

Grill Single Circuit; Grimes Power Amplifier

Radio Digest

EVERY
WEEK

Illustrated

TEN
CENTS

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Vol. VII

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No. 13

TRUST BOSSES RADIO?

COMMANDS FLEET FROM HIS AIRSHIP

Admiral Uses Radio Waves to
Guide Boats; First Time in
Naval History

SAN DIEGO, CAL.—For the first time in history, according to navy officers, the United States battle fleet was commanded from an aerial flagship a few days ago when Admiral Samuel S. Robison flew his four-starred flag from a navy seaplane.

During the ninety-minute flight from San Diego to San Pedro Admiral Robison was constantly in touch with his command by means of Radio equipment carried on the big F-5-L that carried the admiral and two members of his staff.

SAY GOTHAM IS VICTIM OF "RADIO RING"

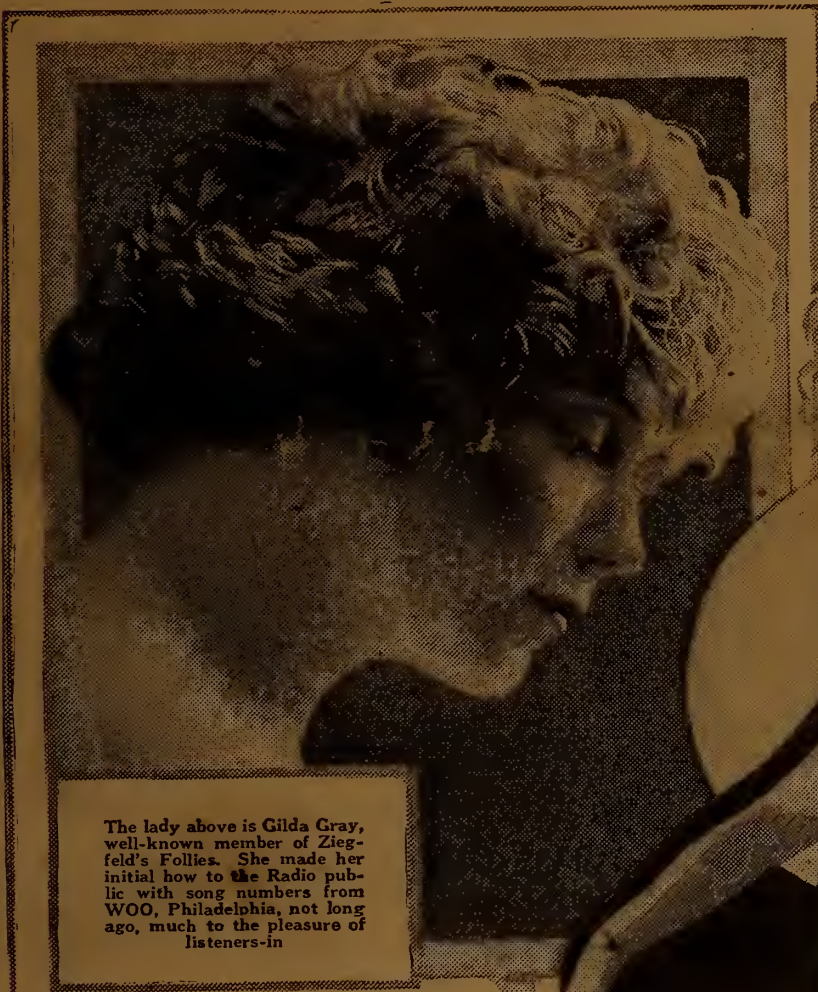
New York Commissioner De-
clares "Dictatorial" Methods
Hampered City Plant

Assail A. T. & T. Policy

Asserts Monopoly Rules When
Only One Bid Is Made
to Build Station

NEW YORK.—A year ago the city of New York decided to erect and maintain a broadcasting station—a powerful one, over which the city could give its population of six million people, the best in education and municipal concerts, the voices of distinguished visitors and all the features usually found on a first-class broadcast program. As usual, the Commissioner of Plant and Structures invited all companies who should be in a position to supply such a plant, to send in their bids for the work.

Only One Company "Licensed" to Bid
Knowing that the General Electric Company had built the installations at WJZ, WJY, WRC and WGY, he included the Schenectady firm on the list. A letter was sent to the Westinghouse Electric & Manufacturing Company because of its stations KDKA, WBZ, KYW and KFKX. Having heard of the many 500-watt sets manufactured and installed by the Western Electric Company, their price for the proposed work was requested. The Radio Corporation of America should be in a
(Continued on page 2)



The lady above is Gilda Gray, well-known member of Ziegfeld's Follies. She made her initial how to the Radio public with song numbers from WOO, Philadelphia, not long ago, much to the pleasure of listeners-in

CKAC Sends Champagne "Pops" to Dry Listeners

Mount Royal Hotel Celebration
Makes U. S. Fans Envious

MONTREAL.—"POP! POP!" and countless other similar pops made life miserable for U. S. Radiophans tuned in to Station CKAC on New Year's Eve, when the celebration of the famous Mount Royal Hotel here was broadcast in true pre-Volstead fashion from this province of liberty. Right under the nose of the microphone bottles of champagne were opened, and as their corks flew and the bubbles fizzed, throat-parched American listeners knew—knew and wept!

3 GENERATIONS OF FAMILY IN CONCERT

ATLANTA, GA.—Featuring as a pianist Mrs. C. J. Allen, eighty-two years old, three generations of a Georgia family recently entertained in a broadcast by Station WSB. Mrs. Allen played melodies popular a half century ago, while her daughter, Mrs. M. A. Cox, and two granddaughters, Mrs. George Tarlton and Mrs. Victor Taylor, assisted with violin, cello and banjo.



Above, Florence Cowanova, the international ballet-dancer, on WDAR's "Morning Glory Club" program in novelty clog dances. In the circle, Genevieve Tobin of the "Polly Preferred" cast, who has entertained listeners to WMAQ



"A. T. & T. FORCES CITY TO ABANDON SITE"

(Continued from page 1)
position, he felt, to supply the country's greatest city with a station.

When the time came to open bids received, how many bids did Commissioner Grover A. Whalen have? One! The other companies did not bid. When asked regarding this, they informed the Department of Plant and Structures that they were "not licensed" to sell voice transmitters to be used for broadcasting purposes. That naturally brought up the question of "Not licensed by whom?" and Commissioner Whalen did some investigating.

This part of the story is clearly set forth in his statement to New York's Board of Aldermen as follows:

"After an investigation it was found that the Radio Corporation of America, the Westinghouse Electric and Manufacturing Company, the General Electric Company, the Western Electric Company and the American Telephone and Telegraph Company, through their ownership of Radio patents, were in control of the Radio industry and through mutual agreement were maintaining a monopoly in it.

Gentlemen's Agreement Exists

"I am informed that the General Electric Company dominates in the sale of Radio apparatus for ship work; that it also manufactures apparatus for Radio reception but sells it only through the Radio Corporation of America. The Westinghouse Electric and Manufacturing Company also manufactures Radio receiving apparatus but sells only through the Radio Corporation of America, in spite of the fact that each of these companies maintains its own complete sales organization. The manufacture and sale of broadcasting apparatus for commercial work is left solely to the Western Electric Company and this company in turn does not manufacture or sell Radio receiving apparatus.

"It is not difficult to see, therefore, how the above mentioned associated companies, through their ownership and buying up of patents, and through this division of the spoils system, are able to maintain a monopoly. This monopoly is, in my opinion, dangerous to the public interest and I intend to point out how it has hampered and delayed the city in its acquisition of a broadcasting station."

Seller Tells Buyer How He Can Buy

Although the many restrictions imposed in the contract of the Western Electric Company, by its parent company, the American Telephone and Telegraph Company, considerably altered the terms of the contract as originally advertised, it was thought by the Department of Plant and Structures that an agreement could be reached, and experimental work was done at the Municipal Building to determine the efficiency of that location.

It is interesting to note at this point, however, that instead of the purchaser stating what he wants and the seller, supposedly anxious to get the work, complying with the terms, we have the unique situation of the seller laying down the terms and restrictions to the buyer. In a genuinely competitive market, in which a monopoly does not exist, could this be done?

By the first of January, 1923, it was decided that a station located at the Municipal Building would give unsatisfactory results and inefficient service and, as an excellent site was available at Elmhurst, Long Island, it was chosen and plans were made for erecting a station at that point.

Western Electric Blocks City's Plan?

In view of what follows, it should be stated here that Station WEAJ, owned and operated by the American Telephone and Telegraph Company, opened at its present site, ready for "business," on April 30, 1923. The Commissioner's report goes on:

"On January 30, 1923, I became aware of a change of attitude on the part of the Western Electric Company. The enthusiasm which up to this time had been manifested toward the project by the company was evidently becoming lukewarm. I was informed that the remote control apparatus for the broadcasting station specified in the original contract could not be furnished in the new one, but that it must be leased by the city from the New York Telephone Company.

"At or about the middle of February, 1923, I received a personal call from A. H. Griswold, Assistant Vice President of the American Telephone and Telegraph Company. At this interview Mr. Griswold stated that there were already too many broadcasting stations in Manhattan, pointed out the difficulties to be encountered in broadcasting, endeavored to persuade me to give up the entire project and suggested that the city lease the station of the American Telephone and Telegraph Co., in other words, WEAJ."

Why New York Got No Station

Considerable correspondence followed, the Department of Plant and Structures exhorting the American Telephone and Telegraph Co. and Western Electric Company to hasten work on the proposed station and the companies courteously acknowledging the letters but ignoring the requests for speed. By March 17, 1923, the Western Electric Company had found

that they could not dissuade the city from having a station and submitted its proposal covering the Elmhurst site. Why New York City has no station is made clear in another illuminating paragraph of the Commissioner's remarkably clear and concise statement:

"This proposal was rejected for the following reasons: the city was subjected to exorbitant charges for the monthly lease of land wires and remote control apparatus; the total first year rental charges aggregated seventy percent of the total cost of the entire transmission apparatus; no guarantee was provided for the quality of the service to be furnished by the Telephone Company even if the city contracted at this exorbitant figure; the Telephone Company limited the city to four hours of actual broadcasting per day in spite of the fact that the hours of broadcasting are determined and enforced by the Federal Government.

"By the acceptance of this proposal the control of the municipal broadcasting station would have been placed in the hands of the American Telephone and Telegraph Company.

"Dictatorial Policy of A. T. & T." Prevents Plant

"It is clear that the city was forced to abandon this site because of the dictatorial, changeable policy of the American Telephone and Telegraph Co. in control of its subsidiary, the Western Electric Company, agreeing when the Elmhurst site was first considered to lease the land wires to the city at a reasonable cost of approximately \$170.00 per month and reversing its position in the manner outlined above at the time the official proposal was submitted."

Central Park, in the heart of the city, has now been chosen as the site for the station. This beautiful park will not be enhanced in any way by the erection of towers and buildings, but it seems the only way out of the situation. The city will save \$12,676 the first year and \$7,776 each succeeding year in maintenance charges, and will own and absolutely control all of the apparatus of its broadcasting station. It can go on the air at any time it deems necessary with what material it feels is for the public good and can present this material as it wishes.

The first request for a proposal on the site at Central Park was made to the Western Electric Company by the city on July 2, 1923, various drawings and layouts passed back and forth and it was not until November 7, 1923, that the complete proposal was finally received.

Will Protect City Against Monopoly

In the concluding paragraph of his statement the Commissioner states: "It is because of the chaotic conditions in the Radio field as outlined above that I am forced to appear before your Honorable Board to request the expenditure of this fund without public letting. In so doing I feel that the city's interest will best be protected against those who are seeking, if they have not already obtained, complete control of the air.

"I believe that the people of the City of New York, with its million Radio fans, should be acquainted with the commercial aims and monopolistic tendencies of this company to coerce this city, which is endeavoring, by means of the establishment of this broadcasting station, to give maximum service and greater happiness to its citizens."

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Looking Ahead

First Let's Start off with What Is Coming Soon—then we'll tell you about the plans for next issue. There is Dr. Lee DeForest for one. The inventor of the triode tube has prepared an informative article you will get with the increased size in Radio Digest—coming soon. And remember what we told you about Dr. A. Meissner last week? The foremost Radio-Engineer in Germany has prepared the first of his series of exclusive articles. We can hardly wait to let you in on the excellent material. It may be rather technical for a lot of us, but then the real Radio hounds, the milliamperers and electron-splitters, will devour it.

Inductance Dope—Some New Units will be described by H. J. Marx, concluding his series on this subject next week. Following the conclusion of the inductance coil series will appear his first article about the super-heterodyne set, the Rolls-Royce of Radio. Save your copies when he tells about the super-heterodyne. Then he'll tell you exactly how to build the finest set there is.

"How Good Is 'Good' Reception?" Asked E. T. Flewelling, so we said for him to write an article on the subject for the Radiophans. "Good" is an adjective with a lot of elasticity. Its stretching ability covers a multitude of bum connections. Watch for the article.

Regeneration, Its Principle and Control—a continuation of M. W. Thompson's thorough exposition on this vital subject will appear next week. Turn to his page this week and start with the first part.

R.D.-110 Is a Single Tube Reflex and is something a little different. Tells how to wind the special reflex transformer, too. Will appear next week.

The Mystery Man Has Some New Dope for next issue and is almost ready to spring a new circuit. Can you keep up with him?

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Oh, what we know about jacks! If we were to romp through our records I should venture to say we have sold jacks enough to make the side of the Court House look like a radiator hood on a Flivver. Yes! We have built hundreds of thousands of jacks for the most critical telephone work for years. If you need jacks and want to be absolutely sure they will deliver, just put "Kellogg Jacks" down on your order list. You can't go wrong.

A thoroughly efficient, snug little job at \$1.10 apiece for 4 conductor Jacks,

Use is the Test

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& SUPPLY COMPANY
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ANYONE Can Operate the

RADIODYNE

"The Voice of the Nation"

YOU don't have to be an expert to install and operate the RADIODYNE effectively. It is operated by simply grounding to a water pipe or radiator and throwing a few feet of wire on the floor.

For use in apartments, boats, automobiles, railroad trains, etc., the RADIODYNE is enjoyable where other types of receiving sets would not be practical.

Stations within a radius of 2000 miles can be picked up on the loud speaker; any wave length from 200 to 700 meters. The RADIODYNE is so sensitive that it picks up Radio telephone speech and music when other receiving equipment fails.

Write for illustrated folder which describes the RADIODYNE in detail. Every radio fan will be interested in this new type (antennaless) receiving set.

WESTERN COIL & ELECTRICAL CO.
312 5th St. Racine, Wis.

FANS HEAR SECRET OF "MAKING" MUSIC

LISTEN-IN WHILE PIANO ROLL IS MADE

Special Radio Song Is Put on Paper In Record-breaking Time

CINCINNATI.—Hang up another record for Radio.

Many fans may recently have heard the WLW broadcasting station of this city announce the beginning of a record-making experiment. A microphone was placed in the studio of a piano recording company and connected by special line to the broadcasting station, for use in letting the world listen to the making of a music roll of the original Radio song, "Somebody Else." The recording was done in less than an hour, and the selection reproduced and broadcast within that time. This establishes a world record, for usually about a week is required to make a reproducing piano roll.

Preceding the recording of the song, the Elmer Aichele Orchestra played it. Mr. Aichele, in association with William Schmitt, composed "Somebody Else." Then, Mr. H. G. Miller of The Vocalstyle music company, explained how the piece would be played for recording. During the time required to complete the making of the music roll until it was reproduced, a program of music was given, interspersed with explanatory talks of what was taking place in the recording laboratory.

First Time Broadcast

This is the first time that the recording of a piano selection and the making of a music roll was ever broadcast.

The method employed in the recording of a piano number is a most interesting one. Upon entering the studio the artist sees nothing but a regular concert grand piano. A closer inspection of the interior of the piano would disclose an intricate mechanism with a number of small rubber tubes leading from the interior of the piano to an aperture in the wall. These tubes connect to a recording mechanism in an adjoining room, which perforates a first, or proof, record when the artist plays upon the piano. An exclusive arrangement in this particular studio, is the double set of rubber tubes which lead to two pianos. This arrangement permits of two artists recording one number simultaneously.

Use Delicate Equipment

The recording equipment is so delicately constructed that the slightest mistake is recorded on the proof-paper roll. For example, should the artist strike an incorrect key, ever so lightly, the same key would be played when the recorded piece is reproduced. Therefore, great care is used in proof-reading the first roll to eliminate any unnecessary notes.

The recording instrument has a number of square punches in it which are operated by air pressure and by means of the little rubber tubes. Thus, should the note "C" be struck on the recording piano the corresponding punch would perforate the roll of paper in the recording machine.

Following the proof-reading of the initial roll, a heavy master record is made. On this all of the playing notations are made. From this master record any quantity of music rolls may be made.

WJZ Changes Bedtime Stories

NEW YORK.—After nine months of trial Station WJZ has found that in this advanced day the children to whom bedtime stories appeal are much nearer bed and the story listening mood at seven o'clock than they are at six. Consequently, Station WJZ recently started signing off for the afternoon at 6 p. m., Eastern time, and reopening at 7, instead of closing at 6:30 and recommencing at 7:30 as before. The daily bedtime story is now told at seven o'clock instead of at six.

NOW A FAN INVENTS LISTENER MARATHON

ELKHART, IND.—Now it's the Radio marathon. At 2 p. m., Jan. 2, 1924, Cleve Hoffman of this city, according to an announcement made by himself, will put the receivers over his ears and will not take them off until exhausted. During this time he will keep a complete record of all stations heard, and the time of the reception. He declared he "hopes to last about thirty hours."

RADIO WINS PARDON FOR ARTIST CONVICT

ATLANTA, GA.—Radio won freedom for Max Sasanof, Russian tenor and painter, who was serving a five year sentence in the Atlanta federal penitentiary. Attention of national scope was first attracted to Sasanof through his artistry on one of WSB's prison concerts. Investigation revealed that Sasanof had been the unsuspecting fool in a counterfeiting plot. He was pardoned.

GIRL HEARS VOICE FROM ARCTIC SHIP

FAIR FAN IN OHIO HOLDS UNIQUE HONOR

Florence Orcutt Gets Direct Message Sent by McMillan from Bowdoin, near North Pole

By A. K. Chenoweth

LONDON, O.—To Miss Florence Orcutt, amateur Radio enthusiast of this place, is belived to go the honor of being the first person in Ohio and the first woman in the world to pick up a Radio message from the McMillan arctic party, located somewhere near the North Pole.

Miss Orcutt, who resides four miles west of this city with her parents, Mr. and Mrs. T. Hollen Orcutt, picked up, about three weeks ago, a message direct from the McMillan party. The message was caught entirely by accident, Miss Orcutt at the time, as is the custom, seeking something new from the ether.

The message was received over the Orcutt receiving set about 10:30 p. m., Central time. The night was extremely clear and favorable to long distance reception. The call letters, as recorded by Miss Orcutt, were given as WNP, and the message was said to be sent from 11 degrees from the North Pole.

The gist of the message received at that time was to the effect that the ice was becoming more dangerous and the crew of the McMillan ship was busy moving all supplies and equipment into the winter quarters of the expedition.

Catches WNP Second Time

It was indicated, Miss Orcutt states, that the ice was a constant menace and that all haste was being used to clear the ship before conditions went from bad to worse. Miss Orcutt caught practically all of this message, although she states that at times the words were indistinct and that parts of the message were not clear to her.

A few night ago, Miss Orcutt, in tuning in for other messages and programs, struck a second broadcast from the arctic. This time, the message was one that was being addressed to friends of the McMillan party in Chicago and New York and in addition to the message proper, greetings were sent to a long list of persons whose names were not retained by the Ohio listener. The message stated that the ship had been unladen, all supplies were safe at the winter base, all parties in the expedition were safe and in good health and that the ice had broken and was no longer a serious menace.

SAVES HIS NECK —ALSO HIS STORY

Being the Account of a Reportorial Near-Tragedy with Radio as "Hero"

WASHINGTON.—A somewhat tardy reporter, although it must be admitted, one with initiative, saved himself from being scooped on a local Capital story, through using his head and Radio. He may have saved his head also.

It was Sunday. He had tickets to an entertaining matinee. He went, intending to leave in time to make the trip to a big cathedral on the outskirts of Washington, get the speech of a celebrated divine, and return to the office to write his story for the morning. But he stayed too long at the theater. He could not get to the cathedral in time, even with a taxi.

Suddenly he recalled that WCAP was broadcasting the ceremonies and that there was a receiving set at the National Press Club. He was saved. Rushing to the Club, he tuned in, and leisurely made notes during the discourse of the speaker. Later at the office he pounded out a neat half column and went home; saved by Radio—if the city editor doesn't find it out.

R. VALENTINO IS A GOOD PICKER



Fresh and sweet as the sunlit air of her "Golden State," Miss Eugenia Gilbert, winner of the recent beauty contest at Madison Square Garden, spoke to the Radio audience through Station WHN, Loew's Theater, New York. Miss Gilbert was chosen by Rudolf Valentino as the most beautiful girl in America and by an odd coincidence, Mrs. Valentino the First, formerly Miss Gene Acker, was also at the station when Miss Gilbert spoke. After the first careful appraisal, such as any two ladies in similar circumstances would have made of each other, the two beauties got along famously and then said nice things about each other to the listeners in K. & H. Photo

Amplifier Initiated into Great Britain's Politics

Millions Enabled to Hear Party Leaders

LONDON.—For the first time in the history of British politics voice amplifiers enabled millions to hear the messages of party leaders in the recent campaign.

Lloyd George's recent trip to the United States is responsible.

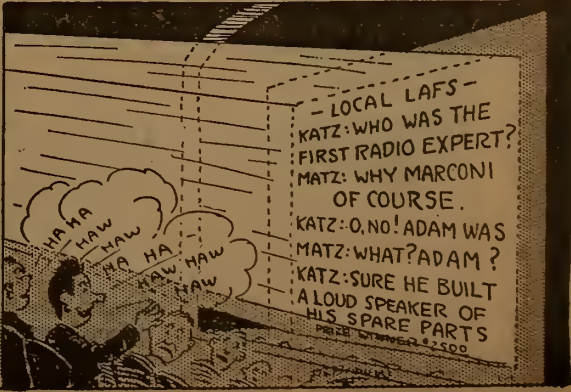
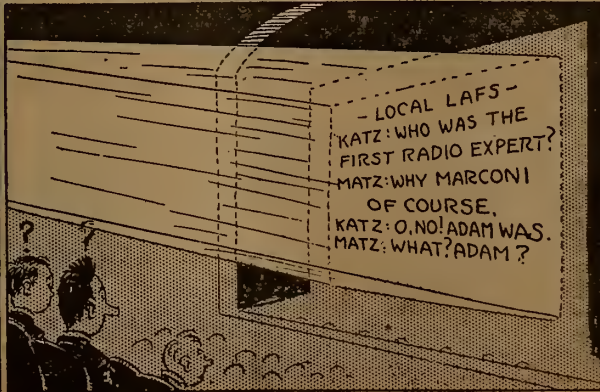
When the former Premier left for one of his campaigns in the north, he was preceded by a band of electricians who installed loud speaking apparatus in all the halls in which he was to speak. Speaking into a microphone he also addressed 80,000 on the Bolton football field.

The innovations, ex-Premier George declares, are due entirely to his American trip. Other British politicians, it is predicted, will be forced to follow his lead.

THE ANTENNA BROTHERS

Spir L. and Lew P.

Radio Movies or the Phunnyfilm



GIVE LESSON FIVE OF MURRAY SERIES

REPEAT CHARTS FOR ENTHUSIASTIC RADIOPHANS

Instructions Republished to Meet Demand from Listeners Who Missed First of Series

Learn to dance by listening in! Radio Digest has perfected an arrangement with Arthur Murray, nationally known teacher of ballroom dancing, whereby Mr. Murray is broadcasting dancing lessons from WOR, L. Bamberger and Company, Newark, N. J., and a score of other prominent stations. Radio Digest exclusively is giving the charts and instructions which apply to the lessons broadcast by Mr. Murray at WOR and by the other stations. WOC, WBAP, WNAC, WLW, WLAG, WRW, WHAS, WFI, KPO, CFCF, WSAD, WTAS, WGY, WMC, KDKA, WRC, WGI, WCAE, WHAM, WBZ, WGR, and KYW are broadcasting the series. The complete course occupies six lessons, one of which will be given each week. Save the lessons to use with the broadcasts.—The Editor.

Lesson V—The Tango Walk By Arthur Murray

THE new Tango is often referred to as the "Waltz Tango" because of the predominance of old-fashioned waltz steps. It is most important that one should know the real Waltz—not the Two-Step Waltz—before learning the Tango. Everyone who wants to become a really good dancer should know the actual steps in the old-fashioned "round waltz." There is no more important dance today than the real Waltz. It is used very extensively in the Fox Trot and is evident in almost every new variation which makes its appearance.

As stated before, the Tango tempo is the same as the Fox Trot. It is danced to "four-four" time. However, we will not be concerned with technical terms. We will use the simplest method of counting, that of counting the actual steps taken.

This week we will study the Corte, better known as the Promenade in the Tango Fox Trot. It is one of the most difficult steps in the Tango Fox Trot and should be studied and practiced very, very carefully.

Radio-dance-movie fans will recall the step danced by Rodolph Valentino in the

film, "The Four Horsemen of the Apocalypse." The Promenade is the most beautiful part of this famous dance.

The Man's Part

Begin with the left foot and take four long, slow walking steps forward, 1, 2, 3, 4; these four walking steps are not a part of the Promenade, but it is advisable to do them before actually beginning the Promenade. They are necessary in order to make the step fit the music. Then—

1. Take one SLOW walking step forward with the left foot;

2. Step forward quickly with right foot, moving it diagonally to the right, about fourteen inches to right of the left foot (see Figure 7);

3. Quickly draw left foot up to right, weight on left;

4. Take one slow step straight forward with right foot, weight on right. That's all.

Study the diagram and read these descriptions over again.

Remember that each time you take a step, place the weight down ON that foot. For instance, if you step forward or sidewise with the left foot, the weight must be placed ON the left foot.

Begin at the beginning and read the instructions very carefully. Practice this step for about an hour.

(TO BE CONCLUDED.)



Figure 7

Music Week Makes Debut on Air Four Weeks Ahead

NEW YORK.—New York's Annual Music Week is scheduled for the latter part of April, but it made its Radio debut from station WJZ to the whole country recently when Isabel Lowden gave to the Radio audience what is likely to prove one of the most unusual musical features of the season. Miss Lowden, who is the sister of ex-Governor Frank Lowden of Illinois, told of the novel and gigantic contests now being held throughout this city in preparation for Music Week.

WJZ will from time to time give to the country later details of the progress.



Baby

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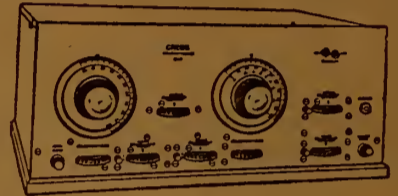
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THE De Forest name has been in the forefront of radio research for twenty-three years. De Forest invented the three-electrode vacuum tube which makes present-day radio possible. The sets and parts made today by the De Forest Company are worthy of the De Forest name.

DE FOREST RADIO TEL. & TEL. CO.
Dept. R. D. 5 JERSEY CITY, N. J.



BROADCAST BLAZES TRAIL TO NIPPON



Concluding a fifteen-day test made by Station WOR, L. Bamberger & Co., Newark, Paul Whiteman's Palais Royal Orchestra, shown with its leader, was heard in Japan and England. This is the first time, it is believed, that an American station on the Atlantic coast has been heard so far west. The Prince of Wales with Lord and Lady Mountbatten heard the WOR program at a special breakfast Radio party

Japan Hears WOR Across America and Pacific While England Listens In

Station in Orient Acknowledges Program as Lord and Lady Mountbatten and Prince of Wales, in Britain, Enjoy Same Music by Whiteman—Fifteen-Day Test Is Concluded

NEWARK, N. J.—Communication by means of Radio telephony across the American continent and the Pacific ocean was accomplished recently by Station WOR, L. Bamberger & Co., here, broadcasting to Japanese, Australian and New Zealand stations. Engineers of a western Radio laboratory who intercepted the broadcast even go so far as to make a sworn statement that a Japanese station made acknowledgment by voice.

This is the first time that both continent and Pacific ocean have been spanned by the human voice.

On a morning early in December, early listeners and late retirers were surprised to hear "This is WOR, WOR, WOR transmitting a program for the benefit of stations in Japan, Australia, New Zealand and the Philippine Islands and for Station WNP now frozen in in the Arctic."

Good Program Needed for Wee Hours
Day after day, the voice of WOR went rolling forth at this unheard of hour, and day after day acknowledgments were received from stations farther away. Artists were persuaded to remain up all night in order to make the programs worth hearing. In Chicago it was 3 to 5 in the morning, in Rocky Mountain states it was 2 to 4 a. m., while along the shores of the Pacific it was 1 to 3.

To conclude the tests on the last morning of the two week test, WOR obtained the finest feature possible, an orchestra that had made a reputation for itself and was loved on two continents, that of Paul Whiteman.

Prince of Wales Hears Whiteman
When the opportunity to do some real long distance broadcasting was presented, Paul Whiteman agreed to everything—even to keeping his musicians up all night. True, WOR was trying to reach westward but naturally was sending energy eastward as well. Here was a chance for Paul

Whiteman to partially repay the kindness shown him by English friends on his recent tour abroad.

At their beautiful and spacious home Brooke House, Lord and Lady Mountbatten assembled a large party of friends which included the Prince of Wales. After breakfast they prepared to listen to the latest American dance numbers played as only the Palais Royal Orchestra play them.

And promptly on time, as reported later by cablegram, the loud speaker boomed forth the voice of J. M. Barnett, manager of the Newark station, with the usual announcement and the added statement, "Also to reach Lord and Lady Mountbatten in England. Paul Whiteman's Orchestra will now play 'Raggedy Ann'."

Japan Broadcasts Reception of WOR
It was regrettable that word was not received before the party of artists left the WOR studio that they were heard in Japan. The E. C. Howard Radio Company of San Francisco advise that they heard the WOR program and heard a Japanese station acknowledge its receipt with the request that anyone in America hearing the acknowledgment communicate with WOR.

This is the first time that both the American continent and the Pacific Ocean have been spanned by the human voice and WOR has set a new record for broadcasters to try to break.

White to Withhold Bill Till After First of Year

WASHINGTON, D. C.—It will probably be some little time yet before Representative White of Maine introduces his new Radio bill in the House. He states that he certainly will not introduce the bill until after the first of the year.

GREAT APPLAUSE FOR SLOWPOKES' SPECIALS

Many Demands for Two Twin City Compositions

MINNEAPOLIS, MINN.—Music dealers of the Twin Cities and other communities reached by Station WLAG here have been swamped with calls for two numbers which they do not have in stock and which they have never had offered to them for sale, thus proving the advertising value of Radio to music publishers.

In each case the numbers were broadcast by Charles Cordray and his Slowpokes Orchestra from WLAG. One is called "Georgia Lullaby" and is Mr. Cordray's own composition. The other is "Radio Blues," written as a piano number and dedicated to WLAG by Dody Reimer, the singing piano player of the Slowpokes' Orchestra.

Requests for both "Georgia Lullaby" and "Radio Blues" come in from many listeners the moment the programs of the Slowpokes begin.

SMOKE CONSUMERS CHARGED WITH HUM

Fans' Letters Declare Devices Are New Cause of Interference

CHICAGO.—Radiophans have complained about practically every kind of interference, but lately a new form of electrical emissions making reception difficult, has been called to the attention of Radio officials and engineers. Complaints against plants using the Cottrell electrical smoke precipitation system have come in letters from fans in Pennsylvania, Arizona and Montana.

Several letters state that the factories using this method of consuming smoke, cause electrical disturbances which interfere with broadcasting within a radius of about twenty miles. There is no law against interferences of this sort, and the Department of Commerce has merely called the attention of the offending plants to the disturbance they were creating.



VALUE

UNLIMITED financial resources combined with mass production facilities give the Federal Telephone and Telegraph Company the right to leadership in the manufacturing of radio sets and parts.

Every radio set and each of the 130 parts manufactured by the Federal Telephone and Telegraph Company must pass a rigid test by experts before being placed on the market.

The name Federal is your guarantee of perfection in manufacture

Price
2200 OHMS
\$7.00

Federal

Standard RADIO Products

Federal Telephone and Telegraph Company

Factory: Buffalo, N. Y.

Boston New York Philadelphia Chicago San Francisco Pittsburgh
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Coto Special Audio Frequency Transformer \$2.50

Turn ratio is 3 to 1. Gives you ample volume and full, rich tone. Finest of materials. Coto quality throughout.

If your Dealer cannot Supply you write us giving his Name

COTO-COIL CO.

87 Willard Ave., Providence, R. I.

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329 Union League Building
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705 Plymouth Building
Atlanta: C. P. Atkinson,
Atlanta Trust Co. Building



LISTENING IN FROM WAY UP NORTH

By Vera Brady Shipman

THE WIND howls tonight. The ice on the lake creaks and whines like a crying child. A streak of white across the road—the winter coat of a rabbit—bear tracks on the woodroad; a light in the clearing—my, but that log fire looks good! A drive of twelve miles from town is ended and then an evening at home listening in.

I tune in on WHAZ, Troy. A program in memory of a professor of the Albany Polytechnic Academy. I heard Havana on a Saturday night at about 11:30. There comes Kansas City Star, WDAF, in a cornet solo. Last night I had WHB, the Sweeney school, with their own orchestra. There's WOS (Watch Our State) of Jefferson City, Missouri—he draws his announcement of the next number by the state prison band. WCAE, Pittsburgh, is on now; a while ago I had KDKA.

The Sunday night Chicago concerts are wonderful. WJAZ, with the Blackstone string quintet and later the Hotel Oriole orchestra playing classical numbers, and WDAP with the Drake concert ensemble. There is nothing lovelier than these on the air. I tune in on Omaha, WOA-W, almost every night. Tonight their orchestra is playing the "Prince of Pilsen" medley, ancient but always tuneful. Memphis announces receipt of 225 telegrams. Why all the excitement, WMC, have you had a birthday or a wedding?

Saturday nights WMAQ tunes in on the Chicago movie theater. You fans who sit and watch pictures cannot imagine the queer sensation to be listening in 500 miles away while the orchestra plays timely accompaniments and the audience laughs at the pictures or shouts with glee as Jesse Crawford plays his interpolated songs with their queer musical turns on the organ. I hear opera disconnectedly from KYW and WMAQ. Even an occa-

sional aria is appreciated, though, by a real music fan. It makes me long for Chicago for a few minutes (but not for long). The woman announcer at WLAG is distinct to me, 150 miles away—but fans write me that her voice is sometimes muffled. Anyway, she is good to look at. I know, because I have visited her in her "native haunts" at Minneapolis.

There is no moon tonight. The lake is black. Romance is blanketed with shadows. Pirates and monsters might lurk between the doorway and the dull expanse which I know is water.

It is getting late. The jazz hounds are on, of course! "Marcheta" is chasing WJZ, New York, around to WBAP, Fort Worth, and I enjoy "Golden Hours" with WGY at Schenectady. WSB, Atlanta, is signing off. Midnight. It's a fadeout for me in the north woods.

Leviathan Life Boats Have Own Sets, Calls

Motor Craft Carry Transmission and Receiving Outfits

NEW YORK.—Two of the Leviathan's life boats, both ten-knot motorboats, have Radio transmitting and receiving sets and calls of their own. Life boat No. 67 is WSNB and No. 68 is WSNB. The Leviathan's own call is WSN, her two tenders carrying an additional letter. This is a new departure in American shipping, planned as an additional sea safety precaution.

If the Leviathan's Radio apparatus should get out of order, or should she be sunk, her two motorboats could communicate with relief ships, within a radius of about fifty miles, guiding them to the scene. Each of these Radio-equipped craft carries a spark set and a one-kilowatt gas engine driven generator. They communicate on wave lengths of 300 and 600 meters.

DON'T TAKE THE RISK!

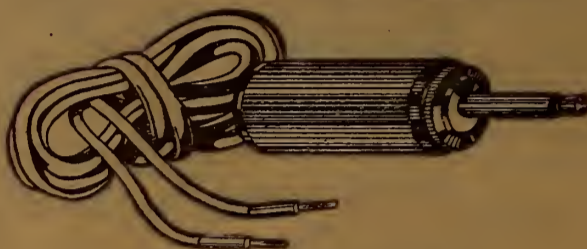
THEY SAY A STRAW BROKE THE CAMEL'S BACK—ANYWAY, A POOR PLUG WILL RUIN THE BEST SET

PLAY SAFE WITH The Original Automatic



BULL DOG GRIP TELEPHONE PLUG

(Licensed under Pat. Pend. Serial No. D 3010—No. 578540)



WE GUARANTEE

that this plug will not demagnetize your phones, ruin your transformers, short circuit your batteries, have battery kicks or break your finger nails. The COMSCO PLUG is the last link in perfect reception. At a small cost it is the final refinement for your set.



For One Pair Phones.....\$1.00
For Two Pair Phones..... 1.50

FOR SALE AT YOUR DEALER

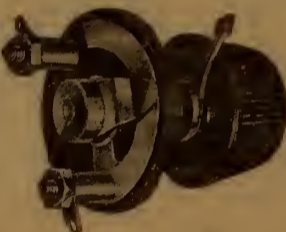
Otherwise send purchase price direct to us and you will be supplied

GENERAL INSTRUMENT CORP.

123 Liberty Street
NEW YORK CITY



WALNART Variable Grid Resistance



- Increases life of batteries.
- Eliminates hissing.
- Clarifies signals.
- Brings in distant stations.
- Works with all tubes.
- Can be used with or without fixed condenser.
- Will last a life time.

Send for Catalog of Walnart Radio Products

WALNART ELECTRIC MFG. CO.

Dept. 416 1249 W. Van Buren St. CHICAGO

The base of this instrument is Condensite Celoron, the perfect dielectric insulation (Licensed under Bakelite patents.)

SUPER VALUES REINARTZ CIRCUIT COMPLETE

| List Price | OUR Price | List Price | OUR Price |
|--|-----------|--|-----------|
| Genuine Reinartz Coil endorsed by John L. Reinartz and bearing his signature. The only genuine coil for this circuit on the market. All others are imitations..... | \$2.50 | Seven Blinding Posts..... | .70 |
| One 7x10x1/2 Radion Panel..... | 1.25 | 25 ft. Tined Bus Bar..... | .50 |
| National Bakelite Socket..... | 1.00 | 3 Switch Levers with Knobs..... | .75 |
| Klossner Vernier Rheostat with Dial..... | 1.50 | One Baseboard for mounting..... | .75 |
| Two 23-Plate Variable Condensers at \$3.00 each..... | 6.00 | One Fixed Phone Condenser..... | .40 |
| Switch Points and Nuts..... | .80 | One Single Jack..... | 1.00 |
| Six Switch Stop Points and Nuts..... | .40 | Blueprints with complete instructions for assembly and mounting..... | .50 |
| Freshman Grid Leak and Condenser..... | 1.00 | | |
| | .65 | Regular Price..... | \$19.05 |

OUR PRICE **\$11.05**

All the necessary screws, nuts and miscellaneous small parts which are necessary to complete the set are included in the above prices. Any part in either of these circuits may be purchased independently at the advertised cut prices.

FADA-HAZELTINE NEUTRODYNE PARTS for 4-Tube Fada Model 160; GENUINE PARTS, Complete. List Price, \$64.00. OUR PRICE..... **\$50.15**
ATLAS AMPLITONE LOUD SPEAKER. List Price, \$25.00. OUR PRICE..... **\$19.50**

CONDENSERS

| List Price | OUR Price | List Price | OUR Price |
|-----------------------------|-----------|----------------------------|-----------|
| \$1.80 3-Plate Vernier..... | .90 | \$3.00 23-Plate Plain..... | \$1.50 |
| 5.00 23-Plate Vernier..... | 2.50 | 2.80 43-Plate Plain..... | 1.00 |
| 5.50 43-Plate Vernier..... | 2.75 | | |

AUDIO TRANSFORMERS

| List Price | OUR Price | List Price | OUR Price |
|--|-----------|--------------------------------------|-----------|
| \$4.50 All American, 3 to 1 Ratio..... | \$3.95 | \$3.25 Star, 3 to 1 Ratio..... | \$2.70 |
| 4.75 All American, 5 to 1 Ratio..... | 4.10 | 3.75 Star, 6 to 1 Ratio..... | 2.95 |
| 4.75 All American, 10 to 1 Ratio..... | 4.10 | 5.50 Jefferson, 6 to 1 Ratio..... | 4.40 |
| 7.00 Amertran..... | 5.55 | 4.25 Jefferson, 3.75 to 1 Ratio..... | 3.40 |
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WE GIVE A 20% DISCOUNT

On All Standard Radio Apparatus Not Listed Above

Write for Our Catalog B

ALL MAIL ORDERS SHIPPED PROMPTLY. SEND MONEY ORDER, INCLUDING POSTAGE. The RADIO MAIL ORDER HOUSE—Known for Low Prices.



A Sure Thing

\$10.00 Buys a NATIONAL MONODYNE Without Tube

NO NEED TO PAY MORE
NO NEED TO HAVE MORE

Receives England

On Tuesday night, Nov. 27th, between 10:12 and 10:21, I heard on your National Monodyne Single Tube Set, hooked up with two stages of amplification, London, England, broadcasting speech, piano and violin solo. I also heard Liverpool between 10:26 and 10:30 broadcasting music very clearly.

FRANK DONDA,
341 East 56th St.,
New York City.

\$10 Without Tube

NATIONAL MONODYNE TUBE SET MODEL GT-1

The Monodyne Circuit is one of the most radical advances in Radio Engineering. Parts heretofore considered essential are entirely omitted. One Simple Tuning Control gives selectivity, equal if not superior to sets costing hundreds of dollars. The Single Tube performs the function of 2 tubes, as Radio Frequency Amplifier and Detector.

ALL WAVE LENGTHS—Local and Long Distance reception comes in clear and loud without distortion.

Order from your dealer today or if he cannot supply you, write us direct

16-22 Hudson St. **NATIONAL AIRPHONE CORPORATION** NEW YORK

ARMY RADIO "NET" SHORT OF HANDS

ACTIVITIES HANDICAPPED,
SAYS GEN. SQUIER

Lack 40 Officers, 150 Men, He Reports; "Unsatisfactory Work Is Result"

By Carl H. Butman

WASHINGTON.—The recently completed and highly efficient Radio net of the Signal Corps, which connects every important army post with Washington, cannot be properly handled due to a shortage of personnel, General George O. Squier, chief signal officer of the army, states in his recent annual report.

Referring to a shortage of approximately forty officers and 150 men, General Squier says, "The result will be the improper maintenance of stations and unsatisfactory handling of important Government business that may considerably overbalance the savings effected by attempting to operate with insufficient personnel."

He points out that no appreciable reduction in Signal Corps activities has been possible. In many cases, considerable increases in the activities have been necessary, notably in Radio communication. "The Corps is confronted to-day," General Squier says, "with many important problems whose solution depends largely upon the question of personnel."

Radio Development Funds Needed

Concerning equipment, the general says further, "The development of advanced types of Radio equipment for military use is a necessary and a very important function of the Signal Corps. The very best equipment obtainable should be provided for the communications of troops in the field. In time of war, thousands of lives and the success of military operations may depend upon it. Equipment of this kind cannot be satisfactorily developed after war starts."

Prisoners Hear Sermons

BIRMINGHAM, ALA.—The First Baptist church has installed a receiving set in the Jefferson county jail here, and now the prisoners listen to the sermons preached at the First Baptist church every Sunday morning and Sunday night.

BEAUTY QUEEN TELLS SECRET



Flora Mae Hackett, nationally famous beauty, was the party to a simultaneous broadcast not long ago when Stations WDAP of Chicago, WLAG of Minneapolis, WJAZ of Chicago and Cleveland, Detroit and several Canadian plants were linked. It gave her the opportunity of telling their invisible audiences the secret of her beauty.

Miss Hackett told the ladies many things, the keynote of which was, "The mind is woman's best cosmetic." In her address she continued: "I should say to the little plain woman who is inclined to cry a little over her plainness, that she ought to get up and fuss about a little—add little soft touches to her wardrobe just by way of giving herself confidence—and then sit

down every night, if possible, and listen to the phonograph or the Radio, particularly the Radio, as the music will come to her dreamily out of the air. She can have most any kind of music she wants.

"Her eyes will take on a dainty sparkle; her cheeks will be a little softer, more rosy; her lips will become somewhat more mobile—and all in all she'll reap a truly marvelous benefit from that little hour with her music.

"If women must have a formula for beauty, I'd give them this: LOOK at beautiful things, LISTEN to beautiful things, DO beautiful things. It might not make you pretty—and shallow—but it'll give you beauty, and that's much better."

"VOICE OF ROCKIES" TO BE HEARD SOON

GENERAL ELECTRIC READY
TO BUILD IN DENVER

Western Metropolis to Be Home of One of Largest Plants; to Cost \$175,000

DENVER.—Construction in Denver of a \$175,000 broadcasting station by the General Electric Company is to begin soon, according to an announcement by local General Electric representatives.

The station is to be one of the largest in this country; it will probably be better equipped than any broadcasting station now in operation. The cost of construction will total \$175,000. Expenditure of \$75,000 annually is planned, it is announced, to make the "Voice of the Rockies" heard from coast to coast.

Plan to Cover Whole U. S.

The Denver station is to be the last of three high powered broadcasting plants which will complete the company's proposed system of stations to cover the United States. The first of these stations was WGY, widely known as the Schenectady station; the second, now being equipped for operation, is in Oakland, Calif.

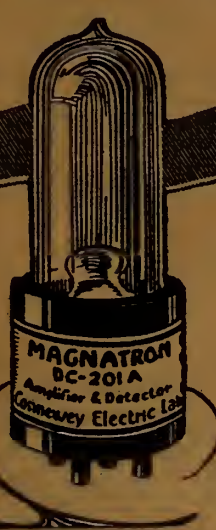
A convenient site, overlooking the city of Denver and affording an inspiring panorama of the Rocky Mountains, has been purchased for the housing of the new station, which will consist of an ornamental two story building, a power house and the antenna system.

1,000 Voice Chorus Sings

from Schenectady Station

SCHENECTADY, N. Y.—A chorus of one thousand voices was recently heard from WGY, the station of the General Electric Company, here. It was the Albany Community Chorus and WGY was connected to Chancellor's Hall, Albany, by telephone lines.

The Albany Community Chorus was heard on the air the first time last year in its annual concert and the feature proved one of the most popular of the year, according to the letters received from every part of the country from Radiophans.



a new tube that's BETTER!

The MAGNATRON Type DC-201A excels as an amplifier and it excels as a detector. It is a new tube that's better! That's why the Magnatron is an achievement out of the ordinary.

Higher amplification, greater sensitivity as a detector, and longer life, are only the highlights of MAGNATRON Type DC-201A superiority. The smaller points of design—which in the end are just as important for real tube results—have been just as carefully worked out in the Magnatron.

For instance, there's the all moulded base without brass shell. This eliminates the capacity effects so detrimental in radio frequency work.

YOUR DEALER HAS THE MAGNATRON

Dealers: Write for Attractive Proposition

CONNEWAY ELECTRIC LABORATORIES
309 Fifth Avenue NEW YORK CITY

This tube functions in all circuits and draws only one-quarter of an ampere. The filament voltage is five; plate voltage up to a hundred.

RADIO TALKS

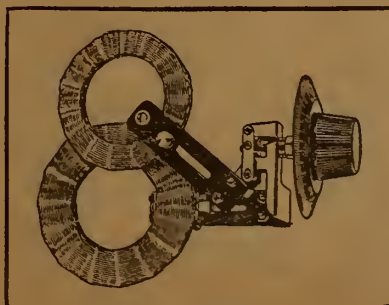
A single circuit receiver using a good eleven or twenty-three plate condenser, in series with antenna, and a 90 to 100 turn coil will give cards and spades to the one that uses a 50 or 75 turn coil when it comes to selectivity and distance work.

There is a whole lot yet that we do not know about even such a simple and much laughed at thing as the single circuit regenerative receiver. E. J. Flewelling

E. J. Flewelling Tuner

The FLEWELLING Tuner is everything a good tuner should be. It is designed to be as near mechanical and electrical perfection as it is possible for human hands to do so. Efficiency, durability and rigidity were not overlooked in planning a tuner that would be of simplicity—of attractive appearance—constant—easily controlled and tuned—and one free from internal capacity effects. From his original model, Mr. FLEWELLING has evolved a tuning unit to which he adds his personal endorsement. Look for the name FLEWELLING on each container. It is your assurance of efficiency.

BUELL MANUFACTURING COMPANY
2977 COTTAGE GROVE AVE.
CHICAGO



\$ **8.00**
At your
dealers
or post
paid.

Further Details of the Famous Miloplex Hook-Up

Part XIV—Condensers Used with King X

By the Mystery Man

AND he said: "Dear King, you don't need to ask me no time to drop Maggie a postal. Man, I'll drop her twenty, each pleading to keep you and her dog Howler well fed if well, anything, O. M., to keep the good circuits coming."

Mercy, and over two hundred eards are in now so it appears suspiciously like I was going to stay on the job. It's up to you

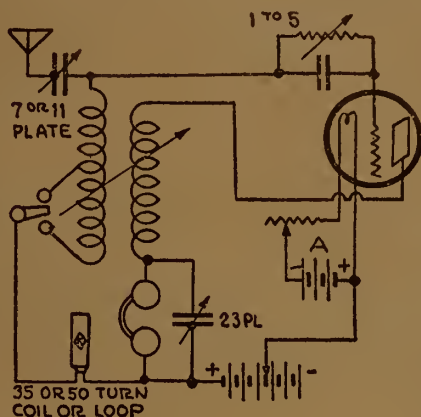
You know here of late many are telling they now have their "Kings" working even better without the ground. Atta baby! Certainly, when I can't get 'em I pull the ground and then she clears up fine.

Variometers

Between the postman, Xmas and wondering whether I'll get any — to celebrate New Year's with, comes along a flood of letters asking if this or that variometer would do for the King. Yes, just about do and that's all. Personally, the King just don't like those beauty variometers that hide all of the stator wires; he takes much better to those sort of exposed types—you know what I mean. One of the kind that looks like the manufacturer didn't care if they weren't so pretty. Yes, use all the exposed types by all means. Why? Well, you know an inductance coil—or say the stator or rotor of a variometer—is first an inductance, but it also has resistance. Now that's bad enough, but just to make life interesting it also possesses capacitance, which in common everyday language means condenser effect, this occurring between the adjacent turns of wire. It is this multiplicity of tiny condensers we would desire to eliminate. It just can't be done, so we have to put up with it; yet by doing

away with all material possible which would prevent free air insulation over the entire winding, we can hold these little condensers tame and add little if any losses to them. Isn't that enough to make you steer clear of enclosed types for circuits working with everything balanced as the King does?

You're wulcum. Except, why not try to do some tuning with your grid leak knob



and potentiometer? Vary them; that's what I put them on for.

Condensers

What say, O. M? We hurry on; or have you already peeked at the circuit I gave you the log of last week? Strange little fellow, isn't he? Who ever heard of a

circuit, with both inductances tied together with a pair of phones, giving one the choice of with or without what? With or without, well, both ground and antenna; with or without honeycomb coils or loop, but with one always. Yes, I admit it; you know really a person couldn't invent a circuit like it. If I remember correctly, tho I do about as often as two goes into two, this is really a King X—a sort of "pull-with baby." I say "pull with" because a lot of you fellows are going to have some fun with it. Of course it works—read last week's log. Supposin' we look it over, noticing particularly that a seven or eleven plate condenser will do for your antenna unless it's a five-ton five-wire one. Such a condenser is possible because we have a high in-

ductance tapped but once—about halfway—in the primary which can be around 85 to 90 turns. Yes, you could use spider web coils very nicely. Then the tickler should have pretty close to half as many as the primary; remember a few more turns on both won't make much difference.

But I put a question mark on that 23-plate condenser; I'm not so sure just what capacity would be best. It's all determined by the make of headphone you use. Try a 21 or 23—cut and try. It's got some by-passing to do you know.

Listen to this little fellow, listen close and hear the varying frequency. You know most authorities say you must have a varying frequency if you want super-

(Continued on page 10)

YOU DON'T NEED TUBES

OR ANY SPECIAL CRYSTAL TO RECEIVE CONCERTS FROM DISTANT STATIONS!

You can hear them on your CRYSTAL SET if you fix it up the right way. People using my methods hear programs clearly from stations 400 to 1,000 miles away. No Tubes, Batteries, Amplifying Apparatus or Special Crystals required—necessary changes often cost less than One Dollar!

Using my plans, a boy in Horton, Kansas, hears KDKA, WDAF, WHV, WAW, WOC, WOS and WSB. Another at Pueblo, Colorado, hears WOAW, KFI, WBAP, KYW, and

KDKA. A man in New York City writes: "Have tested out your Crystal Set and results very satisfactory, no trouble in locating KDKA, WSB, and WDAF." A man in Philadelphia hears KDKA, WOC, WGY, WJAZ. A man in Kansas City hears both KHJ and WGY. A boy in Cortland, Nebraska, hears WAW, WOC, KSD, WOS, WOAL, WJAZ, WLAG, WIL, and WSB. All these records and hundreds more on my Crystal Hook-Up Without Tubes. You may have everything you need and just have it connected up wrong. Send self-addressed envelope for picture of my set, and further information, or \$1.00 for Complete Copyrighted Instructions. Satisfaction guaranteed or money refunded.

LEON LAMBERT

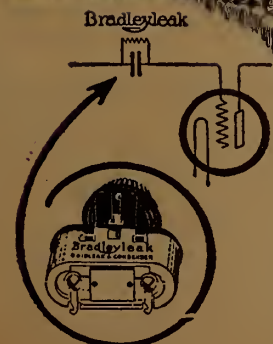
WICHITA, KANSAS

501 South Volusia

Bradleyleak THE PERFECT GRID LEAK



Retail Price 1.85 Condenser (50000 MC) 35¢



The Dawn of Better Radio

THE BRADLEYLEAK has solved the radio fan's most baffling problem. Guesswork in grid leak adjustment has been eliminated. Put a Bradleyleak in place of your grid leak, and adjust it smoothly, noiselessly, and instantly to the precise value required for your detector. Not affected by climatic conditions. Endorsed by Crosley, Kennedy, Amrad, and others. Try one, to-night!

ALLEN-BRADLEY CO.

290 Greenfield Avenue Milwaukee, Wisconsin

Range 1/4 to 10 megohms

SOLD BY LEADING RADIO DEALERS AND JOBBERS

LOUD TALKING CRYSTALS 50c

B-METAL TUBE DETECTORS

Have stood the test of time and are best by every test. **\$1.50**

At All Dealers and Jobbers
B-METAL REFINING CO.
3134 Trumbull Ave., Detroit, Mich.
Chicago Branch, 53 West Jackson Blvd.

RADIO AT N.Y. PRICES

Via Daily Parcel Post

U.S. MAIL

The Prices Quoted Below Deliver Goods to Your Door. Write your order plainly; state number, description and price of items wanted. Send Post Office or Express Money Order, personal check or bank draft.

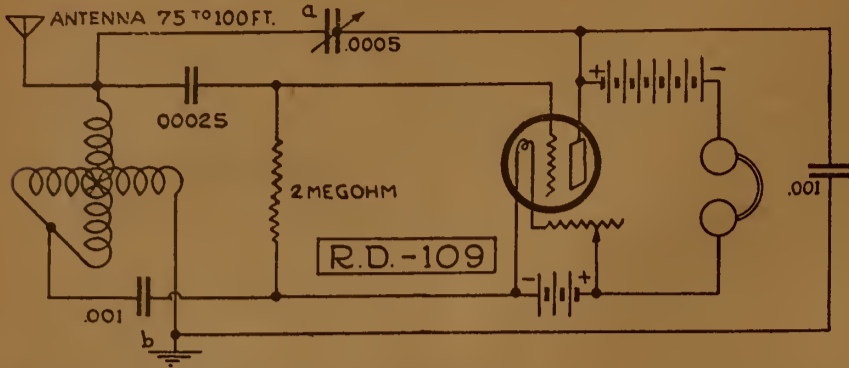
- VACUUM TUBES**
Standard brand Radio Corp. tubes. Guaranteed brand new.
D50 Detector, U.V.200, ea.\$4.25
D51 Amplifier, U.V.201A, ea. 5.75
D52 1 1/2 volt W.D.11, ea. 5.75
D53 W.D.12, ea. 5.75
D54 U.V.199, ea. 5.75
D55 U.V.199 Adapter for U.V.199 tube fits any socket, ea.50
D56 W.D.11 Adapter fits W.D.11 tube and any standard socket, each.50
- WOOD CABINETS**
Highest grade Mahogany finish Cabinets. Hinged top. These cabinets are being sold at less than one-half regular value.
D57 Wood Cabinet; panel size 7"x10". Ea. \$2.50
D58 Wood Cabinet; panel size 7"x12" 2.75
D59 Wood Cabinet; panel size 7"x14" 3.00
D60 Wood Cabinet; panel size 7"x18" 3.50
D61 Wood Cabinet; panel size 7"x21" 3.75
D62 Wood Cabinet; panel size 7"x24" 4.00
Baseboards (Mahogany Stained) for use with above cabinets
7x10.....25c 7x14.....35c 7x21.....45c
7x12.....30c 7x18.....40c 7x24.....50c
- BAKELITE TUBE SOCKETS**
Moulded of brown bakelite; Binding Post Connections.
D99 Standard Type for 201A, 301A, W.D.12.....39c
D100 For U.V.199, U.V.299, Socket39c
D101 For W.D.11, C.11.....39c
- MISCELLANEOUS**
D163 Spaghetti Tubing, per yd.\$0.09
D164 Synthetic Crystal30
D165 Ground Clamps17
D166 Black Rubber Binding Posts, 2 for05
D167 Nickel Plated Binding Posts, 2 for05
D168 No. 18 Annunciator Wire, half pound coil. .39
D169 6 ft. Phone Cord with Tips.79
D170 20 ft. Extension Cord with Tips. 1.95
D171 Wall Insulators, Porcelain.05
D172 Tubular Porcelain Lead-in Insulators, 6-in. .10
D173 Reinartz Coil 1.45
D174 Cockaday Coil 2.42
D175 2 in. Dial and Knob25
D176 3 in. Dial and Knob35
D177 4 in. Dial and Knob49
- AMPLITONE LOUD SPEAKERS**
This speaker will give efficient results when used with any pair of Head Phones; highly nickel plated; 18 inches high.
D117\$3.95
- PLATE CIRCUIT "B" BATTERIES**
The highest grade of battery made at prices lower than they ever were sold before.
D80—22 1/2 Volt Small.....\$1.15
D81—22 1/2 Volt Medium. 1.45
D82—22 1/2 Volt Large..... 1.95
D83—45 Volt Medium..... 1.95
D84—45 Volt Large..... 2.50
D85—45 Volt Extra Large..... 3.50
D86—360 Hour 1 1/2 Volt Twin Double Duty "A" Battery75
- FILAMENT CONTROL RHEOSTATS**
Highest grade of material used, tapered knob.
D104—6 ohm\$0.39
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D106—300 ohm Potentiometer. .79
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- HARD RUBBER PANELS**
The highest grade panel on the market. Highly polished finish; cut in the following sizes:
D88—7x10\$0.95
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- RADIO SOLDERING IRON**
Indispensable for the man who builds his own sets.
D109\$2.50
D133—Soldering Paste, tube..... .25

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America's Greatest Radio Mail Order House
ELEVEN NEW YORK STORES

CIRCUIT USING WD-11 AND 12 TUBES



THis unusual circuit, which is easily adapted for WD-11 or 12 tubes, was submitted by an anonymous fan signing himself "W.W." It covers a wave length range of about 180 to 600 meters. It is shown here as R.D.-109. You are cautioned not to run wires parallel, the passing effects being detrimental to the finer tuning qualities. There are only two controls, a vernier variable condenser and

a variometer. The rheostat preferably should have vernier adjustment. If the panel is shielded, the shield should be connected to the minus side of the filament. If the shield is grounded, it will form one side of a condenser with the body through the phones, increasing instead of decreasing capacity effects. Because of its simplicity the circuit will interest many fans for experimentation.

KING MILOPLEX

(Continued from page 9)

regeneration. Listen and see if you get it.

Maggie calls, but I go not until I thank Mr. Wheat and all his Wheat crowd at Kansas City for listening to my prattle while the dogs were barking, when in Kansas City recently where I appeared without my bad egg shield. Nice fellows, you boys, and every one who made me draw so many circuits they didn't have no chalk left for school. Let's eat.

(TO BE CONTINUED.)

Forming Tap Loops

When forming loops for taps two or three tight turns are sufficient. Too much twisting may cause a break at the twist, which will be scarcely noticeable until the coil is wired into the circuit.

TUBES \$5.43

Genuine R. C. A. Radiotrons
UV199, UV201A, WD11, WD12
Guaranteed Firsts in Original Packages

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| 0 to 50 Pocket Volt-Meter..... | 1.12 |
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| Acme Audio Transformers..... | 3.97 |
| 23-Pt. Vernier Condenser, Knob and Dial..... | 2.13 |
| 23-Pt. Variable Condenser..... | 1.14 |

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1806 Lafayette Ave. St. Louis, Mo.

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"DUO STAT"
Trade Mark
Two Rheostats in One



\$3.00

Rear View

You will see the advantages of this remarkable new apparatus at once. A real innovation. Think of it! One high-class Rheostat that completely replaces two of the ordinary types; does the work even more efficiently, and, in addition, greatly simplifies installation and wiring. One hole to drill, THAT'S ALL. That's what you get in the "Duo-stat."

Two independent resistor windings, each operating one tube. Bakelite Moulded Base, silver etched dial, "NICHROME" wire windings. Made for all types of tubes. No. 12, two windings, each 7 ohms. No. 13, two windings, each 25 ohms. No. 14, two windings, each 40 ohms. Price, all types, \$3.00.

You can't afford to leave out the "DUO STAT" in your next "hook-up." Send for our free Bulletin No. 92.

Ask Your Dealer

Premier Electric Company
3810 Ravenswood Avenue CHICAGO

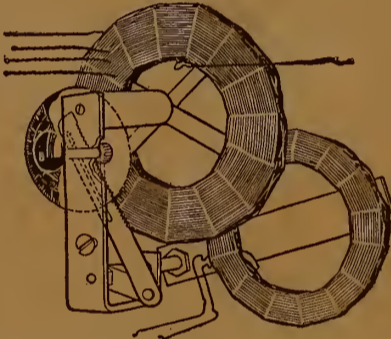
What Causes Squealing

Most of the squealing heard in the receiving set is due to over-regeneration. If a tube is oscillating it is impossible to get intelligible signals over the Radio-phone.

TUNING UNIT

For any circuit

Pfanstiehl
A Marvel of
Efficiency and
Selectivity **\$5.00**



No absorption losses can occur in this universal tuning unit because no composition material is in magnetic field. The gearing makes possible the finest adjustments.

At all good dealers or direct on receipt of purchase price.

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Guaranteed Tubes that draw only a quarter ampere.

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NEUTRODYNE

This is the set that is bringing in the DX stations! The parts are the very best obtainable—look them over:

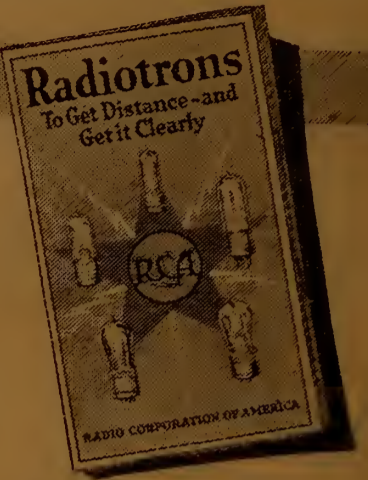
- 3 Workriteformers (Wound on Bakelite with silk wire)
- 1 7x24 Panel
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- 5 Brunswick Sockets
- 2 Shacton Rheostats
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- 2 .006 Westinghouse Fixed
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- 3 Shacton Dials
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Equip your aerial with dry gap insulators and keep it constant in all kinds of weather. Don't blame your set if your insulators are covered with snow or ice, which lets the electric current escape down the wet guy rope to the ground. \$1.50 each, check or money order. Write for descriptive bulletin.

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PANELS and CABINETS

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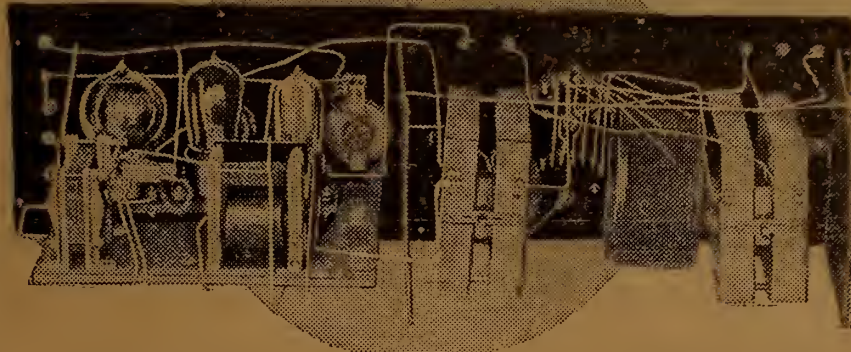
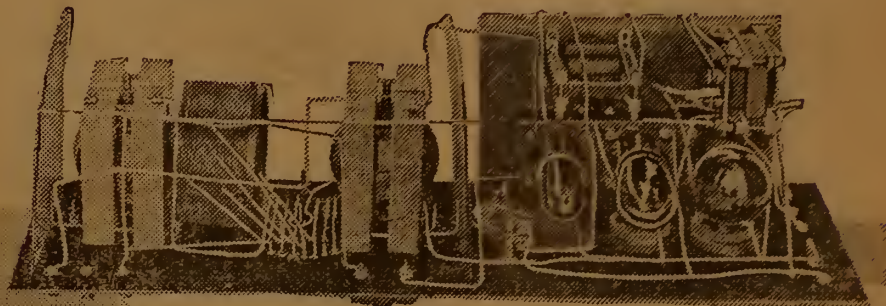
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| Phone Plugs (round or flat)..... | 25c |
| S. C. Jacks..... | 25c |
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| Tube Protectors, 1/4 or 1 amp..... | 23c |
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Phone Specials: Kronephones, 2 pairs \$5.90; Genuine Nat. Baldwins \$8.98

Selective Three Tube Single Circuit Receiver

Part I—Description of Set

By Fred Grill



THIS is the first of a series of three articles which will describe in detail a three tube receiving set, with the addition of a two step amplifier. In the subsequent articles will appear diagrams and all the technical data necessary to construct the set. Nothing technical will be included in this, the first chapter; therefore, the hook-up will not be published until next week. With the hook-up all of the data as to construction will appear.

The receiver will be described in simple Radio language which should be understood before attempting to build the set. Any novice with but a fair knowledge of Radio should be able to construct and operate the set at its maximum efficiency.

Types of Receivers

At the present time there are in use, generally speaking, four types of receivers—the four circuit, the three circuit, the double circuit and the single circuit. Because it is easily constructed and because of its good volume and distance qualities, the single circuit seems to be the favorite. But by many the single circuit is ruled entirely out of classification, because of the broadness of tuning. This fact seems to be the only real point of dissatisfaction in relation to the single circuit set.

The single circuit does not fall directly in any of the previously mentioned classifications. To make an absolutely true statement—it is a single-double circuit. This may seem misleading to many but consideration of the facts will reveal that it is true. The coupling is secured inductively, not conductively as is the case in all single circuit sets of other variety. The coupling depends on the spacing of the variometers. The grid variometer is placed to the extreme left; the inductance coil placed next and the plate variometer to the right of the inductance. The exact

spacing will be given in the next chapter. With incorrect spacing of the variometers and the inductance the set will be rendered inoperative. In the ordinary single circuit the grid is connected directly to the antenna; then the customary grid return through the inductance is grounded. In this circuit it will be noticed that the antenna is connected to the plate instead of to the grid. A variometer is inserted in series with the antenna lead. The grid circuit remains the same but the antenna connection is omitted.

Characteristics of Tuning

This circuit is the result of tests with single circuit receivers, all of which have

the bad characteristic of broad tuning. My desire was for a selective single circuit hook-up. The direct conductive coupling of the antenna to grid was first eliminated. The sharp tuning of this set is attributed to the tuning of two circuits—the grid and the plate. As well as acting as the feedback and making the set regenerative, the plate variometer adds greatly to the selectivity of the set.

Of the three pictures shown, the first is the front view; the second is the top view and the third is the back view. All of these pictures are actual photographs

of the original model of the set. In the first you will observe the dials. The dial to the extreme left is the grid variometer dial. The switches and contact points next are for control of the inductance. The next control is that for the plate variometer. It is with this control that sharpness of tuning is obtained; it acts almost like a tuned impedance in a Radio frequency amplifier.

The second photo shows the top view. In the back view photo a good idea is obtained as to the general arrangement of the apparatus, with spacing of variom-

(Continued on page 14)

Why Feel Like a Radio Fool

Trying to "Tune in" before "Company" on Some Station you want, but can't recall how to "pick up," when by investing only \$1.00 in the New Radio record book

"WHERE I GO BY RADIO"

You can do it easily and quickly? Get a copy at once and save yourself and others embarrassment. Correct List of Stations to November 15.

Holiday Ed., \$1.00. Popular Ed., 2 for \$1.00
RADIO BOOK DEPT., PROGRESS PRESS
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Cut exactly to size and a guaranteed 12 hour shipment. $\frac{1}{4}$ " thick .01 $\frac{1}{2}$ c per square inch, $\frac{3}{16}$ " thick .01 $\frac{1}{2}$ c. Made of the highest grade black fibre. This material possesses electrical strength of 200 volts per mil. is inexpensive, unbreakable, easy to work and takes a fine finish. We pay postage.
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"The Best for Less"

REINARTZ CIRCUIT EVERY PART COMPLETE

1 Reinartz wound coil, 1 tube socket, 1 rheostat, 1 23-plate .0005 MFD. variable condenser, 1 13-plate .00025 MFD. variable condenser, 3 inductance switches, 23 switch points and nuts, 6 switch stops and nuts, 8 binding posts, 2 3" dials, 1 variable grid leak, 1 .002 MFD. phone condenser, 23 feet bus bar wire, 1 high-grade panel ALREADY DRILLED AS PER DIAGRAM \$10.95 and complete instructions.
Two-Stage Audio Frequency Amplifier—Parts complete in every detail for this Circuit—\$11.00
Specify type of tubes you intend using

FLEWELLING CIRCUIT EVERY PART COMPLETE

2 honeycomb coils, 1 2-coil mounting, 2 coil plugs, 3 .006 condensers, 1 variable grid leak, 1 grid leak, 1 23-plate .0005 MFD. variable condenser, 1 Vernier rheostat, 1 tube socket, 8 binding posts, 20 feet bus bar wire, 1 3" dial and 1 high grade panel ALREADY DRILLED as per Diagram in Booklet of instruction sent free. \$11.95
Two-Stage Audio Frequency Amplifier—Parts complete in every detail for this Circuit—\$11.00
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2-LO, LONDON, ENGLAND ON ONE TUBE

Another Record for the

ELGIN SUPER-REINARTZ

Tuesday, November 27, during the test period between 9 and 9:30 P. M., Rev. E. A. Cole in the residence of J. A. McIver, of Roodhouse, Ill., while operating a set made of materials and in accordance with the hookup furnished by the ELGIN RADIO SUPPLY CO., tuned in 2-LO, London, England, using receivers and but one tube. Later another tube was lighted and the loud speaker used, so that four people could hear the program and concluding announcement. The numbers, time, and the order in which they were played were

Officially Confirmed

by the St. Louis Post Dispatch in conjunction with the National Association of Broadcasters, who had charge of the tests. (See page 34, St. Louis Post Dispatch, Dec. 2, 1923.) This same hookup has been advertised extensively as the one which brings in stations 2000 miles overland on a loud speaker and one tube; and this has been demonstrated so often as to need no repetition.

Send a two-cent stamp for circular giving one, two, and three tube hookup, and price list of parts for this remarkable circuit. Address the

ELGIN RADIO SUPPLY CO.

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| 3 Plate Variable; value, \$1.75 |\$1.05 |
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BEST QUALITY JACKS, Single Circuit; value, 65c; special at.....\$.30
Double Circuit; value, 90c; special at..... .45

MULTIPLE POINT INDUCTANCE SWITCH with Knob and Dial (15 Switch Points).....\$1.25

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TELEPHONE PLUGS.....\$.60

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| Filament Rheostat, 6 ohm..... | .65 |
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| With 2" Dial, 15c extra. | |

Honeycomb Coils, 50 turns mounted..\$.95
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EXTRA SPECIAL—Telephone 3000 Ohms Headsets; \$9.00 value; reduced to..... 3.50

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FRESHMAN VARIABLE RESISTANCE LEAK and MICA CONDENSER Combined.. .75



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ENTERTAINERS ON EASTERN PROGRAMS



To the left is presented Johnny Herman, another member of Clarke's band of clever artists. In the circle above is Miss Neil, of Neil and Cantrell, New York vaudeville favorites, and also the delight of listeners in to all metropolitan broadcasters featuring Clarke's White Way Entertainers

UNEVEN AIR SEEN AS FADING CAUSE

HOLD HEAVYSIDE SURFACE IS RESPONSIBLE

Conditions 60 Miles Above Earth Effect signals, Extended Tests Show

WASHINGTON, D. C.—When Radio first was used for long distance communication it was noticed that signals were not transmitted as far during the day as during the night. It has also been observed that at night Radio signals on the higher frequencies or shorter wave lengths, vary greatly in intensity from minute to minute. Persons who receive broadcast concerts from distant stations have occasion to notice this variation in intensity of received signals since loud signals may be received from a given distant station at one moment only to disappear entirely for a few minutes and then recover their original intensity.

Collect Data by Tests

This and related phenomena have been recorded from time to time and various hypotheses have been brought forward in an attempt to explain them. The phenomena are dependent upon a large number of variable quantities such as the weather conditions, the nature of the country over which transmission occurs, the surroundings of the transmitting and receiving stations, and the method of handling the receiving apparatus. Only by a statistical study in which the results obtained simultaneously at a large number of receiving stations are collected and tabulated, may reliable averages be obtained.

In an attempt to secure some worthwhile statistics of this kind, a co-operative study of Radio signal fading was made by the Bureau of Standards and the American Radio Relay League during 1920 and 1921. In these tests from five to ten stations transmitted signals in succession on certain nights, according to prearranged schedules. The signals were received simultaneously by about one hundred receiving stations whose operators were provided with forms for recording the variations in the intensity of the signals as received.

Results Only Tentative

The paper gives summary tables pointing out possible relationships between weather conditions and the fading and intensity of Radio signals and the prevalence of strays or atmospheric disturbances. On account of the limited number of observations and the large number of factors which influence transmission, the statistical results can be considered as only tentative.

The general result of these tests, however, substantiates the theory that the sources or causes of fading are intimately associated with the conditions at the heavyside surface, which is a conducting surface some sixty miles above the earth. Daytime transmission is largely carried on by means of waves moving along the ground, while night transmission, especially for great distances and short waves, is by means of waves transmitted along the heavyside surface.

Monday, January 7

KFAE, Pullman, Wash. (Pacific, 330), 7:30 p. m., Mrs. Glade Burnett, soprano; "Something for Nothing," Dr. C. C. Todd, head chemistry dept.; Beryl Squires, pianist.

WBAP, Fort Worth, Texas. (Central, 476), 7:30-8:30 p. m., Concert; 9:30-10:45, Concert, Band of Whitney, Texas, Charles Furstall, director.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30 to 1:15 p. m., Concert; 2:30-3:30, Matinee Musicale; 6:45-7:30, Children's program; 8:00-10:00, De Luxe program.

WGR, Buffalo, N. Y. (Eastern, 319), 12:30-1:00 p. m., George Albert Bouchard, organist; 6:30, Vincent Lopez Orchestra, dinner music; 7:30, Digest of the day's news.

WGY, Schenectady, N. Y. (Eastern, 380), 9:30 p. m., Dance music, Jack Symond's Orchestra.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Strand Theater Orchestra; Walnut Theater Orchestra; Alamo Theater Organ; 7:30-9:00, Concert, auspices of Myrtle George Stinger; Reading: "An Interesting Historical Episode."

WHN, New York, N. Y. (Eastern, 360), 2:15-3:30 p. m., Fred Whitehouse Review; 3:30-4:45, Ideal Novelty Dance Orchestra; 4:45-5:45, Lou Schubert's Dance Orchestra; 7:30-8:15, Dixie Devil Demons from the Cinderella Dance Hall; 8:15-8:45, James Flynn, tenor; 9:00-9:45, Joint Recital by Muriel Snyder, soprano, and Irving Manly, baritone.

WJAZ, Chicago, Ill. (Central, 447.7), 10:00 p. m.-2:00 a. m., Program, Ted Brown Publishing Co.; Oriole Orchestra.

WMAQ, Chicago, Ill. (Central, 447.5), 8:00 p. m., Salvation Army Band; 9:00, Balaban & Katz Chicago Theater.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., St. Andrew's Choral Society, L. White McCoo, leader.

WOC, Davenport, Iowa (Central, 484), 12:00 m., Chimes; 3:30 p. m., "A Silk Worm," C. C. Hall; 5:45, Chimes; 8:30, Sandman's visit; 9:00, P. S. C. Orchestra; V. B. Roche, baritone.

WOR, Newark, N. J. (Eastern, 405), 2:30-3:00 p. m., Claude Hlman, baritone; 3:30-4:00 Dr. Joseph F. Craigen, psychologist; 7:15-7:30, Fred J. Bendel, "Sporting News Up to the Minute," Newark Ledger; 8:15-8:30, Harry Hirschfeld, famous cartoonist; 9:15-9:45, Belle Bart, astrologist; 10:00-11:00, Harry Hanbury Revue.

WTAM, Cleveland, Ohio (Eastern, 390), 9:00 p. m., Regular Saturday evening dance program by the WTAM Orchestra; Vocal numbers by favorite artists; Miss Clara Sharp, accompanist.

WWJ, Detroit, Mich. (Eastern, 517), 9:30 a. m., Woman's talk; 3:00 p. m., Detroit News Orchestra.

Sunday, January 6

KFI, Los Angeles, Calif. (Pacific, 469), 10:00-10:45 a. m., Church service by L. A. Church Federation; 4:00-5:00 p. m., Concert by Federated Church Musicians.

KHJ, Los Angeles, Calif. (Pacific, 395), 10:00 a. m., Sermon; 10:30-12:30 p. m., Noon, Organ recital and service of First Methodist Episcopal Church, Rev. E. E. Holms, pastor; Arthur Blakeley, organist; 7:00-7:30, Organ recital from First M. E. Church, Arthur Blakeley, organist; 8:00-10:00, De Luxe Program.

KYW, Chicago, Ill. (Central, 536), 11:00 a. m., Central Church service, Dr. F. F. Shannon, pastor; 6:30 p. m., Excerpts from the New Testament—An American Translation, Prof. E. J. Goodspeed, William Ziegler Nourse; 7:00 p. m., Chicago Sunday Evening Club.

WBAP, Fort Worth, Texas (Central, 476), 11:00 a. m.-12:15 p. m., Church services, First Methodist Church, Rev. J. W. Berrin, pastor; 4:00-5:00, Organ concert from the Rialto Theater; 5:00-6:00, Vesper concert, W.D.A.P. Chicago, Ill. (Central, 360), 9:15 p. m., Drake Concert Ensemble and artists.

WGR, Buffalo, N. Y. (Eastern, 319), 3:00 p. m., Vesper services, the Rev. John P. Sala, the University Church of Christ; Mrs. Agnes Luthrull Lullis, lyric soprano, soloist; 4:00-5:00, Robert Munn, organist.

WGY, Schenectady, N. Y. (Eastern, 380), 10:30 a. m., Pilgrim Congregational Church; 3:30 p. m., WGY, Symphony Orchestra; Mrs. Marion Brewer, soprano; 7:30, Church services.

WHAS, Louisville, Ky. (Central, 400), 9:57 a. m., Organ music; 10:00, Church services, Fourth Avenue Presbyterian Church, Rev. Dr. Charles W. Welch, pastor; 4:00-5:00 p. m., Presbyterian Seminary Quartette.

WHK, Cleveland, Ohio (Eastern, 283), 8:00 p. m., Concert program by the WHK Trio, with vocal numbers by favorite artists; 9:30 p. m., Chapel service from the Glenville Presbyterian Church, Rev. A. H. Limoux, pastor.

WHN, New York, N. Y. (Eastern, 360), 3:00-4:45 p. m., Christian Endeavor Union; 5:00-5:15, John D. Flynn, of the National Security League; 5:15-8:00, Radio Five Dance Orchestra.

WJAZ, Chicago, Ill. (Central, 447.7), 6:00-9:00 p. m., Edith Ayres McCullough, soprano; Florentine Trio; Joseph Brinkman, pianist; Oriole Orchestra.

WOC, Davenport, Iowa (Central, 484), 9:00 a. m., Sacred Chimes concert; 1:30 p. m., Orchestra Concert, patriotic and sacred numbers, P. S. C. Orchestra; 9:00, Musical program, Erwin Swindell, director; P. S. C. Orchestra; May Chambers, soprano; Charles Kerns, tenor.

WWJ, Detroit, Mich. (Eastern, 517), 7:30 p. m., Church Services; 5:00, Orchestra.

Saturday, January 5

CKAC, Montreal, Can. (Eastern, 430), 7:00 p. m., Kiddies' stories in French and English; 7:30, Classical selections, Mount Royal Hotel Concert Orchestra, Rex Datto, director; 10:30, Merry-making, Joseph Smith's famous Mt. Royal Hotel Dance Orchestra and Cabaret.

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 12:10 p. m., Noonday concert, Dougherty's Orchestra; 6:15, Dinner concert, Westinghouse Band; 7:45, Children's period; 8:15, "Budgeting for Better Business," Dr. Charles Reittel; 8:30, Westinghouse Band; Charles W. Foden, tenor; Penton Neal Walter, pianist.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Vocal concert and bedtime story; 8:00-9:00, Instrumental concert; 10:00-11:00, Vocal and instrumental concert.

KGW, Portland, Ore. (Pacific, 492), 3:30 p. m., Children's program, story by Aunt Nell; 10:00, Dance music, George Olsen's Metropolitan Orchestra.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Concert; 2:30-3:30, Matinee Musicale; 6:45-7:30, Children's program, Marshall Stedman, dramatic instructor; 8:00-10:00, Program, L. A. Desk Company; William H. King; 10:00-12:00, Art Hickman's Orchestra.

KSD, St. Louis, Mo. (Central, 546), 7:15 p. m., Orchestra concert, organ recital, vocal and instrumental specialties, Missouri Theater.

KYW, Chicago, Ill. (Central, 536), 11:35 a. m., Talk, Mrs. Anna J. Peterson; 6:50 p. m., Children's bedtime story; 8:00-8:58, Herbie Mintz, pianist; A. W. "Sen" Kaney, specialty act; Sallie Menkes, pianist; Wendell W. Hall, KYW's Music Maker; 9:05-9:25, "Under the Evening Lamp," Youth's Company.

WBAP, Fort Worth, Texas (Central, 476), 7:00-7:30 p. m., Review of Interdenominational Sunday School Lesson and Bible Class, Mrs. W. F. Farnum.

WBZ, Springfield, Mass. (Eastern, 337), 7:00 p. m., Dinner concert, Hotel Kimball Trio, Jan Geerts, violinist; Angel G. Loneragan, cellist; Paul Lawrence, pianist; 7:30, Children's hour; 8:00, Loretta Champagne, pianist; Miss McDonald, soprano; 9:00, Bedtime story for grown-ups, Orison S. Marden.

WCAP, Washington, D. C. (Eastern, 469), 7:30-10:00 p. m., Joint program with WVEAF; 10:00-12:00, Dance music.

WDAP, Chicago, Ill. (Central, 360), 10:00 p. m.,

IN GOTHAM, MAKES SPEECH TO PARIS

French Editor Addresses His Countrymen from Heart of New York

NEW YORK.—Speaking from the studio of Station WJY in the heart of America's greatest city, Senator Paul Dupuy recently delivered a stirring speech to his countrymen on the splendid relationship between France and the United States. Monsieur Dupuy is publisher of "Le Petit Parisien" and his speech was directed primarily to his colleagues on other French dailies.

In the address the senator predicted that clear, direct communication between nations and continents would soon be achieved and declared that it would mean an enormous stimulus to international co-operation.

Radiograms and cables advised the Senator the following day, just before he sailed on the liner Paris, that not only had his friends received his message but that his address had been picked up by thousands of French amateurs.

WGY, the General Electric Company's station at Schenectady, was connected by land wire with WJY and broadcast the speech simultaneously, but on a different wave length, so that French Radio enthusiasts were listening in on both wavelengths.

Show One-Wire Antenna Good in Low Power Work

Eliminates Cost, Space and Weight When Used Aboard Ships

WASHINGTON.—Recent exhaustive tests with one-wire antennae on merchant vessels have demonstrated the practicability of using a single wire for low power transmitting purposes as well as for receiving. Aboard ships this feature would eliminate cost, space and weight. It would make the necessary lowering of the aerials on cargo vessels during loading much easier, and reduce the necessary insulators, wire, spreaders, etc. Also the single-wire aerials could be hoisted higher than a three- or four-wire antenna.

Amateurs who have no facilities or cannot afford to erect masts high and strong enough to carry a heavy four-wire aerial, should find the single wire of considerable benefit when using one kilowatt or less power; for two kilowatt transmission, it is said the single-wire antenna is not to be compared with larger antenna.

The efficiency of the single wire aerial in transmitting is not quite as great as a four-wire aerial, but experts believe the decrease in cost, weight and ease of handling would compensate for loss in efficiency. The recent tests included the use of both inverted L and T type aerials, and several forms of wire. A four-strand wire cable twisted over a manila rope core was found most satisfactory.

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Bedtime story for grown-ups, Orison S. Marden.
WCAP, Washington, D. C. (Eastern, 469), 7:30-10:00
p. m., Joint program with WEAF; 10:00-12:00, Dance
music.
WDAP, Chicago, Ill. (Central, 360), 10:00 p. m.,

WNAS, Louisville, Ky. (Central, 484), 7:00-8:00 p. m.,
Organ music; 10:00, Church services, Fourth Avenue
Presbyterian Church, Rev. Dr. Charles W. Welch,
pastor; 4:00-5:00 p. m., Presbyterian Seminary Quar-
tette.
WHK, Cleveland, Ohio (Eastern, 283), 8:00 p. m., Con-
cert program by the WHK Trio, with vocal num-
bers by favorite artists; 9:30 p. m., Chapel services
from the Glenville Presbyterian Church, Rev. A. H.
Limouze, pastor.
WHN, New York, N. Y. (Eastern, 360), 3:00-4:45 p.
m., Christian Endeavor Union; 5:00-5:15, John D.
Flynn, of the National Security League; 5:15-6:00,
Radio Five Dance Orchestra.
WIAZ, Chicago, Ill. (Central, 447.7), 6:00-9:00 p. m.,
Edith Ayres McCullough, soprano; Florentine Trio;
Joseph Brinkman, pianist; Oriole Orchestra.
WOC, Davenport, Iowa. (Central, 484), 9:00 a. m.,
Sacred Chimes concert; 1:30 p. m., Orchestra Con-
cert, patriotic and sacred numbers, P. S. C. Orchestra;
7:00, Erwin Swindell, organist; 8:00, Church Service;
9:00, Musical program, Erwin Swindell, director;
P. S. C. Orchestra; May Chambers, soprano; Charles
Kerns, tenor.
WWJ, Detroit, Mich. (Eastern, 517), 7:30 p. m., Church
Services; 5:00, Orchestra.

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nations and continents would soon be
achieved and declared that it would mean
an enormous stimulus to international co-
operation.
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ator the following day, just before he
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core was found most satisfactory.

THREE TUBE RECEIVER

(Continued from page 11)

eters, inductance, transformers, tubes and the like, the description of which will be detailed later. The shields, one of which is at the left of the plate variometer and the other to the right of the grid variometer, can be observed in the back view.

Necessary Parts Named in Next Chapter

In the next chapter will be a list of the necessary apparatus. Complete instructions will accompany the diagram for the construction of the complete three tube set. Diagrams will be furnished and the constructional data as to the inductance winding also will be supplied. All of the values necessary will also be included, such as grid leak, condensers and the like. In the third article operating instructions will be given and data as to the results obtained. This receiver is not difficult to build but care must be taken and directions followed exactly. The circuit is not tricky; it does not utilize condensers of varying capacities, grid leaks of various values, choke coils, honeycombs coils and the like.

Anyone following the instructions contained in these articles will be fully repaid. In a subsequent article I will give the data necessary for the changing of some standard circuits, for a test of this circuit, without complete destruction of the former sets.

Watch for next week's second installment of this series.

(TO BE CONTINUED.)

The Reader's View

We Are; Everybody—Write Your Senator
Regarding your comment in the last issue of Radio Digest on the subject of spark interference on or around 450 meters, I really hate to start in on this subject, for I get so exasperated every time I mention it.

Why don't all you periodicals bring all your power and influence to bear to reduce this spark interference; unlike static, it is controllable and a decided menace to the present welfare of Radio.

On long-distance work, it is enough to

drive one crazy to have nice concerts from Los Angeles, New York, Philadelphia, etc., all muddled up by that confounded dot-and-dash stuff.

Why, what do folks think of Radio, what incentive have your friends for taking it up when you tune in a nice concert from some distant point and then have one of those spark fellows slip in with his machine gun noise and gum up the works? I insist that such interference is hurting Radio and all our combined pressure should be brought to bear in the proper quarter until it is at least alleviated. Yours, with indignation.—G. W. Weston, Kansas City, Mo.

Dampness or discoloration on the outside of a B battery means that it is about through and might as well be thrown out.



(Patent Pending)

THE PERFECT SYNTHETIC CRYSTAL DETECTOR, SENSITIVE OVER ENTIRE SURFACE. No Hunting for "Spots." Loud and Clear. Endorsed by thousands of satisfied users. Sensitiveness Guaranteed. Price, Mounted..... 50c

14 K. GOLD SUPERSENSITIVE RUSONITE CATWHISKER. Permanent. Will Not Oxidize. Price..... 25c

RUSONITE REFLEX CRYSTAL. Manufactured Expressly for Reflex Circuits. Will Stand Up Under Heavy Plate Voltage. Guaranteed. Price, Mounted... \$1.00

Order from your dealer or direct from
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15 Park Row New York, N. Y.



Columbia Inside Coil Mounting

Newer, Neater, Better

Here is an inside coil mounting made for the radio owner who wishes to keep bulky coils out of sight. It is friction geared and fine "vernier" adjustments are possible. Nothing shows outside panel except knob and pointer. Only \$6.00 at all good dealers.

DEALERS—Responsible distributors all have Columbia Radio products. It pays to give your customers the best. No other radio products have this name—Insist on it.

Columbia Radio CORPORATION
155 N. UNION STREET, CHICAGO



It's Columbia—So It's Good!



The new **TWITCHELL AUXILIARY TUNER** connected to your present set will enable you to bring in the long and short wave stations which your present set cannot get. It also cuts out all local stations so you may bring in distance any time without local interference. Copyrighted diagram of this tuner 55c or with all parts \$9.00. Complete instrument in walnut cabinet, ready to use, \$15.00. Transportation prepaid.

MY HIGHLY IMPROVED REINARTZ brings in all important stations on this Continent loud, clear and without distortion. We dance to music from Atlanta and Los Angeles.

Build one of these wonderful 3 tube sets from my blueprint and specifications, price 50c, or with a complete and perfect double-wound spiderweb coil \$3.00 by mail. Picture of this set on a glass pane with every order. This copyrighted circuit is the most successful of any Reinartz modification yet produced, and is imitated the most. Thousands are in use.

My W. D. II Circuit is especially designed for use with the "Pickle" tube and brings out the full value of that little tube as no other circuit can. Stations 1000 miles away come in clearly on one tube. This set is small, complete, portable. For the man who wishes the highest efficiency, this is the set to build. Price of blueprint and specifications, 50c, or with complete and perfect windings, \$3.00. Photo of set with every order. Sets built from these copyrighted plans will receive all broadcasting stations operating under the new laws. Their wavelength range is from 170 to 800 meters.

All goods prepaid. These instruments are easy to build, easy to operate. Everything clearly shown

S. A. TWITCHELL

1925 Western Avenue Minneapolis, Minn.

More than half a million in service

Standard equipment on the better sets



ALL-AMERICAN
Amplifying TRANSFORMERS

AUDIO AMPLIFICATION

—to get all stations clear and strong

Distant reception is largely a matter of amplification. Therefore, to add to the power and range of your set—easily and at trifling cost—simply improve your audio amplification.

For the best possible audio frequency amplification—*volume without distortion*—all the "old-timers" will tell you to use All-American Audio Frequency Transformers. Your dealer will advise the proper type.

You will be highly pleased with the added distance you get—and the greater clarity and strength of the voices and instruments you hear from out of the air.

Note the special offer below.

ALL THE BETTER
Dealers Recommend
THE "ALL-AMERICAN"



All-American Socket

One-piece molded bakelite—for panel or base mounting. Finest socket money can buy. Only 75c.

POWER AMPLIFICATION

—for utmost volume and pure, rich tone

The addition of the well-known "Push-Pull" form of power amplification to your audio frequency amplifier—by means of All-American Power Amplifying Transformers—develops maximum volume, with a roundness, richness, depth and purity of tone that will amaze you.

Use any good loud speaker—you'll be more than delighted.

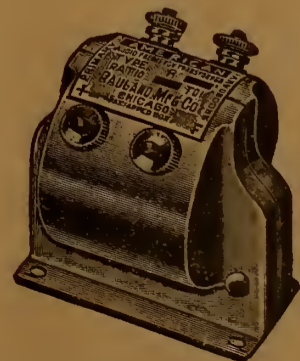
Exhaustive tests prove conclusively that All-American Power Amplifiers are the most efficient, most satisfactory "push-pull" transformers that have ever been made. Here again All-Americans lead the industry.

Read the special offer below.

RAULAND MFG. CO.
Pioneers in the Industry
206 N. Jefferson Street, Chicago



Power Amplifying Transformers for "PUSH-PULL" Circuits. (Input and Output Types.) Price each \$6.00



All-American Audio Frequency Transformers are available in three ratios: 3-1, 5-1, 10-1. Prices: \$4.50, \$4.75, \$4.75.

We Will Send You the latest All-American diagram and circular, describing Power Amplification; also the famous All-American book of Tested Hook-ups—on receipt of 4c in stamps to cover mailing charges.

Read This Offer

LARGEST SELLING TRANSFORMERS IN THE WORLD

Dealers: Sell the Set that Sells Mu-Rad!

Write for territory

Choice territory is still open to responsible, rated dealers. Kindly use your business stationery when writing for complete details. Write today.

WESTERN ELECTRIC TUBES AND LOUD SPEAKERS
GENERAL RADIO PARTS
CARDWELL CONDENSERS

Write for Details and Discounts

CHICAGO RADIO APPARATUS CO.
415 S. Dearborn St. Chicago.

KEYSTONE RADIO LIGHTNING ARRESTERS

\$2.00



Should be on every aerial the year round. Provides highly efficient lightning and static protection for the home. Fully approved by Fire Underwriters. Can be installed outdoors. Has no vacuum to lose. Install one in your aerial lead now—be safe.

This pioneer radio arrester is backed by 31 years' experience in lightning arrester design.

For sale by Dealers everywhere, or sent postpaid for \$2.00. Write for circular.

Electric Service Supplies Co.

17 & Cambria Sts. Philadelphia

Monadnock Bldg., Chicago
50 Church St., New York



Simple Explanation of Radio for Everybody

Chapter VIII, Part I—Regeneration

By M. W. Thompson

THE following article is the fifteenth of a series for Radio beginners, written by Marvin W. Thompson, well known in air-phone circles for his understandable style of approaching his subject. The remaining chapters will be:

- Chapter VIII—Regeneration.
- Chapter IX—Audio Frequency Amplification.
- Chapter X—Loud Speakers.

IN THE preceding chapters we have taken up the various parts that go into a Radio receiving set and have discussed at more or less length why they were necessary and how they functioned. If the reader will refer now to Figure 60, we will see what happens when these units are connected together. Here we have taken one of the antennas and one of the grounds discussed in Chapter VII and connected them to the primary (P) of one of the variocouplers (VC), discussed in part II of Chapter IV. The primary (P) of the variocoupler, as shown here, would have two inductance switches; between the switch points of one there would be six turns of wire, while between the points in the other there would be but a single turn. Thus, any number of turns from one to the total on the coil can be in use.

Oscillating Circuits

The other coil of the variocoupler (VC) is the secondary (S) and, as was shown in Chapter IV, it revolves within the primary (P), or is so mounted that it (S) may be swung closer to or farther away from the primary (P). This secondary (S) has no taps and the two ends of the wire are connected to the plates of a variable condenser (C). We now have two circuits which will respond to waves alternating (oscillating) at Radio frequencies; the antenna circuit is formed by the capacity between the antenna and the ground and by the inductance of the primary coil (P), while the secondary circuit is formed by the capacity of the variable condenser (C) and the inductance of the secondary (S) of the variocoupler (VC). Each circuit has one factor which can be varied. In the first it is the inductance while the capacity is fixed; in the second it is the capacity, while the inductance is fixed.

These circuits are said to be inductively coupled, and if the turns of both coils are in the same direction in the case of the type where one coil revolves within the other, or the coils are close where one swings, they are said to be closely coupled. If the turns of the coils are at right angles, the circuits are said to be loosely coupled.

The Grid Circuit

One side of the variable condenser (C)—preferably the fixed plates—is now connected to the small condenser we have

labeled GC, which is spoken of as the "grid condenser," because it is in the lead from the grid of the tube. Shunted around this condenser is the high resistance labeled GL, which is known as the "grid leak." The action of both of these units was explained in Chapter III. The remaining side of the condenser (C) is connected to the filament (F) or filament

The circuit consisting of A, the primary (P) of the variocoupler and G, is tuned until its natural frequency is the same as that of the desired signals. The circuit consisting of the secondary (S) of the variocoupler and the condenser (C) is now tuned and, when its natural period is the same as that of the antenna cir-

through the vacuum tube as explained in Chapter III, and signals are heard in the receivers. The current in the plate circuit is made up of two components, however, one varying at audio frequency and heard, the other varying at Radio frequency and passing through the small condenser (PC) shunted around the phones. It is this Radio frequency component in which we are interested in the matter of regeneration.

Regeneration

The phenomenon of regeneration was discovered and patented by Edwin H. Armstrong. This phenomenon can be made possible, and utilized, by many different methods of connecting up the apparatus, but they all give the same action—feeding back part of this Radio frequency component into the grid circuit so that it will again go through the tube and create a larger audio frequency component. One method of getting regeneration is

(Continued on page 18)

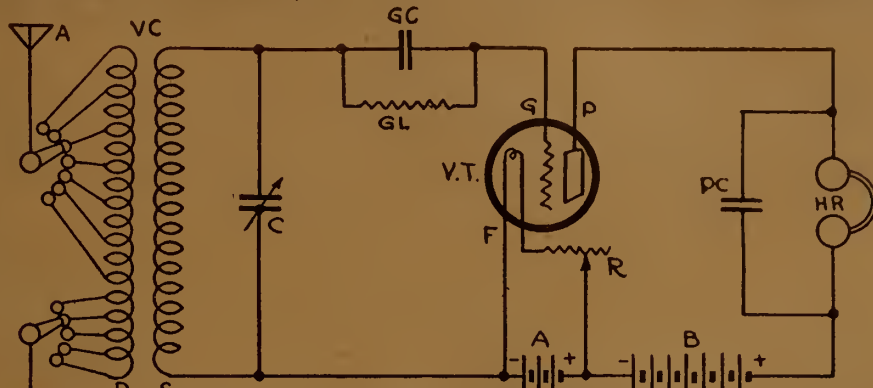


Figure 60—The non-regenerative, inductively coupled receiver

battery (A) of the tube. The remaining connection post of GC and GL is now connected to the grid (G) of the vacuum tube (VT), which completes the grid circuit.

The Plate Circuit

The plate of our vacuum tube is labeled P and it is connected to one side of the head telephone receivers (HR), which are shunted by the phone condenser (PC). The other side of the telephones is connected to the plus, or positive, side of a battery, which, as was explained in earlier chapters, is called the B battery. It varies in voltage with the tube used, being 22½ volts for a C-300 or UV-200 and 45 volts for a C-299 or UV-199. The minus or negative side of this battery is connected to the plus side of a second battery, called the A battery. This circuit consisting of P, HR, PC and B is the plate circuit.

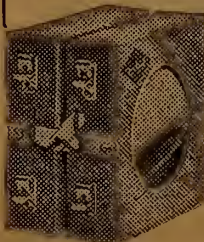
The filament circuit is completed by connecting the plus side of our A battery to the sliding contact of the resistance known as a rheostat (R), then connecting the end of this resistance to the remaining side of the filament, and finally connecting the minus side of the A battery to the point where we had already connected one side of C to the filament F.

Progress of Signals

This circuit will bring in Radio signals.

cuit, the signals will be transferred by induction from one circuit to the other. The differences of potential created across

SPLIT VARIOMETER Especially designed for MILOPLEX CIRCUIT



GEN-WIN Split Variometers assure DX reception

Direct by mail \$3.50 postpaid upon receipt of

Dealers Write for Discounts
GENERAL RADIO WINDING CO.
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The lowest-priced first quality headset on the market today. Compare with headsets costing twice our price. Return ours if not satisfied. Our written guarantee protects you. Send \$3.00 by registered mail or money order. Buy direct of us and save the difference. We ship, postage prepaid, same day order is received. Ask for our

Free Catalog of Radio Parts
EDSON RADIO SALES CO.
6 Elmwood Providence, R. I.

Unusual Business Opportunity

For good, live man who can easily double radio mail order business established three years. Cleared \$5,000 last season. For sale account poor health. Location easily changed without detriment to business. Box Q-100, care Radio Digest, 123 W. Madison St., Chicago.

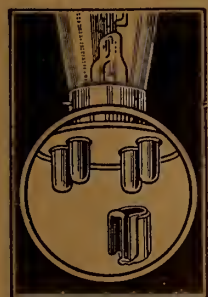
Super-Triplex Circuit Tuner to Radio Digest Specifications.....\$6.90

- Aerials Sr. Style Tuner Unit, 150-600 Meters
- Push Pull Circuit Hi-Power Transformers
- Neutralizing and Tuned R. F. Transformers
- Reinartz Coils, "New Static Reducing Winding"
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- Edison "Signal Corps" Batteries and Elements
- New "Handy" Chargers, 2 to 24 Volt Batteries
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- Nathaniel Baldwin New Loud Speakers and Phones
- 200-300-400-600-800 Ohm Potentiometers
- 6-10-50-50 Ohm and "Universal" Rheostats
- Bishop "Phantom Super" Tuner Units
- Quality Precision Var. Grid Leak, 0-10 Meg's
- Outfits of Parts for Any Circuit You Desire
- 20 Watt Long Range Voice and C. W. Transmitter
- Practically new, left with us for sale.

SEND FOR NEW DEALERS' LIST
QUALITY RADIO SHOP, Richmond, Ind.

FLASH!

Another tube gone—"B" battery wires crossed for only an instant. Radeco Fuses would have saved it—they are saving thousands of tubes for satisfied radio fans. Read this letter



Radeco Safety Fuses

may be attached in an instant to any standard tube going in any standard socket.

In ordering, specify type of tube used

Price 50c each

At your dealer's or by mail postpaid

Radio Equipment Co.

Dept. 6, 20 Stuart Street, Boston, Mass.
New England's Oldest Exclusive Radio House
DEALERS: Write for our proposition

1358 Washington Street,
West Newton, Mass.
Radio Equipment Co.
20 Stuart Street, Boston.
Gentlemen:

I am writing to give you an experience which I recently had which may be of interest to you.

I am a Radio fan, and have experimented with many types of hook-up. I have also had the unfortunate experience of "blowing" several Radio tubes. Recently a friend of mine recommended your fuses, and I purchased three for my three-tube set which I am now using. Shortly after installing these fuses, in attempting to tighten a loose connection, my screw-driver accidentally touched the "B" battery lead. All three fuses were blown, and I realized that if it had not been for the Radeco Fuses I would have lost all the tubes in my set. I am inclosing herewith \$3.00 for which please send me six fuses for UV261A tubes, as I do not wish to be without them. You are at liberty to use this letter in any way.

Very truly yours,
FRANK J. BODAY.

Easy to Build

Complete instructions for assembling and blueprints for wiring are included with each outfit. Instructions written so everyone can understand them.

Panels FREE

Specially drilled panels are included with each of the sets illustrated and described below.

Western Electric VT-2 TUBES

These brand new genuine Western Electric VT-2 Tubes have a higher amplification factor than any other 5-watt tube made! For both RF and AF amp. and CW and phone transmitting. Not Navy defects; a surplus.



Formica Panel

We are prepared to furnish promptly and saw Formica panels of any dimensions. Cutting charge included in following prices:
7/8-inch, sq. in. ...2c
1/2-inch, sq. in. 1 1/2c
Tubing (2 to 4-in. dia.), per running inch10c

| Reg. Price | Consisting of | Our Price |
|--------------------|--|-----------|
| \$1.89 | 7x18 Formica Panel..... | \$1.70 |
| 1.00 | Bakelite Socket..... | .45 |
| 1.50 | Howard Vernier Rheostat.. | 1.35 |
| 3.30 | 23-Plate Variable Condenser | 1.45 |
| 3.10 | 11-Plate Variable Condenser | 1.35 |
| 1.50 | 3 Switch Levers..... | .75 |
| .80 | 2 Dozen Switch Points..... | .40 |
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Simple Sets Most Desirable

Demand for Radio Service Same as for Telephones

THE NEAR FUTURE will see small, compact and portable Radio receivers practically self-operating and in every home. There will be no outside antenna, no complicated wiring, and no batteries in the ideal fool-proof set soon to be sought by up-to-date householders who will demand Radio service just as they do telephone service of today.

When an invention first becomes popular there are always a lot of energetic mechanics or electricians, both professional and amateur, who delight to tinker with the new apparatus. Some of these constructors have aided in the betterment of Radio receiving sets, but today the chief demand is for efficient sets which will be practically self-operating and will approach the ordinary telephone receiver in simplicity, taking their power and broadcasts from a single source, or at least a central broadcasting station.

It would be impossible for every tenant in a thousand, or even in five hundred, apartment building or hotel to have an individual antenna. The roof of the hotel would be literally covered with aerials. The elimination of lead-in wires and batteries are also desirable.

Tell Us of the Nation's Business

Educate the Public Direct from the Capital

ONE of the greatest features of Radio broadcasting is its ability to reach a great many persons simultaneously with the same message. Perhaps this feature of Radio has not been fully appreciated by the general public. At least it is evident that much wider use of it could be made than at present.

It is true that our government is using Radio to broadcast market and weather reports, and other information of interest to the farmer. This has been greatly appreciated by those for whom it is intended. But why not widen the scope of this work? We would all be better citizens if we understood more of the details of our governmental machinery.

Perhaps some day we may have the privilege of listening to our great leaders as they explain matters of vital interest to all Americans. Perhaps we shall hear not only the President's annual message as it falls from his lips, as we did last year, but also the deliberations of our national Congress.

Radio broadcasting seems peculiarly adapted to the educational field, and we predict a much more extensive use of it in the near future. Why should not the advantages of the best teaching methods and expert knowledge of a few be more generally distributed than is now possible?

Learn the Code

Quit Complaining and Help Clear the Air

SOME listeners in keep complaining that amateurs interfere with broadcasting. They do not actually know who is interfering but simply that some one is transmitting code that is interfering with their reception. Half the time it is probably ships which are sending or shore stations handling regular commercial work. What these "knocking" listeners in should do is to learn to read code so that they can identify the senders, getting the calls so that they can report the offending stations if violators are found. Besides reporting the call letters of amateurs breaking the regulations, efforts should also be made to ascertain and report the wave lengths used.

Here is a real service those who own receiving sets can render simply by learning the code and reporting breaches of regulations to the supervisors in charge. Present regulations make the air free to amateurs on 150 to 200 meter waves, except between 8:00 and 10:30 p. m. Amateurs have the right to use sparks or tube sets. Those owning tube sets can communicate by either code or voice. Broadcasting as such is forbidden amateurs, that is, music and entertainment cannot be sent out, but two station owners may converse, except in the evening broadcasting period. Special amateurs have the privilege of using wave lengths as high as 220 meters.

International Morse code is used by amateurs and its rudiments should be mastered within a few months.

RADIO INDI-GEST



The Whooper Degenerative Set (Employing the Principle of Soundless Acoustics) By SIMPLY WADDLES

FELLOW amateurs, here you are. The set for stations near and far. Nothing complicated as you see, best of all the idea's free. If handled both with skill and ease, results obtained are sure to tease.

The only parts you need to get are several grid leaks good and wet. A dozen bulbs, both soft and hard, B batteries about a yard. And get some extra filaments, boys; also a sponge to absorb the noise. Secure a loud C. W. note and put a padlock on your goat.

Attach the aerial to the ground; turn the primary coil around, disengage each thirteenth turn until there are loose ends to burn. Then fasten same to the bulb's south edge and fix it there with a blacksmith's sledge.

A little skill is all you need if to instructions you pay heed. Be sure each contact has some oil and then plug in your tickler coil.

Your phoues upon your ears next gird when a shrill sound can be heard. Or if you hear a silent "drone" be sure and look to the honeycomb.

"Without desire to boast or brag," writes one lad named Horace Nagg, "I get Station BAA, although a city block away. Distant stations come in galore that nobody ever heard before."

"Damped waves received," says another ham, "since I moistened the coils with a watering can."

If results are not right yet, sink it in the lake and buy a crystal set.



Or Two Deaf and Dumb Saxophone Players

First Wowl: What is it that has four legs and can't walk, can't talk, yet goes all over the country and is heard by everybody?

Second Wowl: Can't fool me; it's the Baldwin Grand of Station WOAW.
WOAW Radio Bulletin.

The Promise of Radio

To the depths of the dusty desert,
To the frozen lands of the North,
With the speed of a wheeling planet
The wisdom of man goes forth.

Speeding the wastes of the oceans,
On to infinity;
Bringing the story of friendship
To you and to me.

Blending our tongues together,
Bursting the shackles of greed
And bringing a new understanding;
The world shall be freed.

—FRED HESKETH.

Our Own A. & Q. Dept.

Dere injeston—mi rADeo oWtft hAz A kAklin sonn in it let me no if it iz bkAWs i hAV mi ArAl hukED ovr the hin hous urs respekfly,

WillDeWnot hill top Ark
Ans.—The cackling sound is me laughing at you. Heh-heh!

Dear Indi: (1) Is it true that a Radio-Fan is run by wireless? (2) If I connect my aerial to the ground and sit on the radiator, will I get more DX?

DISTOR-SHUN.

P. S. The postoffice assures me that the dollar I am sending you will arrive in time to buy your children's grandchildren a Christmas present.

D-S.
Ans.—(1) More often by his wife. (2) Sit on your aerial.

You Win Your Condensed Friend

Dear Mr. Gest: It gives me pleasure to note that you have finally given the Indiphans opportunity to try out my highly improved "local interference eliminator," and it may surprise you to learn that the sketch you show of the inventor, listening, with rapt attention, to it, is remarkably true to life. It is most remarkable, most uncanny; but then, we may expect almost anything from Radio these days.

But what I wanted to tell you was this: You remember me telling you about my girl friend who is such a Radioknut that she refers to her Gossard as her "variable Condenser"? Well, she has got rather fatter lately, and yesterday she confided to me that lately she has thought of calling said garment another kind of condenser, viz.: a fixed Micon. When I looked foolish and asked, "Whyzat?" She said, "Gwan, Ellis, don't you ever read the advertisements? A Micon is 'assembled under pressure'!"

Do I win? Disrespectfully,
ELLIS BROAKLEWSE.

Sorry, Jack Sold It for \$000,000,000.03

Dear Indi: If Jack Nelson of WDAP has not found a buyer for that Song He Has For Sale That His Sweetie Turned Down, I suggest that he auction it off. I'll start the bid with a million Rubles.
COUNTER POISE.



Condensed

By DIELECTRIC

I have had quite a few uninitiated give as their reason for remaining without the fold of Radio "hams" their dislike of jazz and "ordinary" singers, as though no other features were offered. Well, we'll pass the reference to jazz, but to classify those who sing from the majority of studios as "ordinary" singers I think is evidence of lack of appreciation. Ignore both of these features and what have we left? More than enough to entertain or instruct the most finicky. No home is complete until it has a receiving set of some sort.

You have attended musicals and lectures where several individuals in the audience apparently came to talk, not to listen, and your chance of enjoying the program was then and there ruined. Such a thing denotes lack of regard for others, as well as respect for the speaker. Does the absence of the speaker (in the case of Radio reception) alter the above indictment? Very few consider a message delivered from a microphone as demanding the same attention as that given in person—or so it seemed when the President of these United States addressed Congress recently. In a room filled with business men (at one place), less than a handful heard all that was said—and the receiver was working excellently! Fortunately, this does not apply wholesale. It's the President, even when broadcasting.

It has made a vast difference to many thousands of Radiophans in having the wave length of Station KYW raised to 536 meters. Now it is possible to pick up this station at some distance with about the only interference coming from the ever-present dit-dahs. With the new "mike" in use, there is no distortion either in voice or music as sent out on the air. This marks the second season for this station to give to its listeners in an opportunity of enjoying grand opera, so well presented by the Chicago Civic Opera company. And now another feature has been added which meets the approval of a great many fans, and that is the midnight revue of musical comedies. This attraction had been reserved for Friday nights, though hereafter anyone listening in to KYW on Tuesday evenings will be able to hear it also. Tune 'em in.

Children may tire of listening to those features on a program which appeal especially to adults, but the early evening broadcasts to youngsters find them ready and waiting at the set for the stories and songs. Some of the studios arrange novel schemes of entertaining and, at the same time, instructing their little auditors; in matters of deportment, the "kiddies" announcer is usually quite successful. When Santa Claus stopped his work long enough to talk to boys and girls, or had his assistant do so for him, the Radio set became a thing alive and no loss would seem so great as to be deprived of it. Now I'm starting in early to suggest that before another Christmas rolls around some of you begin organizing a club, the specific object of which shall be to place receiving sets in the homes of children whose parents cannot afford to buy them. Start it in your own community. It will grow.

In the olden days when a church edifice was destroyed by fire it was necessary for the members either to wait until it was rebuilt, find another house of worship, or remain at home with no services. In this modern age, however, when such a catastrophe occurs it is only required that you have a receiving set in the house to bring any one of several preaching services direct to the family group. An instance of this kind happened at Everett, Mass., a short time ago. Fire made a complete wreck of the Glendale Methodist church, and since a large number of the members had sets, services broadcast through Station WGI afforded the means of having preaching, music and the atmosphere of a religious meeting right at home. Services from KDKA supply all the inhabitants of a small isolated northeru village with the only religious matter available to them.

Latest Development in Grimes Inverse Duplex

Part VII—Power Amplification and the Inverse Duplex

By David Grimes

THIS is the seventh and last part of the present series on the various adaptations of the Grimes Inverse Duplex system. It has been the object of this series to show a few of the many possibilities and to clear up the difficulties of the inverse duplex circuits. It has been shown that, for best results, certain types of tubes must be employed and that tubes as well as apparatus must be without defects. It is felt that the information given will enable an experimenter with average experience to duplicate the successful circuits outlined. The particular combinations shown were decided upon as being the most representative and capable of meeting the many different conditions of Radio reception.

Power Amplification

The present article will enter into a discussion on power amplification as applied to the inverse duplex. Many inquiries have reached me concerning the changes to be made in order to obtain extra-loud results and in answer to these this special information is given. Many amateurs believe that all that is needed for increased volume is the addition of another stage of audio amplification. This will certainly produce the volume but it usually ruins the quality. I have heard many a good loud speaker condemned just because the operator happened to have a great amount of distortion in his Radio set. Most good loud speakers are very faithful in their reproduction and will absolutely deliver whatever is put into them—distortion and all. In fact, it is rather unreasonable to expect a loud speaker to correct the defects in the receiving set.

In the first place, it is most foolish to expect to obtain real power from any of the dry cell tubes. Real power demands high B battery voltages, and the small tubes were never designed to stand, much less deliver, such energy. It is like attempting to put out an immense fire with a garden hose. It simply won't deliver the water. These small tubes have not sufficient electronic emission nor is the physical spacing between the elements sufficient to make their use in loud speaker sets safe. If these small tubes delivered anywhere near the same energy as the larger ones, there would be no need for employing large tubes and a young power plant in broadcasting. Merely a few dry cells and the small tubes would be necessary.

Tubes That Can Be Used

For all-around use, then, the UV-201A

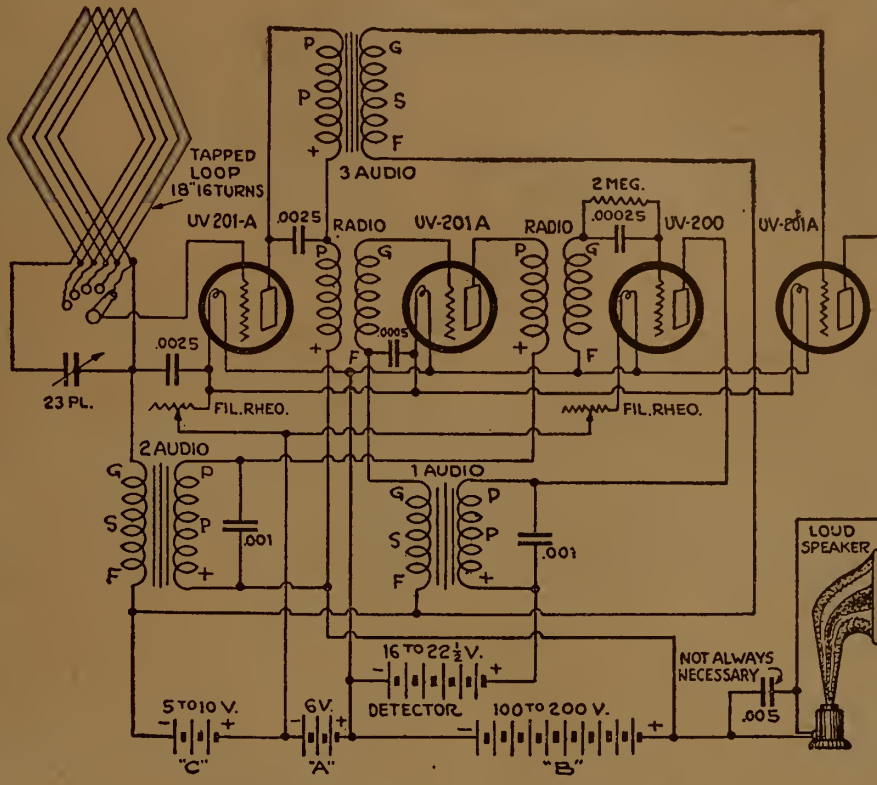


Figure 15—Four tube loop set employing C batteries

or the C-301A is to be preferred to the UD-12 or UV-199. Even then, under certain conditions, these larger tubes must be operated with C batteries or in a "push-pull" arrangement to prevent their being overloaded. Ordinarily, the UV-201A should not be operated with more than 90 volts on the plate. This means that the B battery may be slightly greater to permit a small drop in voltage across the primary winding of the audio transformer or the telephones. When greater voltage than this is used, poor quality results and an unjustifiable drain is placed on the B battery. This will rapidly shorten its life. But it is necessary to use higher plate voltage if good quality extra-loud speaker results are to be secured. It is here that the C battery steps in to save the day.

C Battery Essential

The C battery was developed some years ago. Its purpose is to supply a constant negative potential to the grid of an amplifying tube. This negative potential on the grid controls the current passing through the plate and the B battery and thus limits it to a reasonable value no matter how great the B battery voltage may be. Of course, the higher the B voltage, the more negative the C battery.

The approximate C battery voltage for UV-201A or C-301A tubes is minus 5 volts for every 100 volts B battery. This value will vary with the particular tube, but it is not at all critical. Thus, if we desired to employ 200 volts on the plates of the amplifier tubes, it would be necessary to use minus 10 volts on the C battery.

The attached sketch shows clearly just how this C battery is connected in the inverse duplex system. It shows a circuit using four tubes and operating on a loop. The circuit uses two Radio stages, a detector, and three audio stages of amplification. This arrangement, particularly when operated near a high power station or on an aerial connection, will give better results with a high voltage B battery (from 150 to 200 volts) with the proper C battery. Without a C bat-

(Continued on page 20)

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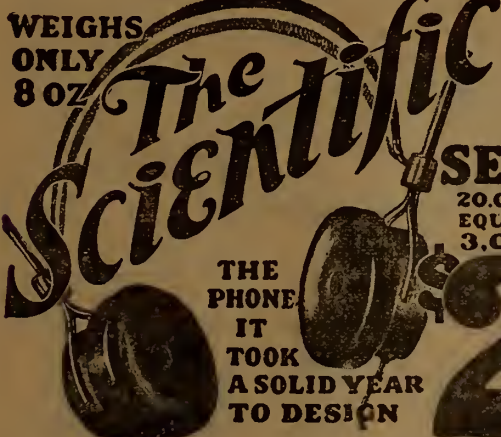
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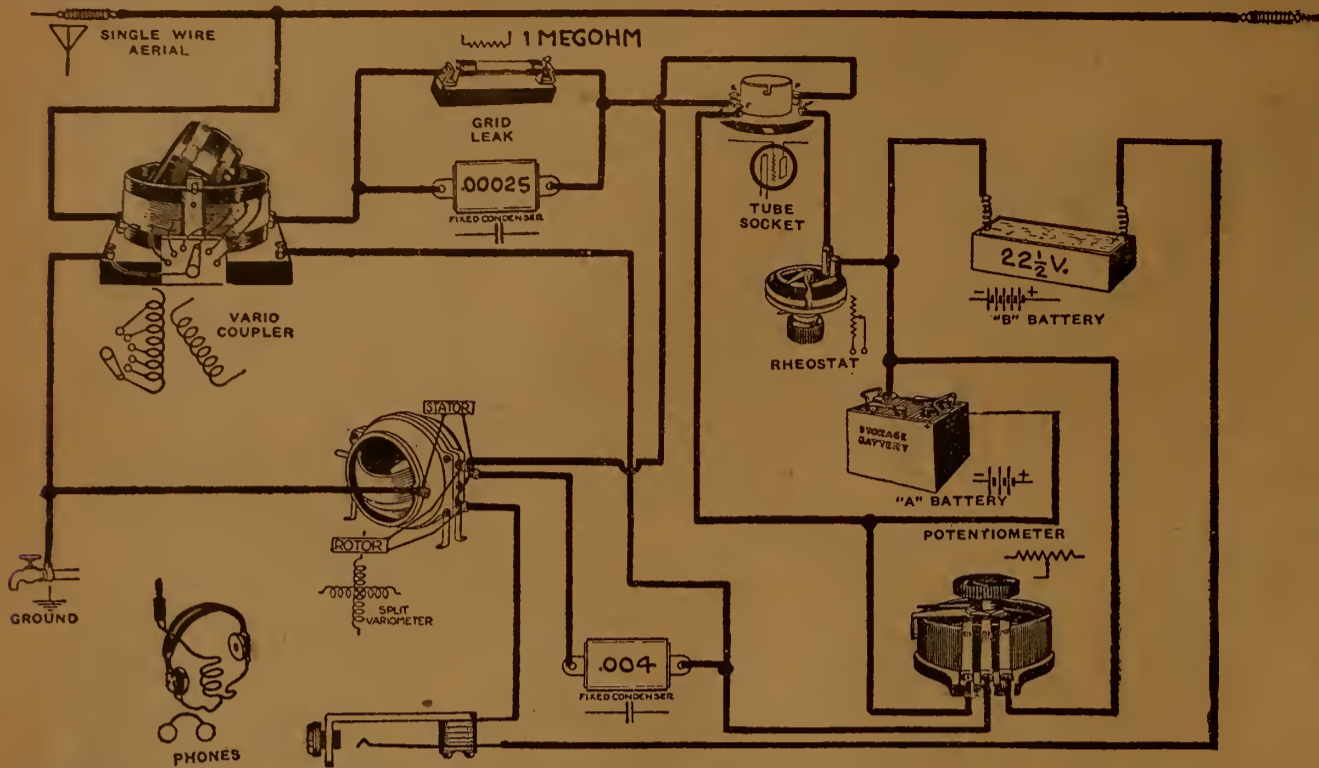
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SIMPLEX HOOK-UP FOR SELECTIVITY AND VOLUME



HERE'S a Simplex diagram of a good hook-up that has selectivity and volume. It requires a variocoupler and a split variometer and a potentiometer for tuning. The circuit is regenerative but will not be found as difficult to control as many others are. The grid leak has a fixed value of one megohm. The

grid condenser is a .00025. The circuit will operate best on the soft detector tube with 22½ volts. If an A tube is used, the B battery voltage will probably have to be increased. The .004 fixed condenser capacitively couples the antenna to the secondary circuit. The potentiometer should have a resistance of about 400

ohms. The use of an open phone jack permits convenient plugging in of the head phones. Audio frequency amplification can be added in the usual manner.

RADIO FOR EVERYBODY

(Continued from page 15)

shown in Figure 61. This circuit differs from Figure 60 only in the fact that we have disconnected the plate (P) of the vacuum tube from the head receivers (HR) and connected in a coil known as the tickler (T). This coil is placed close to the secondary (S) of the variocoupler

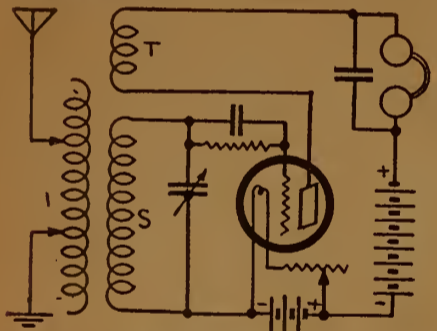


Figure 61—Regeneration is introduced by the feedback from coil T to S

and arranged so that the turns of this coil are wound in the same direction as those of S. Here again induction comes into use and the Radio frequency component of the plate circuit creates currents in the secondary (S). Since these have the same frequency as do the signals created in S by the primary (P), they join with them, strengthen them and cause greater differences of potential or

pressure across the condenser (C) and on the grid (G) of the tube. Such an arrangement has but one drawback. Let us consider the strength of the signals as they go through the tube the first time as W, and the added strength passed into S from T as X. The resulting strength is W plus X. If this strengthening action occurred but once all might be well, but the combined signal W plus X creates a new addition Y, and the next time they go through, the strength is W plus X plus Y. These three, in turn, create Z which is added, and this action continues to a point at which the currents get beyond control and a shrill squeal is heard. In Radio parlance, the circuit has "spilled over" and reception under such conditions is impossible.

(TO BE CONTINUED.)

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Simple and Efficient Honeycomb Coil Circuits

Part II—Special Inductance Tuning Units

By H. J. Marx

THE appreciation of the value of the form of inductance illustrated in the last article is shown in the development of special forms of tuning units already on the market or in the advance stages of production. Their field of use in various Radio apparatus is almost unlimited, not merely as tuning units for both regenerative and non-regenerative circuits, but also for air core Radio frequency transformers, oscillator units in

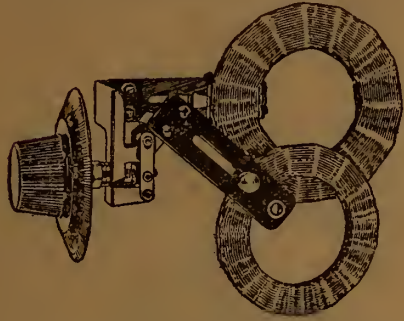


Figure 1

the super-heterodyne, for use in impedance coupled Radio frequency amplifiers, loading coils, wave traps and a vast field of possibilities yet undiscovered. Three of the applications which are already on the market are shown in the illustration. As fast as more of these practical units are available they will be presented. It

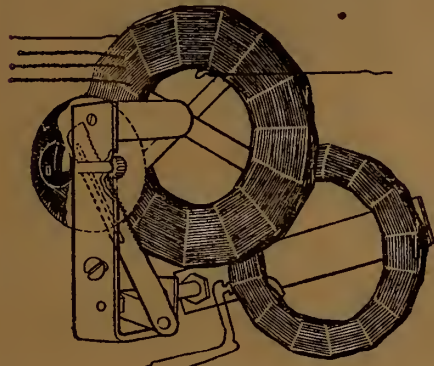


Figure 2

is well to repeat the chief advantages of their application in apparatus: compactness, low internal capacity, very close coupling possibility, cheapness, and, last



Figure 3

but not least, a little ingenuity permits the fan to construct innumerable forms of efficient tuning units and other apparatus to suit his own requirements. Honeycomb coils have been more or less indispensable for fan and laboratory experimental work, and this unit also will prove a necessary adjunct to the experimental parts on hand.

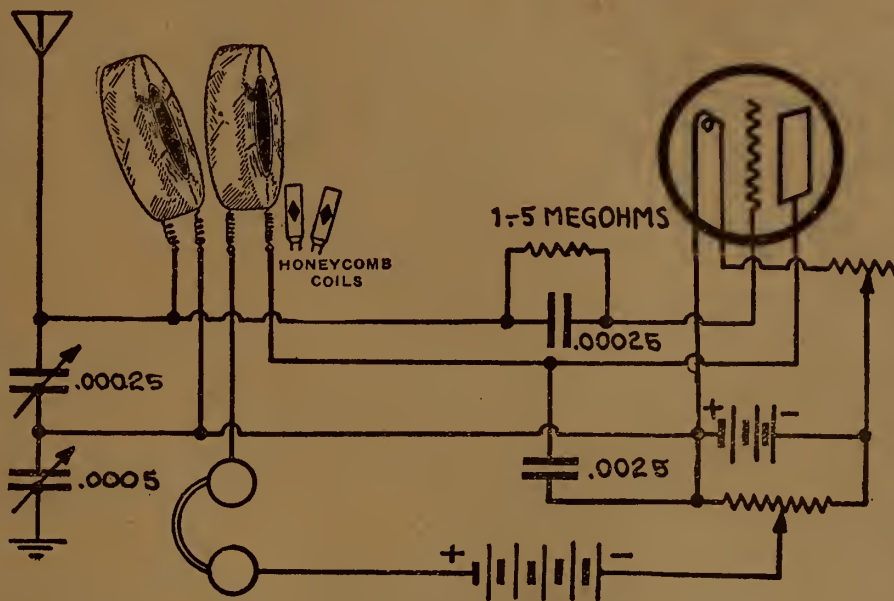


Figure 4

Flewelling Unit

The unit shown in Figure 1 is especially adapted for use in the Flewelling circuit. This, however, does not limit its use in other two-coil circuits. In fact, this apparatus was designed by the inventor of the circuit who started other manufacturers to develop units with this particular type of inductance. The features of the unit are the ease of interchangeability of coils, the absolute vernier control of coupling and the lack of capacity effects in the mounting and assembly of the whole unit. Fans will readily remember the unearthly shrieks and howls that developed the moment the hands were brought in close proximity to the honeycomb coils. In this unit the coils are inside of the panel with only the control dial in front. It is obvious, therefore, that the hand or body capacity effects do not come within the field of the coils. By means of the small adjustable thumb-screws any size coil can be snapped in place.

Another Two-Coil Unit

Another of these two-coil units operated in a slightly different manner is shown in Figure 2. In this unit the one coil is indicated as tapped. Its use is more limited than the first, since the design is not

intended for interchangeability of coils. It is to be used in a manner similar to that of the variocoupler. There are, however, no reasons why this unit could not be made with any special coil, as may be required, without affecting the main frame. It is mounted in the rear of the panel with just the dial in front. The dial shaft has a small pinion that operates against a rack which, by means of a system of levers, varies the coupling between the two coils. This unit also eliminates the capacity reactions found in many of the tuning units at present on the market.

A Combination Tuning Unit

A clever development of this type of inductance, in combination with a condenser, is shown in Figure 3. By means of a double shaft the dial operates the condenser plates, and a small knob controls the coupling of the one coil to the other. This has been designed as a tuning unit for both regenerative and non-regenerative circuits. In the assembly a small piece of panel stock carries six binding posts to which connections are made. The small coil is variably coupled to the large fixed coil by rotation, which gives 180° coupling range from maximum to minimum. The minimum coupling, however, is not so loose as might be desirable in some cases, owing to the fact that even at this point the lines of force will cut the turns of the rotor coil, although in an edgewise direction with the minimum effect. The advantage of the use of the combination is

(Continued on page 20)

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H. C. COIL CIRCUITS

(Continued from page 19)

obvious inasmuch as any of these two-coil circuits require the use of at least one condenser. The compactness which is possible in this way is very desirable

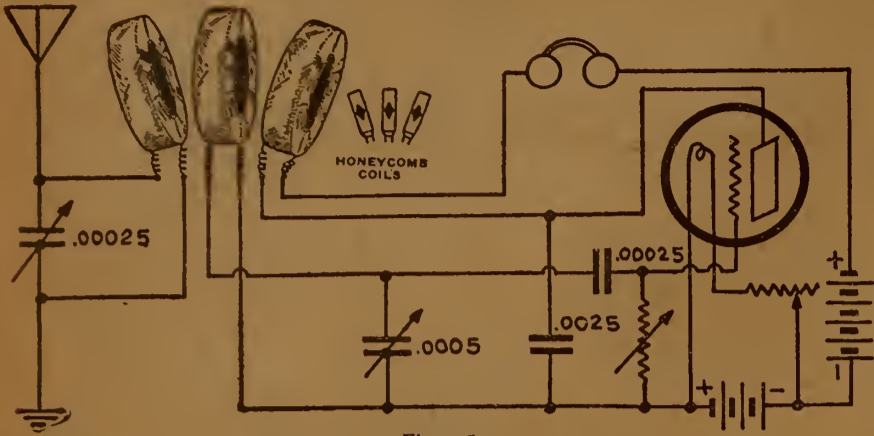


Figure 5

and it eliminates the space required for the extra control knob that otherwise would have to be placed on the panel. These coils are also non-interchangeable except as assembled by the manufacturer. The mounting of the unit on the panel is similar to that of the ordinary condenser mount.

Two-Coil Circuit

Another form of two-coil circuit is shown in Figure 4. Two condensers are required, one for rough adjustments, while the .00025, shunted across the primary coil, permits vernier control of wave length. The second coil is used as a tickler. The best coils to use are 50 and 75 turns, respectively. This of course can be altered to suit the particular requirements of wave length range and the oscillation point of the tube. The grid leak can be of the variable type if desired. A potentiometer

gives plate voltage adjustment. Any sort of detector tube can be used with about 22½ volts' B battery. The circuit is selective and will give very good volume.

Three-Coil Circuit

In the three-coil circuit shown in Figure 5, a constructor will have to use the familiar form of honeycomb coils with a

mounting similar to that shown in the last article. If the other inductance forms are desired, a little ingenuity will be required in designing a coil mount, for nothing of this type for three coils is at present on the market. A .00025 variable condenser controls the primary circuit and a .0005 with vernier control takes care of the secondary circuit. The third coil is the usual tickler coil. A variable grid leak will be found almost a necessity for best operation of the tubes. This circuit can be amplified in a normal manner similar to other circuits of this type. The coil values commonly used are primary 35 turns, secondary 50 turns, and tickler 75 turns. It is best, however, to have a few extra coils on hand in order to be able to substitute values that will operate best over the wave length range and the antenna system used.

(TO BE CONTINUED.)

amplifier B batteries should be of large capacity as from 10 to 20 milliamperes are drawn from them. The C battery may be of the flashlight type as practically no current is drawn from it. Its depreciation is due mainly to local chemical action within the cell.

Remedies for Howls

There is a tendency, sometimes, when three audio stages of amplification are used, for certain types of loud speakers to howl back into the set. This type of noise starts by a slight low-pitched howl and gradually grows louder and louder. There are several remedies for this, depending on just how the feedback takes place. First move the loud speaker away from the set. This will overcome any magnetic action. There still may be mechanical vibration. Place either the set or the loud speaker or both on cushion supports. Lastly, vibration through the air may affect the tubes. The remedy for this is to point the horn away from the set or to place a piece of cloth in the throat of the loud speaker. This last trouble is due to a tube in the set having a loose filament or grid, and can be absolutely done away with by changing that tube. Always try reversing the terminals of any loud speaker for best volume, clarity, and quietness.

Conclusion

In closing this series of articles, let this thought remain. I have not endeavored to give constructional data. I have merely outlined practical possibilities in order to give the experienced experimenter a few clues whereby he may duplicate my successful results. I will leave the detailed part of "how to build your own" to that experienced experimenter who has built the successful set. I do not recommend that the novice try this system any more than I would recommend him to try the super-heterodyne, or any other complicated circuit which produces wonderful results when built properly. So much depends, in all of them, on the apparatus used. An experienced experimenter can tell in a few moments just what part of his apparatus is "missing fire"—the B bat-

tery, the A battery, the tuning condenser, the transformer, etc.—because each trouble has certain earmarks which are unmistakable. The novice blames it on the circuit and lets it go at that.

I have received a great many letters asking me why I do not show the Grimes circuit alike in two consecutive articles; whether there is any such thing as the Grimes circuit and if so why I don't stick to it. Their general complaint is that some articles show the circuit one way, while other articles show it differently. My answer is that there is no such thing as the Grimes circuit. My development is a system of amplification, applicable to any circuit from the crystal to the super-heterodyne. To date, I have only shown a few of its many adaptations. It is a system employing Radio and audio amplification in the same tubes.

(THE END)

Using Solder

Rosin core solder is excellent for use in soldering Radio sets, but great care must be taken to see that the wires are held by the solder and not the rosin.

INVERSE DUPLEX

(Continued from page 17)

tery, not much more than 90 volts can be used. This rule is not ironclad, because, as brought out above, some audio transformers have fairly high resistance primary windings and really require more B battery in order that the proper voltage may actually reach its destination at the plate of the tube. Theoretically there is no limit to which a B battery may be increased with the proper C battery applied. Practically there is a very decided limit—that of the tube. More than 200 volts on the plate is very likely to break the tube down or dangerously heat the elements. But it is not necessary to go so far, as the volume then delivered will be about as great as most loud speakers will stand. If greater power is desired, it will be best to use regular power tubes such as the UV-202 or the Western Electric 216-A tubes.

Separate B Battery on Detector

It will be seen in the circuit diagram that a separate B battery is employed on the detector. This is desirable and often necessary for best results when more than two stages of audio amplification are used from the same B battery. Most power audio stages are recommended to be used on separate 90-volt B battery. This is usually not necessary, if the detector is placed on a separate B battery. The detector B battery, being only 16 to 22 volts, is cheaper than an entire separate 90 volt for the power amplifier. The extra detector B battery may be of small capacity since only a fraction of a mil-

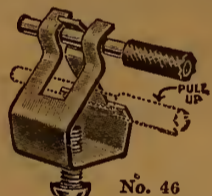
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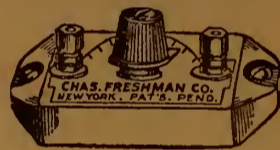
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Tuned Impedance Single Tube Reflex

Inductance of Coils Makes It Regenerative

I have been doing quite a lot of experimenting with single tube reflex circuits and have found that the following gives results as good as, if not better than, any other I have seen published. The diagram

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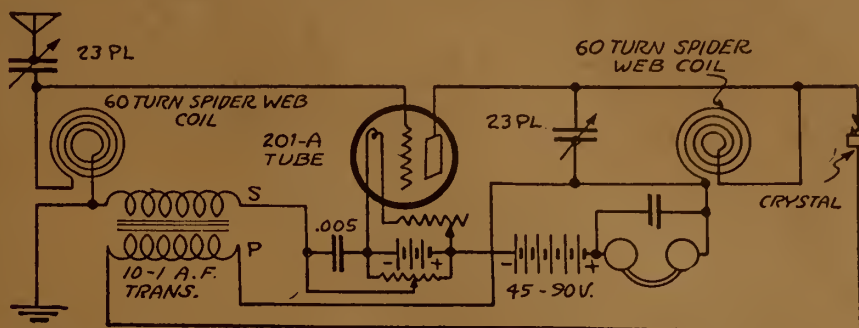
RADIO KINKS DEPARTMENT,
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is almost self-explanatory; in short, it is a tuned impedance single tube reflex. If the two coils are placed in inductive relation to each other it can also be made regenerative, but care must be taken to get the right polarity on the second coil and not to have it close to the first coil. It is safer to have the two coils at right angles to each other.

A great deal depends on the adjustment of the potentiometer, because if it gets too far toward the positive side the detection will take place in the tube and not in the crystal. One can tell if it is working right by lifting the cat whisker. If it is right, all reception will cease or be very weak.

Both condensers are rather critical, but

COILS SWING ON BRASS HINGES



it is surely worth the trouble, for when one gets them both and the potentiometer right, it comes in like a ton of bricks.

The audio frequency transformer I used was a 10 to 1 and I found that if the secondary was shunted by a condenser that was too large, it cut down the volume to almost nothing. If any at all is used it should not be larger than a grid condenser .00025 mfd.

It will certainly pay anyone interested in a powerful single circuit set to try this, but it should be borne in mind that the potentiometer must be toward the negative side and the second condenser must tune critically, or there will be no R. F. amplification at all, but the tube will function as a detector. You will certainly notice the difference when you get it right, because it will be so loud you will want to remove the receivers from your head.—C. K. Beebe, Chicago, Illinois.

Infringement of the Law

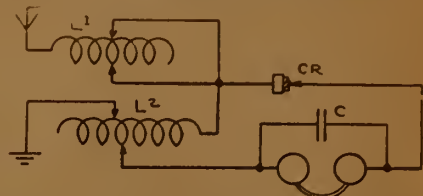
Amateurs should not try to communicate with neighbors by inserting a microphone in the ground lead. This causes interference to other listeners in the neighborhood and is a violation of the law.

Binding Post Markings

Here is another kink for the fan who frequently changes his hook-ups and is not sure about the current on the tubes. In building your set use the different kinds of binding posts, as, for instance, nickelplated type for the A battery and black composition type for the B battery. By using them habitually this way, you will know them without even having to look at them.—McGuire & Parks, Gregg, Manitoba.

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JULIUS ANDRAE & SONS COMPANY
113 Michigan Street, Milwaukee, Wis.

Questions and Answers

Flewelling and Code

(05557) J.K. Cicero, Ill.
 When it comes down to receiving Radio code, my set (Flewelling, one condenser) cannot be beat. The dots and dashes come in so strong that I can stand from 5 to 10 feet away from the headpiece and yet hear them plainly, but no music. My detector consists of the following parts: 50 and 75 turns on the honeycomb coils (75 on the plate); grid leak (.0025) with condenser; variable condenser (vernier, 9 plates together and the tenth separated); WD-12 tube. I have tried a loop aerial that has 10 turns of No. 22 cotton-covered wire, and also an aerial strung from moulding to moulding with two wires, 24 feet long. It is impossible for me to put up an outside aerial. But this does not mean that I cannot have a Radio set. Put me wise as to what

change I should make, and I will appreciate it very much.
 A.—The limitations experienced in operation of the Flewelling circuit are due to inability to tune to higher wave lengths.

This can be overcome by employing honeycomb coils of 75 and 100 turns.

Single Tube Reflex

(5229) S.H. Detroit, Mich.
 I built the single tube reflex set described in the April 21 and 28 issues of the Radio Digest and do not seem to get the results I am supposed to get. The local stations come in about as loud as on my Flewelling set, and the only outside stations that I am able to get are WJAZ, WDAP and WGY.

I am using a 201-A tube, a Baldwin C type receiver and exactly the same apparatus as illustrated in your paper, except the coupler, which I cannot buy anywhere in this city. Could you tell me where I can buy one?

When the set is in operation I can hear a humming noise like that of a telephone line, but my aerial is 80 feet long and 10 feet above any power or telephone wires, and I don't hear it on my other sets. I went over my wiring a number of times and do not seem to see anything different from your diagram.


A.—Noting your specifications and dif-

iculties encountered in operation of single tube Reflex circuit, we are advising that the action cited would indicate a poor crystal detector. A simple test may be made to determine this. When crystal is efficient there will be no hum, but if cat whisker is removed, the set will howl. If this action obtains, it is evidence that circuit is functioning effectively.

In the matter of variocoupler used, there would be no disadvantage. Any of standard, rugged construction and electrical perfection should serve well.

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Inductance Switch



PRICE \$2.00

Self-contained. Only one panel hole. Easy to install. Pig-tail connection eliminates sliding contacts. Westinghouse "Micarta" insulation prevents leakage. Solder terminal and contact one piece. Adjustable stop pin. New type dial knob eliminates battery numbering. Can be used as "B" battery tap switch.

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 1/16" THICK 3/4¢ PER SQ. INCH
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Looking for stations you already had. When you get a station simply copy the readings in a KASPER RADIO RECORD BOOK, then when you want it—IT'S THERE. This book can be used with any set and it is so arranged and printed that each day's broadcastings are kept separate; also contains full illustrations and instructions HOW TO RECORD STATIONS. 25 cents—or 6 for \$1.00, postage paid—don't send stamps.

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Radio Frequency Set for Only \$30



Send \$30 today and receive prepaid this fine non-regenerative Radio Frequency Set. Results guaranteed equal to sets costing three or four times as much. Four tube assembly—detector, 1 radio, 2 audio frequency. Only one simple adjustment for wide range of wave lengths. Perfect modulation. No howling or squeaking. Large, complete production in our own factory makes this wonderful value possible. Make draft or money order payable to CLEVELAND APPARATUS COMPANY, GRAFTON, OHIO.

The NIGHTINGALE

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 PARTS for 5-Tube Set, guaranteed highest quality. Cabinet inc. \$46.75
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 Genuine Dilecto XX Bakelite Panels, any size, per sq. in..... .02
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 4.75 45 V. medium B Bat., highest quality..... 2.00
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 DEPARTMENT R. D.

Equal to All Demands

THIS IS NUMBER FOUR OF A SERIES

Every tube you add to your receiver makes it just that much more important for you to use Eveready "B" Batteries, for each additional tube increases the work the "B" Battery has to do. It demands a more capable, long-lived battery.

Here is a table that shows just what each type of receiving tube draws from your "B" Battery. The current is measured in milliamperes, or thousandths of an ampere.

Current (in milliamperes) Taken from the "B" Battery by Various Tubes

| "B" Volts | WD-11 | UV-199 | UV-201 | UV-201-A |
|-----------|-------|--------|--------|----------|
| | WD-12 | C-299 | C-301 | C-301-A |
| 22½ | 0.5 | 0.5 | 0.5 | 0.5 |
| 45 | 1.5 | 1.4 | 1.5 | 1.5 |
| 67½ | 2.5 | 2.4 | 2.5 | 3.5 |
| 90 | 4.5 | 4.0 | 3.9 | 6.0 |

Above figures are at zero grid bias

The table shows that the "B" Battery current drain increases much more rapidly than the increase in voltage. For example, if the voltage doubles from 45 to 90, the current drain increases threefold in one case and fourfold in another case. This all means that the life of the "B" Battery may be materially lengthened by not using a higher voltage than is necessary to obtain the desired results.

The most popular type of receiver to-day has at least three tubes, operating a loud speaker. As ordinarily employed, it places a fairly heavy drain on the "B" Battery.

Under light and heavy service, Eveready "B" Batteries prove up. More and more fans buy them every day because they are the most economical. According to the work they have to do, so is their life.

You get most energy for your money in Eveready "B" Batteries—they last longer.

"the life of your radio"



The Metal Case Eveready "B" Battery No. 766. The popular 22½-volt Eveready Battery in a new handsome, durable, water-proof metal case. At all dealers, \$3.00.

Eveready "B" Battery No. 767. Contains 30 large size cells, as used in the popular No. 766. Voltage, 45. Made especially for sets using detector and one or more stage of amplification. The most economical "B" Battery where 45 volts are required. At all dealers, \$5.50.



Eveready Radio Battery No. 771. The Eveready "Three." The ideal "C" Battery. Voltage, 4½—three terminals permitting the use of 1½, 3 or 4½ volts. The correct use of this battery greatly prolongs the life of the "B" Battery. At all dealers, 70 cents.

Manufactured and guaranteed by
NATIONAL CARBON COMPANY, Inc.
 Headquarters for Radio Battery Information
 New York San Francisco
 CANADIAN NATIONAL CARBON CO., Limited
 Factory and Offices: Toronto, Ontario

NOTE—This is No. 4 of a series of informative advertisements, printed to enable users to realize the utmost in battery economy. If you have any battery problem, write to G. C. Furness, Manager, Radio Division, National Carbon Company, Inc., Thompson Avenue and Orton Street, Long Island City, N. Y. Ask for special booklets on "A", "B" and "C" Batteries.

EVEREADY Radio Batteries

—they last longer

Radio Illustrated

That a seashell should be used as a Radio loud speaker seems singularly fitting, doesn't it? For most of us can remember how as children we listened with awe to the mysterious hum emanating from it. As seen below, it gives forth the real voice, though there is mystery enough about it still P.&A. Photo

At the right, sweet Colleen Moore, youthful star of the silver screen, is broadcasting a message from the new plant of the Klnema Theater of Los Angeles Photonevs Photo



Claudia Muzio, soprano of the Chicago Civic Opera Company, has been heard by Radiophans in the title rôle of "Monna Vanna" broadcast recently by WMAQ. Below she is presented as "Selika" in "L'Africana." KYW listeners have heard her as concert singer

Charles Marshall, the well-known American tenor, now singing with the Chicago Civic Opera, is shown below as Radames in "Aida," which has been on the air several times



In this set, which was one of the exhibits at an English show, the graceful Grecian vase on the table serves as a loud speaker and the cabinet itself also as a writing desk Wide World Photo

