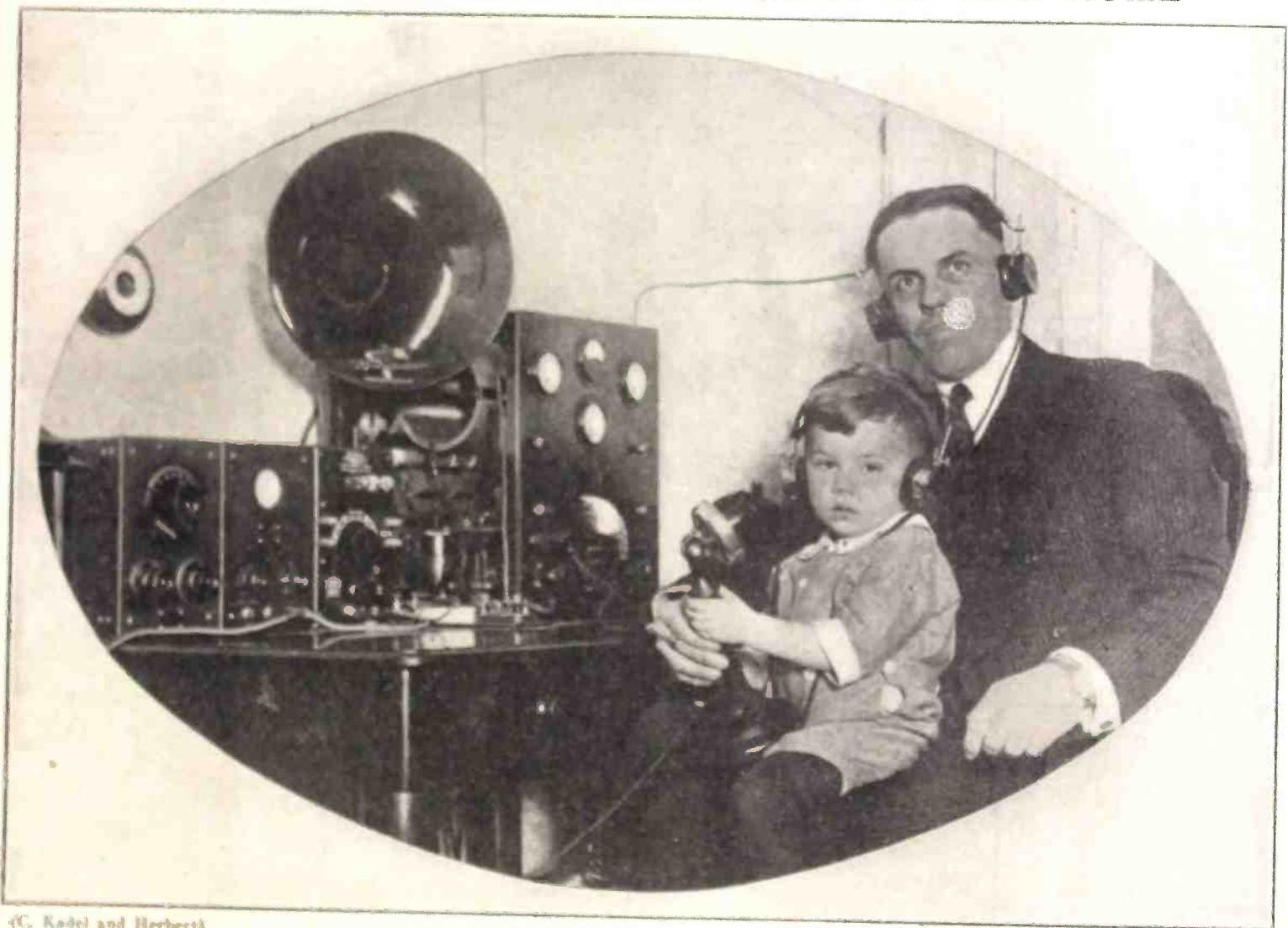
RADIO WORLD

Title Reg. U. S. Pat. Off.

ILLUSTRATED

EVERY WEEK

ENJOYING NATIONAL RADIO WEEK IN THE HOME



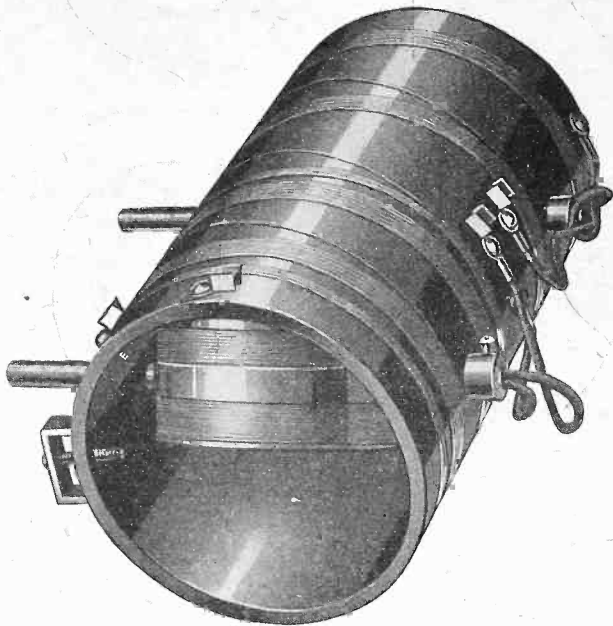
(C. Kadel and Herbert)

With every station in the country putting its best foot forward during National Radio Week, and giving programs that are far and away the best ever heard, this picture is typical of the scene in thousands of homes where radio has taken its place. Incidentally, the illustration shows a boy hearing his grandfather telling bedtime stories over the radio. Little Bobby Johnston and his father, Don H. Johnston, a Cleveland fan, listening to Dr. William T. Johnston, of Collins, Ohio, giving the fans their nightly bedtime story. Three generations united by radio—grandfather, father and son.

LIST OF BROADCASTERS AND PROGRAMS

YOUR LAST CHANCE TO BUY A
REGENEDYNE SET

THE GREATEST RECEIVING SET THE WORLD HAS
 KNOWN—2725 MILES ON ONE TUBE



If you want a set that will cut through local stations and bring in real distance on your loud speaker at all times at the exact same dial settings, then what you want is a super Regenedyne receiver, and this is your last chance to get it. Yes, sir; just think of having all your local stations banging away, and at your wish, just turn the dial and get the sensation of hearing stations 2,000 miles away. For example turn

Dial One	Dial Two	
12	28	and hear WOR
46	21	" " KDKA
61	80	" " WCX
45	74	" " KSD

Prices are for sets knocked down complete, with genuine tubes, dry batteries, drilled panel, sockets, transformers, full directions, etc.:

Blue print alone.....	\$2.00
Dial Coil alone.....	5.25
Complete One Tube Set, 2,000 Miles Guaranteed.....	19.00
With cabinet, extra quality.....	21.00
Complete Two Tube Set, Works Loud Speaker.....	29.00
With Cabinet, extra quality.....	32.00
Complete Three Tube Set, Works Loud Speaker.....	40.00
With Cabinet.....	44.00
Special Loud Speaker Phones.....	5.25
Special Super Regenedyne, The Rolls Royce of Radio. Complete with 7x24 cabinet, 4 inch dials, relizing condensers, Tubes, Batteries.....	75.00

(Publishers are warned not to publish this circuit)

Storage "A" Batteries	Light Plates	Heavy Plates
6 Volt 80 Amp. Battery.....	\$9.75	\$11.00
6 Volt 90 Amp. Battery.....	11.00	13.50
6 Volt 120 Amp. Battery.....	13.75	16.50
6 Volt 160 Amp. Battery.....		22.50

6 Volt Tubes are furnished with sets when storage battery is purchased or at request.

BIG CATALOG FOR THE ASKING. DEALERS INVITED.

Sidbenel RADIO EQUIPMENT MANUFACTURING CO.
 Dept. L4, 25 West Mt. Eden Avenue New York City

OUT NEXT WEEK!

RADIO WORLD'S
Holiday Gifts Number

DATED DECEMBER 1st

Last Advertising Form Closes November 22nd

A GREAT advertising issue especially designed to help to make both the radio and the non-radio public purchase radio goods for holiday gifts.

Radio World's HOLIDAY GIFTS NUMBER will have a list of distinguished con-

tributors and will be larger and better than ever, and will have an especially large sale, as there will be no increase in the price per copy.

Extra circulation—no advance in advertising rates. Prices for cover and other special position quoted on request.

RADIO WORLD

1493 BROADWAY,

NEW YORK CITY

Phones: Lackawanna 2063
 " 6976

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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November 24, 1923

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A Sensitive and Selective DX Special

By Walt. S. Thompson, Jr., E. E.

NOW that winter is fast approaching the DX hound will begin to burn the midnight lamp in an attempt to pick up that station on the other side of the continent. The set herein described was designed to meet the requirements of such a fan.

The requirements which are most desirable in a set which would deserve the name "DX Special" are sensitivity and selectivity. These two features go hand in hand because no receiver, sensitive as it may be, will pick up distant stations unless interference from all other stations can be tuned out.

By referring to Fig. 1, the reader can see that sensitivity has been incorporated by using one stage of tuned radio-frequency amplification in conjunction with regeneration. Such a combination has been made possible by neutralizing the internal capacities of the radio-frequency amplifying tube. This neutralization eliminates trouble caused by the tendency of this tube to oscillate and prevents the set from radiating energy when the detector tube oscillates.

Selectivity may be acquired by several different methods, three of which have been made use of in this set. These three methods are: (1) by using the tuned plate circuit type of regeneration; (2) by using loose couplings between circuits, and (3) by tuning the grid circuit of both tubes. Again referring to Fig. 1 it is evident that the grid circuit of the first tube is inductively coupled to the antenna circuit and that the grid circuit of the detector tube is coupled in the same way to the plate circuit of the first tube. By making these couplings loose a great deal of interference can be eliminated. The tuning of the grid circuits adds materially to the selectivity because each tuned circuit acts as a wave trap and hence decreases the intensity of signals from interfering stations.

The tuner used has been described in RADIO WORLD for October 27, 1923, so it will not be discussed here.

The radio-frequency transformer is of special design and can be easily made by any fan who has any mechanical ability. The transformer is shown in Fig. 2, each part being numbered to correspond to the numbers used in the following list of materials necessary for its

construction: 1, variometer; 2, bakelite tube 3" dia. x 2"; 3, two brass braces; 4, 40' of No. 24 D. S. C. wire; 5, two brass machine bolts and brass wood screws.

The first step in the construction of this transformer is to prepare the bakelite tube by drilling two 3/16" holes, 1/4" from one end and exactly opposite each other. After this has been done the primary and neutralizing coils should be wound on the tube. Starting about one-half inch from the end which has been drilled, 40 turns of No. 24 double silk covered wire should be placed on the tube, taking a tap off at the twentieth turn and leaving a tap loop at either end. The 20 turns nearest the variometer are the primary coil and the other 20 turns are the neutralizing coil.

The brass braces are made from 1/16" brass stripping 1/2" wide. Each brace before bending should be 1" long and should have two 3/16" holes drilled 1/4" from either end. After the holes have been drilled each strip should be bent at the center to make a 90° angle as shown by Fig. 2.

The attaching of the tube to the variometer completes the assembly. Two brass wood screws and two brass machine bolts are necessary for this final step.

After the tuning unit and transformer have been made, the set itself can be assembled and wired. The following list of apparatus which is necessary has been lettered to correspond to the lettering on Fig. 1: A, tuning unit; B, radio-frequency transformer; C, audio-frequency transformer (1 to 5 turn ratio); D, Amsco compensating condenser; E, by-pass condenser (0.002 mfd.); F, two rheostats (50 ohms); G, one vernier rheostat (6 ohms); H, three sockets; I, two hard tubes (UV-201A); J, one soft tube (UV-200); K, grid condenser and grid leak; L, variometer; M, composition panel; N, three 4" dials; O, four-point switch; P, cabinet, connecting wire, binding posts, etc.

Body capacity effects may be greatly lessened by placing shields between the panel and all tuning apparatus. In wiring the set there are several precautions which should be observed. Make the grid and plate circuit wires as short as possible and keep them away from all other wires. A good plan is to bunch all

(Concluded on next page)

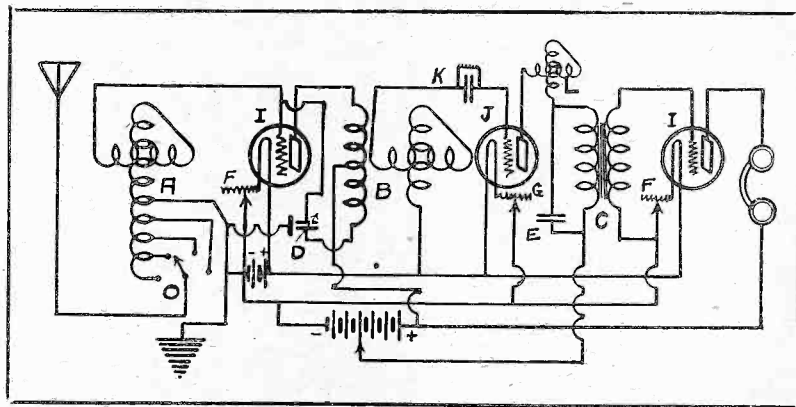


Fig. 1. Circuit diagram of a three-tube receiver embodying tuned radio-frequency and regeneration, Special tuners and radio-frequency transformers are used. D is the special compensating condenser described in RADIO WORLD for October 27, 1923.

the other wires together, in which case, insulated wire should, of course, be used.

Referring to Fig. 2, tap (a) goes to the plate of the first tube, tap (b) to the B battery and tap (c) to the compensating condenser. These connections are very important and should be carefully checked.

In order to prevent inductive coupling between the tuning unit and the radio-frequency transformer, there should be a grounded metal shield placed between them.

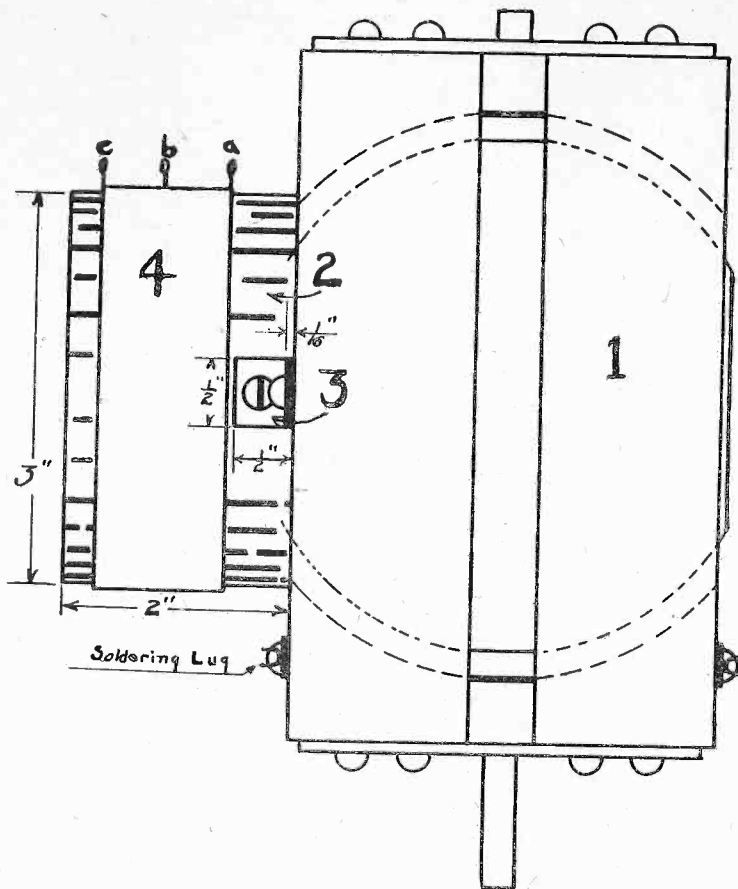


Fig. 2. Special radio-frequency transformer allowing tuning of the radio-frequency circuit. Any good make of variometer may be used in the construction of this part of the receiver.

This shield should extend from the panel to the back of the cabinet and from the bottom to the cover of the cabinet; hence it will be necessary to drill holes in the shield through which to pass the necessary connecting wires.

The plate battery should be tapped between $16\frac{1}{2}$ volts and $22\frac{1}{2}$ volts for the soft detector tube. The voltage used on the amplifier tubes can be from 40 up to 90 volts, although C batteries will be necessary for the higher voltages. The values for the grid condenser and grid leak will depend upon the particular tube used, although a condenser with a capacitance of 0.00025 mfd. and a grid leak with a resistance of two megohms will be found satisfactory with most UV-200 tubes.

The tuning of this circuit is very simple after the compensating condenser D has been correctly adjusted. This may be done by tuning in some local station by adjusting the settings of the three variometers. Just as soon as some signal is heard, the filament of the first tube should be turned out and then the condenser D slowly rotated until the signal fades out completely. By turning the filament on again the final setting of the tuning controls can be made. The tuner dial should be first set to give maximum signal strength and then the transformer dial and the variometer (L) dial can be adjusted as if the set were a standard regenerative receiver. The adjustments of these two dials depend upon each other, but are not affected by the setting of the tuner dial.

If the interference from other stations cannot be eliminated with the tuning dials, the tap switch O may be used to decrease the degree of coupling between the grid circuit of the first tube and the antenna circuit. The fewer turns in the antenna circuit, the more selective will be the set. This tap switch is also very useful in eliminating static.

The writer recommends that this, as well as all other circuits, should be connected and tried out before mounting on a panel, as the builder can then find out just what wires should be kept separated and can make whatever changes his fancy dictates. This rule cannot be too strongly emphasized.

New World Uniting on Communications

By Washington R. Service

WASHINGTON, D. C.—The Pan Americas are planning to take a prominent place in world communications in the near future. The government of the United States has led in organizing an Inter-American Communications Commission, and is now urging the adoption of a continental policy on all matters of electrical communication, including radio telegraph and telephone operation.

The next session of the Inter-American body, created at the Fifth Pan-American Conference, will probably be held in Mexico City, next spring.

Meanwhile, Secretary of State Hughes' Inter-Departmental Communication Committee is preparing data and agenda on governmental communication policies, in anticipation of calling in commercial interests at an early date for conference on the commercial phases of the question. At an early session of the governmental committee, on which representatives of the State, War, Navy, Commerce and other departments are represented, Chairman Leland Harrison of the State Department is expected to appoint sub-committees to thresh out the details of the several forms of communication. As soon as the sub-committees report back, it is understood that the committee as a whole will

draw up a definite governmental policy, subject to suggestions from American cable, telegraph, telephone and radio organizations. With the approval of commercial interests, including wire and apparatus manufacturers, and perhaps radio amateurs, whose scope is becoming worldwide and may require international attention, it is said, the United States agenda will be used as the basis of a Pan-American communications tract to be presented at the sessions of the Inter-American Communication Committee when it meets.

Once a policy for the Americas is adopted, representatives of these republics will go overseas next fall to the next International Communications conference in Paris with a united front. Led by the United States delegation, it is believed, they will get practically anything they want or insist upon in the way of communication rights in the air, over the land or under the water.

It is known pretty definitely that the United States Government will take a strong and determined stand on her rights in international communications and also in the interests of all the Americas, which countries it is believed will back her lead as communication champion for the New World.

A Pure Tone Receiver

By C. White, Consulting Engineer

A POORLY constructed radio set using an equally poor circuit not only disturbs your nearby radio friends, but helps to disgust you with radio in general. When radio broadcast reception first became popular there were many fans who were accustomed to blame noisy, scratchy and distorted reception to atmospheric conditions and static. The development of better circuits with better electrical construction in assembling plainly showed these fans that static was not the only noise producer. Now we are trying to perfect quality, eliminate noise and produce reception that is almost as good as the original. The crystal detector which many radio fans discarded in disgust is once more returning to favor, because of its pure, noiseless rectifying qualities. It is certainly true that music received through the aid of a crystal detector is exceedingly pure and undistorted. It breathes depth and lacks artificial contamination by extraneous noises. The only drawback to the universal use of the crystal detector is its lack of sensitivity as compared with a vacuum tube detector, but the advent of radio-frequency amplification has made it possible to step up the sensitivity of the crystal by amplifying the original radio-frequency waves.

Then again, many who were inclined to overlook the lack of sensitivity of the crystal form of rectification objected to the great care needed in adjusting or finding the sensitive spot on the surface of the crystal. Now there are not only good fixed crystals, but there are cleverly designed cups for holding an ordinary piece of crystal and allowing easy control of the contact point.

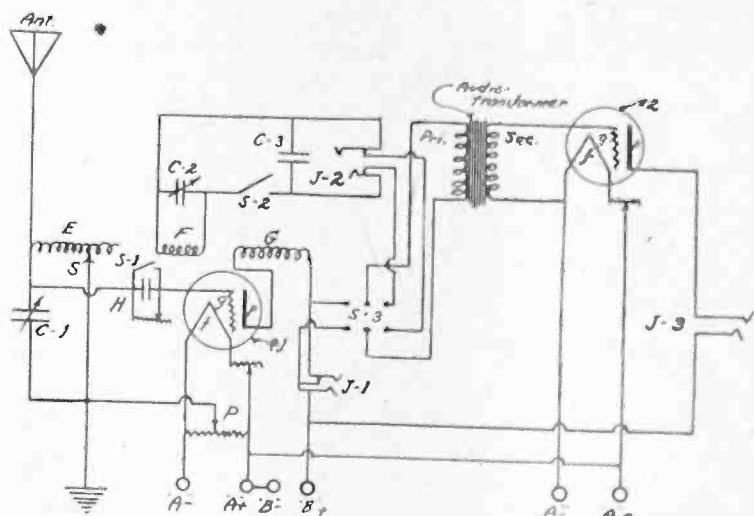
Versatility is very seldom if ever found in a radio receiver. A receiver, for instance, is designed to operate for one circuit arrangement only, and if another circuit is to be used all the connections must be changed. This receiver is so assembled that it can be operated as a straight crystal receiver using no tubes at all, or as a regenerative tuner, or as a radio-frequency amplifier with crystal detector and one stage of audio-frequency amplification. The latter combination is the most efficient.

The crystal detector alone can be used when individual reception on local stations is desired or when for some reason or other it is not feasible to operate the tubes. The regenerative tuner can be used with or without amplification (audio-frequency), and the same applies to the crystal detector combination. For example, to use only the regenerative tuner: Open the switch S-1 and also the switch S-2, then move the switcharm S to the end tap next to the coil F, thereby increasing the coupling between E and F. If no audio-frequency amplification is desired the phone plug can be inserted in J-1 and the receiver is a good regenerative tuner; tuning being accomplished by E and C-1 and regenerative feed back action by the condenser C-2. Audio-frequency amplification can be readily obtained by inserting a dummy plug in the jack J-1, throwing the double-pole double-throw switch S-3 to the left, and inserting the real phone plug in jack J-3.

It is just as simple to change the circuit to that of a crystal detector alone using no tubes at all. This is accomplished by leaving S on the last tap of E, placing C-1 at zero capacity (that is, no plates in mesh), closing S-2, and inserting phone plug in J-2. Tuning is done with the condenser C-2, but under conditions where interference is exceptionally strong C-1 can be

effectively brought into action. Of course, tube No. 1 should not be lighted if the crystal detector is to be used alone. If it is desired to add one stage of audio-frequency amplification the switch S-3 can be thrown to the right and the phone plug inserted in J-3. To use the receiver with tube No. 1 acting as a radio-frequency amplifier, the crystal as the detector, and No. 2 as the audio-frequency amplifier make the following changes: Place S on one of the inner coil taps to E, close S-1 and S-2, see that S-3 is thrown to the right and place the phone plug in J-3.

The specifications for this circuit are as follows: The coils E, F and G are wound on the same tubing



A receiver which allows the maximum range of flexibility with a remarkable degree of selectivity and no distortion. It is really three sets in one.

with No. 22 magnet wire. The coil E has 50 turns in all with taps for S at the 20th, 30th, 40th, and 50th turns. The coils F and G have 40 turns apiece. The coils F and G are placed next to each other, while there is a 1-inch space between the 50th turn of E and the first turn of F. Calculating on 20 turns of No. 22 wire per inch length of tube, a 9-inch length of 4-inch diameter bakelite tubing will be required. The condensers C-1 and C-2 are each 17-plate air variables. C-3 is a .002 mfd. mica bypass condenser. The unit H is a reliable grid leak and grid leak condenser. The potentiometer P has a resistance of 300 ohms or more. The jack J-1 is a closed circuit jack, J-2 is a double-circuit jack, and J-3 is an open-circuit jack. This receiver is primarily intended for use with UV199 tubes using a separate "A" battery for each tube, but UV201As or similar type tubes can be employed with one common storage "A" battery.

Although this receiver affords exceedingly clear, loud and pure tones when used in the most efficient circuit arrangement, which is using the two tubes as amplifiers and the crystal as a detector, still it allows ample room for quick experimentation and also emergency operation without tubes. Of course, if it is undesirable for any reason to install the switching controls, the outfit can be wired up omitting them by making the connections to conform to the efficient combination. This receiver is ideal for a short aerial and it exhibits a very remarkable degree of selectivity for a single circuit tuner. In addition, to all its theoretical and operating advantages the circuit, or rather the outfit, is very inexpensive.

Features of National Radio Week

Nation-wide Push for Radio and Broadcasting

NATIONAL Radio Week will sweep the country like fire from November 25 to December 1. Dealers, radio stores, broadcasting stations, amateurs, listeners, public associations, in fact everybody that has given a thought to it is helping to make it one grand success.

Started in 1922, by Roland Burke Hennessy, Editor of RADIO WORLD, it has taken the entire country by storm. Even in England they have acknowledged National Radio Week, as a communication from the British Broadcasting Corporation states that they intend to celebrate it with special programs in a fitting way.

Daily newspapers, some of which do not even carry a single radio line in the regular news, are putting on extra sections during the week of November 25 to December 1. Papers that carry regular radio sections are enlarging them. Stores are bringing out extra displays and holding big sales to introduce radio. Broadcasting stations are putting every last iota of energy into making their programs for this week the best that can possibly be. Manufacturers are getting ready for the big increase in business that will come from this boost of radio by pushing their output to the utmost, concentrating every effort to make this a real National Radio Week.

Among some of the big newspapers in the country that are pushing radio through their pages are the following: The New York Globe, E. L. Bragdon, radio editor; The New York World, Capt. R. S. Wood, radio editor; The New York Mail, Stuart Rogers, radio editor; The Rochester Herald, H. J. Thompson, associate editor; Camden Daily Courier, F. J. Kinsella; The Brooklyn Times; The Newark Call; The Brooklyn Standard Union, V. C. Poe, radio editor; The Fostoria Daily Review, F. M. Hopkins, radio editor; The Christian Science Monitor, K. McCandless, radio editor; The News Leader, Richmond, Virginia, Earl Sowers, editor; The Bridgeport Herald, A. S. O'Brien, editor; The Buffalo Evening News, G. J. Reiger, radio editor; The Atlanta Journal, J. S. Cohen, editor; The Bridgeport Times, W. J. Guest, radio editor. These of course are only a few—hundreds of others are aiding in the event. Every day, every hour, reports are pouring in from editors of papers, small and large, that they will do all in their power to aid this National Radio Week to be the biggest, best, and most well-worked-out radio week in the history of the industry.

The broadcasters have had a program laid before them by the Executive Committee for National Radio Week and have promised to follow it as near as it is humanly possible, and to improve upon it if they can. The programs that will

be followed out by the stations throughout the country are as follows: SUNDAY, November 25, Radio and the Church. Sermons on how radio has helped to connect the people with the church, and the benefits derived therefrom. MONDAY, November 26, Stage Day. On this day the stage and radio will be linked as close as possible. Plays will be broadcast, noted actors and people of the stage will give talks. TUESDAY, November 27, Government Day. Children's afternoon. On this day the officials of the government, city, state and national, will be urged to give talks pertaining to the civic, state or national government. In the afternoon and early evening, special programs of interest to the little folks will be broadcast. WEDNESDAY, November 28, Music Day, National DX Contest Day. On this day all efforts will be toward giving the listeners the best music possible, both popular and classical. The amateurs of England, America and Canada will attempt for the first time in history to "get across" two way transmission, sending from America and Canada and England. Listeners will try to get the most distant transmitting stations. All extraneous amateur transmission will be stopped. THURSDAY, November 29, Thanksgiving Day. Sports Day. On this day special Thanksgiving programs will be broadcast. All the big football games in the country will be broadcast. Special programs for the evening with special attention to the little folks. FRIDAY, November 30, Education Day. Noted educators will talk. Colleges and institutes having radio transmitters will put on special programs. City and state commissioners of educational boards will broadcast. SATURDAY, December 1. The Radio Party Night. Radio and Pleasure. Fans are asked to have friends who do not own radio sets over to their "shack" and put on parties, either impromptu or formal. Special features will be broadcast which will lend themselves admirably to parties. Comedians and orchestras will broadcast.

The executive committee of National Radio Week are the following: Powel Crosley, Jr., Crosley Mfg. Co.; Roland Burke Hennessy, editor RADIO WORLD; Theodore R. Gerken, Marshal-Gerken Co.; F. Clifford Estey, National Chelsea Radio Corp.; Major J. Andrew White; Pierre Boucheron, Radio Corporation of America, Chairman of the Publicity Committee; Paul G. Weil, Frank Kiernan Agency, head of the Advertising Committee; Robert F. Stayman, Chairman of the Editors Committee.

With the best of programs, the best of apparatus displayed, the stores keeping open until late at night, National Radio Week will prove the United States—the entire works—that radio is the biggest thing on earth today. Help make it big—make new fans, listen, don't send!

How It Happens

LISTENERS often wonder why it is that sometimes their sets will tune so nice and sharp and at other times so broad that it is impossible to differentiate between two stations as much as 10 to 12 degrees apart on their dials. There is one good reason for it, if you stop to observe and reason. For the most part you will notice that the broadest tuning happens on a misty or rainy night. The insulators of the transmitting and receiving stations become covered with moisture, increasing the normal length of the antenna on the transmitting station and disturbing the finely adjusted sets, reducing the frequency by increasing the useful length of wire in the circuit. The same thing also happens at the transmitting station. At the

receiving station, it will be found that it is a more difficult job to make the set regenerate steadily. It will go up to the "peak," and then for no reason at all apparently "slop over." This is caused by leakage from the insulators. This is the one main reason for broad tuning and lack of selectivity on receivers in districts where two or more transmitters are located in that district on differing wave lengths. Take note of it the next foggy, rainy night. See how hard it is to make the set regenerate properly, note the extreme broadness of all stations, even those at distant points. When insulators are designed that will not hold or absorb moisture, the tuning will be the same on rainy days as on dry cold days.

Ship Stations Wreck Many Broadcast Programs

HARTFORD, Conn. — Relief from interfering radio mediums, whether broadcast stations operating on almost the same wave lengths, howls from neighborhood receivers, or code telegraph slipping over into the broadcast band, is being sought not only by the individual fans having to deal with this interference, but also by such notably influential organizations as the National Association of Broadcasters and the American Radio Relay League.

One of the first to recognize the necessity for unified regulation of radio traffic, the A. R. R. L. advocated "quiet hours" voluntarily for amateurs during the evening broadcast period and has since assisted the Department of Commerce in carrying out regulations providing for more harmonious air conditions.

In view of this timely assistance in behalf of the broadcast listener whose cause is being championed by the National Association of Broadcasters, Paul B. Klugh, its executive chairman, has written the league headquarters at Hartford, Conn., as follows:

"The wholesome co-operation which the amateurs comprising your league have given, in giving radiophone broadcasting the right of way for a specified limited period and doing so voluntarily, has gone far toward causing the radiophone listener to respect the amateurs."

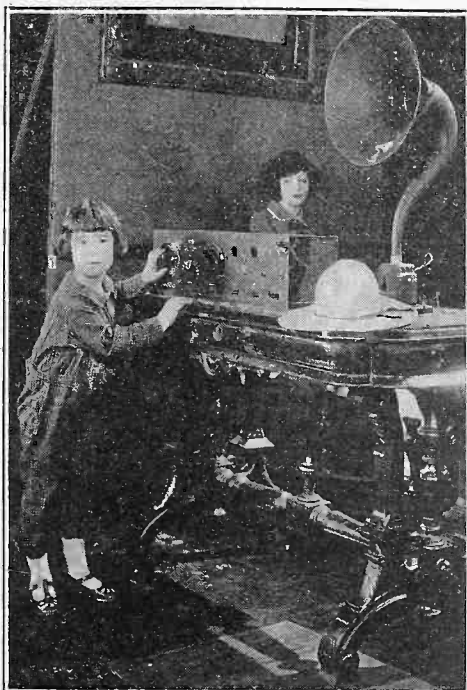
This fact is upheld by many listeners who have mastered the code or who have had pointed out to them by radio telegraph operators that the majority of interference at the present time is being caused by ship stations transmitting on the broadcast wave lengths. One of them cites from his personal experience in Shreveport, La.:

"I have never heard an amateur signal come in on my radiophone

concerts; but I can hear, every night, all sorts of ship stations breaking right in on 300 to 360, 400, 411, 420, 425, 430, 450 and 512 meters. In fact, it was almost impossible to hear Mr. Lloyd George from KDKA, because certain ship stations were constantly calling or working WSA and WCY."

Baby Peggy Tunes In

THE capable little "skipper" of this radio equipment is no less a person than Baby Peggy, Mary Pickford's only rival on the screen. This is decidedly a picture *not* to be shown to your own



Baby Peggy, the child actress, amusing herself between scenes in the studio, by tuning in on a broadcast program.

young hopefuls around Christmas time or near a birthday, unless you are prepared to arrive home with an outfit just as good as this under your arm.

When you come to think of it, though, it is a mighty significant thing, that the kiddies of Baby Peggy's age are no longer satisfied with Noah's Arks or rocking horses.

Radio Jumps Mountain

RADIO is being used successfully in India to send messages over a mountain 15,000 feet in height. Previously considerable difficulty was found in wire communication due to heavy snowdrifts and storms which severed the lines. This achievement has been effected between the cities of Srinagar and Jammu, in Kashmir. Other installations have been effected or are planned in Bhopal, Gwalior, Hyderabad and Rejkot, by Marconi engineers, Trade Commissioner Spofford reports to the United States Government from Calcutta.

Radio Amateurs Prepare for Storm Emergencies

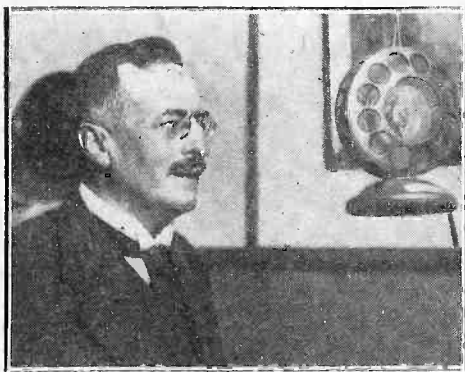
LA JUNTA, Colo.—If the wires go down this winter in the blizzard swept states of Colorado, Kansas and Idaho along the traffic route of the Santa Fe Railroad, which has its headquarters in this city, radio amateurs are prepared to piece together the tangled web of communication and keep trains moving on schedule.

In view of the terrific storms which have in the past disorganized railroad traffic in Colorado and vicinity, this special emergency plan by which radio will be used to dispatch trains has been worked out by representatives of the Santa Fe and Norman R. Hood, manager of the Rocky Mountain Division.

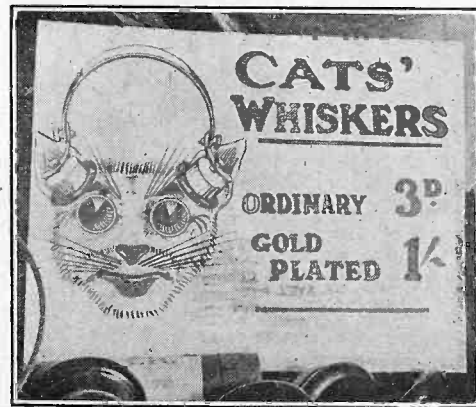
This is the first step taken by the league in connection with its co-operation with the American Railway Association, a committee of which is now being selected to work out a national program for radio relief in railroad emergencies. Details of the tentative arrangement for the immediate protection of the Santa Fe have been worked out by M. O. Davis, district superintendent of the A. R. R. L. and traveling air brake engineer for this western railroad system.

He has drilled a number of amateurs in relay work until he now has six good stations along his route in daylight range of each other with the possible exception of the extreme western section of the state. The Denver-Billings route is complete.

"When amateurs in Utah have linked up with the route," he says, "we will have the Santa Fe covered from Kansas to the Idaho border, across the division and the C. & S. and C. B. & Q. from Denver to Billings, Mont. The next time a storm tears things to pieces, we are pretty sure that we can meet the emergency.



Doctor Sven Hedin, world-famous Swedish explorer and writer, had his first experience at broadcasting when he talked from the studio of station KHJ, Los Angeles. He thrilled the radio listeners with a very interesting description of his hazardous exploits in the Thibetan Desert. He is shown before the microphone in the studio of KHJ.



(C. Gilliams Service)

Quite a furore was created in dear old London town recently by a dear old lady spotting the sign shown and reporting the owner of the shop to the Cruelty to Animals Prevention Society. "It is terrible the way people are allowed to torture poor dumb beasts—it should be stopped." Hi! Hi!

Fourth Series Transatlantic Amateur Radio Tests Will Be Held Soon

HARTFORD, CONN.—The fourth series of transatlantic tests of the American Radio Relay League between December 22 and January 10 will be a receiving contest as far as American and Canadian amateurs are concerned. They will keep their transmitters silent during the entire period listening for signals from European operators.

Believing that their skill in transmitting has been tried and proven, amateurs on this continent are now going to show the European radio men the courtesy of allowing them to do the sending, while their own sets and ears are sharpened and tuned to catch the incoming signals.

During the first three transatlantic tests North American amateurs were determined to get their signals across the water. Transmission was the big thing and meant everything to them. Even last year when signals from the United States transmitters were hurled across the ocean by the hundred, there was only a mild interest in the receiving end. This was a great disappointment to the French and British hams.

With the conditions for the present tests changed and the motives practically reversed everything depends on the receiving, and the time previously used by each operator in getting his entire apparatus into trim, will now be given almost wholly to the improvement of the receiving circuit. This opens the way for the free-for-all two-way tests which immediately follow the last day of the transatlantics.

The program that has now been arranged by F. H. Schnell, traffic manager of the A. R. R. L., calls for transmission by the British amateur and French operators on alternate nights between 8 P. M. and 1 A. M. Eastern Standard Time, with the latter starting on December 22.

Another feature of the tests is the offer by prominent manufacturers of over \$3,500 worth of radio apparatus for prizes, including an \$1,100 transmitter.

In previous years this season found the American ham going over every detail of his transmitter, devising new ways of crowding stray watts into his set to increase his range. Now the same careful attention is being given to the receiver, while the CW sending set stands idle with the aloof dignity of accomplishment.

It is no novelty for the relaying amateur to rebuild his receiver and it is directly in line with the present movement calling for the installation of the superheterodyne, or another of the new types of receiving circuits that are fast gaining in popularity. This means as radical a change as it was for the amateur to revert from the old thunder spark set to the smooth-toned CW in transmission.

The complete failure of the first transatlantic amateur tests in February, 1921, only acted as an incentive for those that followed. Transoceanic amateur radio loomed up as a tremendous achievement. The next year the experiment was considered worthy of sending an American amateur, Paul Godley, to Ardrossan, Scotland, to listen.

There, in a fishing village some twenty miles to the west of Glasgow, Godley heard nearly 30 stations and one complete message. The job of getting across was finished to all purposes; it had been proved amateurs could reach over the broad Atlantic on low power.

The business of organizing the third transatlantics was by way of demonstrating that transoceanic amateur radio could become a common thing and was well within the realm of the practical. The signals went over to the tune of more than a score a day, and when the final total was made up, more than 300 stations had landed.

In the west bound tests a total of about twenty American amateurs heard European amateur signals, primarily from three stations, French 8AB, British 5WS and British 2FZ. American hams aim now to surpass all receiving records.

Radio on the Rifle Range

By Carl H. Butman

WASHINGTON, D. C.—Radio, or its half-brother, "wired wireless," will be used very soon on big national rifle ranges between the firing lines and the target pits as a substitute for line telephone systems.

Results of recent Signal Corps tests during the National Rifle Matches at Camp Perry, Ohio, have demonstrated that a wired-wireless system will cost only a third the money required to install and operate a regular telephone system. In addition, the new system would last several years longer than the present field telephone service, which usually requires replacement every three years.

On this range with 100 targets, 1100 men fire in three hours time, and about 75 men, one for each 10 targets, were required by the Signal Corps to maintain telephonic communication between the firing points and the butts where the targets and the markers are located. The initial cost of the complicated equipment is approximately \$35,000 and the annual upkeep, including personnel, amounts to about \$11,000. Usually, the whole range from 200 to 1000 yards, is being fired at the same time. The markers have to pull each target down, find the hit, if there is one, and mark it. This is done by pasting a paper sticker over

the bullet hole, hoisting the target and indicating with one of three large disk markers where and what the hit was. When the men fail to so mark a target, believed to have been hit, the range officer has to call up the proper pit on one of several phone lines and order the target re-examined.

The new system planned and laid out by Captain H. W. Webbe, of the Signal Corps, eliminates considerable time, work and complication. With a field radio transmitting set, five loud-speaker receivers and a little wire, he conducted a most satisfactory test for the National Rifle Association and the army at Camp Perry during the last days of the recent matches. When a target was not pulled down, he spoke into the transmitter on the firing-line, saying, for example, "Mark 21," or "Mark 67," which would be at least 200 feet from No. 21. All along the line of pits the five loud speakers announced his order, and No. 21 or No. 67 came down and was marked promptly. Those in the pits not concerned with the numbers called paid no attention.

The cost of a wired-wireless system to replace the almost worn-out equipment at Camp Perry is placed at \$12,000, and the maintenance with about 25 men is estimated at about \$4,000 for the period of the national rifle matches.

New Method of Sending Photographs by Radio

MARVIN FERREE, a Cleveland newspaper man, has just completed a series of rather strenuous experiments with a machine he invented for sending by radio photographs, fingerprints, signatures or facsimile copies of anything in that line. The device has proved a success as his numerous tests are reported to have shown.

The apparatus resembles in detail a hybrid radio receiver and transmitter. The resemblance stops, however, at that point. The idea embodied in the device is different from any so far perfected and does not rely

At the receiving end there is also a cylinder, with a special sensitized paper on it, the paper being treated with a special electro-chemical solution which darkens when electrical current is passed through it. As the cylinder revolves, the pen bearing on the paper makes light and dark lines which correspond exactly to the lines traced on the cut or engraving. This gives a reproduction which has vertical lines instead of horizontal, due to the pen bearing on the paper. All the shades, dark lines and other details are thus faithfully reproduced. It requires from three to five minutes to reproduce the material wanted, which is really fast work.

The instruments are small, readily portable, and can be used at any place where a source of current is obtainable. It is claimed that it will prove an immense benefit in newspaper work, as it will allow faithful reproduction of material over the air. Reproductions of fingerprints and signatures can also be made, proving of value to the police seeking identification of people. It will also be of value to banks which need instant identification of signatures on checks or drafts, when the signer is in a different part of the country, and therefore not available in person.

The range of this device so far has been determined as 900 to 1,100 miles. The accompanying photograph, showing the reproduced print and the original, was transmitted through the Ferree machine from a distance of 400 miles.

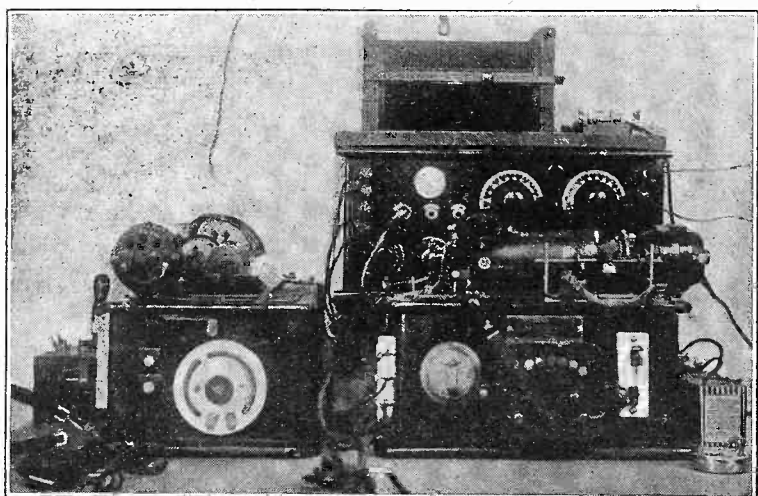


Fig. 1. Layout of the apparatus used for the sending of photographs by means of radio.

upon light rays for its work. Instead an electro-chemical process is used.

In detail, the device consists of a transmitting cylinder and a receiving cylinder, located on the transmitting and receiving machines, respectively. These two cylinders are synchronized and revolve at the same speeds. On the transmitting cylinder there is placed a one line zinc or copper engraved plate. The lines in this plate run from right to left only. This breaks the photograph up into insulating and conducting surfaces of varying thicknesses. The plate is placed on the revolving cylinder and a needle passes over it, making and breaking the circuit as the cylinder revolves. This current is transmitted in the regular manner.

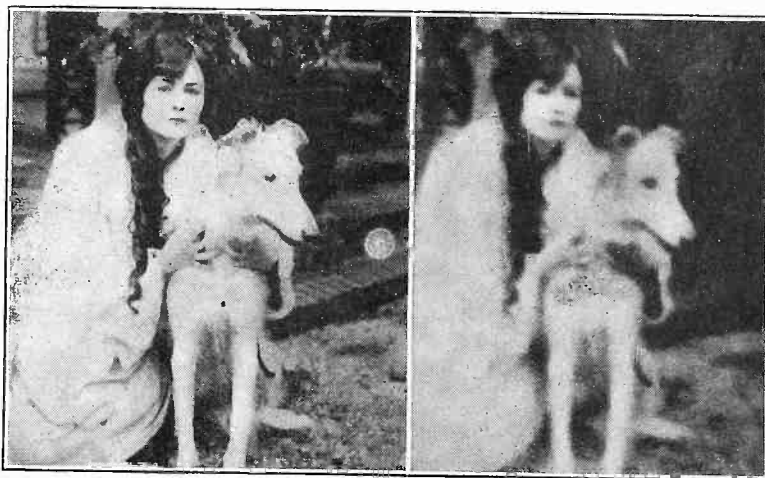


Fig. 2. The original (left) and the transmitted picture (right) sent at a distance of 400 miles.

New Broadcasters

FOUR new broadcasting stations of Class A were licensed by the Department of Commerce during the week ended November 10:

		m.	k/cs	watts
KFLU	Rio Grande Radio Supply House, San Benito, Tex.	236	1270	20
KFLV	Rev. A. T. Frykman, Rockford, Ill.	229	1310	10
KFLW	Missoula Electric Supply Co., Missoula, Mont.	234	1280	10
WWAF	Galvin Radio Supply Co., Camden, N. J.	236	1270	100
Transferred From Class C to Class A				
		m.	k/cs	watts
WHAM	Eastman School of Music of University of Rochester, Rochester, N. Y.	283	1060	100

Dissipators of Energy

IN the good old days the average "good operator" was the man who could operate the most switches, knobs, crystal detectors and inductances in the fastest possible manner. The average set resembled the switching station of a central office, with its multitudinous array of switches of all types, large coils, small coils, crystal detector, table mounted condensers, etc. However, wise engineers found out that a very large amount of the small energies was lost in the switches, long leads, and large coils and set about simplifying the matter. They lost some advantage in doing this—the wonderful display of copper and brass—but they gained efficiency. Therefore, bear in mind that the fewer switches you use, the shorter and more direct your leads are, and the simpler your controls, the more efficiently your set will function over any given period of frequencies (wave length is obsolete).

The Radio Primer

Shortcuts to Efficiency in Radio—When constructing a receiver try to bear the following things in mind: Keep your grid leads as short as possible. That is, keep the leads between the coupler and the grid leak condenser, and the grid of the socket as short as you can make them. If you make them real short, you will note a decided sharpness in tuning, and the set will not be inclined to be noisy when regenerating.

Use heavy sized wire in making your connections. Light or fine wire has great resistance, and the point to look after in the making of a receiver is the removing of all possible resistance. This is especially true in your secondary or circuits that terminate in the tube and power side. It does not matter if you use bus wire or heavy copper wire, but see that it is heavy and has very little resistance. If you are troubled with interference with local stations butting in on one another, try using an antenna of 50 or 60 feet of wire inside the room. It will be necessary to use more filament current and finer tuning, but you will be enabled to get much sharper tuning.

The dry cell tubes, especially the WD11 and 12, are slightly critical as to B battery voltage when working distant stations. Arrange a switch whereby you can obtain voltages from 16 to 30, in $1\frac{1}{2}$ volt steps, and you will notice that on certain stations you will be able to clear up and get them much easier.

If you use a potentiometer in your receiver, see that you also use a cut-out switch to disconnect your A battery when you are through using the set. Otherwise your battery will be constantly discharging through the high resistance of your potentiometer.

Always insulate the antenna lead-in very carefully where it enters the house. Most receivers are connected to the antenna by a wire which is just a continuation of the antenna lead-in, coming through the top of the window, no precautions being taken to insulate it at all. A great deal of energy is lost in this manner.

There is no advantage gained in making your receiving antenna, more than one wire. A three or four wire antenna is meant for a transmitting antenna, but for straight receiving, the single wire T or inverted L is all that is necessary.

Watch your phone leads. Some times the manufacturer in making his phones states that a certain lead should go to the positive side of the circuit. It may not seem to make any material difference in the loudness of the signals, but it will make itself known when in time the sensitiveness of the phones falls off greatly. This is due to demagnetization which occurs from the current flowing in the wrong direction in the coils, tending to reverse the polarity of the permanent magnets in the phones themselves.

The Radio Woman

I WONDER what would be the best thing to give Mabel for Christmas," said a young and adoring husband. The question was really aimed at me and it seems he was in doubt as to which of the following would be best: An automobile, phonograph, mah jongg set or, last but not least, a radio set. Is there any doubt in your mind which one of these things I told him to get? Well, just to relieve your suspense, I told him to get a radio set for the simple and sufficient reason that it was cheapest in the long run of any of the other gifts and much more enjoyable. He was finally convinced and that is what Mabel will get on Christmas day.

* * *

I have a sneaking suspicion that many more Mabels and Alices, to say nothing of Marys and Janes, will be surprised in like manner on Christmas day, and if any other enterprising hubbies ask me for suggestions, they shall all be told to do as Mabel's hubby will do.

* * *

There really isn't an argument left when I tell them that once the set is in the house (providing it's a good one) there is no more expense attached to it like there is to a phonograph or piano or an automobile. Each of the latter things having continual expenses, whereas the radio set has none—except the renewal of dry batteries.

* * *

Now that I've convinced all you doubting Johns about the advisability of buying a set for Christmas, I must rack my brains for something as good that wifie can buy in exchange.

* * *

All suggestions gleefully accepted. Send them along. There isn't very much more time to save. Isn't it awful when Christmas comes nearer and nearer we always wish we had just a little more time in which to save up the pennies for those presents?

* * *

Did you see that picture of a secretary taking dictation a la radio in last week's RADIO WORLD? Isn't that a pip, as High School Johnnie would say? It seems to me that wonders will never cease.

* * *

A friend of ours who is a confirmed "rooter for Roxy" has become strangely addicted to visiting the Capitol Theatre every Monday matinee. She blames it, of course, on the good programs they have at the theatre, and while I believe that that is so, I attribute it as much to the marvelous Sunday night programs as anything. I only wish that more program managers would try to emulate Roxy without overstepping the bounds of decency and making extremely risqué "wise cracks," as some of the imitators of our famous Sunday evening entertainer have done.

Improvised Radio Set Used in Emergency

ON a recent voyage of the steamship "Cuba," the motor-generator used to operate the radio set became inoperative, and because of this defect, which the radio operators and the ship's electrician were unable to remedy, the vessel could not transmit radio signals and obtain compass bearings, which probably would have saved the vessel.

In a similar case the resourcefulness of the operators of the steamship "Harry Luckenbach" is to be commended. The operators contrived an apparatus for in-

terrupting the direct current by taking an ordinary electric fan and providing brushes for it, which were placed in the direct-current circuit. In this way they were able to work distances up to 1,400 miles. The blades of the fan acted as a motor and made contact with the improvised brushes, thus giving a pulsating current through the transformer. This improvised emergency set made it possible to carry on radio communication and should be of value to other radio operators who may in the future have similar experiences.

Seven Stations Maintain Constant Frequencies

SEVEN radio stations have been named by the Bureau of Standards as maintaining sufficiently constant transmission frequencies to serve as standards for calibrating wave meters and radio-receiving apparatus. Two, KDKA and WGY, are broadcasters.

The stations, located in Massachusetts, New York, New Jersey, Pennsylvania and Maryland, include one naval station, four Radio Corporation, one General Electric and one Westinghouse station. The Tuckerton station of the RCA leads the seven in accuracy, deviating only 0.1% in 36 tests of its assigned frequency; all the other stations are, however not deviating on an average of over .3%, and should serve as fairly accurate measures of frequencies.

The seven stations follow with their frequencies and other data:

Station	Owner	Location	Assigned frequency k/cs	Period covered	Times measured	Greatest deviation	Average deviation
WQL	R. C. A.	Coram Hill, Long Island, N. Y.	17.13	Aug. 24-Oct. 12	16	1.2%	0.3%
NSS	U. S. N.	Annapolis, Md.	17.48	" "	30	0.5%	0.2%
WQK	R. C. A.	Rocky Point, L. I., New York	18.21	" "	22	0.4%	0.2%
WGG	R. C. A.	Tuckerton, No. 1, N. J.	18.85	" "	36	0.4%	0.1%
WSO	R. C. A.	Marion, Mass.	25.80	" 27 "	36	0.6%	0.2%
WGY	G. E.	Schenectady, New York	790.	(380 meters) June to Oct. (326 meters) June to Oct.	34	0.5%	0.2%
KDKA	W. E. M.	E. Pittsburgh, Pa.	790.	June to Oct.	30	0.6%	0.3%

NOTE: R. C. A.—Radio Corporation of America.
U. S. N.—U. S. Navy.
G. E.—General Electric Co., and
W. E. M.—Westinghouse Electric & Mfg. Co.

Commenting on the standard frequency situation, the Bureau of Standards says: "If every radio transmitting station maintained exactly the wave frequency assigned to it, there would be available a standard frequency wave every time any station was in operation. However, at present this is the case only with certain stations, and because it is a matter of difficulty to maintain exactly the assigned frequency, and also because this is of great importance, the bureau has been collecting some interesting data on the subject. As a result of these measurements, it is possible to give out information from time to time on stations which maintain sufficient accuracy to be useful as frequency standards. Several stations, which use special means for maintaining constant frequency, have very nearly attained the goal of remaining within two kilocycles of the assigned frequency, as recommended by the Second National Radio Conference.

"Transmission from seven stations may be used in standardizing apparatus, by the methods given in Bureau of Standards Letter Circular 92, 'Radio Signals of Standard Frequency,' and their utilization."

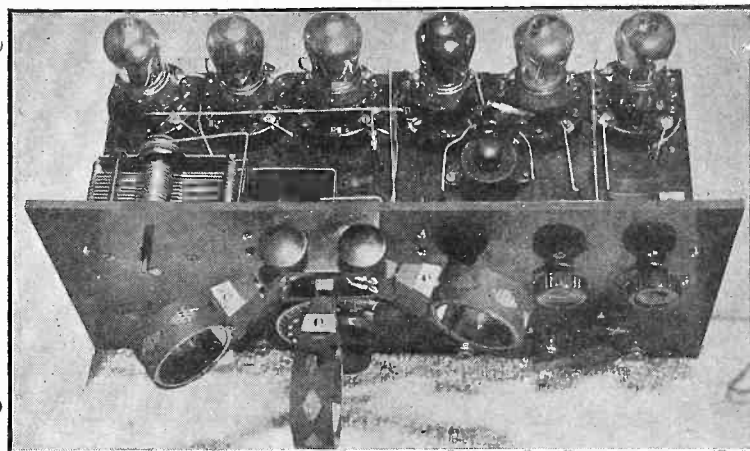
Why Not Two Aerials?

YOU have but to use a receiver a short time, experimenting with it a little, to realize that a long aerial will bring in volume, but cause extremely broad tuning. Try erecting a small aerial for sharp tuning when the locals are on, with the long antenna for the distant stations after the locals are off. It takes an afternoon to do it, but the results are fully worth the trouble. A single-pole double-throw switch makes it easy to transfer from one aerial to the other.

Efficiently Combines Radio-Frequency and Regeneration

DUE to some unknown reasons, the average amateur builder shies clear of any circuit where there is radio-frequency and regeneration. It can be done, and but for the fact that the controls are a little difficult, it works efficiently.

Charles Hall, a New York radio expert, desired a set

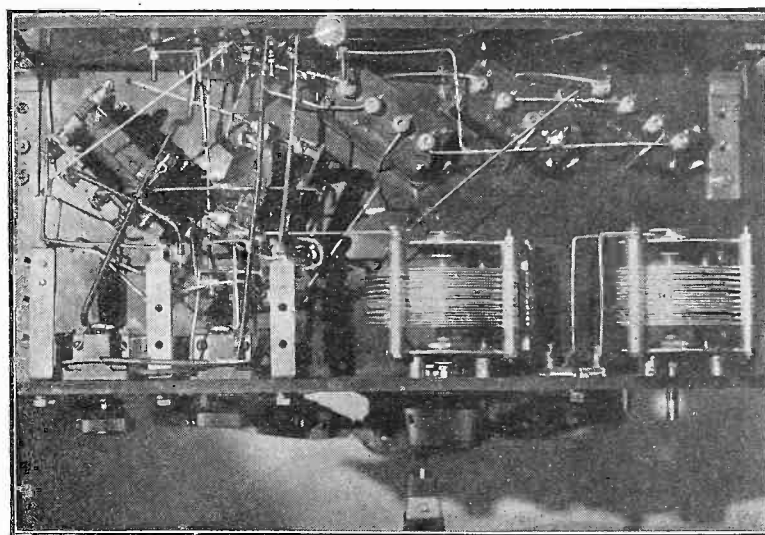


(C. Foto Topics)

Fig. 1. General view of Charles Hall's completed receiver.

which embodied the selectivity of the three-circuit honeycomb tuner with the range and advantages of radio-frequency amplification. Therefore he built the set shown in the accompanying illustrations. It uses six tubes (three stages of radio-frequency, detector and two stages of audio-frequency), as shown. The radio-frequency is transformer coupled and the tuning elements are all well shielded to prevent any trouble being caused by stray capacity.

One point of interest is that by disconnecting the antenna and ground, the secondary honeycomb can be used as an antenna, tuning being accomplished by means of the con-



(C. Foto Topics)

Fig. 2. Bottom view of the receiver, showing all transformers mounted below sub-base. Note the arrangement of the transformers to prevent howling and broad tuning.

denser shunting it. In this event, the primary is used as a coupled wave trap or selector, and the tickler is used to affect the volume of signals, but it does not seem to have much bearing on the general tuning, as it does when the set is used with antenna and ground.

By arranging the transformers at certain angles, and wiring in the manner shown, the maximum efficiency was had in a small cabinet without any trouble.

How Broadcasting Waves Are Selected

By
John V. L. Hogan

CONTINUING his series of radio talks, John V. L. Hogan, consulting engineer and author, broadcasting through Station WEAJ, New York City, discussed recently the subject of how radio waves are selected. The series is attracting wide attention among radio enthusiasts because of its informative nature. In the course of his remarks Mr. Hogan said:

When radio was very young, people who opened radio stations used any wave frequency that they happened to select. There was no standardization or regulation, and most of the station owners had no real idea of what frequencies their plants were using. All this became very confusing when the number of stations began to increase, and finally international conventions were held to work out some orderly plan for government supervision of radio. In 1912 Congress passed a law requiring radio transmitters to hold government licenses, and establishing wave frequencies of 500 and 1,000 kc as standard for ship and coastal stations.

When radio broadcasting stations appeared they were first licensed to operate at 833 kc. When that wave frequency became overcrowded another wave of 750 kc was set aside for use by the better broadcasting stations. These are the 360 and 400 meter waves to which we all tuned our receivers last winter, and most of you will remember vividly that with over 600 broadcasting stations using those two frequencies there was so much overlapping or interference that good reception was very difficult.

Last spring Secretary Hoover called a conference to tackle this interference problem, and a new distribution of wave frequencies was worked out for the broadcasting stations. That conference plan is now in effect and, as the radio supervisors are eliminating the little troubles that always come up when a change is made, we are all finding a great improvement in the situation.

The new organization of broadcasting waves divides the stations into four groups. Class A includes the small stations intended for local service, to which are assigned waves having frequencies between 1,350 kc and 1,000 kc.

Class B stations are the main sources of high grade programs, and are capable of long distance transmission. They are given wave frequencies between 1,000 kc (where the Class A stations stop) and 550 kc, which is not far from the 500 kc wave used in ship and shore radio telegraphy.

Class C stations are those which were licensed under the old plan to operate at 833 kc and which did not desire to adopt one of the new wave frequencies.

Class D includes a small number of stations used for development or research work, which are allowed to use Class B wave lengths.

The stations in which nearly all of us are most interested are those in Classes B and D. For these plants the wave frequencies every 10 kc apart, beginning at 550 kc, have been selected. If we look over the list we find that 550 kc is used by Station KSD in St. Louis, 560 kc by KYW in Chicago, 570 kc by WOAW in Omaha, 580 kc by WCX and WWJ at Detroit, 590 kc by WIP and WOO in Philadelphia, 600 by WMC in Memphis, 610 by WEAJ in New York and so on. Where the same wave frequency is assigned to two stations in the same or nearby cities, they do not operate at the same time.

You will note that these frequencies come in even

10s and you will find them much easier to remember than the corresponding odd wave lengths of 546, 536, 527, 517, 509 meters and so on. The interval of 10 kc between adjacent broadcasting waves was chosen because waves separated by that frequency difference cannot directly interfere with each other under ordinary conditions. The difference in wave length which is necessary to keep adjacent waves from interfering with each other varies from 9.7 meters at one end of the broadcasting scale to only 1.6 meters at the other end. This big variation shows the uselessness of trying to determine how closely two station waves may be placed without interfering if we keep on talking about "meters wave length." The frequency difference of 10 kc is constant over the whole gamut of radio waves, and here we have another good reason for forgetting meters wave length and adopting kilocycles wave frequency.

The point for you to remember is that every broadcasting station has a characteristic wave frequency between 550 kc and 1,350 kc. The wave frequency identifies the station as clearly as the pitch or sound frequency identifies a musical note. We might say that 550 cycles in the musical scale (which is the second C-sharp above middle C on the piano) corresponded to 550 kilocycles in the scale of radio waves; then the highest broadcasting wave frequency of 1,350 kc would correspond to the second F above (whose frequency is about 1,350 cycles) and all the broadcasting stations could be considered as scattered on frequencies between these two extremes just as are the intermediate notes of the piano. Of course, the radio frequencies are 1,000 times as great as the sound frequencies, and cannot be heard as musical tones, but the relative or proportional frequencies are the same in music and in radio.

Standardizing Radio Tubes

THE first step toward standardizing radio equipment, purchased by several departments of the government in considerable quantities annually, was taken last week when a conference of manufacturers and government officials met to adopt for the government a single vacuum tube for reception.

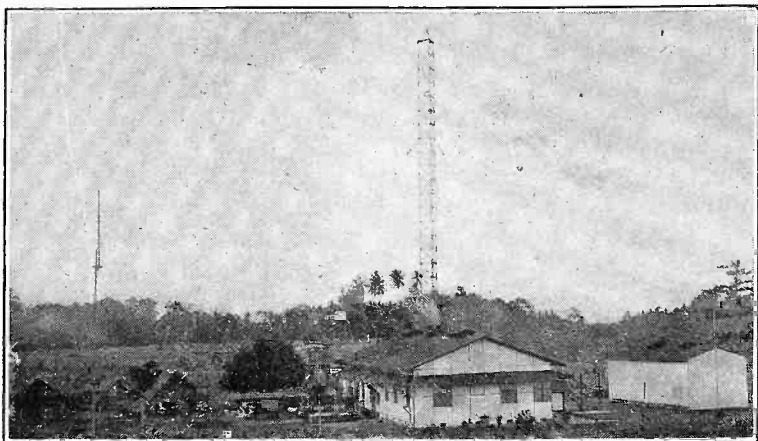
The sub-committee on technical problems of the Inter-Departmental Radio Advisory Committee invited representatives of the Western Electric, General Electric, Westinghouse and De Forest companies to meet with them in Washington to give them data and advice on radio receiving tubes. This was done, and Major L. B. Bender, Signal Corps, chairman; Lt. Comdr. H. P. Le Clair, U. S. N., and J. H. Dellinger of the Bureau of Standards, of the technical sub-committee now have the information sought and will at once draw up specifications for a standard government receiving tube.

Tentative specifications for a small, low-power consuming tube will be sent to all manufacturers of radio tubes for criticism and suggestions. Many tubes are purchased annually by the navy, signal corps, shipping board, post office and coast guard, and a single standard tube is desired.

This conference is the beginning of government radio standardization, it is understood. As soon as receiving tube specifications are adopted, the committee will take up transmitting tubes and various forms of apparatus. At present there are at least 12 American types of tubes.

RADIOGRAMS

WORLD NEWS HAPPENINGS BRIEFLY
PHRASED FOR OUR BUSY READERS



(C. International)

The radio towers and station buildings at Bitapaka, Australia. The tall steel mast in the center foreground supports the main antenna.

A message from Royal Sterling, of the S. S. "Hawaiian" of the American-Hawaiian Line, informs Station WLW, Cincinnati, that they were heard about 120 miles off La Libertad, Salvador. This is particularly good, when the warm weather is taken into consideration. The program was exceptionally fine that evening, according to the letter on file at the studio.

* * *

A regular, duly licensed, union wireless operator was put on the payroll of the Capitol Theatre, N. Y. City, recently, where George Arliss in "The Green Goddess" was presented for the first time at popular prices. This bit of realism was staged behind the scenes to synchronize with certain wireless messages used on the screen. Two of the most thrilling sequences in the picture are the sending of a decoy message by the scheming Rajah on his private wireless, and SOS sent by his helpless prisoners. S. L. Rothafel, a stickler for realism in presentation, decided to install a wireless set and engage the services of an operator to dispatch the messages literally.

* * *

That the slogan of Station WHAZ, Troy, N. Y., at the Rensselaer Polytechnic Institute, "The Transcontinental and International Radiophone Station broadcasting from the Oldest College of Engineering in America," which was adopted a year ago, is still justified as another season of distance radio reception opens, is demonstrated by reports being received from Europe and all parts of the North American Continent. Referring to a single weekly program, twelve letters and cablegrams were received from various points in England. Except in the matter of names of entertainers the reports show remarkable fidelity to the program as presented.

She—"Why did they throw those men out of that building?"
He—"Maybe it's a broadcasting station."

* * *

The government of Japan has conferred the second degree order of the Sacred Treasurer upon General Guy E. Tripp, chairman of the Board of the Westinghouse Electric and Manufacturing Company. This is the highest decoration that can be awarded a civilian foreigner by the Japanese government.

* * *

An urgent call for radio receiving apparatus from the Netherlands is expected as soon as radio broadcasting starts. Dutch manufacturers are able to supply vacuum tubes, having made them for local and export use for some time, but there will be a shortage of receiving sets, Commercial Attache McKenney at The Hague states.

* * *

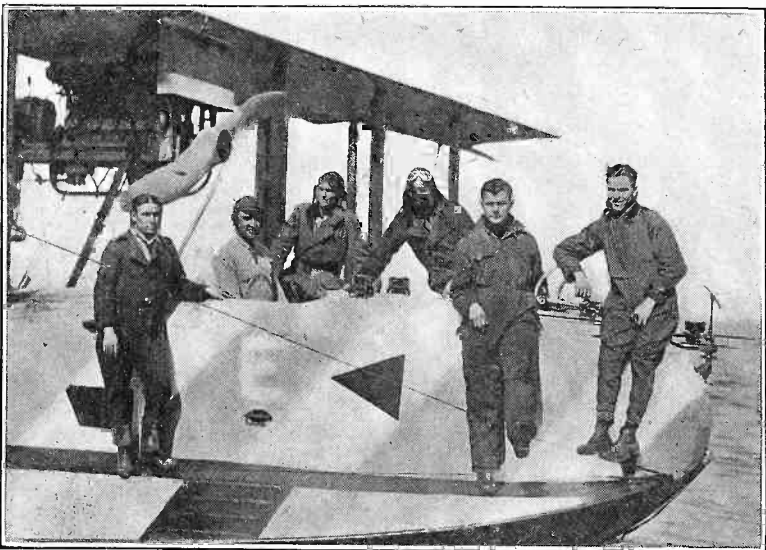
H. V. Neff, a student in the Evergreen School for the Blind, at Baltimore, Md., apologized to WGY for not earlier acknowledging the pleasure he received from the program of the Schenectady station. "Bum spelling was the cause of my not writing sooner," he wrote. "I just learned this morning how to spell the city in which you are located and I don't know now whether or not I am right."

* * *

KDKA, East Pittsburgh, Pa., the world's pioneer broadcasting station, operated by the Westinghouse Electric & Manufacturing Co., has ceased to be a station whose programs are enjoyed only in America. This station must soon be known as an international broadcaster, judging by the number of letters that are being received from England. These letters are interesting as they show what is being done on the other side of the Atlantic and what the radio fan abroad thinks of America's programs. There is, of course nothing in Europe to compare with America's broadcasters so the European fan likes to tune in on America.

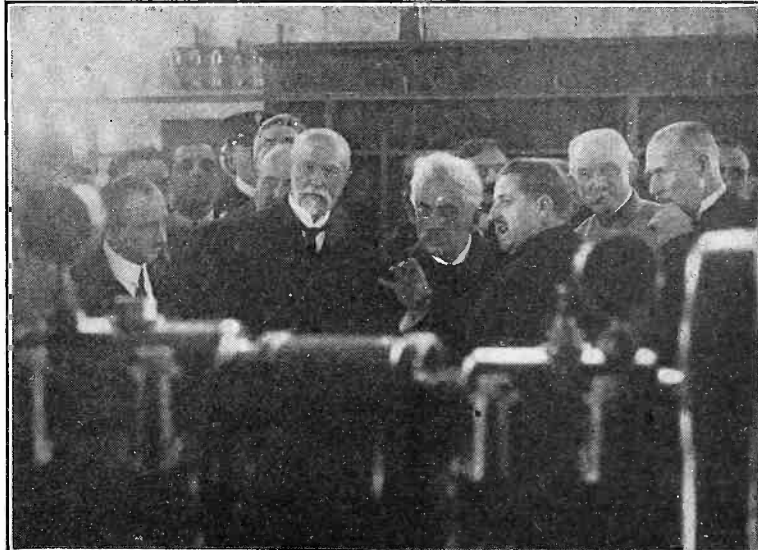
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E. W. Rice, Jr., Honorary Chairman of the Board, General Electric Company, in an address delivered at a public memorial meeting in Schenectady, N. Y., following the recent death of Dr. Charles Proteus Steinmetz, said: "The whole world, through its orators and writers, has expressed so beautifully and so well its appreciation of Charles Proteus Steinmetz that if I attempted to express what is in my heart, it would be but to repeat what has already been said much better by others. However, as his devoted friend and intimate associate for one-third of a century, as one who recognized his great talents when he was unknown, and surrounded him with a favorable environment for the development of his genius, I regard it as a privilege to publicly endorse all that has been said of his usefulness, his commanding genius, his inspiring personality. This cheerful, patient, kindly spirit, this zealous student of nature and lover of humanity was your friend and my friend."



(C. Kadel and Herbert)

The first aeroplane crew to win the Naval E for general efficiency attribute a large share of their success to the aid of radio in their manoeuvres. From left to right they are: Lieut. H. R. Bowes, commander; T. P. Wilkinson, second pilot; P. S. Litts, plane captain; G. A. Crawford, first mechanic; L. W. Splan, second mechanic; D. P. Odum, radio man.



(C. Underwood and Underwood)

President Masaryk, of Poland, and President Millerand, of France, inspecting the radio station at Ste. Assise, France. This is one of the large French stations which keep in communication with foreign countries day and night. It affords direct communication between Poland and France. The station engineer is explaining the working of the high tension alternator.

Corrected Official List of Broadcasting Stations in the United States

FOLLOWING is the last installment of a corrected list of commercial broadcasting stations in the United States as issued by the Department of Commerce. The Canadian stations are included.

Call	Station	Frequency Kcys.	Wave Length Meters	Power Watts	Call	Station	Frequency Kcys.	Wave Length Meters	Power Watts
WHAG	University of Cincinnati, Cincinnati, Ohio	1,350	222	100	WJAK	White, Rev. C. L., Greentown, Ind.	1,180	254	30
KFAJ	University of Colorado, Boulder, Colo.	833	360	100	WJH	White & Beyer Co., Washington, D. C.	1,100	273	50
WRN	University of Illinois, Urbana, Ill.	833	360	500	WEAH	Wichita Board of Trade, Wichita, Kan.	244	1230	100
WLB	University of Minnesota, Minneapolis, Minn.	833	360	150	WPAD	W. A. Wieboldt & Co., Chicago, Ill.	833	360	100
WAAN	University of Missouri, Columbia, Mo.	1,180	254	50	WCAS	Wm. Hood Dunwoody Industrial Inst., Minneapolis, Minn.	833	360	200
WFAV	University of Nebraska, Lincoln, Neb.	833	360	100	WHAV	Wilmington Elect. Specialty Co., Wilmington, Del.	833	360	50
KFJM	University of North Dakota, Grand Forks, N. D.	1,310	229	100	KFIL	Windisch Elect. Farm Equip. Co., Louisburg, Kan.	1,280	234	100
WNAD	University of Oklahoma, Norman, Okla.	833	360	100	KFEL	Winner Radio Corp., Denver, Colo.	833	360	150
WHAM	University of Rochester, Rochester, N. Y.	833	360	100	WHAP	Winter Park Elect. Const. Co., Winter Park, Florida	833	360	20
WEAJ	University of South Dakota, Vermillion, S. D.	833	360	200	WBAN	Wireless Phone Corp., Paterson, N. J.	1,230	244	100
WCM	University of Texas, Austin, Tex.	833	360	500	WPAH	Wisconsin Department of Markets, Waupaca, Wisc.	833	360	800
WCAX	University of Vermont, Burlington, Vt.	833	360	100	WNAP	Wittenberg College, Springfield, O.	833	360	100
WHA	University of Wisconsin, Madison, Wisc.	833	360	250	WKY	Radio Shop, Oklahoma City, Okla.	833	360	100
WSAI	U. S. Playing Card Co., Cincinnati, Ohio	970	309	500	WFAB	Woese, Carl C., Syracuse, N. Y.	1,280	234	200
WMAF	Utility Battery Service, Inc., Easton, Pa.	1,220	246	50	WOAX	Wolff, Franklyn J., Trenton, N. J.	1,250	240	100
KFJQ	Valley Radio Div. of Electric Construction Co., Grand Forks, N. D. (portable station)	1,190	252	5	WOAW	Woodmen of the World, Omaha, Neb.	590	526	500
WCAB	Valley Radio, Grand Forks, N. D.	1,070	280	5	WOAL	Woods, Wm. Evans, Webster Groves, Mo.	1,050	286	100
KFHD	Utz Electric Co., St. Joseph, Mo.	1,330	226	10	WIAY	Woodward & Lothrop, Washington, D. C.	833	360	50
WOAN	Vaughan, James D., Lawrenceburg, Tenn.	833	360	150	WLAH	Woodworth, Samuel, Syracuse, N. Y.	1,280	234	250
WLAK	Vermont Farms Mach. Co., Bellows Falls, Vt.	833	360	500	WWAX	Wormser Brothers, Laredo, Tex.	833	360	100
WGAM	Villanova College, Villanova, Pa.	833	360	100	WEAP	Wortham Carter Pub. Co., Fort Worth, Tex.	630	476	500
KFAY	Virgin's Radio, Medford, Ore.	833	360	50	WWAD	Wright & Wright, Inc., Philadelphia, Pa.	833	360	200
WCBD	Voliva, Wilber Glenn, Zion, Ill.	870	345	500	WKAF	W. S. Radio Supply Co., Wichita Falls, Tex.	833	360	100
WLAJ	Waco Electric Supply Co., Waco, Texas	833	360	50	KFIQ	Yakima Valley Radio Broadcasting Association, Yakima, Wash.	1,240	234	50
WDAS	Waite, Samuel A., Worcester, Mass.	833	360	30	WABE	Y. M. C. A., Washington, D. C.	1,060	283	50
WWZ	Wanamaker, John, New York, N. Y.	833	360	100	WKC	Zamoiski Co., Jos. M., Baltimore, Md.	833	360	50
WOO	Wanamaker, John, Philadelphia, Pa.	590	509	500					
KLS	Warner Brothers, Oakland, Cal.	833	360	50					
KFJV	Warren, T. H., Dexter, Iowa	224	1,340	10					
KHQ	Wasmer, Louis, Seattle, Wash.	833	360	100					
WMAR	Waterloo Electrical Supply Co., Waterloo, Iowa	833	360	50					
KFJD	Weld County Printing & Pub. Co., Greeley, Colo.	1,270	236	100					
KZV	Wenatchee Battery & Motor Co., Wenatchee, Wash.	833	360	50					
WQAQ	West Texas Radio Co., Abilene, Texas	833	360	60					
WHD	West Virginia University, Morgantown, W. Va.	833	360	250					
WBAY	Western Elec. Co., New York, N. Y.	610	492	500					
KFAF	Western Radio Corp., Denver, Colo.	833	360	500					
WOQ	Western Radio Co., Kansas City, Mo.	833	360	250					
KFCY	Western Union College, LeMars, Iowa	833	360	100					
KYW	Westinghouse Elect. & Mfg. Co., Chicago, Ill.	870	345	500					
KDPM	Westinghouse Elect. & Mfg. Co., Cleveland, Ohio	1,110	270	250					
KDKA	Westinghouse Elect. & Mfg. Co., East Pittsburgh, Pa.	920	326	1,000					
WEZ	Westinghouse Elect. & Mfg. Co., Springfield, Mass.	890	337	600					
WQAD	Whiteall Elect. Co., Waterbury, Conn.	1,240	242	50					

BROADCASTING STATIONS OF CANADA

Call	Station	Frequency Kcys.	Wave Length Meters	Power Watts
CFAC	The Calgary Herald, Calgary, Alta.			430
CFCA	Star Publishing and Printing Co., Toronto, Ont., 18 King St., W.			400
CFCF	Marconi Wireless Telegraph Co. of Canada, Montreal, Que., Can. Cement Bldg.			440
CFCH	Abitibi Power and Paper Co., Ltd., Iroquois Falls, Ont.			400
CFCJ	La Cie de L'Evenement, 30-32 Fabrique St., Quebec, Que.			410
CFCK	Radio Supply Co. Ltd., Edmonton, Alta., 10229 101st St.			410
CFCL	Centennial Methodist Church, Victoria, B. C.			400
CFCN	W. W. Grant Radio, Ltd., Calgary, Alta., 511 Loughheed Bldg.			440
CFCO	Semmelhaack-Dickson, Ltd., Bellevue, Que.			450
CFCW	The Radio Shop, London, Ont., 77 Dundas St.			420
CFQC	The Electric Shop, Ltd., Saskatoon, Sask., 144 Second Av., N.			400
CFUC	University of Montreal, Montreal, Que., 185 St. Denis St.			400
CHBC	The Albertan Publishing Co., Calgary, Alta., 229 8th Av., W.			410
CHCD	Canadian Wireless and Electric Co., Quebec, Que., 30-32 Fabrique St.			410
CHCE	Western Canada Radio Supply, Ltd., Victoria, B. C., 919 Fort St.			400
CHCL	The Vancouver Merchants Exchange, Ltd., Vancouver, B. C., Merch. Ex. Bldg.			440
CHYC	Northern Electric Co., Ltd., Montreal, Que., 121 Shearer St.			410
CJCA	The Edmonton Journal, Ltd., Edmonton, Alta., Journal Bldg.			450
CJGC	London Free Press Printing Co., Ltd., London, Ont., 430 Richmond St.			430
CJDC	The T. Eaton Co., Ltd., Toronto, Ont., James & Albert Sts.			410
CJCE	Sprott-Shaw Radio Co., Vancouver, B. C., Room 1604 Tower Bldg.			420
CJCI	Martime Radio Corp., Ltd., St. John, N. B., 543 Albion St.			400
CJCN	Simons Agnew & Co., Toronto, Ont., McKinnon Bldg., 19 Melinda St.			410
CJCX	Percival Wesley Shackleton, Olds, Alta.			400
CJSC	The Evening Telegram, Toronto, Ont., 81 Bay St.			430
CKAC	La Presse Publishing Co., Ltd., Montreal, Que., Cor. St. James St. and St. Lawrence Blvd.			430
CKCD	Vancouver Daily Province, Vancouver, B. C., 142 Hastings St., W.			410
CKCE	Canadian Independent Telephone Co., Toronto, Ont., Wallace Ave. and Ward St.			450
CKCK	Leader Publishing Co., Ltd., Regina, Sask.			420
CKOC	Wentworth Radio Supply Co., Hamilton, Ont., 31 John St., N.			410
CKY	Manitoba Telephone System, Winnipeg, Man., Sherbrooke St.			450

The Radio University

Conducted by the Technical Staff of RADIO WORLD
for the information and instruction of its subscribers.

My aerial is 10 feet above and at right angles to my neighbor's antenna. We interfere with each other a great deal in tuning as we both use regenerative receivers of the three-circuit type. Can you suggest any method of eliminating the interference?—R. R. Townroe, 894 Broad St., Meriden, Conn.

You cannot eliminate interference due to re-radiation of regenerative receivers. By proper manipulation of the receivers you can lessen the interference but you cannot entirely eliminate it. When tuning, do not burn up your tubes brightly, and do not use tight coupling on the vario-coupler or the tickler or if the variometer plate method of regeneration is used, do not tune so much with the plate variometer, leaving the mutual inductance of the two coils as loose as possible. It has been suggested that a third wire running under, and parallel to either antenna and grounded through a small value impedance (a 12 ohm magnet will suffice), will lessen the interfering beats. It might help somewhat but it is doubtful in your case. Interference due to "beats" caused by the radiation of an interfering oscillating wave from a two or three tube receiver has heterodyned other receivers over a half-mile distant.

* * *

My antenna is 68' long, four wires spaced 24". The height is approximately 58', with a lead-in of 42' and a 6' ground lead. What is the natural wave length of my antenna?—H. E. Burns, Martinsburg, W. Va.

The approximate natural period of your antenna is 160 meters.

* * *

Is there any reason for the following? I purchased a Crystola DeLuxe Receiver last January. It worked well getting all the local stations up till this present August. Then the stations got weak and now they scarcely whisper in on the phones. My antenna is 70' long, one end attached to the smokestack of the house next door.—Clarence Wilburton, Boston, Mass.

Probably your trouble lies in the fact that your crystal needs cleaning, and that your insulator at the far end of your receiver, or the end attached to the smokestack, is coated with a sulphurous deposit coming from the smoke. Wash the crystal surfaces with a toothbrush dipped in carbon tetrachloride (cleaning fluid—commercially sold under the Carbona trade-mark), and clean the insulator with the same solution. If a catwhisker is used with the crystal, make a new point on the metal with a pair of cutting pliers.

* * *

I have a 5-tube receiver, constructed as per instructions published in one of your past issues by C. White. I live in an apartment hotel, where there are four elevators going night and day, and where they use bell ringing transformers to ring the bells and operate the drop signals on the cars. The motor room with its breakers and magnetic stops is located one flight above my rooms, and directly to the right of the room in which I have the receiver located. I am continually bothered with clicks whenever the elevator starts, and a rising hum while the elevators are in motion, with a banging click when they stop. Every time the bells in any of the apartments on my floor ring, I can hear it. It is annoying. How can I stop it? Is my set too sensitive for use in

such an apartment?—J. H. Clarkson, New York City.

There is no way you can stop these noises. The fact that you are operating a sensitive loop receiver and are practically surrounded by a network of commercial electric light and power wires and apparatus makes it impossible to help you out of your trouble.

* * *

Enclosed herewith find a circuit diagram of a receiver that I have built. The diagram was drawn for me by a friend of mine, but since I have built it I cannot get it to work. Even on the second stage, I scarcely get more than howls and whispers of voices on local stations. What is my trouble? How can I remedy it? Should this circuit give me good volume on three tubes?—Wm. Schultz, 260 Palisade Ave., West Hoboken, N. J.

The circuit you furnish is a sort of hodge-podge single circuit. Remove the plate circuit variometer. The secondary or tickler of the coupler furnishes enough feed-back to promote all the regeneration such a set can handle. As it is now it would be inoperative because of this variometer. Use a better type coupler. The one you mention is too cheap a grade to get good results from. You have purchased excellent transformers and are using good tubes and other parts, so why slight the most important tuning element for use? Use a series parallel switch in your antenna circuit instead of simply hooking your condenser directly into the antenna lead. This allows greater selectivity and range than the way you have it now.

* * *

In RADIO WORLD for Feb. 3, 1923, you gave a three circuit diagram (two variometer-coupler regenerative circuit) in response to an inquiry by one of your subscribers, Mr. Anthony. Would this circuit be improved by the addition of a 43, 23, and 3 plate condenser? What is the proper method of tuning this circuit?—H. A. Heldt, 2223 Fourth Ave., Hibbing, Minn.

The circuit shown would be slightly improved by the addition of a 23 plate condenser shunting the secondary. However if you use variocouplers and variometers of good make, and designed for this type of circuit there is little need for additional condensers. They only complicate the controls unnecessarily. The condenser mentioned however may be inserted with a slight increase in the selectivity of the receiver. The only proper method of tuning or learning to tune a receiver is to operate it under your own conditions and learn from experience just what the proper way of doing it is. However, the wave control is the coupler (the primary taps, and the secondary coupling). The selectivity is the grid variometer, and the amount of regeneration is the plate variometer. Operate it with these ideas in mind.

* * *

I am using the circuit shown in this letter, but cannot get the higher stations. How can I arrange my set to get the stations above 400 meters? If loading coils are to be used, kindly explain how they can be made.—Charles E. Labrodie, New York City.

There are several methods of doing what you wish. The easiest is by the use of condensers. Shunt your primary circuit with a 43-plate condenser (across antenna and ground posts). The placing of a larger size condenser across your secondary will

also be necessary. Should you not care to do this, and desire to use load coils, do the following: Get three pieces of cardboard, or fibre tubing, 3" in diameter and 3" long. Wind these for 2½" with 80 turns each of No. 22 SSC copper wire. Tap every 20 turns for the first half, and every 10 turns for the last 20. Insert one of these in your antenna circuit, another in your grid circuit, before the condenser, and another in your plate circuit, in series with the variometer. It is best to get another variometer, wound for the higher wave lengths, than to use this third coil; but in case you do not want to purchase a new variometer the method of loading with the coils will be satisfactory. In inserting these coils make sure that you place them in close relation to the particular part that they are to load. If it is in the grid lead place the coil close to the secondary tap that goes to the grid, taking care that the winding of the load coil runs in the same direction as that of the secondary, and also taking care that the load coil is not coupled with the primary. The same applies to the variometer load and the primary load. Do not shellac the windings, but hold them in place with small drops of sealing wax at each end.

* * *

I have a four-tube receiver, detector, and three stages of audio-frequency amplification. What are the capacities of the condensers designated on the diagram as A, B, C? Which side of the transformers is the primary, both in the diagram, and on the transformer itself? How many volts should I use on the amplifiers and the detector?—Charles Schmitt, 307 East Burlington Street, Iowa City, Ia.

The condensers, according to your diagram, should be as follows: A-.001 mfd., B-.00025 mfd., C-.0005 mfd., or .0003 mfd. These will be satisfactory. In the diagram the primary is the side which is connected to the plate circuit of the preceding tube. On the transformers it is generally designated as B+ —P, or P & P. You should place from 16 to 22½ volts on the plate of the detector, depending upon the degree of softness or hardness of the particular tube you are using. From 45 to 90 volts are placed on the plate of the amplifiers. You will note that the greater the plate voltage that is placed on the plate of the amplifiers, up to a certain extent (90 volts), there will be a corresponding increase in the volume of the signals. Suggest that you accommodate the last stage of your audio-frequency to Fig. 1 or Fig. 2, page 3, in RADIO WORLD for November 3, 1923. Three stages of straight audio-frequency, as you show them, will not give good results. The signals in the third stage will be so distorted that they will be simply a jumble of noises. Accommodate it to Fig. 2 if possible as this will give the best results. Suggest a C battery in the second and third stages at any rate. For the voltages you are going to use, it is best to get about 4.5 volts C battery potential.

* * *

In RADIO WORLD you describe a two tube reflex receiver. What is the voltage of the "B" batteries? Will UV199 tubes function properly in this circuit? Is there any necessity for the use of a potentiometer? What type of antenna should be used?—L. Wilde, 5953 Commonwealth Ave., Detroit, Mich.

For the B battery voltage, use 45 to 60 volts for the amplifier, and 18 to 22½ for the detector. UV199 tubes will operate very well in this circuit. To properly operate any reflex receiver using more than one tube, a potentiometer in the first or radio-frequency circuit must be used. Otherwise you will not be able to get the proper volume out of your receiver and the set will howl nearly all the time. Use a loop as described, or if you want an outside antenna, use it with a coupler across the terminals of condenser C1.

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ROLAND BURKE HENNESSY, President
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1493 BROADWAY, NEW YORK, N. Y.
Boston Representative: Chas. H. M. White, 1367
Commonwealth Avenue, Allston, Mass.
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Editor

Roland Burke Hennessy

Managing Editor

Stephen L. Coles

Technical Editor

Robert L. Dougherty

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While every possible care is taken to state
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NOVEMBER 24, 1923

Cheerfulness By Radio

HAVE you heard "The Cheerful Philosopher?" His real name is Burr McIntosh. Mr. McIntosh has been actor, photographer, editor, publisher and world traveler. He did magnificent work in the cantonments and elsewhere during the late war. His six feet of brawny manhood and his smiling face were welcome wherever they appeared during those dark days. This same personality is being projected through the ether by Mr. McIntosh, and now "The Cheerful Philosopher" is a smiling though invisible nightly visitor in the homes of hundreds of thousands of American families. Here is an instance where personality and great-heartedness and a cheery voice with equally cheery sentiments make themselves felt and understood even if the speaker is not at our elbow. Radio needs more like "The Cheerful Philosopher." Cheerfulness may not be next to godliness, but it is a nearby neighbor.

Constructive Program Criticism Needed

By Corley W. Kirby,
Radio Editor, The Detroit News.

RADIO applause—what a vague and meaningless term this particular kind of applause has come to be! It is the term applied by listeners and radio people in general to mail, telegraph and telephone appreciation for concerts sent out by broadcasting stations in the United States and Canada.

For the most part this same radio applause means nothing to the program manager and artists performing at radio stations. Of course, the fact that certain numbers as broadcast by a station were heard is of some value, but it certainly is not of the same value that good constructive criticism would be.

If a radio listener is not satisfied with the entertainment furnished by a station let him say so with the same ease that he would hand out compliments. Those associated with broadcasting stations of the type maintained by The Detroit News know that all entertainments sent out by the station fail to please everybody. This is an impossibility in any line of recreational effort.

By giving good constructive statements regarding programs in general and some particular concerts, radio applause can be of far more use to broadcasting stations than it is at the present time. If you don't like a radio concert say so with the same ease that you would criticize a theatrical performance. This is the only real way that radio programs can be made to satisfy the greater majority of those benefited thereby.

At the same time broadcasting stations should not be looking for favorable comment all the time, as many of them are wont to do, but to expect and heed recommendations from those who are members of the great invisible audience. Those who like classical music, those who prefer the popular variety, the vocal soloist, should express their views instead of saying "heard your station at 9:15, signals good," and the like. It has about the same value as sitting on your hands and applauding in a theatre.

Who Will Pay the Piper?

AGAIN there comes before us the query: Who will pay for broadcasting? This problem is one that must be met some time, and met completely to the satisfaction of everybody concerned. Just now it is the owners of broadcasting stations who are furnishing the sinews of war.

Admittedly, the cost is great in every individual case, and quite staggering in the total.

It is said that an official of a big corporation now engaged in broadcasting remarked recently that, while he would like to have his own concern relieved of the bother and cost of broadcasting he was much against having the public pay the toll. He is quoted further as suggesting that the whole matter could be arranged if the sellers of sets were to be required to add 5% or so on each sale and that the monies so collected go into a general broadcasting fund for the benefit of all stations.

At present the matter still remains very much in the air.

Buttering Their Bread

IT is no wonder that the big electric lighting companies in New York and throughout the country are very much interested in radio and are showing their interest in some cases by taking space at various expositions. It is a matter of record that families having receivers stay up late at night trying to get DX. Heretofore, only the hopeful son of the family has paid very much attention to radio, but now everybody from Arthur all along the line including Sister Elsie, father and mother and very often grandma, make use of the receiving set for hours at a time—and this means that the electricity bills run up, much to the delight of the lighting company.

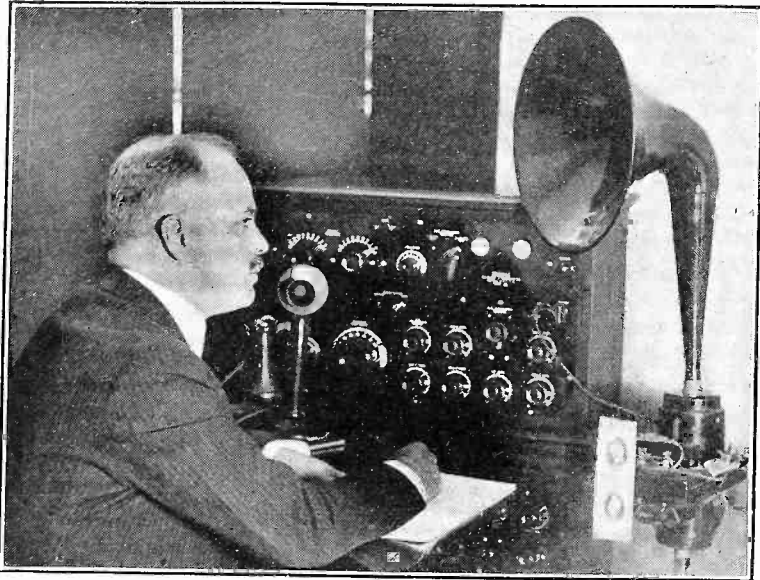
Radio, the Culture Builder

YOU go into a phonograph record shop, pick out as many records as your pocketbook will stand, take them home, and listen to them until you are sick and tired of even the best of them, or until you can afford a new lot.

How different with the radio set owner. He buys a set, or assembles it as best suits his pocket or mood, and the whole world of music and literature is immediately open to him. At one sitting a listener has the opportunity of hearing the latest jazz, Gounod's "Ava Maria," Beethoven's "Moonlight Sonata," a talk on finance by a famous banker, a cookfest by the culinary editor of the daily paper, football scores, the words of a famous preacher—all to be had for the mere seeking. Any man, woman or child can now imbibe culture as well as entertainment through the agency of the receiving set.

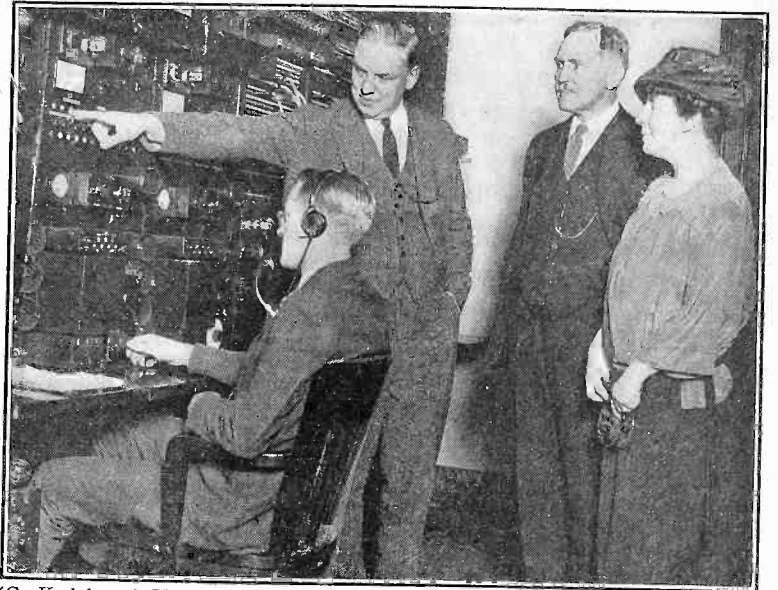
Is it any wonder that phonograph companies are having a struggle to retain the interest of their old patrons in the face of radio's stern and ever-growing competition!

A Half Dozen Radio News Snapshots



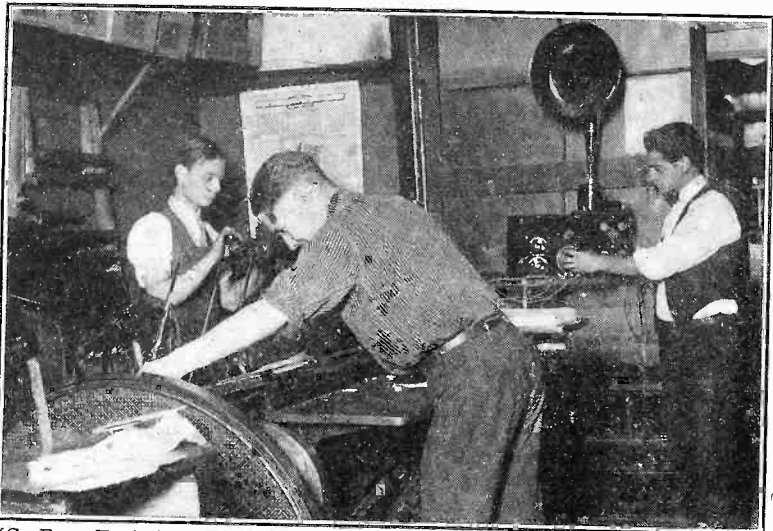
(C. Foto Topics)

Here is how one up-to-date candidate arranged to get election returns hot off the griddle without stirring from his den. James J. Sullivan, who ran for Alderman in the 11th Republican District of New York City, is quite a fan otherwise, as the elaborate receiver testifies, but it played an important part in this election, as the radio stations broadcast the news every few minutes and he could learn how his party was faring.



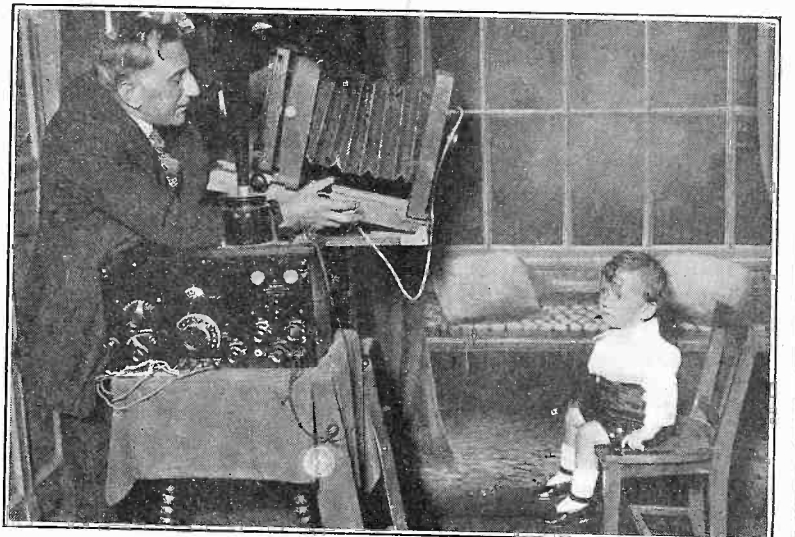
(C. Kadel and Herbert)

Mrs. Douglas Robinson, sister of the late Col. Theodore Roosevelt, and Hon. James R. Garfield, son of the late Ex-President Garfield, visited the American Telephone and Telegraph Radio Station WEAJ, and were taken "through the works." They were shown just how broadcasting is handled and were amazed at the intricacy of the thing. The illustration shows Mr. Harkness, manager of WEAJ, explaining the speech input and amplifying room.



(C. Foto Topics)

The University Printery, New York City, knowing that printers are oftentimes apt to waste time telling about their radio experiences (they are all fans), decided to invest in a good radio set and keep the boys busy and happy. You cannot listen to a good program and discuss last night's DX records at the same time. Now every one gets going merrily and the radio keeps them happy.



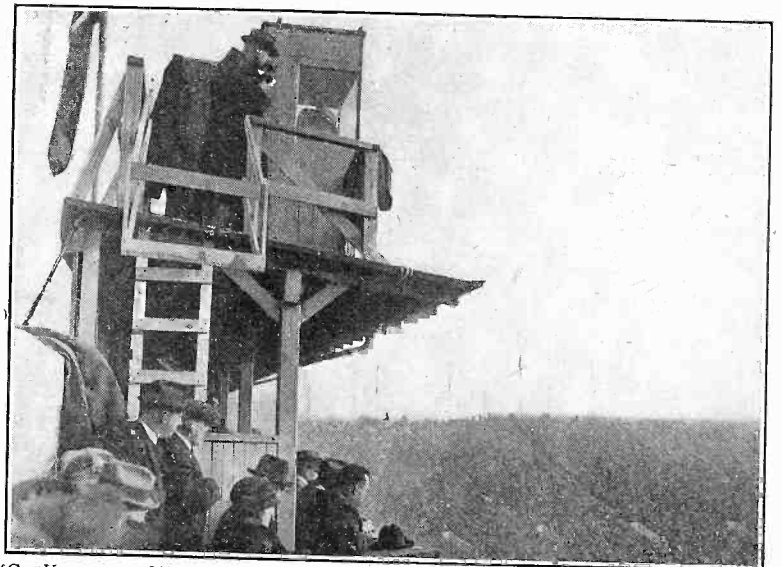
(C. Foto Topics)

No more saying, "Watch the birdie!" Instead, it is now "Ooooh, listen to the radio, Buster!" That is how Charles A. Stein keeps them happy when "shootin' 'em." Child photography is probably hardest because they are afraid of the camera, but the children are so used to radio that they instinctively look and wait for the station to commence sending. In the mean time, "snap-click," and a natural unforced expression.



(C. Kadel and Herbert)

During his recent tour east, Charles Chaplin, director and film comedian, known throughout the entire world as the "man with the funny feet," gave several interesting radio talks on the movies. Naturally all were humorous, as Charlie is a comical optimist and seldom is serious. He is shown before the microphone at WOR where he made his first talk.



(C. Keystone View)

The radio control tower at Franklin Field, Philadelphia, Pa., where WIP observers give a play by play account of the football games played there. There is a soundproof booth for the announcements and also a microphone switchboard so that the fans may hear the cheering and yells. The stand is located far above the heads of the spectators.

Here Are Good Broadcast Programs

Station WGI, Medford, Mass.

360 Meters (830 Kilocycles). Eastern Standard Time. November 23.—12:00 Noon—Selections on the Edison Laboratory Phonograph and by the Ampico. 12:40 P. M.—New England weather forecast. 12:45 P. M.—Closing report on farmers' produce market report. 3:00 P. M.—Amrad Women's Club program. 5:30 P. M.—Closing stock market reports. Live stock markets reports. Government reports. 6:15 P. M.—Code practice, lesson No. 170. 6:40 P. M.—Boston Police reports. 6:45 P. M.—Late news flashes—sports news. 7:15 P. M.—Talk by John J. Rowlands, editor of "National Sportsman Magazine," on "Harvesting the Fur Crop." 7:30 P. M.—Evening program: 1. Selected verses by Mr. Charles L. H. Wagner, radio poet. 2. Musical program to be announced. 3. Red Cross health talk, by Henry Copley Green.

November 24.—6:45 P. M.—Code practice, lesson No. 171. 7:05 P. M.—Boston Police reports. New England weather forecast. New England crop notes, by V. A. Saunders, Statistician. 7:30 P. M.—Evening program: 1. Thirty-fourth of a series of talks on New England Business Problems, by Arthur R. Curnick, of the New England Business Magazine. 2. Musical program to be announced.

November 25.—4:00 P. M.—Twilight program: 1. "Adventure Hour," conducted by the Youth's Companion. 2. Musicals to be announced. 8:30 P. M.—Evening program: 1. Talk on "World Unity," under the auspices of the Massachusetts Federation of Churches, by Mr. E. L. Shaver. 2. Evening musicale program to be announced.

Station KDKA, East Pittsburgh, Pa.

326 Meters (920 Kilocycles). Eastern Standard Time. November 23.—10:00 A. M.—Music. Union Live stock market report. 11:55 A. M.—Arlington time signals. 12:30 P. M.—Music. Weather forecast. 12:50 P. M.—United States Bureau of Market reports. 6:15 P. M.—Organ recital by Lucile Hale from the Cameo Motion Picture Theatre, Pittsburgh. 7:30 P. M.—"Christians Called To Be Missionaries," the Sunday school lesson for November 25, presented by Dr. R. L. Lanning. 7:45 P. M.—The children's period. 8:00 P. M.—National Stockman and Farmer market reports. 8:15 P. M.—Radio Boy Scout Meeting, conducted by Richard Victor, Scoutmaster, Troop No. 1. 8:45 P. M.—Concert by the Dormont Ladies Trio.

November 24.—10:00 A. M.—Music. Union live stock market reports from the National Stockman and Farmer. 11:55 A. M.—Arlington time signals. 12:50 P. M.—United States Bureau of Market reports. 1:00 P. M.—Dinner concert by Dougherty's Orchestra from McCreery's dining room. 2:30 P. M.—Carnegie Tech-Notre Dame football game from Forbes Field. 6:00 P. M.—Dinner concert by the Westinghouse Band under the direction of T. J. Vastine. 7:00 P. M.—Football scores. 7:05 P. M.—Dinner concert continued. 7:30 P. M.—"Bringing the World to America," prepared by "Our World." 7:45 P. M.—The children's period. 8:00 P. M.—Feature. 8:30 P. M.—Concert by the Westinghouse Band under the direction of T. J. Vastine. 9:55 P. M.—Arlington time signals. Weather forecast.

Station WBZ, Springfield, Mass.

337 Meters (890 Kilocycles). Eastern Standard Time. November 23.—11:55 A. M.—Arlington time signals; weather reports; Boston and Springfield market report. 6:00 P. M.—Dinner concert by the WBZ Quintette. 7:00 P. M.—"A Soldier of the Air," dramatized story from the Youth's Companion. 7:30 P. M.—Twilight tales for the kiddies. Current Book Review, by R. A. MacDonald. Farmers' period—"When Farmers Turn Business Men," by Thomas Dyer, director of the Eastern States Farmers' Exchange and Hampden County Farmers' Exchange. 9:55 P. M.—Arlington time signals. 11:00 P. M.—Program of Chamber Music by the WBZ Quintette.

November 24.—11:55 A. M.—Arlington time signals; weather reports; Boston and Springfield market reports. 7:00 P. M.—Dinner concert by the Hotel Kimball Trio direct from the Hotel Kimball dining room. 7:30 P. M.—Twilight tales for the kiddies. "Bringing the World to America," prepared by "Our World" Magazine. 8:00 P. M.—Concert by Mrs. Elizabeth Hoover, pianist; Ruth Ray, violinist. 9:00 P. M.—Bedtime story for grown-ups, by Orison S. Marden. 9:55 P. M.—Arlington time signals.

Station WFAA, Dallas, Texas

476 Meters (630 Kilocycles). Central Standard Time. November 23.—12:30-1:00 P. M.—Address, Dr. Robert Stewart Hyer, Southern Methodist University, on the Sunday school lesson, "Christians Called To Be Missionaries." 8:30-9:30 P. M.—Joe Fusch in piano recital of popular selections.

November 24.—12:30-1:00 P. M.—Prof. J. D. Boon, Southern Methodist University, in Story of the Stars, a review in astronomy. 8:30-9:30 P. M.—Grace Methodist Episcopal Church, South, sends its Sunday school orchestra, Earle D. Behrends, director. 11:00-12:00 P. M.—W. A. Green Company Choral Club, Earle D. Behrends, director.

November 25.—2:30-3:30 P. M.—Radio Bible class, Dr. William M. Anderson, Jr., pastor First Presbyterian Church, teacher; Bible study and Gospel song. 9:30-10:00 P. M.—E. W. Pfaffenberger and assisting musicians in sacred and favorite song recital. 10:00-11:00 P. M.—Dizzy Four Orchestra, now called Lee's Foxtrotters.

Station KYW, Chicago, Ill.

536 Meters (560 Kilocycles). Central Standard Time. November 23.—9:30 A. M.—Late news and comment of the financial and commercial market. 10:00 A. M.—Market reports. 10:30 A. M.—Late financial news and comment. 10:58 A. M.—Naval observatory time signals. 11:00 A. M.—Market reports. 11:05 A. M.—Weather report. 11:30 A. M.—Late news and comment of the financial and commercial market. 11:35 A. M.—Table talk by Mrs. Anna J. Peterson of Peoples Gas Company. 12:00 Noon—Market reports. 12:30 P. M.—"The Progress of the World," furnished by Review of Reviews. 1:00 P. M.—Market reports. 1:20 P. M.—Closing market quotations. 2:15 P. M.—Late financial comment and news bulletins. 2:30 P. M.—Closing stock quotations, Chicago Stock Exchange. 3:00 P. M.—News and sport bulletins. 4:00 P. M.—Late news and sport bulletins. 4:30 P. M.—Late news and sport bulletins. 5:00 P. M.—Latest news of the day. 6:30 P. M.—News, financial and final market and sport summary, furnished by the Chicago Journal of Commerce, and the Union Trust Company. 6:50 P. M.—Children's bedtime story. 10:00-11:30 P. M.—Late show: Artists and program will be announced by radio-phonograph. News, sports and children's bedtime story.

November 24.—(Same as for November 23 up to noon.) 12:10 P. M.—Final market reports. 12:20 P. M.—Final stock reports. 12:30 P. M.—Late financial comment and news bulletins. 2:00 P. M.—University of Chicago vs. University of Wisconsin football contest broadcast from Stagg Field, University of Chicago. 4:30 P. M.—News and sports. 5:00 P. M.—Latest news of the day. 6:30 P. M.—Late news, financial and final market and sport summary, furnished by the Union Trust Company. 6:50 P. M.—Children's bedtime story. 8:00-8:58 P. M.—Musical program—Will be announced by radiophone. 8:58 P. M.—Naval observatory time signals. 9:00 P. M.—News and weather report. 9:05 P. M.—Under the Evening Lamp service including stories, articles and sketches furnished by the Youth's Companion. News, sports and children's bedtime story.

November 25.—11:00 A. M.—Central Church service broadcast from Orchestral Hall, Chicago. Dr. F. F. Shannon, pastor. Musical program under the direction of Daniel Protheros. 6:30 P. M.—Excerpts from the New Testament—An American Translation by Prof. Edgar J. Goodspeed, read by William Ziegler Nourse. 7:00 P. M.—Chicago Sunday Evening Club service broadcast from Orchestral Hall, Chicago. Special musical program will be given by the Choir of One Hundred under the direction of Edgar Nelson. The speaker of this evening will be Sherwood Eddy, New York City, noted missionary, traveler, Y. M. C. A. leader.

Station WJZ, New York City

455 Meters (660 kcys). Eastern Standard Time. November 23.—3:00 P. M.—Organ recital played by Leo Riggs on the Hotel Astor organ, by direct wire from the Hotel Astor. 4:00 P. M.—Fashion developments of the minute prepared by Women's Wear. 4:05 P. M.—Two one-act plays by the Threshold Players. 4:45 P. M.—Piano recital by Alphonse Bohrer. 5:15 P. M.—"The Larger Aspect of World Affairs" by the International Interpreter. 5:30 P. M.—Closing reports of the New York State Dept. of Farms and Markets; Farm and Home reports; closing quotations of the New York Stock Exchange; Foreign Exchange quotations; "The Condition of the Leading Industries" by the Magazine of Wall Street; Evening Post news. 6:00 P. M.—"Cloverfield Farm Stories," by Helen Fuller Orton. 7:50 P. M.—"Looseleaf Current Topics." 8:15 P. M.—"A Story of a Story," the newspaper side of the reporting of the Slocum and Titanic disasters by J. E. Hardenberg, general manager of the City News Association. 9:15 P. M.—United States Navy Night; speeches and musical program.

November 24.—1:30 P. M.—Play-by-play description of the Army-Navy football game direct from the Polo Grounds, New York City; announcing by Walter Trumbull, of the New York Herald, and Ennis Brown, editor of "The American Golfer." 4:45 P. M.—Recital by Adelaide Travers, contralto. 5:15 P. M.—Recitations by Clyde Monroe, blind artist of expression. 5:30 P. M.—Closing quotations of the New York Stock Exchange; Farm and Home reports; closing reports of the New York State Dept. of Farms and Markets; Foreign Exchange quotations; Bradstreet's financial report; Evening Post news; football scores. 6:00 P. M.—"Uncle Wiggly Stories," by Howard Garis. 7:30 P. M.—Dance program and concert by the Battin High School orchestra. 8:45 P. M.—"When Radio Controls Radio," one of the "Highlights of Modern Radio Broadcasting" series of talks by Dr. Alfred N. Goldsmith, Director of Research of the Radio Corporation of America. 9:00 P. M.—American-Scandinavian Evening; program arranged by James Creese.

Station KSD, St. Louis, Mo.

546 Meters (550 Kilocycles). Central Standard Time. November 22.—8:00 P. M.—Broadcasting concert given by St. Louis Symphony Orchestra. Carolina Lazzari, contralto, soloist, direct from the Odeon.

November 23.—Silent.
November 24.—8:30 P. M.—Orchestra concert, organ recital and vocal and instrumental specialties broadcast direct from the Missouri Theatre.

Station WEAf, New York City

492 Meters (610 Kilocycles). Eastern Standard Time. Regular features: Sunday—2:45 P. M.—Interdenominational Services under auspices of New York Federation of Churches. 3:45 P. M.—Regular Sunday Men's Y. M. C. A., Brooklyn, N. Y. 7:20 P. M.—Capitol Theatre Symphony Orchestra and the Capitol Staff of Artists. 9:00 P. M.—Organ recital by Skinner Organ. Monday—7:30 P. M.—United Daily Sports Talk by Thornton Fisher. Tuesday—7:30 P. M.—United Daily Sports Talk by Thornton Fisher. 8:30-9:00 P. M.—Weekly News Digest by H. V. Kaltenborn. Wednesday—7:00-7:30 P. M.—Religious program under auspices of the United Synagogue of America. 7:30-7:40 P. M.—United Daily Sports Talk by Thornton Fisher. Thursday—11:00 A. M.—Special Hour Program for Women. 7:00-7:30 P. M.—Midweek Interdenominational Services under auspices of the New York Federation of Churches. 7:30-7:40 P. M.—United Daily Sports Talk by Thornton Fisher. 8:50-9:00 P. M.—Weekly magazine fiction story. 11:00-12:00 P. M.—Vincent Lopez Orchestra from Hotel Pennsylvania. Friday—7:30-7:40 P. M.—United Daily Sports Talk by Thornton Fisher. 9:00-10:00 P. M.—Astor Coffee Orchestra. Saturday—10:00-11:00 P. M.—Lucky Strike Orchestra. 11:00-12:00 P. M.—Vincent Lopez Orchestra.

Time Schedule: Mornings—Tuesday to Friday, inclusive, 11:00-12:00 A. M. Afternoons—Monday to Saturday, inclusive, 4:00-5:30 P. M. Evenings—Monday, Tuesday, Wednesday and Friday, 7:30-10:00 P. M. Thursday, 7:00-12:00 P. M. Saturday, 7:30-12:00 P. M. Sunday, 2:45-5:30 and 7:20-10:00 P. M.

Station WOR, Newark, N. J.

405 Meters (740 kcys). Eastern Standard Time. November 23.—2:30 P. M.—Soprano solos by Renata Freber Walsh. 2:45 P. M.—Dr. Walter Russell, famous painter of America's fifty most beautiful children, will talk on "The Home—Your Castle—Protected." 3:00 P. M.—Continuation of soprano solos by Renata Freber Walsh. 3:15 P. M.—"Health Hints"—a talk by Dr. Harriet VanBuren Peckham, of Brooklyn. 3:25 P. M.—WOR entertainers in popular songs. 3:45 P. M.—"Half Hours With Famous Women"—Neisa McMein, illustrator and well-known writer, in "The Seven Most Beautiful Women I Have Painted." 6:15 P. M.—"Music While You Dine," by the Apollo Country Club orchestra. 6:30 P. M.—"Man in the Moon Stories for the Children"—copyright of the Newark Sunday Call. 7:00 P. M.—"Music While You Dine," by the Apollo Country Club orchestra. November 24.—2:30 P. M.—Helen Louise Althouse, contralto. 3:00-4:00 P. M.—Original Highland Syncopators of Brooklyn. 6:15-7:30 P. M.—"Music While You Dine," featured by Kenneth Kitchen's Club orchestra. 8:00-9:00 P. M.—Eugene Ingraham's orchestra in a program of dance music. 9:00 P. M.—"Sporting News, Up-to-the-Minute," by Fred J. Bendel, sporting editor of the Newark Morning Ledger. 9:10-10:00 P. M.—Program under the direction of Charles Wakefield Cadman, composer and pianist. 10:00-11:00 P. M.—Concert by the winners of the prize contest of the New York Opera Society.

Station WRC, Washington, D. C.

469 Meters (640 Kilocycles). Eastern Standard Time. November 23.—6:00 P. M.—Children's Hour by Peggy Albion. 8:00 P. M.—A Talk on the United States Coast Guard Service by Oliver M. Maxam, chief of the division of operations. 8:15 P. M.—Song recital by E. D. Langworthy. 8:30 P. M.—Violin recital by Helen Benta. 8:45 P. M.—Song recital by Mabel Terry. 9:00 P. M.—Piano recital by Lotta Linthicum. 9:15 P. M.—Song recital by Robert Woodland. 9:30 P. M.—Violin recital by Helen Benta. 9:45 P. M.—Song recital by Mabel Terry. 10:00 P. M.—Concert by the United States Navy Band, Charles Benter, leader. November 24.—3:00 P. M.—Fashion Developments of the Minute prepared by Harper's Bazaar. 3:10 P. M.—Song recital by Margaret Campbell. 3:20 P. M.—Violin recital by Jose Huerta. 3:30 P. M.—Farm Home Reports. 3:40 P. M.—Current Events prepared by The Review of Reviews. 3:50 P. M.—Instruction in Code Practice. 4:00 P. M.—The Magazine of Wall Street. 6:00 P. M.—Children's Hour by Peggy Albion.

Station WSB, Atlanta, Ga.

429 Meters (700 kcys). Central Standard Time. November 23.—12:00 to 1:00 P. M.—Musical entertainment. 4:00 P. M.—Music by the Howard theatre orchestra. Enrico Leide and Alex Keese, conducting. 5:00 P. M.—Late news flashes, sport summary, markets. 5:30 P. M.—Burgess bedtime story, by Miss Bonnie Barnhardt. 8:00 to 9:00 P. M.—Musical entertainment, presenting John McCrindle, "Radio's Harry Lauder," and other artists. 10:45 P. M.—Transcontinental Radiowl entertainment, presenting concert by Decatur, Ga., artists, featuring a mixed quartet.

November 24.—12:00 to 1:00 P. M.—Musical entertainment. 4:00 P. M.—Music by the Howard theatre orchestra, Enrico Leide and Alex Keese, conducting. 5:00 P. M.—Late news flashes, sport summary, markets. 5:30 P. M.—Burgess bedtime story, by Miss Bonnie Barnhardt. 8:00 to 9:00 P. M.—Musical entertainment, presenting a "Hired Hands" program, featuring employees of The Atlanta Journal. 10:45 P. M.—Transcontinental Radiowl entertainment.

(Concluded on page 23)

Yes, We Have More Records!

DX Nite Owls, Attention!

THE DX season is now upon us.

All faithful DXers are requested to get ready for the fray and prepare themselves for the night vigil.

Send your records to the DX Editor of RADIO WORLD.

Write only on one side of the paper and write clearly.

Give full particulars of your location, your set, your aeriels and other items of interest.

It Helps

From J. E. Bradley, Justin, Tex.

Added the step of A. F. A. to the old time 2 tube set and have started DXing. Following is what I caught Saturday and Sunday nites, October 20 and 21:

WNAD, Norman, Okla., 3:00 p. m., football game; WFAA, Dallas, Tex., 3:10 p. m., football game; WEAY, Houston, Tex., 5:35 p. m., sign off; KDKA, Pittsburgh, Pa., 6:15 p. m., dinner orchestra; WDAF, Kansas City, Mo., 6:17 p. m., football results; WOAI, San Antonio, Tex., 6:18 p. m., news items; WLAL, Tulsa, Okla., 6:25 p. m., phonograph; WDAP Chicago, Ill., 6:28 p. m., health talk; WOC Davenport, Iowa, 6:55 p. m., football results; KFJW, Towanda, Kans., 2:03 p. m., music-phonograph; WEBD, Zion, Ill., 7:12 p. m., lecture; PWX, Havana Cuba, 7:45 p. m., orchestra; WTAM, Cleveland, O., 8:10 p. m., request number from Houston, Tex.; WHAS, Louisville, Ky., 8:12 p. m., solo by Mrs. Knole; WSB, Atlanta, Ga., 8:15 p. m., 11-year-old girl playing piano; WMAQ, Chicago, Ill., 8:16 p. m., football results; WEAF, New York, N. Y., 8:20 p. m., piano solo, joint program with WCAP, Washington; KSD, St. Louis, Mo., 8:25 p. m., program from Missouri theatre; WOQ, Kansas City, Mo., 8:30 p. m., piano solo; KLZ, Denver, Colo., 8:45 p. m., sign off; KHJ, Los Angeles, 8:50 p. m., mandolin and guitar duet; WEAH, Wichita, Kans., orchestra; KFDY, Brookings, S. D., 10:12 p. m., orchestra from Pipestone, Minn.; 9XW, Hastings, Neb., 10:15, testing, calling 8XK; WGY, Schenectady, N. Y., 10:16, Hotel Kenmore orchestra; KFKB, Milford, Kans., 10:18, announce; WBL, Anthony, Kans., 10:25, test program, piano solo—Wooden Soldiers; WOAW, Omaha, Neb., 10:30, football results; KFI, Los Angeles, Calif., 10:31 p. m., announce; WCAP, Washington, 10:35 p. m., Mgr. Donis Parody orchestra; WJAZ, Chicago, Ill., 10:40 p. m., speech about dedication of highway; WSAI, Cincinnati, O., 11:05, Miss Axline Page, pianist; WLAG, Twin Cities, Minn., 12:35 a. m., announce, sign off; KPO, San Francisco, Calif., 12:38 a. m., dance music Palace Hotel.

Sunday, October 21, 1923—WHB, Kansas City, Mo., 12:28 p. m., orchestra and sign off 12:57½ p. m.; WDAF, Kansas City, Mo., 4:30, Sunday school organization program—Quartette, singing, etc.; KDKA, Pittsburgh, Pa., 6:00 p. m., A. A. orchestra; WSB, Atlanta, Ga., 6:10 p. m., Sunday evening choir services; WCAK, Houston, 6:12, phonograph music; KFIX, Independence, Kan., cornet solo; WJAZ, Chicago, Ill., 6:20, solo; KFJZ, Ft. Worth, Tex., 6:55, phonograph; WWJ, Detroit, Mich., 7:10, services; WOC, Davenport, Iowa, sport review; WEAF, 8:10, joint program, organ; WCAP, music from the Skinner Home, New York, N. Y., and Washington, D. C., sign off 10:02 Eastern

time; WHB, Kansas City, Mo., 8:55, Sweeney orchestra; KFI, Los Angeles, Calif., 9:10, lecture, lady; WSY, Birmingham, Ala., 9:20, line off; WDAP, Chicago, Ill., 9:22, Helen Gail Howard, soprano; KHJ, 9:26, organ music from First Methodist Church; 6KW, ———, Cuba, 9:30, sign off; KFLC, Dallas, Tex., 9:35, music, Fair Park.

When the air gets real good expect to beat this.

58 of 'Em as a Start

From D. J. Smith, Box 171, Blackfoot, Idaho,

At present have a one tube regenerative set and am enclosing list of stations for the Nite Owls to shoot at:

KHJ, CHBC, KFAE, KDYF, KFBK, CFCB, WLAG, WAAP, WOS, KFI, KFAF, BEI, KUO, WBAP, KLB, WDAF, WFAA, KFBL, WMAJ, KSD, WWJ, CFCN, KFDB, CFAC, KGW, KGG, KFAT, KLZ, KJS, KFAB, KFDF, KFBD, KFV, KFBV, KHD, WCAS, KDYL, WRAD, WAAB, KFDL, WDAP, KFAY, KFCL, WOC, CKCK, WOAW, KDCC, CJCA, KZN, KFEV, WJAZ, KPO, WHA, WGM.

Counterpoise Seems to Help

From Melbourne Renken, Cole Camp, Mo.

Since cold weather has come and old man static has given up the ghost, it is possible to do quite a bit of DX work. Below is some receiving I have done, using detector and occasionally one step. I am just giving the extreme distances.

WOR, WGY, WEAF, PWX, CKCK, WWJ, KFDL, KFDY, WCAP, WTAM, KHJ, KFI, KPQ, WOAI. The rest of the stations are in between these, of which I have quite a list. Using the one step I can get PWX, Havana, over a room. I have a very common aerial, but for a ground I use a tuned ground counterpoise, with which I can tune out much of the interferences.

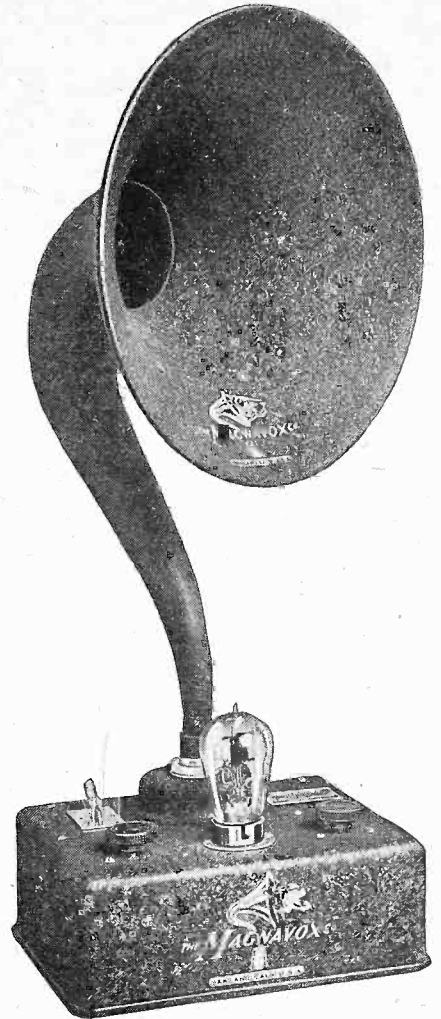
This'll Keep Some of You Fellows Up Nites

From A. H. McKay, 240 Jackson Ave., Bradford, Pa.

I have read the records of the DX Nite Owls for several months and at last I decided to send mine in. I have a single circuit regenerative tuner with one stage of audio-frequency amplification and have received the following stations in the past six months:

KZN, KLZ, KFFQ, KSD, KOV, KOP, KYW, KHB, KHJ, WOAZ, WEEA, WWV, WBAL, WJAL, WHAN, WPAB, WGAZ, WIZ, WEAN, WJY, WDAY, WHN, WAAS, WAAC, WMU, WJAZ, WWAD, WLK, WMAY, WDAP, WMAQ, WGAS, WJAX, WOAW, WBT, WHK, WRK, WLW, WEAO, WWI, WCX, WWJ, WHAS, WHAK, WIK, WJAS, WCAE, WHAF, WMAF, WCR, WMAK, WHAM, WMAC, WCY, WHAZ, WLAK, WNAC, WCI, WBZ, WBAN, WRW, WAAM, WOR, WJZ, WEAF, WBAY, WEAS, WQAA, WFI, WJAR, WNAT, WOO, WIP, WOAG, WAAK, WCAJ, WIAO, WCM, WSB, WPAJ, WAAS, WDAL, WSY, WOAY, WKN, WMC, WOAL, WHB, WDAF, WRAM, WOC, WHA, WCV, WAAC, WKAC, WCAJ, WLB, WLAG, WCAL, WMAW, WDAY, 8ANC, 8KO, 8DCG, 9AMS, 8XX, 9ZAF, 9XM, 9XW, 9XU, 9BM. 133 stations in 35 States, District of Columbia and Canada. 69,517 miles in all. I think that this will give the other Nite Owls a chance to think. Come on in, boys!

MAGNAVOX Radio Products



A1-R—\$59.00

THIS combination of electro-dynamic Reproducer and one-stage Power Amplifier gives the user the utmost in adaptability, convenience and efficiency.

Magnavox Reproducers

R2 with 18-inch curvex horn \$60.00
R3 with 14-inch curvex horn \$35.00
M1 with 14-in. curvex horn. Requires no battery for the field . \$35.00

Magnavox Combination Sets

A1-R consisting of electro-dynamic Reproducer with 14-inch curvex horn and 1 stage of amplification \$59.00
A2-R consisting of electro-dynamic Reproducer with 14-inch curvex horn and 2 stages of amplification \$85.00

Magnavox Power Amplifiers

A1—new 1-stage Power Amplifier \$27.50
AC-2-C—2-stage Power Amplifier \$55.00
AC-3-C—3-stage Power Amplifier \$75.00

Magnavox products can be had at Registered Magnavox Dealers everywhere. Write for new 32-page catalogue.

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New York Office: 370 Seventh Avenue

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Latest Radio Patents

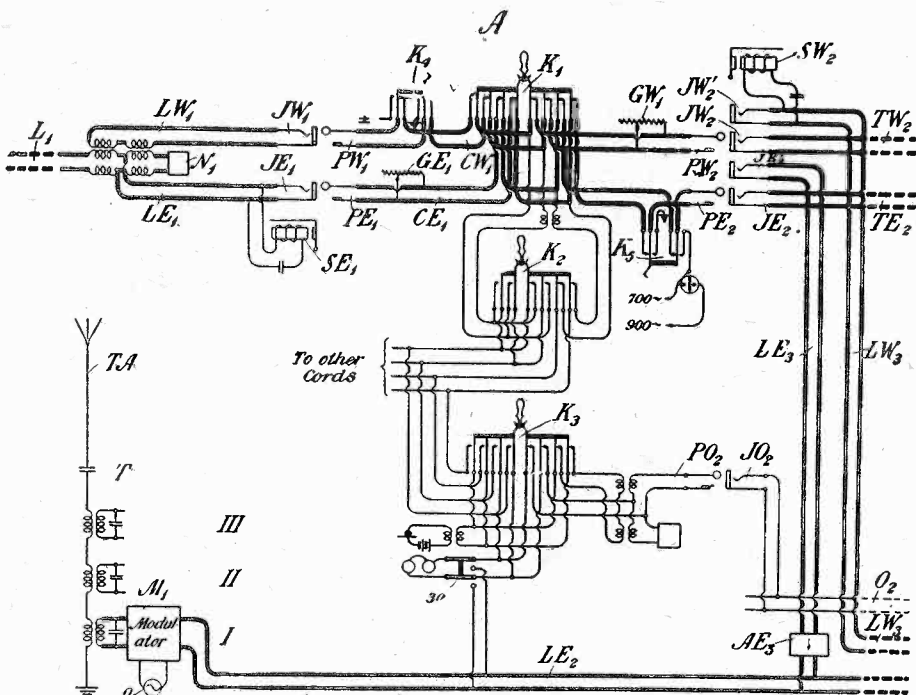
Radio Wire Connecting Circuits

No. 1,472,289: Patented October 30, 1923. Patentees: R. Bown and E. L. Nelson, East Orange, N. J.

This invention relates to connecting circuits and more particularly to connecting or link circuits for establishing connections between wire lines and radio systems.

Radio systems, as now developed, and particularly radio telephone systems, involve a transmitting station and a receiving station, usually located some distance apart, as for example, a mile or so. In order to reduce reaction of the radio transmitter upon the radio receiver, the transmitting station may be provided with a plurality of channels for transmitting to each of several distance receiving stations and the receiving station may likewise be provided with a corresponding number of receiving channels for simul-

perform a number of different operations. For example, he must be able either to listen or to talk and listen simultaneously or independently on any and all radio channels. He must be able to monitor a call which has been set up between radio and wire without interrupting; also, he must be able to talk or listen either way on such a call. Furthermore, the operator should be able before making the final through connections on a call, to adjust the gains on either the transmitting or receiving side of the circuit so that a proper communication will result. Arrangements are, of course, also necessary for signaling over the toll wire circuit or for signaling the distant radio stations. It should be possible for any call to be monitored from the non-operating sta-



Means whereby switches are used to allow flexibility of the apparatus at a radio station, to change circuits and adapt them to different purposes instantly. Especially useful where the transmitter and studio or studios are separated by some distance.

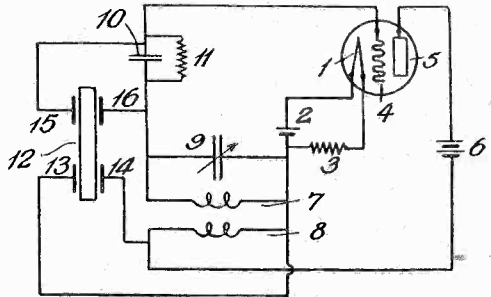
Method of Maintaining Electric Currents of Constant Frequency

No. 1,472,583: Patented October 30, 1923. Patentee: W. G. Cady, Middletown, Conn.

The invention which forms the subject of my present application for Letters Patent is an improvement in the art of producing and maintaining alternating currents of constant frequency. It is well known that heretofore the development of such currents to any very high degree of precision has been unattainable by ordinary means and great difficulty has been experienced in producing alternating currents of high and constant frequency and free from fluctuations due to disturbances in or near the generating system.

The useful applications of my invention are numerous. It may be employed in the transmission or the reception of intelligence by means of high frequency currents, or it may be used for the testing and measurement of such currents and of those in circuits associated therewith in all cases where the frequency may be controlled by the electrical constants of the system, and, in general, the invention is applicable to currents of any frequency.

In an application filed by me on January 28, 1920, Serial No. 354,659, which has matured into Patent No. 1,450,246, April 3, 1923. I have shown and described what I have termed a piezo-electric resonator, which, in general, comprises a plate of piezo-electric crystal with coatings on its opposite face. Such a device has a natural period of vibration, but when set in vibration by a source of alternating current connected to its coating, the amplitude of such vibrations is very slight unless the frequency of the alternating current approximates or equals



Means of maintaining a constant frequency in an alternating current circuit, especially adapted to radio.

taneously receiving messages from said distant stations. In order that the communication facilities provided by such a radio system may be extended over wire telephone or telegraph circuits, it is desirable that some arrangement be provided for interconnecting any long distance telephone circuits, for example, with any one of a number of corresponding transmitting and receiving channels of the radio system.

There are certain factors which make the operation of a radio telephone system distinctly different in some important aspects from similar operation of wire or carrier circuits. The radio receiving station and the radio transmitting station, although located a short distance apart, must be brought to a common point with the toll line terminal so that they may be properly connected for a through circuit from wire to radio. It is further desirable that this condition be duplicated at both the transmitting and receiving station of the radio system, that is to say, duplicate arrangements should be installed at the two stations, which will allow the operation from either station of any or all circuits independently.

Each radio operator must be able to

tion; that is to say, if operation is being carried on from the receiving station board, it should, at the same time, be possible to monitor all connections from the transmitting station board as well. Finally, provision must be made for the operator to cut over quickly and readily to an order wire connecting the transmitting and receiving station of the radio unit.

In accordance with the present invention, connecting or link circuits are provided and so organized as to interconnect wire lines with radio channels, in such a manner as to satisfy the foregoing requirements. As it is obviously necessary that the two-wire toll line which is brought up to the radio station, must be split into a four-wire circuit before connection with the radio transmitting and receiving channels, there are two possible places in the circuit where the necessary switching and operating arrangements may be introduced. These are in the two-wire line or in the four-wire part of the circuit. In accordance with the present invention, arrangements are provided for performing the switching operations in accordance with either of these methods.

the natural or critical frequency, in which case the reaction of the deformed crystal upon the circuit may be such as to practically choke back the alternating current. In carrying out my present invention I utilize this piezo-electric resonator in the manner hereinafter to be described.

The special properties of the piezo-electric resonator that I take advantage of for my present purpose are—first: that property by virtue of which such a resonator, whose vibrations are maintained by impulses; received from one electric circuit, may be used to transmit energy in the form of an alternating current into another circuit; second, that property which it possesses of modifying by its reactions the alternating current of a particular frequency or frequencies flowing to it; and third, the fact that the effective capacity of the resonator depends, in a manner which will more fully hereinafter appear, upon the frequency of the current in the circuit with which it may be connected.

In the description and explanations of my invention which follow, I have assumed the piezo-electric resonator to comprise a single suitably prepared plate cut from a piezo-electric crystal.

GET THOSE DX STATIONS WITH THE
Pat. Pend.
MICRO-COUPLER
NEW! SENSITIVE!
NOT COMPLICATED!

Gets those distant stations where others won't pick up a sound.
Use it in any circuit with best efficiency, in place of variocoupler.

Unmounted\$3.60 } Prepaid
Unit Panel.....\$7.75 } Insured

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The Amateur Radio Equipment Supply
1304 Federal St., Philadelphia, Penna., U. S. A.

OUT OF THE ETHER

Chats About Broadcasting Stations

By Hirsch M. Kaplan

For Maximum Amplification Without Distortion and Tube Noises
use the well known
Como Duplex Transformers
Send for literature
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SEND NO MONEY **Guaranteed!**
\$3.98
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SEND no money! Order by postcard and pay postman on arrival. If they do not excel any other phones ever used regardless of price, return them and your money will be refunded at once.

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MORE THAN A LOUD SPEAKER
Bristol Audiophone, Sr., 15-in. Horn...\$22.50
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Bristol Single Stage Power Amplifier...\$25.00
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Waterbury, Conn.

WE REPAIR RADIO TUBES

WD-11...	\$3.50	UV-199...	\$3.50
WD-12...	3.50	C-299...	3.50
UV-200...	2.75	UV-201A...	3.50
UV-201...	3.00	C-301A...	3.50
C-300...	2.75	UV-202...	4.00
C-301...	3.00	C-302...	4.00
UV-6A...	\$3.50		

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Dealers and agents write for special discounts.

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Complete mark-down parts for the 5-tube Fada Neutrodyne Receiver, including drilled engraved Bakelite Panel and Base Board\$65.00
Absolutely guaranteed on our money-back basis.

Amperite—Automatic Filament Control.
Unmounted \$6.70. Mounted.....\$1.10

Langbein and Kaufman Variometers.....\$6.00
Langbein and Kaufman Variocouplers.....\$6.00

Our stock consists of a most complete line of all standard radio apparatus. Just let us know what you want and we will ship it to you immediately at regular manufacturers' prices.

Rametra CORPORATION 23 Warren St. New York City

Some Radio and It's GIVEN AWAY

An interesting talk on "The Laying of the Greatest American Cable" by W. C. Davies, vice president of the Postal Telegraph Cable Co., came through from station WNAC.

Jimmie Clark's "White Way Entertainers" amused us with a jolly song review. Their program was broadcast through WDT.

Station CKAC, Montreal, Canada, offered a splendid program of classical music by the orchestra of the S.S. "Regina."

The former British premier, Lloyd George, sure was a busy man recently for we heard him on several occasions—first through KDKA, then WJAX followed by a talk from KYW.

Scotty Holmes and his Crown Hotel dance orchestra, through WJAR, offered a delightful program of dance music, which certainly did keep us one-stepping into early the next morning.

WSAD, Providence, R. I., came through with a musical recital by Helen Grey Whitney, soprano, accompanied by Miss Bertha Woodhull at the piano.

Do you want to increase your knowledge of radio? Well, listen to the weekly talk on "Radio for the Layman," as delivered by Albert E. Sonn, through WOR.

As long as the Cleveland Union Trust Co., through their station WJAX, keep offering their popular programs, we radio fans should never have the blues.

Again we tuned in WGR, who was this time broadcasting the Junior League Ball, which took place in the ballroom of the Hotel Statler.

The Blackstone Trio and the Drake Hotel Ensemble, with their splendid offering helped us to pass an enjoyable evening. As usual they were part of the program offered by station WDAP.

Col. H. H. Hartney's talk on "Commercial Aviation" from station WRC was mighty interesting.

DX weather must be approaching for we unexpectedly tuned in Will Foster, organist of the First Methodist Church of Fort Worth, Texas, who entertained us with one of his splendid organ recitals through station WBAP.

A favorite of the kiddies is Uncle Dave Cory, who from station WJZ, tells them of "Uncle Peter Wiggly and His Family."

A rare treat was the program of band music as played by the J. W. C. I. Band through WOO.

The fighting fans' idol, Benny Leonard, again appeared at WHN, and this time presented a few of the features from his Wigwam Cafe.

The Waterman Trio, from station WEAN, sure did make a hit with us.

Say, fellows, I'll tell you how you can get a Radio Set like mine without spending a single penny for it. My set came to me complete, all ready to use, with single slide tuning coil, crystal detector, phone condenser and double Rico headphones.

No expense for batteries—they're not needed with my set. The set's a dandy—I wouldn't take \$15 for it.

Read what other fellows say about their sets, then send your name today to the Home Supply Co., 131 Duane Street, Dept. 367.

They'll tell you how a few minutes of your spare time will bring you a set like mine without costing you a penny.

Here's What the Fellows Say

I have received the "Crystal Set." We get wonderful results. We are 22 miles directly west of Philadelphia. A list of stations received perhaps will be of interest to you: WGY, Schenectady, N. Y.; WJAX, New York City; WHAZ, Troy, N. Y.; KDKA, East Pittsburgh; WOO, Philadelphia; WIP, Philadelphia; WFI, Philadelphia.

For a crystal set we think this a wonderful range. When the atmosphere is right we get these stations very clearly, especially the ones in New York State.

Again thanking you for your many favors, I am,
Most sincerely,
R. B. B., Box 182, Paoli, Pa.

Received a Radio Set from your company some time ago, and thought perhaps it would interest you to know that I reach further than the twenty miles the paper stated. The following are the stations which I reach: WOO, Philadelphia, Pa.; WJAX, New York City; WOR, Newark, N. J.; WJZ, N. Y.

Yours respectfully,
H. B. F.

Send in your name NOW—and get your set without delay and without spending a cent for it.

HOME SUPPLY CO.
131 DUANE STREET Dept. 367 NEW YORK

SELECTO, Jr.
180° Variocoupler
Greatest Selectivity
200-600 Meters

The Retor is mounted without the use of any mass of dielectric resulting in minimum losses with consequent selectivity and sharp tuning.

Requires only 3/4" of panel width, about one half as much as most couplers, and is ideal for the portable set.

Absolutely guaranteed, which means that if not perfectly satisfactory, your money will be returned without question.

Price \$3.00 net

If your dealer cannot supply you, remit P. O. or Express Money Order and sample will be sent prepaid.

J. E. TAYLOR
202 N. Calvert St. Baltimore, Md.

Due to increase in business activities, it has been found necessary to install two telephone trunk lines in the office of RADIO WORLD. These two trunk line numbers are Lackawanna 2063 and Lackawanna 6976. If one is busy, try the other.

Radio Merchandising

Advertising Rates: Display, \$5.00 an inch, \$150.00 a page. Classified Quick-Action Advertising, 5 cents a word. Phones: Lackawanna 6976 and 2083

New Radio Music

MAUD MORAN, music composer, has entered a new field. The Moran Music Publishing Co., Vincennes, Ind., has published two of her radio compositions, "The Radio Blues" and "Radio Song," a waltz.

The radio blues is the plaint of a young lady who wants some one to call her over the radio, because she is blue, while the other song is a ballad of a more romantic nature. Both songs have catchy melodies and lyrics.

This is one of the earliest ventures of a music publishing house to incorporate radio into their songs, and if these are a tasting sample, they are sure to please. More composers should take radio as a theme as it is not as timeworn as some of the other hackneyed ones. Miss Moran has broken the ice.

New Radio and Electrical Firms

Harris Products, manufacture electrical and radio devices, \$100,000; Paul Harris, H. Harris, Louis A. Fishoff, New York. (National Corporation and Guarantee Co.)

Durrant Radio, Ltd., New York City, 100 shares common stock, no par value; J. E. Whiting, G. O. Castell, E. W. Dankel. (Attorneys, Avery & Whiting, 5 Nassau St.)

Watertown Radio Service, Watertown, N. Y., \$10,000; H. B. Graves, J. F. Taylor, J. Purser. (Attorney, H. B. Donaldson, Watertown.)

Stone Electric Co., Brooklyn, electric devices, \$3,000; M. D. Wechsler, J. Kopleman. (Attorney, J. Bregman, 233 Broadway.)

Radio Tube Exchange, Philadelphia, Pa., manufacture and sale of radio tubes, \$100,000. (U. S. Corporation Co.)

Nature Radiophone Co., Wilmington, manufacture radio equipment, \$1,000,000. (Colonial Charter Co.)

Radio Trade Notes

The Reliable Radio Supply Co., 17 Fairfield Ave., Bridgeport, Conn., would like to hear from manufacturers and jobbers.

* * *

Harold Austin, who is in charge of radio training in the 28th Infantry, United States Army, Fort Niagara, N. Y., states that he is always in the market for radio parts and would like to receive circulars on antennae, amplifying transformers, vacuum tubes and condensers.

* * *

M. C. Robinson, 2801 East 48th St., East Lake, Tenn., is considering adding a small line of radio supplies to his stock of general merchandise and would like to receive dealers' discounts. His territory includes the immediately adjacent town of Rossville, Ga.

* * *

Rupert H. Paul, Texico, New Mexico, expects to sell radio supplies and complete outfits. He would like to receive wholesale prices from manufacturers.

Newark Holds Third Annual Radio Show

THE Third Annual New Jersey Radio Show, held from November 14 to 17, at the Robert Treat Hotel, Newark, N. J., exceeded all expectations and broke all records for past shows. More exhibitors applied for space than ever before and their booths showed a decided improvement over the past.

Among the firms exhibiting were; Mydar Radio Co., Essex Mfg. Co., Newark Sunday Call, Newark Evening News, Newark Ledger, Lightrite Co., L. Bamberger & Co., Weston Electrical Instrument Co., The Shelton Co., Roval Electric Laboratories, A. B. Cole, Newark Electrical Supply Co., Newark Star Eagle, Tri-City Electrical Co., National Light & Electric Co., North Ward Radio Co., Shamrock Mfg. Co., American Transformer Co., Westinghouse Batteries, H. B. Hyman Co., New York City; R. C. Outlet Co., L. B. Radio Co., Fiber Products Co., Starter and Battery Service Co., Radio Distributing Co., Exide Battery Co., American Radio Panel Co.

The Micro-Coupler

THIS entirely new and novel piece of radio apparatus has proven its efficiency many times since its recent perfection. Mr. Talone, inventor of the micro-coupler, had had wide experience in radio circles, having started out as a wireless amateur some ten years ago, later joining the Naval Service as soon as the war began. In 1918, when radio-telephone work was in its infancy, he was selected to attend the U. S. Naval Radio-telephone School at New London, Conn., and later installed the set aboard the U.S.S. "Kansas." From chief radio electrician he later became commercial operator in the American Merchant Marine.

A good feature of the coupler is that closest possible coupling necessary in some of the circuits in use today can be made. The inductance coils can be brought so closely together that they touch.

With the exception of two mounting screws all metal parts are eliminated, in this way eliminating energy losses.

Primary and secondary coils are very thin multi-bank wound and designed for best operation on broadcasting wave lengths.

Primary has eight and secondary four taps. If used in regenerative circuits, the secondary has more than sufficient inductance for this purpose.

A feature not found in any other type of coupler now on the market is that at all times the planes of the two inductance coils are the same, and in actual reproduction a better tone than usual is noticed, since there is a direct transfer of energy with no changes in the direction of the fields of the coils, as is the case with a variocoupler.

Radio Literature Wanted

Manufacturers of and dealers in radio apparatus and accessories are notified that literature and catalogues describing their products have been requested, through the Service Editor of RADIO WORLD, by the following:

Frank Walsh, Jr., 724 North 37th St., Philadelphia, Pa.

Jay Nunes, 1006 Fourth St., Des Moines, Iowa. Reliable Radio Supply Co., 17 Fairfield Ave., Bridgeport, Conn.

H. Armstrong, De Luxe Piano Co., 1170 Second Ave., New York City. (Wants wholesale price lists.)

Harold Austin, Headquarters Co., 28th Infantry, Fort Niagara, N. Y.

C. P. R. Men's Store, 415 North Railway St., Medicine Hat, Canada.

Lynn W. Eddy, 30 Blanchard St., Jamestown, N. Y.

John Richardson, 41 Locust St., Buffalo, N. Y. Leslie A. Didsbury, 469 Putnam St., Bridgeport, Conn.

M. C. Robinson, 2801 East 48th St., East Lake, Tenn.

Edgar T. Carr, 110 East Nesquehoning St., Easton, Pa. (Will build a three-tube set.)

Otto H. Hunzicker, Letter Carrier No. V, Lawrence, Kansas.

Frank Cag, 410 Illinois Ave., Jeffersonville, Ind. (Interested in neotrodyne sets.)

Marcus Acheson, Rice Institute, Houston, Texas. E. C. Channell, 406 Barry Ave., Chicago, Ill.

Paramount Service, 12 Drake Bldg., Oneida, N. Y. (Retailer.)

Kearney & Davis, 2918 N. Sixth St., Philadelphia, Pa. (Retailers. Build and repair sets.)

S. Horowitz, 203 Congress Ave., Chelsea, Mass. M. P. Pool, Colser, Ala.

Lewis B. Hill, Woodburn, Ky.

J. W. Myers, Vandalia, Mo. (Builds sets.)

T. J. Capella, Point Reyes Station, Marin Co., California.

Thos. P. Conroy, 4062 East 71st St., Cleveland, Ohio. (Retailer.)

Homer J. Dean, 1443 East Elliot St., Erie, Pa. (Retailer.)

E. K. Hughes, Heron Lake, Minn. Leslie E. Potts, Rea, Mo.

The Radio Club, Leraysville, Pa. A. J. Baker, Dryden, Lee Co., Va.

The Radio Shop, P. O. Box 196, Wahoo, Neb. Reginald C. Neurman, East Barnet, Vermont.

W. F. Rothermund, 205 Second St., Keyport, N. J.

I. E. Hayes, 466 Tulpehocken St., Reading, Pa. Harry Ellert, 1905 Roscoe St., Chicago, Ill. (Retailer.)

Radio and Electrical Business Opportunities

Rate: 40¢ a line. Minimum, 3 lines.

PARTNER—Manage radio stores; must have references that will stand investigation; only small investment, but entire time required; chain store proposition, New York City or out of town; reply by letter only for appointment. Room 96, 90 West Broadway.

RADIO mechanical engineer; experienced; manufacturing; sales; looking for connection; can produce business. Box A, Radio World.

RADIO patent vario-coupler and variometer combination, more sensitive than anything on market; sell outright or royalty. Box B, Radio World.

ALL rights for Canada and Cuba, to an absolutely new article, introduced last Spring, and now being sold in all the leading department stores and electric stores of Greater New York; demand is so great that it is difficult to fill orders; small amount of cash required as an evidence of good faith, and balance can be arranged on royalty or stock basis, provided parties show sufficient capital to handle the business properly; references required. Apply by letter to Box C, Radio World, upon receipt of which an interview will be arranged.

**All Together, Now, Everybody Root Hard for the Success of
National Radio Week, November 25 to December 1, 1923**

Here Are Good Broadcast Programs

(Concluded from page 18)

Station WOC, Davenport, Iowa

484 Meters (620 Kilocycles). Central Standard Time. November 23.—10:00 A. M.—Opening market quotations. 10:55 A. M.—Time signals. 11:00 A. M.—Weather and river forecast. 11:05 A. M.—Market quotations. 12:00 Noon—Chimes concert. 2:00 P. M.—Closing stocks and markets. 3:30 P. M.—Educational program—(Musical numbers to be announced.) Lecture by C. A. Russell. Subject: "Body Heat and Fever." 5:45 P. M.—Chimes concert. 6:30 P. M.—Sandman's visit. 6:50 P. M.—Sport news and weather forecast. 8:00 P. M.—Musical program (1 hour)—Erwin Swindell, Musical Director. Geneseo Male Quartette, of Geneseo, Ill.

November 24.—10:00 A. M.—Opening market quotations. 10:55 A. M.—Time signals. 11:00 A. M.—Weather and river forecast. 11:05 A. M.—Market quotations. 12:00 Noon—Chimes concert. 12:30 P. M.—Closing stocks and markets. 3:30 P. M.—Educational program—(Musical numbers to be announced.) Lecture by C. C. Hall. Subject: "Hemorrhoids." 5:45 P. M.—Chimes concert. 6:30 P. M.—Sandman's visit. 6:50 P. M.—Sport news and weather forecast. 9:00 P. M.—Orchestra program (1 hour) P. S. C. Orchestra. Gerald M. Barrow, director. (Popular selections released through the National Association of Broadcasters, of which WOC is a member.)

Station WGY, Schenectady, N. Y.

380 Meters (790 Kilocycles). Eastern Standard Time. November 23.—11:55 A. M.—Time signals. 12:30 P. M.—Stock market report. 12:40 P. M.—Produce market report. 12:45 P. M.—Weather forecast. 2:00 P. M.—Music and household talk, "Home Decorations and Abominations" (Courtesy of "Modern Priscilla"). 6:00 P. M.—Produce and stock market quotations; news bulletins. 6:30 P. M.—Children's program. 7:35 P. M.—Health talk, N. Y. State Department of Health. 7:45 P. M.—Radio drama, "The Intimate Strangers," WGY Players. 10:30 P. M.—Program of Russian music. November 24.—11:55 A. M.—U. S. Naval Observatory time signals. 12:30 P. M.—Stock market report. 12:40 P. M.—Produce market report. 1:45 P. M.—Yale-Harvard football game direct from Cambridge, Mass. 9:30 P. M.—Phil Romano's Rain-bo Orchestra at the Kenmore Hotel, Albany, N. Y.

Station KHJ, Los Angeles, Calif.

395 Meters (760 Kilocycles). Pacific Time. November 23.—12:30-1:15 P. M.—Program presenting Paul Ford, baritone. 2:30-3:30 P. M.—Matinee musicale. 6:45-7:00 P. M.—Children's program. 7:00-7:30 P. M.—Organ recital from First Methodist Episcopal Church. Arthur Blakely, organist. 8:00-10:00 P. M.—Program arranged by Oberlin Alumnae. Walter F. McEntire, lecturer, will talk on "Mission Santa Barbara." 10:00-12:00 P. M.—Broadcasting Art Hickman's Orchestra, by line telephony, from the Los Angeles Biltmore Hotel. Nov. 24.—12:30-1:15 P. M.—News items. Music. 2:30-3:30 P. M.—Matinee musicale. 6:45-7:30 P. M.—Children's program. 8:00-10:00 P. M.—Program presenting the Southern California Saxophone Band, Kathryn Thompson, director. 10:00-12:00 P. M.—Broadcasting Art Hickman's Orchestra, by line telephony, from the Los Angeles Biltmore Hotel.

Station KFAE, Pullman, Wash.

330 Meters. Pacific Time. November 26.—"Milk and Health." Prof. E. V. Ellington. Musical features. "Mining Opportunities in Washington," Prof. Hugh M. Henton. November 28.—"How to Study Occupations," Dr. D. W. Hamilton. "Housecleaning Made Easier," Dean Florence Harrison. Music. "Aspects of the Future of Agriculture," Dean E. C. Johnson. November 30.—"Control of Water Borne Diseases," Prof. M. K. Snyder. "Talk on New Books," Miss Alice L. Webb. Music. "Gas Engine Cooking," Prof. C. C. Johnson.

Station WLW, Cincinnati, Ohio

309 Meters (970 Kilocycles). Central Standard Time. November 23.—10:30 A. M.—Weather forecast. Business quotations. 1:30 P. M.—Business reports. 3:00 P. M. Stock quotations. 4:00 P. M.—Special matinee arranged by Margaret Spaulding. Fantasy "Pierrot's Mother" in one act. November 24.—10:30 A. M.—Weather forecast and business reports. 1:30 P. M.—Business reports. November 25.—11:00 A. M.—Services from the Church of the Covenant, Dr. Frank Stevenson, minister.

Coming Events

BOSTON RADIO EXPOSITION, December 3-8, Boston, Mass.

NATIONAL RADIO WEEK, November 25 to December 1, 1923.

SECOND ANNUAL RADIO SHOW, Los Angeles, Calif., February, 1924.

Chicago Radio Show a Big Success

THE Second Annual Chicago Radio Show, held at the Coliseum, opened its doors November 20, to the biggest crowd that has ever visited a radio show in the mid-west. The visitors arrived early and clamored for admittance before official opening time. Most of the exhibits were complete.

Farmers, school children, women, octogenarians, and everybody in general seemed to make up the crowd. By far



M. J. Hermann, Managing Director, Chicago Radio Show

the greatest interest was displayed by the farmers. This is due, no doubt, to the fact that radio has had wonderful publicity in the smaller towns, and as it is such a great help to the farmer, he wants to keep absolutely up-to-date.



James F. Kerr, Manager, Chicago Radio Show

The amateur exhibits created a lot of interest. It was expected that about twenty or thirty would compete, but there were nearer to a hundred, and they kept on piling in every couple of hours. Some very novel and complete amateur constructed sets were exhibited, and it will prove quite a task for the judges to award the prizes, as there are so many fine examples of good work.

Stations WDAP and WJAZ are putting on special programs, which are amplified

at the exposition and everybody in the large auditorium can easily hear every word spoken and every instrument played. This in itself is no mean task, as the Coliseum is a large place and to fill it with the broadcasting requires a score of power amplifiers and horns correctly located.

The management of the show has tried to place the exhibits so that each and every one will be displayed to advantage. Credit is due them for the manner in which the show was carried off.

Congress Should Supply More Government Radio Funds

By George Lewis

Crosley Manufacturing Co.

THE United States Government has done more than any government in the world to advance radio telegraphy and telephony. It desires to continue this work, which is so beneficial to all of us who are interested in the manufacture, sale and use of radio receiving and broadcasting apparatus, but its hands are tied by the lack of funds. The Bureau of Standards and the Radio Section of the Bureau of Navigation are trying as hard as possible, with the small amount of money available, to advance the cause of both commercial radio and broadcasting, but because Congress has refused to increase the appropriation for this work, it has been compelled to slow down, and rapidly is approaching a compulsory cessation of its endeavors.

National Radio Week, November 25th to December 1st, which every person interested in radio is trying to make the greatest week in the history of radio, will be an ideal time for the individual radio enthusiast, working in co-operation with the manufacturers, distributors, dealers, trade organizations and radio clubs, to make a concerted drive upon Congressmen and Senators, flooding them with personal appeals in order that the good work of the Bureau of Standards may be continued.

Your representatives in the United States Congress have it within their power to do this, and are certain to abide by the will of their constituents. Let these men, or women, know you appreciate your government's efforts to foster radio, and point out to them the vital necessity of additional funds for this work.

Radio broadcasting in this country has reached a point far in advance of that in any other country, a condition brought about to a great extent by the broad and far-reaching policies adopted by our government. The commercial branches of the government have attempted to keep up with the growth of this new branch by bringing into effect proper legislation and inspection to permit the listening public to enjoy the concerts to the fullest extent. The constantly increasing demand for inspection and for legislation has completely swamped the limited personnel available, a condition that quickly will result in America losing her position as a leader in the radio art.

And in the meantime other powers are appropriating larger amounts of money for the development of radio broadcasting, their efforts discouraging the men connected with our own governmental departments.

Remember, therefore, that the Federal radio laboratories and inspection services are operating only in order to give service to the American people—and that the men who are operating these need additional funds to carry on their work. Your Congressmen will approve larger appropriations if you will but let them know you favor such action.

This Week's Specials

Prices effective to December 1st.

Watch Our Weekly Specials.

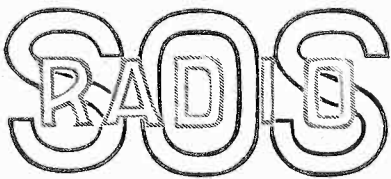
- No. 1. For Hazeltine or other Tuned R. F. Circuits
3 R. F. Transformers; 2 Micro-Mike Condensers **\$5.95**
- No. 2. For Variometer-Variocoupler Circuits
1—Estru Variometer; 1—Variocoupler (Estru or Uniflex) **\$7.55**
- No. 2. With 2—ESTRU Variometers **11.60**
- No. 2. With 1—50, 100, 150 Load Coil **8.95**

For Auto-Plex or High Inductance Circuits

- No. 3. 1—1500 Turn Green Lattice Coils **\$2.35**
Same with base mounting **3.05**
- No. 4. 1—1250 Turn Green Lattice Coils **1.95**
Same with base mounting.. **2.65**
- 1—1500 T and 1250 T Green Lattice Coils **4.15**
- 1—1500 T and 1250 T Green Lattice Coils with base mounting **5.55**

HOW TO ORDER

PLEASE give number, description and price of the article you order to help us avoid mistakes. Total the amount of your order and send Post Office money order, certified check or draft with your order. Be sure to give your name and address on both letter and envelope. Do not include money for transportation. We pay it.



2903 W. MADISON STREET
CHICAGO, ILL.

Radio Humor a Solemn Affair

WHEN we go to the vaudeville theatre or musical comedy, we laugh at the comedian's jokes mostly on account of his funny antics or because some one in the audience with a particularly funny funny-bone laughs first. But when we obtain humor over radio it is an entirely different matter. We sit with the head phones clamped over our ears or before a loud speaker. We cannot see the comedian and we have no audience around us to encourage us to laugh; we sometimes cannot see the jokes.

For this reason, the radio humorist has his troubles, and John Skinner, the official humorist for radio station WBZ of the Westinghouse Company at Springfield, Mass., is no exception. Mr. Skinner comes to the station three times a week loaded with jokes to give to the sober audience. And sober they are and rightly so even though they have a good sense of humor.

So the humorist starts to give his jokes. He tells one about an Irish ditch digger and then pauses. He doesn't know how that went over but it was one of his best. Now he tells one about the Scotchman and his golf. But still no reaction. For the ordinary humorist, this would be so discouraging that he would quit on the spot, but not so with Mr. Skinner. He is experienced.

The WBZ humorist knows that although he cannot hear the laughter and giggles of his audience he is certain that a few thousand are enjoying the jokes and that is better than the ordinary vaudeville performer can say.

Mr. Skinner is not a humorist by profession and that is probably why he is such a success on radio. He is a graduate of Yale and has chosen the newspaper profession as his ladder to success.

The WBZ humorist can tell stories in practically every dialect. Scotch, Irish, Negro, French, Swedish are easy for him and his ability to vary his jokes and tell them in their original dialect is responsible for his success over radio.

The time may come when professional laughers will be present at the studio to laugh in order to start the audience to laugh.



ON APPROVAL FOR 30 ¢
ZOBEL-STEIN LABORATORIES
322 9TH ST. BROOKLYN, N.Y. SOUTH 2650

WD-11 and WD-12 TUBES REPAIRED

- WD-11 or WD-12 **\$3.50**
- C-300 or UV-200 **2.75**
- C-301 or UV-201 **3.00**
- C-302 or UV-202 **3.50**
- C-301A or UV-201A **3.50**
- DV-6 or DV-6A **3.00**
- C-299 or UV-199 **3.50**

All tubes guaranteed to work like new.
Mail Orders Given Prompt Attention
"24 Hour Service"

RADIO TUBE CORP.
70 Halsey Street Newark, N. J.
TUBES SENT PARCEL POST, C. O. D.

For Clear and Loud Reception INSIST ON Defiance Mica Condensers



Whose Quality is Guaranteed.
Made in the full capacity. Mail orders filled.
.001 25c. .0005 20c.
.002 30c. .00025 20c.
.0005, .00025, made with 1/2, 1 and 2 Mags G. L. 25c.



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Three in one. Galena, silicon and iron pyrites sold under a replacement guarantee. All tested.
Price 50c each

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SAVING OF SPACE

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Head Set and
Loud Speaker or
Two Head Sets —
permitting instant
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Manufactured by
G. E. WALKER CO., Inc.
1926 CHESTNUT ST. ST. LOUIS, MO.

New Method of Teaching Radio

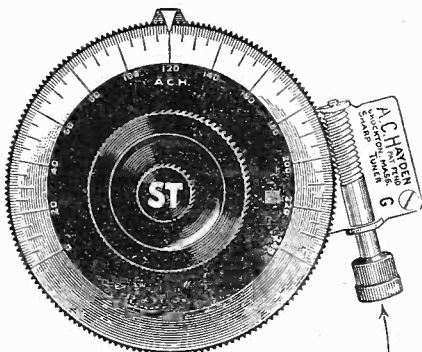
An entirely new and exclusive method of instruction in radio has been formulated by the American Radio Association 4513 Ravenswood avenue, Chicago, of which G. A. Mohaupt is engineer. The greatest difficulty in teaching radio by mail was the inability of the student to grasp the practical as well as the theoretical side of the subject through the means of charts and pictures alone. The American Radio Association gives, with their course, a radio outfit ready for wiring. The student is taken step by step through all the phases of radio. He works on an actual radio set and his education, therefore, is of practical value. He is not given mere book learning but he learns by actually doing.

The student having the radio outfit at hand works on his subject with greater interest and he very quickly qualifies for work in the radio field. Many graduates of the American Radio Association earn considerable money during their spare time by constructing and installing radio sets for their friends and neighbors. Mr. Mohaupt reports that the demand for radio trained men far exceeds the supply and it is his prediction that the radio field, although enormous now, will in time prove very valuable to men who get in on the ground floor now.

Static Bars Cupid

PRETTY little lady-o,
Cut in on your radio,
Listen to the broadcast from my attic.
Witty little lady-o,
Tell me, is it "yes," or "no"—
Just my luck—tonight there's too much static.

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Why the A.C.H. is different

- 3 in. DIAL (156-fo-1)
- 4 in. DIAL (215-fo-1)

Rough tuning with dial or one thousandth of an inch in either direction.

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Price ACH 3" Dial Complete.....\$2.50
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Regular fitting 5-16" hole, 1/4" and 3-16".
Bushings, 5c. each extra. 10c. for all.

"A booster for the A.C.H. Dials."
A. F. Goodman, Biloxi, Miss.

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W. J. Mulcahy, Newark, N. J.

To retain your good will you must be satisfied or money back.

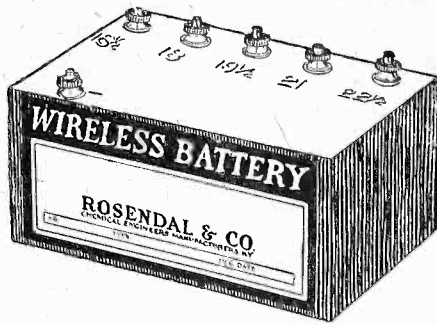
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All ready for you to put together.

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Mail Orders sent prepaid in U. S. A.

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	Large	Med.	Small
22½ V. Plain ...	\$1.25	\$1.00	\$0.70
22½ V. Variable.	1.38	1.13	0.75
45 V. Plain ...	2.50	1.75
45 V. Variable.	2.75	2.00

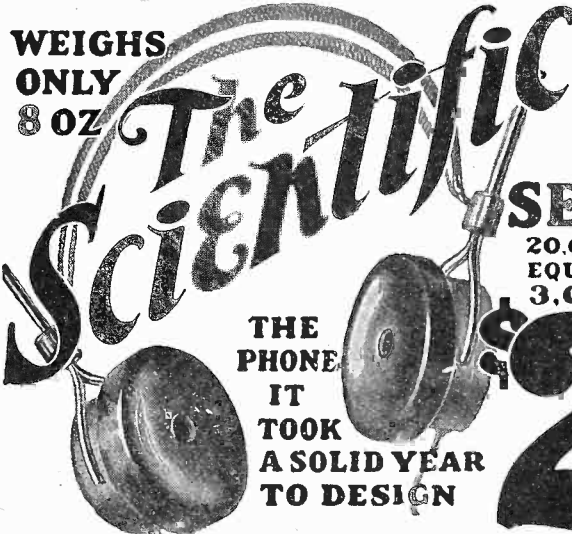
Ask for Circular on other radio parts

"TUNE IN" with a "Rosendal" and see how much better your programs will come in. A "Rosendal" is first of all a good battery—very carefully and scientifically made. It comes to you fresh—not a week old when you get it—and at a price that cuts out the middleman and saves you money. In addition to that, it's guaranteed. Money back if you're not satisfied.

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Chemical and Radio Engineers
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LOUD SPEAKER UNIT \$1.95

We Guarantee The Scientific Headset to be the greatest value on the market. Try it for five days. If not satisfactory send it back and your money will be refunded immediately. Circular on request. Dealers wanted.

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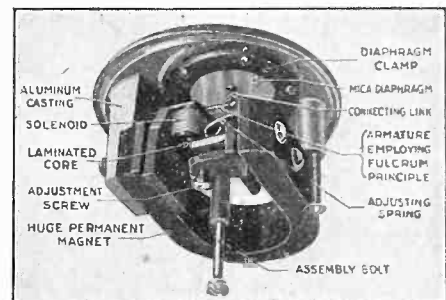
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THE TRINITY LOUD SPEAKER



TYPE "A1"
21" FIBER HORN
\$25.00

TYPE "B"
(For Phonographs)
\$12.50



INTERIOR CONSTRUCTION

An ear phone is an ear phone no matter how fancy the horn that covers it may be, and, due to the delicate construction of an ear phone it is utterly incapable of giving true tone reproduction, especially, when relatively large currents are passed thru its coils, such as the output of a two-stage or power amplifier.

The Trinity Loud Speaker element embodies the well-proven and tested principles of the phonograph reproducer with the soundest principles of electromagnetic design best adapted for loud speaker operation. It is not an ear phone when placed on a head band and a loud speaker when covered with a horn. It is a sturdy loud-speaking element ALWAYS.

Send for Literature.

TRINITY RADIO CORPORATION

446 TREMONT STREET, BOSTON, MASS.

Station KLX, Oakland, Cal., Establishes Sub-Station

CALIFORNIA and in fact the entire Pacific Slope is to be afforded a more intimate touch with the University of California at Berkeley through an elaborate radio broadcasting scheme.

The Oakland Tribune, Station KLX,

through the co-operation of the Radio Club of the University of California, announces that henceforth it will be possible to broadcast all of the important events at the university, covering a wide field, sports, music, academic features and educational lectures, directly from the institution by a sub-station installed on the twentieth floor of The Tribune tower.

The sub-station at the university is directly connected with the powerful transmitter on The Tribune tower by private leased wires, and will be a permanent installation. The sub-station, or speech in-put panel, practically takes The Tribune's broadcasting station to Berkeley.

The first event at the university to go over the air was the big football game on November 24, between the University of California and Stanford University.

resumé of the situation is a valuable contribution to present literature on wire and wireless communication, especially as regards international relations and regulations.

Under the title "International Communications and the International Telegraph Convention," No. 121 of the Miscellaneous Series of Department of Commerce publications, Mr. Nagle's publication is available from the Superintendent of Documents, Government Printing Office, Washington, D. C., at ten cents a copy.

Prepared with a view of serving the American business public, which is constantly appealing to the department for assistance in connection with international telegraphic and radio correspondence, the book covers the present means of direct communication, additional facilities planned, registered addresses and certified codes, methods and regulations. The part devoted to the telegraph convention relates to present foreign practice and regulations. The United States has never subscribed to these proceedings, but many of them are incorporated in the later radiotelegraphic convention, now being studied by government experts in view of modification and extension in the next international conference.

Concerning additional radio routes now being established, the report says:

"High-power radio stations are in process of construction in the Netherlands, Sweden, Poland, and Italy, and on their completion direct radio service will be established from New York to the commercial centers of those countries.

"Austria, Spain, Denmark, Portugal, and Russia are each engaged in surveys for the establishment of high-powered radio stations for intercontinental work, and all of these additional circuits should be in operation by the summer of 1925.

"In the Far East an American company is proceeding with the erection of a radio station in China designed to communicate with the stations of the Radio Corporation of America in Hawaii and California. Another American company plans a radio circuit between the countries of the Orient and Alaska and Seattle. A high-power station of the Dutch Government is now in operation at Malabar, Java, communicating with the United States naval radio station at Cavité, but this East Indian station will probably establish a circuit direct to the U. S."

PATENTS

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International Communications Pamphlet Published

A PAMPHLET on international communications, of considerable value to business men whose interests extend beyond the United States, has just been prepared by P. E. D. Nagle, Communication Expert of the Department of Commerce. The booklet reviews the present situation in world-wide cable and wireless communication, and publishes for the first time in this country, the provisions of the International Telegraph Convention of St. Petersburg and Lisbon.

In view of this government's plans to participate in the next international conference on electrical communication, a

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This NEW Pyralin-SHELSTONE, made by DUPONT, gives greater volume—better tone and is more beautiful in appearance.

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- This offer good only up to and
- including December 5, 1923.
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- can take advantage of this offer by
- extending subscriptions one year NOW.
- Or order thru your newsdealer.

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RADIO WORLD, 1493 Broadway, New York City.

Enclosed find \$6.00, for which send me RADIO WORLD for twelve months (52 numbers), beginning months, beginning

This Offer Good Only Until December 5, 1923
Name
Street Address
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The Government Wants More Radio Help

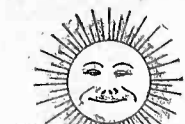
THE United States Civil Service Commission announces open competitive examinations for radio laboratory aid, \$900 to \$1,400 a year; radio laboratorian, \$1,200 to \$1,700 a year, and junior radio engineer, \$1,400 to \$2,000 a year.

The examinations will be held throughout the country on December 5. They are to fill vacancies in the Signal Corps, Camp Alfred Vail, N. J., at the entrance salaries named above, plus the increase of \$20 a month, and vacancies in positions requiring similar qualifications.

The duties are to assist in the development, design, and construction of practical and special radio apparatus; to assist in advanced technical work in radio research; to analyze the data accruing from observations of the operation of various radio apparatus and installations; to perform engineering calculations and other related work.

Competitors will be rated on the subjects of general physics, mathematics through calculus, practical questions on radio engineering, and education, training and experience.

Full information and application blanks may be obtained from the United States Civil Service Commission, Washington, D. C., or the secretary of the board of U. S. civil-service examiners at the post office or customhouse in any city.



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B BATTERIES—HIGHEST QUALITY

List		Our Price
\$1.75	22 1/2 Volt small	\$0.70
3.00	22 1/2 Volt small	1.20
4.75	45 Volt medium	1.69
5.50	45 Volt large	2.20

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\$5.00 W. D. 11—U. V. 201-A Transformers \$2.28

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Marvel Radio Specialty Co.
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"The only reliable way to determine if 'B' Batteries are still capable of service is by testing with a Voltmeter."

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VOLTMETER \$1.50

Tests "B" batteries 0 to 50 Volts. Guaranteed accurate. Handsome nickeled case. Indian Head Ammeter at same price. If your dealer does not carry it send money order to us. Also name of your favorite dealer.

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Send for this attractive proposition. This fast selling article gives you big profits.

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Sydell's Radio Trade Directory
406 W. 31st St., New York. Watkins 5987

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FREE Wonderful home construction tube receiving set, of the latest design. **Write Today "Radio Facts" FREE**

A. G. Mohaupt, Radio Engineer, AMERICAN RADIO ASS'N, Dept. #10, 4513 Ravenswood, CHICAGO



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Special Radio World and Popular Radio Sub. Blank

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Send Radio World beginning.....
.....and Popular Radio for one year beginning.....
for the price of Radio World alone, for which I send \$6.00 herewith.
Name.....
Address.....
City and State.....
This offer good only until Dec. 1, 1923.

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Should Attend the

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Kansas City Radio Program for Hawaiian Fans

RADIO listeners in the Hawaiian Islands have for some time had the pleasure of listening to programs from "the good old U. S. A." re-broadcast from the station of the Honolulu "Advertiser." Usually these programs come from KHJ and KFI, both in Los Angeles, Calif., and both equipped with Western Electric 500-watt transmitters. On the night of September 2, a new record was made with the re-broadcasting of a late program from WHB, the Sweeney Automobile School at Kansas City. This station is also equipped with a 500-watt Western Electric transmitter and its well-known slogan, "The Heart of America," has been heard from coast to coast. On this particular occasion the engineer in charge of the Hawaiian station said that WHB's signal strength was exceptionally good and its modulation perfect.

The re-broadcasting arrangement is as follows: At the Koko Head station twelve miles from Honolulu, is a receiver consisting of three stages of radio-frequency and a standard short wave set, fed from a combination of a Beverage and horizontal antenna. The signal is then amplified with one stage of audio-frequency and one-stage power amplification, and passed through 12 miles of telephone line to the City of Honolulu, where it is put into the modulating circuit of the Honolulu "Advertiser's" transmitter, Station KGU. The distant signal thus actuates the local station and provides coast programs to the enthusiasts in the islands of the Hawaiian group.

N. A. B. Music Proves Very Popular

DO the radio fans like the music being released, tax free, to broadcasting stations throughout the National Association of Broadcasters? "Absolutely!" says Stanley W. Barnett, program director at The Palmer School of Chiropractic, Station WOC, Davenport, Iowa.

In many cases radio has created a demand for copies of the songs before the publishers could get them on the market. "So numerous are the inquiries from listeners," says Mr. Barnett, "that a specially printed form is used to refer the listener to the proper publisher for copies of the numbers requested. Our greatest difficulty is in filling all the requests for 'repeats' on our programs."

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2 volt for W.D. 11 & W.D. 12 tubes run 300 hours on 1 charge.....	6 volt 60 amp. hr. \$7.90
4 volt for U. V. 199	6 " 80 " " 8.85
	6 " 100 " " 10.60
	6 " 120 " " 12.10
	6 " 150 " " 14.50

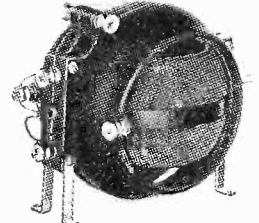
All batteries are fully guaranteed in writing and shipped subject to examination. Send 10 per cent. with order, balance on arrival. Deduct 5 per cent. if full cash accompanies order. Shipped same day order received. Act now.

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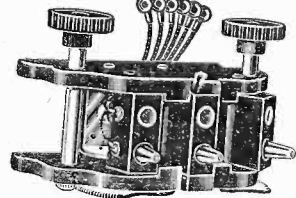
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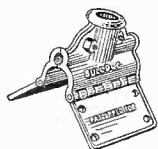
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Coils are fully assembled, made exactly as specified by Mr. Cockaday, D coil bank wound. Far more efficient than any home made coils.

Standard parts for this sensational circuit—panel, coils, condensers, verniers, variable resistance, vernier rheostat, socket, double jack, dials, switch, contact points, posts, busbar, wire, spaghetti, etc. (no tubes or phones).

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DV-6A	3.50

All tubes positively guaranteed to be satisfactory. Special discounts to dealers.
Tubes returned P. P. C. O. D.

**HARVARD RADIO
LABORATORIES**
200-204 Old Colony Ave.
So. Boston Mass.

The Permanence of Radio
RADIO is here to stay. There is no longer any doubt about its permanence as a utility, nor is there likely to be any radical change or new discovery in connection with it which will affect it fundamentally.

The history of other inventions, as well as experience in the field of radio to date, indicates this to be a fact.

Two years ago when radio first became known to the man on the street there was a general belief among laymen that some new idea would soon come out and upset all the principles previously discovered in this new art of communication. But nothing of the kind has happened, and in this respect radio is repeating the history of other inventions.

Take the telephone for example. The telephone is fundamentally the same today as the first model which Alexander Graham Bell produced. Likewise the principle of the steam engine is the same now as when Robert Fulton made the first steamboat. Hardly ever has a great invention later undergone a fundamental change in the principles underlying it. Obsolescence comes in styles, but not in principles. Refinements are made, costs cut, and parts made simpler and more rugged, but no revolutionary change occurs.

The same is true of radio. Circuits that gave good results two years ago give good results now, although simpler circuits have been developed, using fewer controls.

It is a fact that the public is now buying higher grade parts than they were a year or two ago, but they are still buying well known, tried and true brands.

Five years ago a certain small concern produced an amplifying transformer which was the first offered for general sale to the public. Today that transformer is identical with the one first produced, and its efficiency as well as its slogan have become famous. This manufacturer has developed the so-called reflex circuit to a point where anyone can put together a set which will bring in broadcasting stations within a thousand mile radius and do so on a loud speaker.

Models and styles change, but not fundamental principles.

The pessimists who predicted the failure of radio will have to find something new to worry about. Take anybody with a good set and try and get it away from him, or shake his faith in radio. Try and do it!

Ask the radio fan—he knows!
Send \$6.00 for RADIO WORLD and get 52 issues without a break.

Bargains in Radio Parts

Write for our Monthly Bulletin of Radio Parts, etc., at greatly reduced prices.

WORKSMAN RADIO SERVICE
Dept. W
14 VESEY STREET, NEW YORK, N. Y.

IMPROVED GROUND CLAMP

Equipped with
Fahnestock
Patent
Wire
Connectors
Easily
Attached

No Soldering—For Radio Use Only
AT YOUR DEALERS
FAHNESTOCK ELEC. CO.
Long Island City, N. Y.

For best reception
you need

The Goodman

The finest short wave tuner on the market. Great for present broadcasts, local and DX. Used in all parts of the world. Certificates of merit from testing laboratories. Pamphlet on request.
L. W. GOODMAN, Mfr., Drexel Hill, Pa.

**ALL LINES OF
RADIO MERCHANDISE**
ARE IN OUR STOCK
New York Prices Direct to You
Just Tell Us What You Want
GLOBE RADIO SHOP
115 West 3rd Street New York

MASTER RADIO AT HOME

You can become one quickly. Write TODAY for scholarship. Our up-to-the-minute Home Study Course in Radio is the last word. Covers all angles and every new development; includes over 600 diagrams and drawings of Radio Sets, circuits, hook-ups, parts, etc.

\$10 SCHOLARSHIP FOR PROMPT ACTION given without charge to the first thousand who enroll. This introductory offer to widely advertise the course cannot be repeated.

THIS OFFER UNRIVALED

A complete \$50 Radio Course, including 600 diagrams and drawings—40 separate lessons, and all it will cost if you act quick is \$10. Never a bargain like it before.

WRITE TODAY. If you would be sure of a scholarship send in your enrollment with \$10 TODAY. Money back if dissatisfied. You take no risk. Circular showing reduced reproductions of the 600 diagrams and drawings sent on request.

BURGESS ELECTRICAL SCHOOL
Yorke Burgess, Superintendent
Dept. 1, 748 E. 42nd Street, Chicago, Ill.
Canadian Branch: 201 E. Crawford St., Toronto

SUPERTRAN

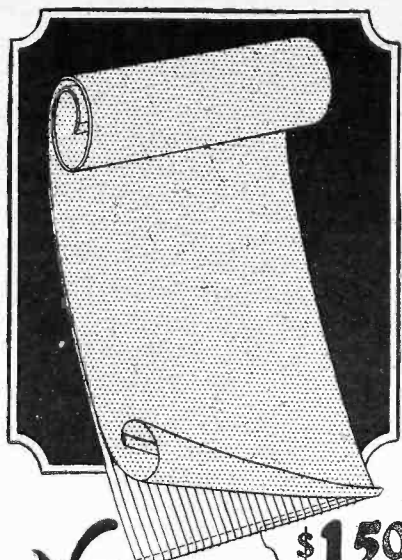
The Audio-Frequency
Transformer that does more
than meet requirements.

Offers exceptionally clear toned reception and the highest amplification on all wave lengths.
Designed to work equally well with all types of modern tubes.

Price \$6.00

At your dealers or by mail postpaid on receipt of purchase price. Write for our free literature.

Ford Mica Co., Inc.
14 Christopher St., New York



Now \$1.50 ELECTRAD INDORARIAL

Ideal for sharp tuning. Reduces static to a minimum. Contains 600 feet of wire. Instantly collapsible and portable. Can be hung on door or placed under carpet. Noticeable directional effect. Particularly effective in large cities where several stations are broadcasting at the same time. One INDORARIAL used as antenna and another as ground gives interesting results.

At your dealers, otherwise send purchase price and you will be supplied postpaid.

DIODE, \$2 SOCKET, 50c
LEAD-IN, 40c VARIOHM, 75c
GRID LEAKS, 30c

ELECTRAD, Inc.

428-K Broadway

New York

Now Sit Up and Take These

Bobby was a radio fan, his mother a fanette,
Bobby blew a brand new tube—did a fanning get.
Stands up for his programs now, stands up for his meals;
Once in a while he sits down—oughta hear his squeals!

* * *

Jay—"Here comes Johnnie. Let's duck. He will start to brag about his set and bore us to death."

Gee—"Don't fear, old dear. He just completed a ten-tube super, and before he can get it in shape to tune anything in, the programs are all over."

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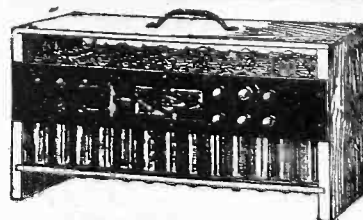
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IT'S A FRAME-UP

Some Prominent Radio Men Are Implicated

Quinby Radio Construction Co.



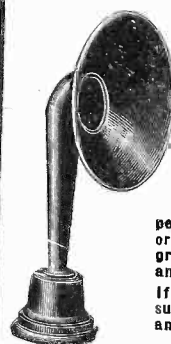
Rechargeable Storage "B" Battery
Build Yourself a 100-Volt Storage "B" Battery From Edison Elements, \$9.00.
140 Volt \$13.50, consisting of drilled elements, tubes, separators, wire, electrolyte and complete instructions. Assembled Battery 100 Volt, 1500 Milliamps, \$17.50. 140 Volt \$23.50.

Unassembled 100 Volt Battery, consisting of elements, cabinet and tubes, Bakelite panel board, double pole, double-throw switch, rubber knobs \$13.50. 140 Volt Battery assembled and charged \$17.50. Drilled elements 6c per pair; glass tubes, 2c each; separators, 1c each; nickel wire 1c per length; rubber covered switch wire 2c per foot.

MAIL ORDERS FILLED
W. ROBERTS STORAGE "B" BAT. CO.
41 JEFFERSON STREET BROOKLYN, N. Y.
Near Broadway and Myrtle Ave. Tel. Pulaski 2023

ACKERMAN RADIO LOUD SPEAKER

Complete, Ready for Immediate Use **\$9.50** Delivered to Any Part of the United States.



For the price of a headset you can have a loud speaker that actually speaks for itself. Not alone that, but a loud speaker superior to many of the much higher priced ones now on the market.

Standing 21" high, with 11" bell and made of heavy metal, eliminating vibration, together with its special loud speaking unit, this speaker reproduces voice and music far beyond expectations. Finished in plain black or brown, also special alligator grain in black and green or black and yellow.

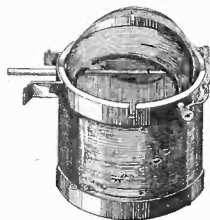
If your local dealer is unable to supply you, send order direct to us and pay postman on delivery.

Sold on a money-back guarantee.

Ackerman Brothers Co., Inc.

301 W. 4th St. (Dept. "RW"), New York, N. Y.

200-600 Meters



BEL-TONE TYPE A-10

THE IDEAL VARIO-COUPLER BRINGS IN DX AS CLEAR AS A BELL. MADE OF DARK RED MOULDED RADION, THE SUPREME INSULATION. DOUBLE SILK COVERED WIRE USED THROUGHOUT. ALL METAL PARTS NICKEL PLATED. WORKMANSHIP, MATERIAL AND PERFORMANCE GUARANTEED.

If you cannot secure one at your dealers send purchase price to us with your dealer's name and address.

BEL-TONE RADIO CO.

List Price \$6.00

161-167 JAMAICA AVE.

BROOKLYN, N. Y.

DO YOU WANT TO BUY, SELL OR EXCHANGE RADIO OR OTHER GOODS? TRY THIS DEPARTMENT AT 5c A WORD

RADIO WORLD'S QUICK-ACTION CLASSIFIED ADS

The rate for this RADIO WORLD QUICK-ACTION CLASSIFIED AD. DEPT. is 5c. per word (minimum of 10 words, including address), 10% discount for 4 consecutive insertions, 15% for 13 consecutive insertions (3 months). Changes will be made in standing classified ads. if copy is received at this office eight days before publication. RADIO WORLD, 1493 Broadway, N. Y. C. (Phone, Bryant 4796).

YOU WILL ENJOY membership in "PERFECTION CLUB." Real live members exchange letters, postcards. Send stamp for membership application. Dept. A, Oneida, N. Y.

900 CYCLE, 250 WATT, BALL BEARING, BELT DRIVE ALTERNATORS with transformers, for plate supply, \$18.50 each. Miscellaneous C. W. and radiophone apparatus on hand. Write—N. A. PATCHIN, 226 Stocum Place, San Antonio, Texas.

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MAGNAVOX R3 or M1—Latest nationally advertised reproducers. List, \$35. Introductory, \$25. The factory sealed carton is your guarantee. RADIO CENTRAL, Dept. W., Abilene, Kans.

LONESOME? Make new friends. Write Dolly Gray Agency, Box 186B, Denver, Colorado.

A REAL LONG DISTANCE GETTER!—The Kond.-Koil Tuner Special (Variable Condenser and Variable Coil on one mounting). Tuner and Special Circuit for \$3.00. KAUFMAN RADIO CO., 4209 12th Avenue, Brooklyn, N. Y.

**ONE
JACK DOES THE WORK OF
THREE**

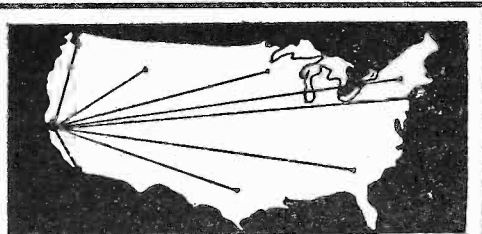
Say "PRALL" That's All
ENJOY PERFECT RECEPTION ON
DETECTOR, ONE-STEP OR
TWO-STEPS WITH THE

PRALL TRIPLE-JACK

\$3.25 with Plug and Diagram

B. W. PRALL CO.

160 College Avenue
West New Brighton, Staten Island, N. Y.
If your dealer can't supply you write direct.



ON ONE TUBE

Broadcasting from Atlantic Coast, Mexico, Hawaii, Canada and Cuba heard in California by users of CROSS COUNTRY CIRCUIT. Range due to simplicity of set and only one tuning control. Easily and cheaply built by any novice. Dry cell tubes may be used. All instructions, blueprint panel layout, assembly photo, etc. Postpaid 25c. Stamps accepted.

VESCO RADIO SHOP, BX RW-117, Oakland, Cal.

Milwaukee Radio Amateurs' Club Elects Officers

MILWAUKEE delegates reporting on the Second National American Radio Relay League Convention, held in Chicago, was the principal feature at the season's opening meeting of the Milwaukee Radio Amateurs' Club, Inc. Next was held the annual corporate meeting, at which seven directors and one vice-director were elected, who in turn appointed the society's five general officers and seven standing committee chairmen. The directors, all prominent Milwaukee, Wis., radio amateurs, are C. N. Crapo, 9VD, the A. R. R. L.'s local district superintendent; D. W. Gellerup, 9ACE; E. T. Howell, Sc. M., 9CVI; M. F. Szukalski, Jr., 9AAP; E. A. Cary, 9ATO; F. W. Catel, 9DTK; M. H. Doll, 9ALR, West Allis; and G. F. Metcalf, 9CKW, Wauwatosa. The officers are E. T. Howell, president; M. F. Szukalski, Jr., vice-president; C. S. Polachek, secretary; E. W. Ruppenthal, 9AYA, treasurer; L. S. Hillegas-Baird, business manager; F. W. Catel, assistant treasurer. The committee chairmen are: Legal, Attorney L. J. Topolinski, general counsel; publications, H. G. Fawcett; technical, D. W. Gellerup; membership, F. W. Catel; program, E. T. Howell; publicity, L. S. Hillegas-Baird; and traffic, C. N. Crapo.

At the annual meeting the outgoing officers reported a steady growth in membership and an increase in scope of activities. However, the annual membership drive has been launched, and it is hoped that the total number of members will reach 200 before the season closes. The West Allis Radio Club, a suburban society, has been dissolved and its members are joining the Milwaukee club. "One large radio association for Milwaukee County and make it a real local chapter of the A. R. R. L., is the slogan for this year's activities.

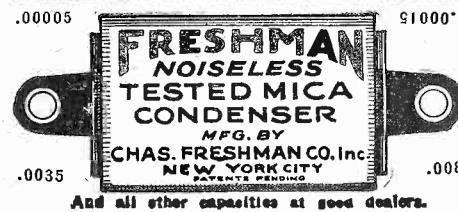
The committees are all in action. The technical one remains a leader, recently giving an interesting report entitled "C. W. Transmitter Circuits." Many lectures by well known radio men are being arranged by the program committee. Two have already been given. They were "The New Tantalum Chemical Rectifier," by H. L. Oleson, 9CSR, Fansteel Products Co., North Chicago, and "Vacuum Tube Characteristics," by J. H. Miller, Electrical Engineer, Jewell Instrument Co., Chicago.

Did you miss any copies of Radio World while you were away on your vacation? If so, send us 15c a copy for those you missed, or \$1.00 for any seven copies.

Hear From Everywhere Perfectly with the
SLEEPER-MONOTROL
GRIMES INVERSE DUPLEX CIRCUIT
One control—no aerial, no ground.
Four tube set, \$140 Three tube set, \$115
Booklet on request
SLEEPER RADIO CORPORATION
88 Park Place New York City

Don't Ask for Rheostat—Say

FIL-KO-STAT
FOR REAL FILAMENT CONTROL



NEW ELECTRAD DIODE
Replaces crystal in all circuits. Gives greater volume, greater selectivity and steadies the circuit. No adjustments for change of wave lengths. Real results. Guaranteed. Send purchase price and you will be supplied postpaid. Socket 50c extra.
ELECTRAD, Inc.
428-K Broadway New York

DEALERS!

We handle only well known and nationally advertised lines. On top of that we give the kind of service you expect.

And—Our discounts are RIGHT.

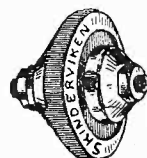
Drop us a post card for our 36-page catalog just off the press.

Address Dept. 6

WERNES & PATCH
159 N. STATE ST., CHICAGO, ILL.

SEND FOR YOUR FREE COPY
TESTED HOOK-UPS

SUBMITTED BY USERS OF OUR
Wonderful Transmitter Button for Loud Speakers Amplification and Experiments



Price \$1.00 POSTPAID with instructions
K. ELECTRIC CO.
15 PARK ROW NEW YORK

You Don't Need Tubes

to get out of town. If you want new stations on your crystal set WRITE ME TODAY. Mine works 400 to 1,000 miles without tubes or batteries! Thousands have bought my plans and now get results like mine. CHANGES OFTEN COST LESS THAN A DOLLAR. Send self-addressed envelope for further information. Leon Lambert, 56 1/2 South Volusia, Wichita, Kansas.

Radio World mailed every Tuesday. \$6.00 year (52 numbers).

TWO GREAT NEW RADIO BOOKS

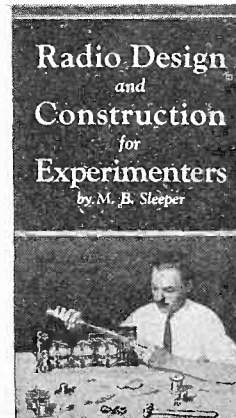
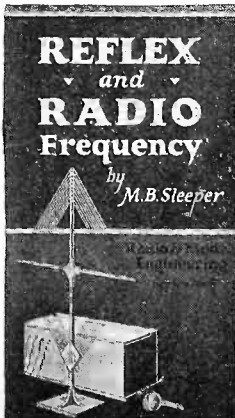
By M. B. SLEEPER

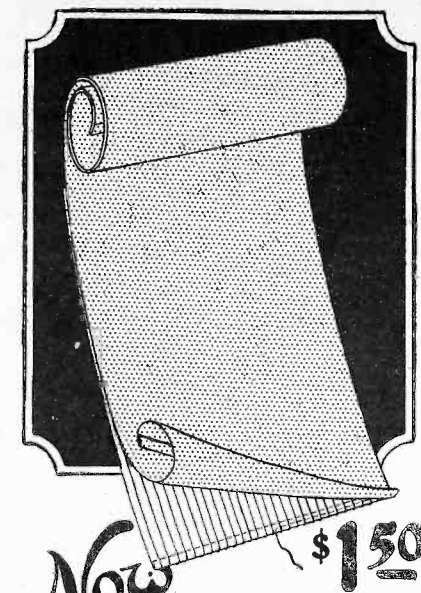
"REFLEX AND RADIO FREQUENCY"

"RADIO DESIGN AND CONSTRUCTION FOR EXPERIMENTERS"

Two of the best and liveliest books written by this acknowledged authority. Packed full of information. These are really great text books and are of inestimable value to radio novices, amateurs, and experimenters. Sixty cents each, postpaid, or both books for \$1.00.

The Columbia Print, 1493 Broadway, N. Y. C.





Now \$1.50 ELECTRAD INDORARIAL

Ideal for sharp tuning. Reduces static to a minimum. Contains 600 feet of wire. Instantly collapsible and portable. Can be hung on door or placed under carpet. Noticeable directional effect. Particularly effective in large cities where several stations are broadcasting at the same time. One INDORARIAL used as antenna and another as ground gives interesting results.

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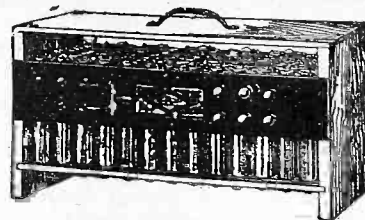
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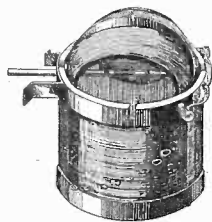
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Milwaukee Radio Amateurs' Club Elects Officers

MILWAUKEE delegates reporting on the Second National American Radio Relay League Convention, held in Chicago, was the principal feature at the season's opening meeting of the Milwaukee Radio Amateurs' Club, Inc. Next was held the annual corporate meeting, at which seven directors and one vice-director were elected, who in turn appointed the society's five general officers and seven standing committee chairmen. The directors, all prominent Milwaukee, Wis., radio amateurs, are C. N. Crapo, 9VD, the A. R. R. L.'s local district superintendent; D. W. Gellerup, 9ACE; E. T. Howell, Sc. M., 9CVI; M. F. Szukalski, Jr., 9AAP; E. A. Cary, 9ATO; F. W. Catel, 9DTK; M. H. Doll, 9ALR, West Allis; and G. F. Metcalf, 9CKW, Wauwatosa. The officers are E. T. Howell, president; M. F. Szukalski, Jr., vice-president; C. S. Polachek, secretary; E. W. Ruppenthal, 9AYA, treasurer; L. S. Hillegas-Baird, business manager; F. W. Catel, assistant treasurer. The committee chairmen are: Legal, Attorney L. J. Topolinski, general counsel; publications, H. G. Fawcett; technical, D. W. Gellerup; membership, F. W. Catel; program, E. T. Howell; publicity, L. S. Hillegas-Baird; and traffic, C. N. Crapo.

At the annual meeting the outgoing officers reported a steady growth in membership and an increase in scope of activities. However, the annual membership drive has been launched, and it is hoped that the total number of members will reach 200 before the season closes. The West Allis Radio Club, a suburban society, has been dissolved and its members are joining the Milwaukee club. "One large radio association for Milwaukee County and make it a real local chapter of the A. R. R. L., is the slogan for this year's activities.

The committees are all in action. The technical one remains a leader, recently giving an interesting report entitled "C. W. Transmitter Circuits." Many lectures by well known radio men are being arranged by the program committee. Two have already been given. They were "The New Tantalum Chemical Rectifier," by H. L. Oleson, 9CSR, Fansteel Products Co., North Chicago, and "Vacuum Tube Characteristics," by J. H. Miller, Electrical Engineer, Jewell Instrument Co., Chicago.

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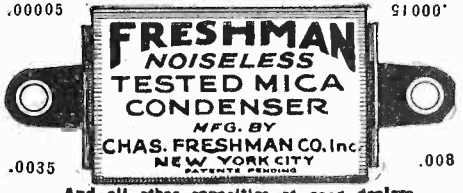
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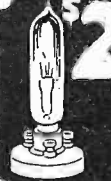
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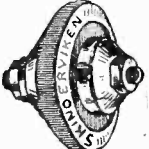
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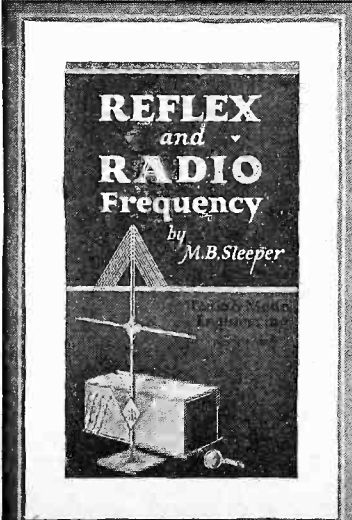
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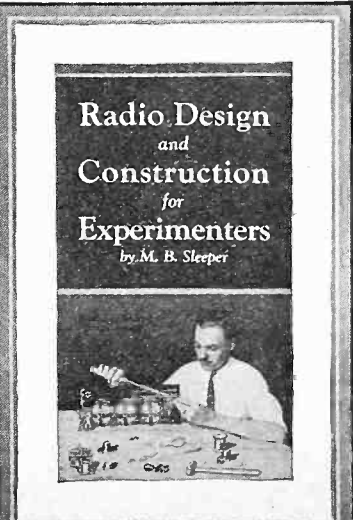
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