Indiana Historical Radio Society

BULLETIN

Vol. 10 December, 1981 No. 3&4

Indiana Historical Radio Society

PRESERVATION for POSTERITY

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Historian . . . . . Ed Taylor
245 N Oakland Ave, Indianapolis, IN 46201

FOR INFORMATION WRITE TO:

Vice President - For legal matters of the I H R S.

Secretary - For general correspondence and membership applications.

Treasurer - For membership payments and address changes. (1981 I H R S membership dues are $6.00.)

Historian - For history of the I H R S and for donations of material for the Society Scrapbook.

Please use a Self Addressed Stamped Envelope when corresponding.

The President's Corner

Thanks to many helpful members, my presidency has been an enjoyable and easy job. I want to thank all of the members who have given so generously of their time and effort to make 1981 a good year for IHRS. The year will soon be drawing to a close and I will be ending my term.

Thanks to Del Barrett, Ross Smith and to their helpers, the Auburn meet was the best yet. And, speaking of Auburn, our thanks to Glen Rogers for his part in the donation of the "Best of Show" trophy, which was awarded for the first time at Auburn this year. Frank and Diana Heathcote were fine hosts for our Logansport meeting, Lionel and Mary Haid gave us an excellent meeting in Richmond, and our hard-working Editor, Fred Prohl -- with Ed Taylor's help as usual -- gave us a good meeting in Indianapolis.

Please give your same fine support to our new officers in 1982 that you have given to me. That will certainly make their jobs easier. They will need your input, help, and support. This is especially important to Fred, who has agreed to shoulder the tough job of Editor for another year.

As you may know, some antique radio clubs are falling by the wayside; others are considering merging with larger clubs in order to survive. Lack of participation on the part of members is the primary reason! Don't hesitate to get involved. If we are to preserve our identity, ALL of us must get actively involved.

If you have read this, you have noticed that I've done a lot of name dropping. All of the people I've mentioned are busy people. Get your name in the Bulletin. Get involved. Send Fred an article, a helpful hint, or an ad for the Bulletin. Arrange a meeting in your area. Please don't leave the whole job in the hands of a few devoted members.

Finally, thanks again for all of the help, suggestions, and support that you have given me for the last two years. It has been sincerely appreciated.

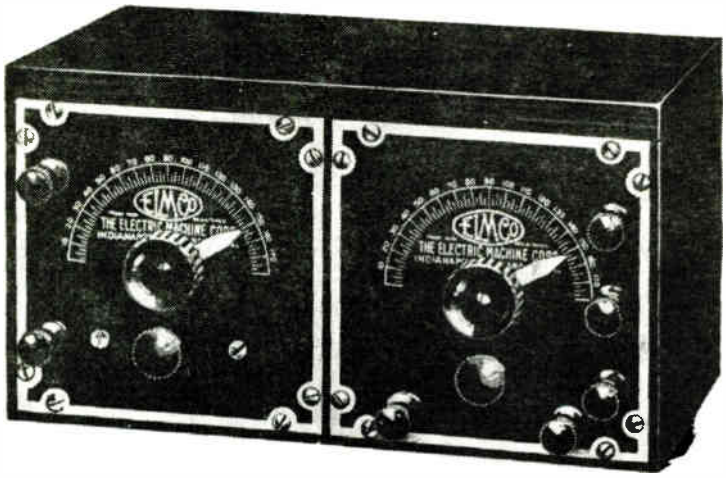
My Best Wishes to you and yours for a Merry Christmas and a Healthy and Prosperous New Year.

73

Don Johnston

RECEIVING SET, TYPE 100

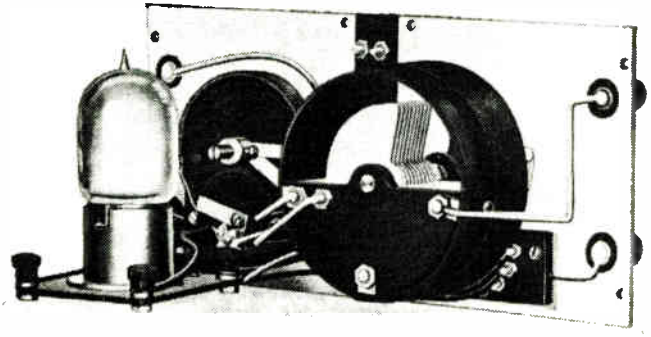
Price Without Phone, Tube or Battery, $35.00



This Receiving Set is a most compact and efficient apparatus with a range of from 50 to 300 miles, which of course depends upon weather and other conditions. With the addition of the Two Stage Amplifier, Type 402, the range of this set is increased from 600 to 800 miles.

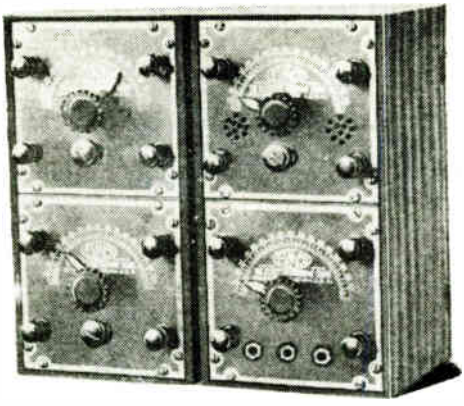
We guarantee this set if used with proper Antenna equipment, to be as efficient as any apparatus of equal price on the market. It is equipped with a Vacuum Tube Socket of the moulded type, Vernier Rheostat, and 23 plate variable condensers.

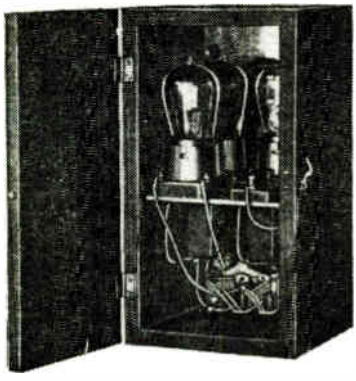
All joints and connections of these sets are very carefully soldered and each set is thoroughly tested before shipping.



Interior of Type 100

SHIELDED TUNER AND AMPLIFIER





Interior of Amplifyer No. 401

No. 401
TUNER, DETECTOR and AMPLIFIER
PRICE COMPLETE, $100.00
No Bulbs, Battery, Etc.

Type No. 403 Shielded Tuner is gauranteed by virtue of its Black Satin Finish Aluminum panels to be free from body capacity. These units have a range of wave length from 175 to 750 meters. Circuits are inductively coupled. Tuning is very sharp and easily eliminates interference. PRICE $40.00

Type No. 404 Shielded Detector Two Stage Amplifier is designed for use with the above shielded tuner, but will operate with any other good receiver. PRICE $60.00

Type No. 402 Shielded Two Stage Amplifier does not contain a detector and is designed for use with the No. 400 Tuner Detector Unit shown on page eleven. PRICE $50.00

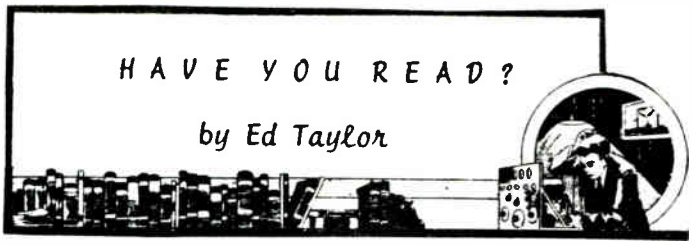
All of these units are of uniform size and same in external appearance and can be used with any other make of tuners or amplifyers.

Prices do not include Bulbs, Phones or Batteries.

The Indiana manufactured receiving set pictured on these pages was reproduced from an undated catalog of the Essex Manufacturing Co., Newark, NJ. (1923?)

ELMCO - The Electric Machine Corporation, Indianapolis, Indiana.

Contributed by Alan S. Douglas.



ELECTRICAL COLLECTABLES

by Don Fredgant 1981

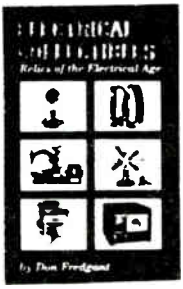
160 Pages

This month we have a new book on collecting antique electrical products including a chapter on RADIOS and a short chapter on TELEVISION.

The text is sprinkled with such gems as: (page 62)"Toaster makers got heated up over advances.",(page 71) "Motor driven kitchen appliances present a potpourri for collectors.",(page 97) "Suddenly a flood of washers drenched the public.", and (page 103) "Many other companies soon got sucked up into the vacuum cleaner race."

A heavily illustrated paperback with advertisements and over 130 photographs of a wide variety of domestic electrical products that changed the life style of the nation.Fascinating history of early electrical inventions, along with a price guide on electricals that can still be aquired at bargain prices. Also included are tips on how to identify manufacturers, references, and a directory of outstanding electrical museums.

Available from : Padre Productions, Box 1275, San Louis Osbispo, CA, 93406. $10.95 postpaid.



Relics of the Electrical Age

10 Years ∞∞∞∞∞∞∞∞∞∞ *ANNIVERSARY* ∞∞∞∞∞∞∞∞∞∞ 10 Years

On Sunday October 10, 1971 the Indiana Historical Radio Society was organized at the YMCA in Peru, Indiana. In the past decade we have grown from the 13 founders to hundreds of members from coast to coast and overseas. Of course, there have been growing pains but most of our original goals have been achieved. Our quality IHRS BULLETIN is enjoyed by collectors as a source of information and the Radioads are always popular. We have a beautiful permanent exhibit at the ACD Museum in Auburn, Indiana. Financially, both the general fund and the museum fund are in excellent condition while we still maintain reasonable dues.

The annual meeting,in conjuction with the Antique Wireless Association, is the largest of the year. Contests, auctions, flea-markets, and programs are wellsupported by both IHRS and AWA members.

We all hope that future generations of radio collectors will appreciate our effort at "PRESERVATION FOR POSTERITY.

The 13 FOUNDERS of the IHRS. L.to R. Don Johnston, Jim Thomas, Jim Fred, Ed Taylor, John Noble (D), Serge Krauss, Joe Duray, Julian Stark, Warren Johnson, Ross Smith, Del Barrett, and Gary Vierk. Marshall Howenstein snapped the photo.

THE INDIANA HISTORICAL RADIO SOCIETY RADIO MUSEUM
At The AUBURN-CORD-DUESENBERG MUSEUM, AUBURN, INDIANA.

The idea of creating a Radio Museum in conjunction with one of the world's finest Classic Automobile Museums was conceived by I.H.R.S. member Delbert Barrett. In the summer of 1976, a committee was appointed to make necessary arrangements and to enter into agreements with the Auburn-Cord-Duesenberg Museum. It was a natural marriage of interests to publicly display early radios and related items along with the beautiful Classic Automobiles of the same period.

The first display was housed in a relatively small room in the north wing on the second floor of the original Corporate Headquarters Building of the Auburn Automobile Company. Following a very enthusiastic response from the public, the Radio Museum was moved to a larger room in the north-west corner of the second floor with 3,000 square feet of display area.

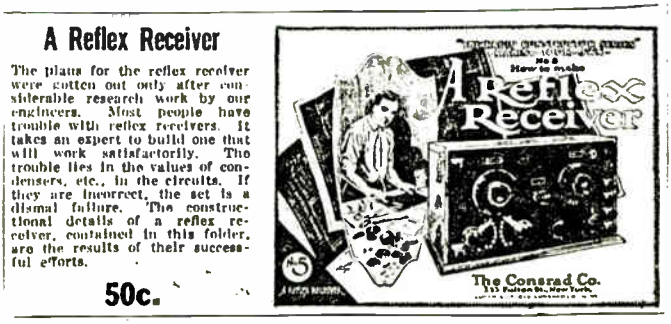
Exhibits are primarily designed for the average visitor and are not particularly intended for the radio collector. The purpose of the Radio Museum is to present the public with meaningful displays related to the Museum visitor's own interest and experience with early radio and home entertainment.

Displays include antique and classic radios and related items, along with posters and stories of old-time radio stars. An audio presentation of the old-time radio shows is actuated by a start button on a console radio of the 1930's. An antique telephone display has been added, along with early mechanical phonographs and early television sets.

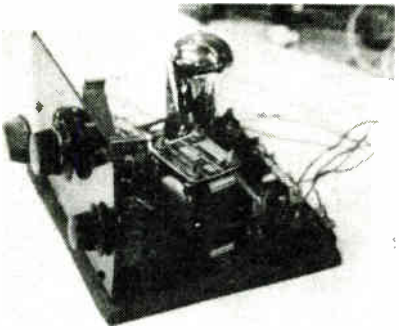
The latest addition to the Radio Museum is the A.H. Grebe exhibit, which includes Grebe receivers, Mr. Grebe's picture and the I.H.R.S. Grebe "Best of Show" Trophy honoring Mr. Grebe for his contributions to early radio.

The Auburn-Cord-Duesenberg Museum is open every day in the year with the exception of Christmas and New Year's day. It is located in Auburn, Indiana, seventeen miles north of Fort Wayne on I-69. There is a nominal charge.

The permanent address of the Indiana Historical Radio Society is 245 N. Oakland Ave., Indianapolis, IN 46201.



The Baby Emerson - Clapp-Eastham Co. A Recent Addition to the I H R S Museum at Auburn Indiana. Contributed by Del Barrett.



Lionell Haid's interest in radios and electronics was ignited when he was a boy and when he found a bushel basket filled with old tubes behind a Richmond, Indiana store and hauled them to his home. He recalled the years to come: "I fooled around with crystal sets at home. Then after I graduated from the Richmond High School in 1932, I was hired by Montgomery Ward and Company to service radios. Times were bad in the depression and it seemed for a while that I worked in six month stretches - at Ward's, at International Harvester, and for a radio shop on South Sixth Street. Then I signed up with the Civilian Conservation Corps."

In 1937, a friend decided to open a book store and asked Lionell to join him with a radio shop. By 1949, television sets were flowing into Indiana homes just as radio sets had marched into them 30 to 35 years earlier. Then Haid opened Acme Radio and Television in a new store.

Today, even though he has turned his business over to someone else, Lionell shows up at the store to check out his collection of radios, most of which are at the store. He has approximately 75 sets, mostly one and two-tube battery sets, manufactured from 1923 to 1927.

Lionell traces his interest in acquiring old radios to a time in the late 1960's. He enjoys restoring them to original condition and if they were manufactured locally he will search for historical information on the manufacturer. (There is one manufacturer in particular and that is the Dis-Ton Radio Products of Richmond.)

For the years that Lionell has been a member of I H R S, he and his wife Mary have regularly attended I H R S functions. Most recently Mr. and Mrs. Haid hosted the Fall Meeting in Richmond. and all those who attended will agree that it was a most successful meet.

I H R S Member Lionell Haid and some of his Collection.

★ ★ RADIOADS ★ ★

TRADE: Stewart - Warner Mod.300 (working) for Hamilton clock in heavy brass case approxamatly three inches in diameter. Has small seconds dial and up-down dial. Have other 5 tube TRF radios. Jim Grant, 2635 Central Park Ave., Evanston, IL., 60201 (312)869-4737

FOR SALE: Low cost battery eliminators for antique radios. Five DC outputs for filaments, plate circuits and bias voltage. Can be used internal or external to the set. For more information contact Peter Yanczer, 835 Bricken Pl., St. Louis, MO 63122

FOR SALE OR TRADE: Radio News, Crosley Grandfather Radio, Gla ss Radio, Medical Kits, British Art Decco AC and Crystal sets, Cathedrals, Kellog set, comic wireless postcards, AK-10 for AK-9, Grebe CR-3/6, Federal 59/61, Pup. A. R. Nolf, 620 Auburn Cr., Burlington, ONT. Canada, L7L5B2

FOR SALE: Marconi wireless tegraph stock certificates 1913. Mint condition - authentic - shows Marconi wireless station. Beautiful artwork. $25.00 each post paid. James Kreuzer, 257 Hastings, Buffalo, NY 14215

TRADE: Aeriola Sr., Radiola III-A, Kennedy 220, RADA. Looking for early ham gear, Kodel radios, good Neutrowound. George B. Clemans, 1104 East Wooster St., Bowling Green, Ohio 43402

FOR SALE: Marconi Wireless Telegraph Stock Certificates - 1913. Mint condition - authentic - shows Marconi wireless station. Beautiful art work. $25.00 each post paid. James Kreuzer, 257 Hastings, Buffalo, NY 14215

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From the mail bag: Sell - A Crosley radio-phono combination with short wave, model no. 82CP, (measures 30" across, 33" tall and 17" deep). Needs some cabinet repair - veneer gluing. Also a Westinghouse radio-phono with AM FM (38½"across, 35" tall and 17" deep (has curved top), model H166, serial Z13381. Is mahogany and in good shape. Would like to have $25.00 for each set. Jo Ann Todd, 5161 West 59th Street, Indianapolis, IN 46254 (317)291-5850

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I H R S MEETING SCHEDULE - 1982

The Indianapolis Winter Meeting. February 27, 1982

* * * *

The Auburn Meeting. April 17, 1982. Program is planned for early arrivals on Friday, April 16.

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Frank Heathcote, 1982 I H R S President, has requested member feedback on the possibility of a joint I H R S, Illinois and Mid-America (Missouri) meeting during August of 1982. It's been suggested that the first meeting would be held at the Elgin (Ill) Holiday Inn. The regularly held meeting would then move to a different location each following year. You may correspond with Frank at 1235 North Third Street, Logansport, IN 46947.

Results of the I H R S election of officers for 1982 at the Richmond meeting.

President	**Frank Heathcote**
Vice President	**Robert Shuck**
Secretary	**Jim Fred**
Treasurer	**Marshall Howenstein**
Editor	**Fred Prohl**
Historian	**Ed Taylor**

Indiana Historical Radio Society Member George S. Haymans Jr. passed away on September 5, 1981 in Gainesville, Georgia.

Wanted

Jewell Meter Catalogs, or other advertising material. Also need 2 Thordarson Audio Transformers and 2 National Impedaformers. Cash or trade.
Don K. Johnston, R. 1, Box 218-A, Windfall IN 46076

RADIO STATISTICS-1926 STYLE

George and Edna Clemans
Bowling Green, Ohio

In the October, 1926, issue of Telegraph and Telephone Age we happened across the results of a survey taken to determine "the trend of radio usage" at that time. The statistics were attributed to Ray H. Manson, then chief engineer of the Stromberg-Carlson Company. The number of set owners surveyed was not mentioned. Some of the more intriguing findings are given here.

Type of Set	
Home-made	55%
Manufactured	45
Circuit Used in Home-made Set	
Super-het	16%
Reflex	15
Neutrodyne	14
Radio Frequency	5
Regenerative	48
Number of Tubes (All Sets)	
1-2	11%
3	24
4	14
5	31
6-10	20
Audio	
Phones	53%
Loud Speaker	17
Both	29

Radio Statistics (continued)

Although interesting in themselves, these figures also give striking insight into the life of a radio fan in 1926. For instance, over half of all radios in use at that time were still home-made. Even though by 1926 home radio constructors had a variety of circuits from which to choose, the notorious regenerative "blooper" continued to be overwhelmingly the most popular. This is confirmed by the large number of three-tube sets, suggesting that the old "detector and two stages" was still being used extensively. Finally, it is surprising that well over half of the radio fans still "listened in" with headphones alone, only 17% using a loud speaker all of the time. All in all, the survey paints a rather more primitive picture of radio technology than might have been expected just months before the introduction of the first electric sets. Perhaps today we tend to forget just how far apart the fan and the technological frontier really were.

A Cockaday Receiver

The Cockaday four-circuit tuner is one of the latest advancements in radio. Its main advantage lies in the fact that the set can be adjusted to the highest point of regeneration, and tuning accomplished over a wide band of wave-lengths without the necessity for readjusting the regeneration control. The set described in our folder was designed and built at our own shop. All dimensions, size of wire, number of turns, etc., are given, leaving nothing to the imagination.

50c.

A Reinartz Receiver

The original Reinartz Receiver is the most popular type of set in existence today. It gained its popularity through its simplicity of operation and capability of long-distance reception. Full directions for building this receiver are given in this folder. The construction of the coil--the most difficult part—is made easy with the concise instructions we furnish. The connections of the set are shown plainly, so that the novice will have no trouble in following them.

50c.

"BUILD YOUR OWN"

The Home Built receiver in the early 1920s' was for most people their first contact with the emerging technology.

As radios were being placed on assembly lines, many more were being assembled on the kitchen table at home. They were put together with skill, or lack of skill, by those curious about wireless; those hoping to wire the best receiver in the neighborhood, or those wanting to beat the high cost of commercial sets. The plans that were followed came from books, magazines, special order instructions, a neighbor or from the builders imagination. So when you start to check out a Home Built, you are probably working with a lot of unknowns - it could be your Homemade set never did work for its builder!

The Home Built receiver has not held a high interest among collectors. Perhaps some of the reasons are - Homemade construction dates are hard to determine (could be mid-1960); they vary greatly in quality, circuitry, reception and are difficult to talk about.

Home Built receivers can be interesting from both a historical and collectable view point. Historically through Homemades one can trace receiver circuit design from the crystal detector to the superheterodyne. For every new circuit design or variation in design published in a magazine you can be sure a Homemade was built following the design. Historically it was the Home Built design that showed a profit potential and then was placed on an assembly line. Historically it was the working Homemade that provided the greatest pleasure and fond memories for its builder.

Home Built receivers are collectable by the types of parts that were used, the type of construction used (craftsmanship) and the circuit design.
The articles that follow will provide a sample of the variety of circuits and advice the radio enthusiats had available. The articles are interesting reading and may provide some insight on the hows and whys for the Home Made radio you have been wondering what to do with.

Fred Prohl

You Can Build Your Own

I What Kind Of Receiver Shall I Make? Author - Marvin Hughes "On The Air" October 1925

II Government Experts Tell How to Make a Radio Set for $10 Author - Franklin S. Keating "Popular Science Monthly" June 1922

III Using Tuned RF Ahead of the Crystal. Author-Lieut. Peter V. O'Rourke "Radio World" October 1924

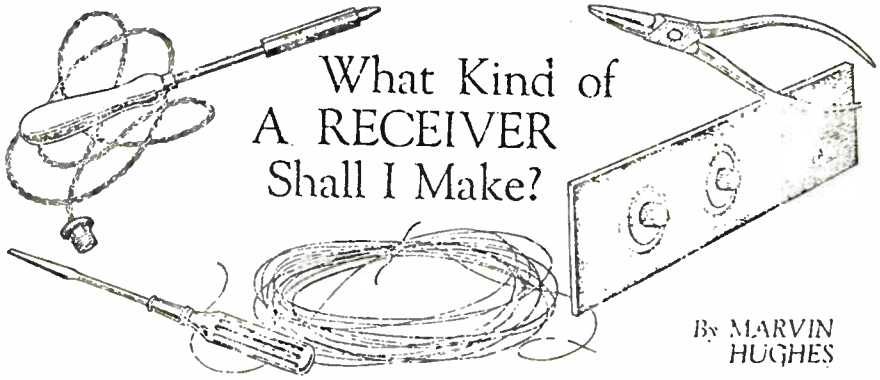
IV Simple Crystal Receiving Set. Felix Anderson for "On The Air" October 1925

V A Fine 4-Tube RF Receiver Author - Byrt C. Caldwell "Radio World" October 1924

VI Wiring The Single-Tube Set Author - Watson Davis "The Country Gentleman" June 1924

VII The Two Tube Tone Beauty Author - Brewster Lee "Radio World" May 1925

Radio Apparatus



What Kind of A RECEIVER Shall I Make?

By MARVIN HUGHES

What to Consider Before Deciding on the Type of Circuit to Incorporate in your Home-Built Set

ONE of the greatest problems confronting the new radio enthusiast, whether of the entertainment-seeking type or of the technical dabbler, is the proper choice of a circuit for the most effective results. If the receiving set is to be homemade, it is no small matter to decide which kind of a radio is to be constructed, since the market offers so many sure fire long distance circuits for consideration.

When considering circuits, it is best to rate them on the following basis, respective to their all around merits. First, range; 2, selectivity; 3, volume; 4, cost, and fifth, the quality of the music received—a better term probably would be reproduction. The quality of the received programs is largely dependent upon the proper choice of instruments, and does not except in multi-bulb receivers, enter into the argument as to the nature of the electrical connections.

Radio Has Styles

RADIO has its "styles," and in the past three years, we have witnessed and fooled with an unceasing flow of dynes, supers, plexes, gons and gens. In spite of all this rush of freak and trick circuits, we have a good, old reliable stand-by that has stood its ground, and except for a few modern twists, remains inherently the same as when it was first originated.

The standard three circuit regenerative set, its origination and popularity dating back to pre-broadcasting days, has withstood for years the onslaught of newer and "better" circuits: for years it has been used as the basis of comparison, and today, it sits back and challenges all of them to give equal all around results tube for tube.

Properly constructed, a three circuit regenerative receiver has few equals. It is simple to assemble, easy to adjust, and is very selective. This circuit gives more volume per tube than probably any other circuit when generally considered, and the cost places it within the reach of nearly everyone. Its operation and selectivity is often questioned, some people contending it "finicky." Others contend that it is hard to operate, and is objectionable due to the fact that regeneration is employed to bring in the distant stations. This is not true, for when placed in the hands of a person who is willing to acquaint himself with its traits, it is as effective as a super-heterodyne receiver with eight or ten tubes. With a good location, it will accomplish results just as pleasing. As to selectivity, it is the only receiver of three tubes that will really tune through locals and get long distance, since the advantages in selectivity obtained by employing the "zero" beat method of reception can be resorted to.

In experiments, I have used this circuit, and tune in stations over 2,500 miles away, while three local stations operating on powers ranging from 1,000 to 500 watts, with wavelengths not more than 30 meters apart from the wave of the stations being received, and when it is considered that the three locals were not more than five miles distant, it speaks very well for the set. These results were accomplished with standard apparatus, on an antenna located in average surroundings.

Circuit Provides Expansion

A RADIO set using this circuit can be constructed first with one tube at a small initial, and tubes and improvements can be added from time to time, until loudspeaker reception and three tubes have been connected up. Only when this stage is reached is the room for improvement entirely exhausted—but when this is realized, the builder has a receiver that is just as up to date as any radio ever was, and he has a set that will give greater results per dollar than any other.

With a receiver of the three circuit type, a little time devoted to tuning will reap receptions from many long distance stations. In fact, I have seen lists of receptions made with a radio of this circuit so long and effective that they would strike the owner of a ten tube super-heterodyne green with envy.

Government Experts Tell How to Make a Radio Set for $10

By Franklin S. Keating

TEN dollars, according to wireless experts in the Bureau of Standards, will build a receiving set that will permit an amateur to listen in on signals from navy stations 200 miles away and from broadcasting stations 25 miles distant. The set is one that can be built at home, the final cost depending on the cleverness of the worker with the tools and materials available.

The knowledge of radio gained in the construction and operation of this set will form a sound basis for later sets of greater power and receiving range.

—THE EDITOR.

YOU can build a $10 radio set, consisting of tuning coil, crystal detector, and phone, as planned by government wireless experts, by following these detailed directions.

For the tuner secure a cardboard tube 4 in. in diameter. The cores around which linoleum is wound are ideal for this purpose and can usually be obtained free at a housefurnishing store. If not procurable there, the round cardboard boxes of certain kinds of breakfast foods, while thinner, can be used if handled carefully.

For the coil secure ½ lb. No. 24 double cotton-covered copper wire. If this size is not available, the next size above or below will make but little difference. Beginning at a point ½ in. from one end of the tube, punch two holes through the cardboard. Put one end of the wire down through one hole and up through the other, until the end is firmly anchored, leaving about 12 in. for the connections. Wind on 10 turns of wire tightly and closely, and then, while holding the turns, arrange a loop for a tap. Do this by punching two holes, as at the beginning, and passing down and up through them a 6-in. loop of the wire. With this done, wind on 10 more turns and take off another loop. But instead of taking off the second loop directly beneath the first, "stagger" it about ½ in. This makes it easier to carry the connections to the switch points without short circuiting them.

Continue winding in the same manner until the seventieth turn, making six taps in all. Then, commencing with the seventy-first turn and continuing for 10 turns, take off a tap from each turn. At the last tap, anchor the wire firmly, leave 12 in. for the end connection, and cut the wire from the spool.

Use Brass Screws for Switches

Now lay the tuner aside while the other parts are finished. Secure a piece of wood ½ in. thick, 5 in. wide and 8 in. long to be used as the panel. Remove two binding posts from old dry cells and attach to the panel at points 2 in. apart. Drill the first hole for the top binding post ½ in. from the top and ½ in. from the left-hand edge.

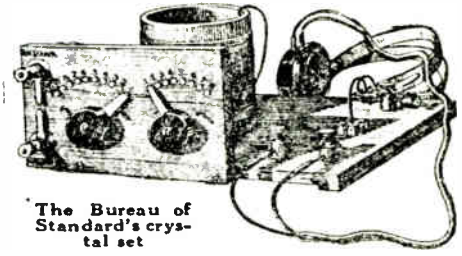
Next, lay out the two switches with their handles and the necessary switch points. For the handles, drill two holes at the same height as the lower left-hand binding post, 3 and 6 in. respectively from the left-hand side. With these holes as a center, draw a circle 1½ in. in radius to locate the switch points.

Switch points can be made by taking 18 ¾-in. round head brass screws and filing the heads down to a flat surface. They are inserted in holes drilled along the circle, separated by a distance equal to the diameter of the head.

The taps taken from the single turns are fastened to the left-hand switch and those from the "tenth" turns to the switch on the right.

The switch arms or handles may be purchased from a supply store or can be made by sawing a slice from a broom handle with a piece of brass rod or bolt passing through the wood to the back of the panel. The brass contact can be cut to shape and fastened to the under side of the piece of wood in such a way as to make contact with the bolt.

The wiring of the panel is then completed by carrying a wire from the ground binding post—the lower one—to the left-hand switch arm, and connecting the upper binding post—the aerial—to the right-hand switch arm. All that now remains are the detector, condenser, and the binding posts for the telephone.



The Bureau of Standard's crystal set

The detector consists of a piece of galena held securely by wood screws to the base and a fine spring wire attached to a movable arm so that the position of the wire can be changed. The spring wire—an E mandolin string may be used—is wound several times around a small finishing nail after the latter has been slipped through the binding posts. A piece of cork or wood may be used for the knob of the detector or a very good handle can be made by softening sealing-wax and molding it to the desired shape before it hardens. Attach the detector on the extension of the base near the back and the two binding posts for the phone near the front edge. Complete the wiring for the set by connecting the ground binding post with the left phone binding post and the antenna post with one side of the detector. Connect the other side of the detector with the remaining post of the phones and the work is done.

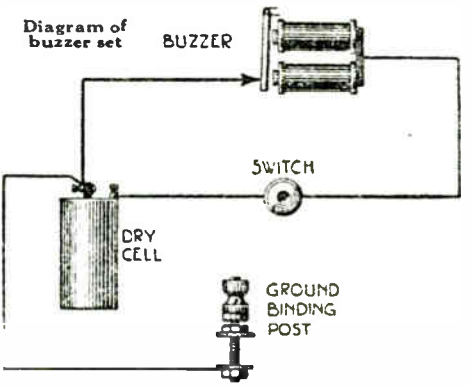
While not necessary to the operation of the set, a fixed condenser placed across the phones will bring in the signals clearer and slightly louder. It is simply made.

Obtain some tinfoil and waxed paper. Cut four sheets of the tinfoil 4 by 3 in. and the waxed paper 4¾ by 3¾ in. Lay down a sheet of the paper and in the center of it place a sheet of the foil, holding the latter in place by a drop of shellac. Connect the tinfoil with the outside by small strips of the same material 2 by ½ in., placing them alternately at one corner and then the other, so that after laying down the four sheets of tinfoil and five sheets of waxed paper, there will be two sets of connections.

Place a piece of stiff cardboard on top and bottom and bind the whole with tape. Fasten each set of connections together and lay them under the binding posts for the phones.

A single phone receiver can be purchased for as low as 65 cents, but for best results a Baldwin phone costing about $6 should be used with the outfit. This is the most expensive part of the set, but is well worth the cost.

A test buzzer is a worthy addition to any set. Connect a dry cell with an ordinary doorbell — with bell removed — and a homemade switch of any kind. Lead a wire from the vibrating point of the bell to the ground wire and attach it there. If



the crystal is in good adjustment, a loud buzz will be heard in the phones when the buzzer is operated. If the buzz is heard in the set, then wireless signals within the range of the set will also be heard.

In constructing the aerial, height and length are the factors that affect the receiving distance. An aerial 60 ft. high is twice as good as one only 40 ft. high. The single wire of No. 14 bare copper should be made as long as possible, preferably over 100 ft.

It is not necessary that both ends be of the same height. If the end farthest from the house can be attached to a tree or mast, the lower end can be sloped so that it leads directly to the instruments.

The principal parts with their costs are as follows:

Wire No. 24	$0.75	Rope for aerial	$0.50
Cardboard tube	.10	No. 14 wire for aerial	.75
Switch bolts and nuts	.25	Pulleys for aerial	.39
Galena crystal	.25	Insulators	.20
Test buzzer	.50	Tinfoil	.10
Dry battery	.30	Phones	4.50

Using Tuned RF

By Lieut. Peter V. O'Rourke

ANYBODY desiring a set that will operate a loudspeaker usually must have at least three tubes. A crystal detector preceded by a stage of a radio-frequency amplification constitute a receiver that gives wonderful tone quality, missing none of the rich overtones which bring the voice and music into the home with all its purity and naturalness. The two audio stages give loudspeaker volume. The set has some DX possibilities, but of course does not compare with the Neutrodyne or Super-Heterodyne in that respect, nor indeed from the viewpoint of expense. The circuit described herewith may be built for $45, including everything except the speaker.

Three devices not usually encouraged are used in this circuit, a potentiometer, a double tap switch and a fixed RF transformer. However, the crystal, because of its inherent resistance, makes selectivity difficult, hence the tap switches are necessary. Moreover they are nothing to worry about. The potentiometer supplies the correct grid bias to the RF amplifier. This gives an excellent control over the tube to prevent oscillation and is in keeping with the idea of preserving quality at all cost.

The crystal may be either fixed or adjustable. Several excellent fixed crystals are being marketed. However, I prefer the adjustable type because of the greater volume I have been able to obtain and the facility with which the greatest sensitivity may be established.

To complete the trilogy a fixed RF transformer is used. This is another "don't" in the conventional radio category but it is inserted here to appease those who want no more than two controls. However, this transformer may be of the tuned type instead, and even better results will be obtained. The fixed transformer is a commercial product, but anyone desiring to make one may do so by following directions published in RADIO WORLD, issue of September 20.

The antenna is joined to the connecting arm of one of the switches and the unit turns of a standard variocoupler are tapped and connected to the switchpoints Contact between the antenna and the coupler is made by rotating the switch arm or lever from one switchpoint to another, thus introducing more or less inductance. The other switch is connected in the same way with the ground, taps from the variocoupler being

those from every ten turns. Most standard couplers are tapped in units and tens, that is, every turn is tapped at the beginning up to about eight and the rest of the turns are tapped at every tenth turn. The rotor of the variocoupler is shunted by a .0005 mfd. or 23-plate variable condenser. It is preferable that this condenser and the variocoupler be of the low-loss type If any choice must be made let the coupler be low-loss rather than the condenser, because the losses in coils are much greater than those in condensers. The end of the variocoupler rotor goes to the rotor plates of the variable condenser and to the midpoint of the potentiometer, the two extreme posts of the potentiometer, commonly called the terminals, going to A — and A +. This does not short-circuit the A battery, due to the high resistance of the potentiometer, which should be 300 or 400 ohms. The stator or immovable plates of the condenser go to the grid of the first tube at the extreme left on the diagram. The A battery wiring is completed by connecting the A — to one leg of each of the three rheostats and the other leg to the F— post on each of the sockets. The A+ goes direct from the A battery to the F+ posts on the sockets and the A+ and —B are connected.

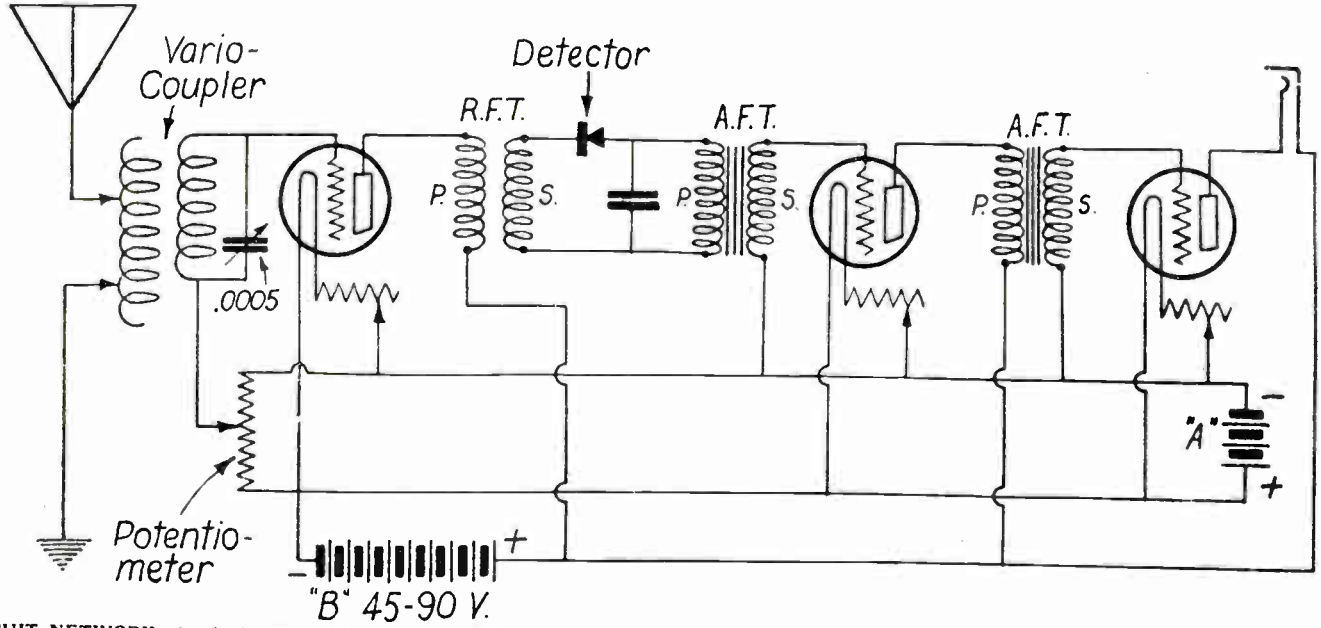
The plate of the RF tube goes to the P post of the fixed RF transformer and the B post of that transformer goes to the B + 90 volts.

P and B constitute the primary of the RFT. The secondary of the RFT is connected as follows: The G post goes to one side of the crystal detector and the F (S2) post goes to the B (P2) post of the first audio-frequency transformer. The P post of AFT, is connected to the remaining unconnected side of the crystal. A fixed condenser, .00025 mfd., is placed across the primary of the first AFT, that is, from P to B.

Now to complete the two stages of audio-frequency amplification. The F posts, or S 2, are connected to the —A battery lead, or to the battery side of the rheostats, never to the socket binding post side. The G post of the first AFT goes to the grid of the first audio tube, that is, the second tube from the left in the diagram, and the plate of this tube goes to P or P 1 on the second AFT. The B post of this transformer is joined to B+ 90 volts. The G of the second transformer goes to the grid of the last tube. The plate of the last tube is connected to the frame or right

(*Concluded on next page*)

RF, Crystal Detector and 2 AF



CIRCUIT NETWORK of a high-quality receiver, comprising a stage of RF, crystal detector and two stages of AF. Its tone quality on a speaker is superb and it is one of the most satisfactory receivers that can be built. It is not a great DX-getter.

(*Continued from preceding page*)

angle of the single circuit jack and the B + 90 volts is connected to the blade of the jack. No provision is made for plugging in the detector alone or just one stage of AF because persons possessing loudspeaker sets hardly ever use earphones.

If three controls are not objectionable, and I do not find them so, the RF transformer may be of the tuned type and constructed as follows: On a bottle 3" in diameter, which need not necessarily have a circular exterior but may be hexagonal or the like, place four strips of gummed paper one inch wide, for the full length of bottle. Using No. 22 DCC wire and moistening the four strips near the point where you are beginning, wind 45 turns of wire, moistening the paper as you go along. A few inches of gummed paper protrude from each end and these are moistened and bent over the coil, affording a means of support. Then take a sheet of Empire cloth or wrapping paper about 1½" wide and wrap it over the coil, placing gummed paper with the sticky side out as formerly. Wind twelve turns of the same wire as a separate winding. The 12 turns constitute the primary and 45 turns the secondary of the RF transformer. A 23-plate condenser is connected in shunt with the secondary. It does not matter which side is connected to which. The fixed condenser still remains in the circuit.

W. B. M., Chicago, Ill.

Question: I would like to construct a simple but efficient crystal receiving set for use in listening to Chicago stations and would appreciate your printing a diagram of a receiver suited to that purpose. Kindly give me a list of the necessary parts with all the detail —a list that I can give to a dealer to supply me without going into all the technicalities involved in purchasing such materials on my own judgment. Inasmuch as I cannot read circuit diagrams, I would appreciate your making the sketch of the picture variety.

Answer: We always aim to please our readers and comply with their requests whenever we can—so on this page (Figures 5 and 6) I am showing the construction of your crystal set. You will need the following materials:

1 panel Formica 7x12x¼ inch
1 Cabinet to suit your furniture
1 Switch lever King
8 Switchpoints King
1 SLW Variable Condenser Bremer-Tully, Continental or Silver-Marshall
1 Three inch Na-ald dial
4 Eby Binding Posts
1 Muter or Dubilier .002 fixed Condenser
1 half pound spool No. 20 DCC wire
1 3 inch cardboard tube 4 inches long
1 Grenwol Crystal detector

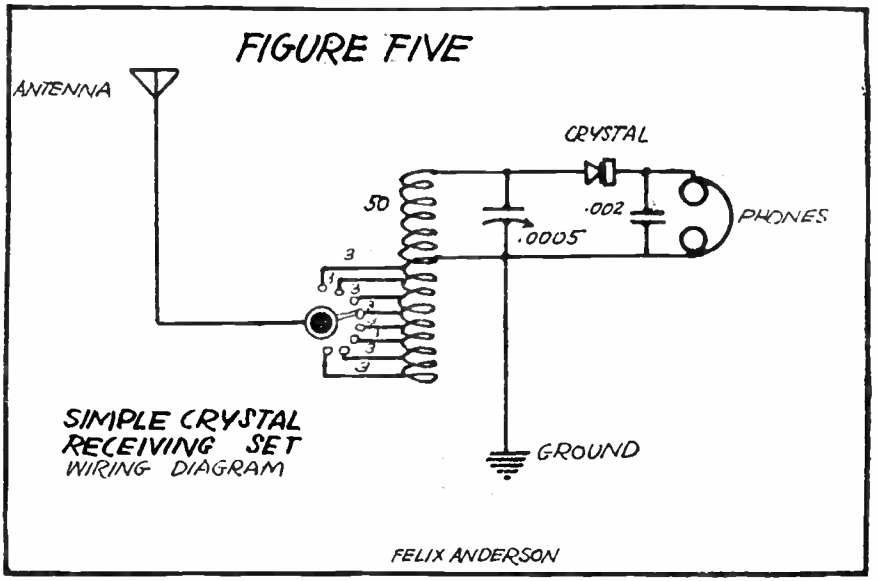
ACCESSORIES

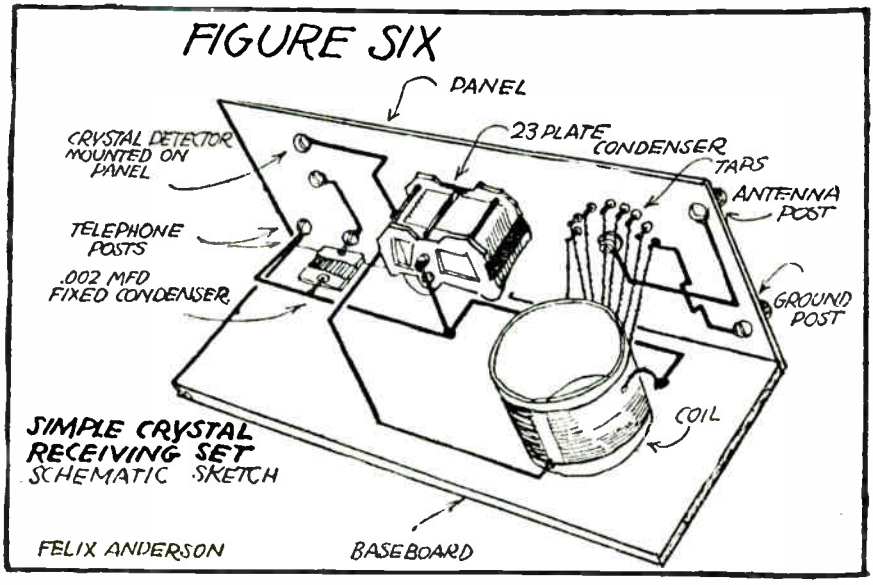
100 feet No. 14 antenna wire
50 feet No. 18 lead in wire
2 Pyrex insulators
1 ground clamp
1 pair headphones Tower

About the only thing not explained in the diagram is the construction of the coil. The winding of this unit is quite simple.

Wind fifty turns on the three inch tube, one turn right after the other. When the fiftieth turn has been wound, instead of cutting the wire, make a twist —say six inches long, and then proceed to make three more turns. Make another twist the same length, and then wind three more turns. Continue the three turns, twist and three turns process until 8 taps—24 turns have been wound in this fashion. When the 74th turn of the entire coil (the 24th turn counting from the 50th tap) has been wound, cut the wire from the spool, and fasten the end. This end counts as the eighth tap. The taps are all soldered to the switchpoints progressively.

Instructions for the erection of a good antenna can be found in the June, 1925, issue of ON THE AIR. I sincerely hope your radio set will be everything you wish it to be.





A Fine 4-Tube

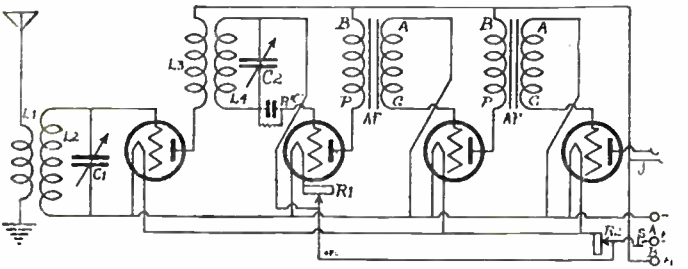


FIG. 3.—The wiring diagram for Caldwell's 4-tube set, consisting of one stage of radio-frequency, detector and two stages of audio-frequency. Radio-frequency transformers are basket-wound, low-loss type. The use of low-loss condensers increases the efficiency to make this set almost the equal of a 5-tube receiver.

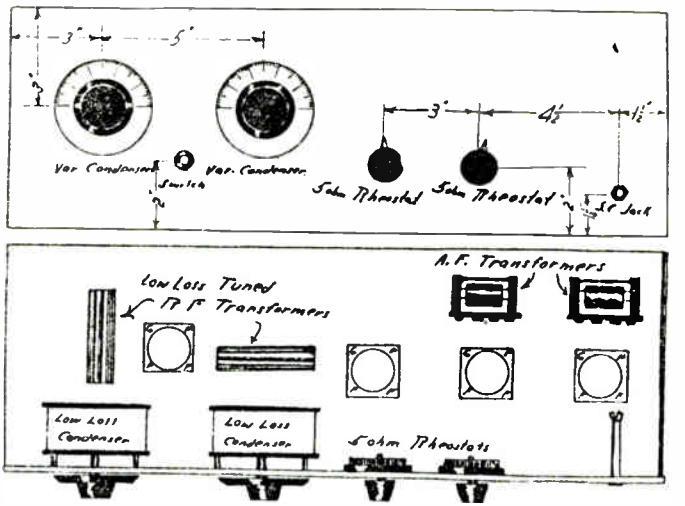


FIG. 1 (top) shows panel layout. The panel should be some high-grade insulating material 7"x21" on which are mounted the two condensers, rheostats, jack and filament switch. Fig. 2 shows the instrument layout. The RF transformers should be mounted at right angles and the audio-frequency transformers kept as far away as possible to prevent audio-frequency feed back into the radio-frequency tubes, which causes howling. This layout will give the short leads necessary for efficiency.

By Byrt C. Caldwell

ONE of the most popular receivers is the 4-tube set which employs one stage of tuned radio freuency amplification, detector, and two stages of audio amplification. There are many receivers of this type on the market. The reason for the popularity of the circuit is that it is moderately powerful, is selective, easy to tune, does not radiate, and has a low initial cost as well as a low cost of upkeep. The

RF Receiver

cost of constructing this receiver of the very best parts, exclusive of tubes, etc., is less than $30. Properly constructed, this receiver will give at least the results of the average good 5-tube Neutrodyne as to distance and volume, and almost as good selectivity, because the condensers and the tuned RF transformers are of the best low-loss design. By actual trial I have found that the substitution of two of these low-loss condensers and transformers for two of the regular Neutrodyne type has increased the selectivity of the receiver 100% and has at least increased the sensitiveness of the receiver an amount equal to an additional stage of RF.

Fig. 1 shows the layout of the panel, 7"x21". Use radion or some other high-grade rubber.

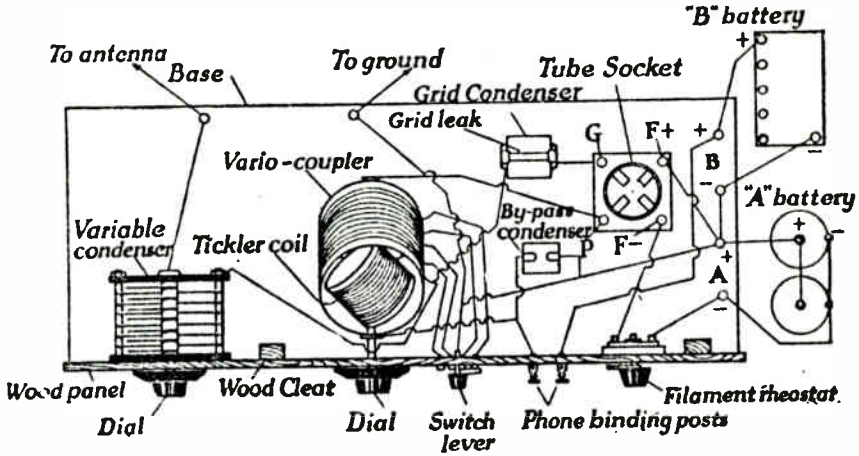
The low-loss tuned RF transformers are basket wound coils, made as follows: Draw a 3" circle on a block of wood. Mark this into 15 equal divisions and drill a ¼" hole on each of these divisions. Put 2" lengths of ¼" round rod or dowel into each of these holes. Wind the coils with No. 22 DCC wire. Exactly 65 turns are needed, and they are wound in and out of every two pegs. When the coil is finished, put collodion on the wire, but only where it crosses, both inside and outside of the coil, and when this is hard remove the pegs. Wind a layer of paper over this coil, and on top of this wind from 3 to 10 turns of the same wire in the same direction. This is the primary. If you are in a section where very good selectivity is required, such as the New York or Pittsburgh district, wind only 3 turns on the primary. If you are far from any station, you may wind as many as 10. The beginning of each winding goes to the grid, the plate and the antenna respectively. The low-loss variable condensers have a capacity of .00025 mfd. These coils and condensers exactly cover the wavelength band of the broadcasting stations.

Fig. 2 shows the arrangement of the parts on the base. It is essential that the RF transformers be kept as far as possible from all solids. They should be at least 1" away from the condensers or any other part.

Fig. 3 shows the hookup. A separate rheostat is used for the detector tube. If the 200 tube is used, the rheostat should be a 5 ohms, but if 201A tubes are used throughout it should be 20 ohms. The hookup is shown for use with 201A tubes. If the 200 tube is used the connection from the plate of the second tube to the B battery will have to be made at 22½ volts instead of at 90 as shown. It is unnecessary to use the 200 tube.

WIRING THE SINGLE-TUBE SET

By Watson Davis



This Top View Shows All the Parts and Wiring of the Regeoerative Circuit

A REGENERATIVE circuit gives a greater receiving range than any other circuit employing a single electron tube. This extreme sensitivity is obtained by making the tube amplify the received signals in addition to detecting them or making them audible in the phones. A circuit which does not incorporate regeneration requires additional tubes for amplification.

There are several kinds of regenerative circuits but the one described in this article is the simplest and best for broadcast reception. It is wired up from the parts suggested in last week's article and when used with the antenna installation previously described, will receive the programs of broadcast stations within a radius of about 400 miles. Under good conditions, greater distances are possible.

These suggestions present a simple and effective method of assembling and wiring the parts of the regenerative circuit. If you wish to purchase a set employing this same circuit, the instructions given here will help you to choose the most satisfactory.

Figure 1 shows a top view of the complete layout including all the connecting wires. All these parts and their symbols were described in the preceding article. Study the arrangement of Figure 1 and then refer to Figure 2 where the conventional symbol is pictured for each part in the same relative position.

In Figure 1 the antenna, ground and phones are not shown, but their conventional symbols are shown in Figure 2. The tube socket in Figure 1 is replaced in Figure 2 by the conventional symbol of the electron tube. There is no conventional symbol for a tube socket. The parts and symbols as illustrated in the preceding article will be of value in the understanding of subsequent circuit diagrams.

Selecting the Base

SECURE a base of dry wood large enough to accommodate the parts without excessive crowding, and a panel of thin wood—not more than five-sixteenths of an inch thick—which may be stiffened by two or three wooden cleats and which is to be secured in an upright position to one edge of the base. For permanent use, a composition panel of insulating material is desirable because it is neater, is stronger, and is not subject to bending or warping, but if dry wood is used, almost equally good results will be secured. The wooden panel is much cheaper and it is easily drilled.

These parts are mounted on the panel: The variable condenser, the variocoupler, the switch lever—with switch

points and switch stops—the phone binding posts and the filament rheostat. They are mounted about halfway between the lower and upper edges of the panel.

The variable condenser is provided with three machine screws for securing it to the panel. Drill the holes for these screws, a hole for the shaft of the rotating plates, and if a separate vernier—fine-adjustment—knob is used, drill a hole for the shaft of this knob also.

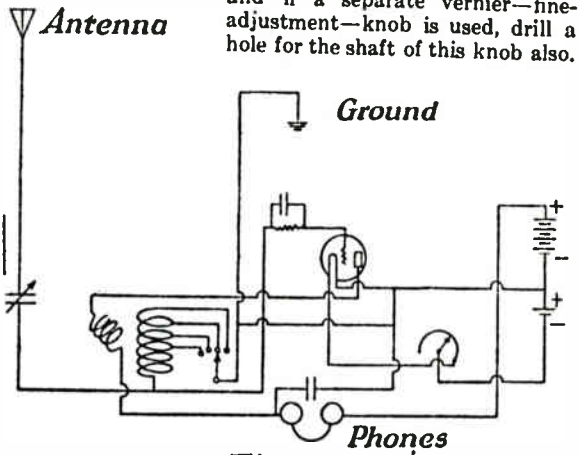


Fig. 2

Only the Symbols are Used in this Diagram

Fasten the condenser in position and place the dial on the shaft of the rotating plates. Turn these plates so that they completely mesh with the fixed plates. Slip the dial around on the shaft until the numeral "100" is at the top, mark this position on the panel and lock the dial in position by means of the small set screw. See that the knob rotates smoothly and stays set in any position.

Next drill the necessary holes for the variocoupler and fasten it in place. Set the dial on the shaft and turn the tickler coil until its axis coincides with the axis of the fixed coil. Twist the dial around on the shaft until "100" is on top, mark this position on the panel and lock the dial in place. See that the tickler coil rotates smoothly and maintains any desired setting.

In order to clearly show all connecting wires, the variocoupler in Figure 1 is set back slightly from the panel.

Mount the switch points in the arc of a circle having a radius equal to the length of the switch lever and close enough so that the switch blade will pass smoothly over them. Mount the two switch stops in such a manner that the switch blade will not drop off the contact points. Drill two holes for the phone binding posts near the lower edge of the panel and about one and a half inches apart.

Mount the filament rheostat near the right end of the panel and adjust the spring contact arm so that it presses firmly on the resistance wire, fasten the knob to the shaft, turn it to the left as far as it will go and mark the position of the pointer on the panel. This is the "off" position—that is, it opens the circuit so that no current can flow from the A battery through the filament of the electron tube.

On the base mount six binding posts in the positions shown, spacing them at least one and a half inches apart. As the screws in the posts project below the base it is best to fasten a wooden strip under each end. Fasten the tube socket, the grid leak and the grid condenser and the by-pass condenser in the positions shown in Figure 1.

No. 20 insulated copper wire or No. 14 bare tinned copper wire may be used in connecting the parts together. The wire is straightened by clamping one end in a vise, gripping the other end with a pair of pliers and pulling until it gives slightly. The wires should be stiff enough to be self-supporting; crossed wires should not touch even though they are insulated. The No. 14 wire is more rigid.

Ends of Connecting Wires

WHERE the wires cross in Figures 1 and 2 a curved line is used. This indicates that the wires *do not touch* or come close to one another. In Figure 1 you should carefully discriminate between connecting wires and the outlines of the apparatus, as for example, the edges of the base.

The ends of the connecting wires are formed into an eye or loop and clamped under a binding post or a nut which is part of a terminal of a piece of apparatus. Sometimes this means of connection is not possible, as for

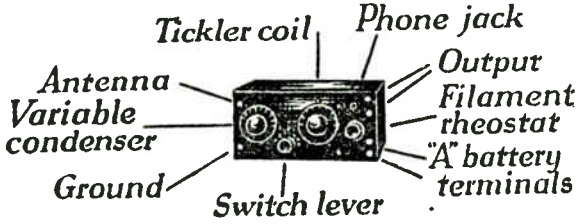


Fig. 3

Here is a Typical Single-Tube Set

instance in the case of taps on the fixed coil of the variocoupler. In such instances the best way to make connections is by soldering, but if soldering equipment is not available these connections may be made by placing the end of the wire along the terminal where the connection is desired and wrapping tightly with several turns of small bare copper wire—about No. 24.

Wiring the Single-Tube Set

(Continued from Page 18)

From the antenna binding post run a wire to that terminal of the variable condenser which connects to the *rotating* plates. From the other condenser terminal lead a wire to that terminal of the fixed coil of the variocoupler which is *nearest* the tickler coil. Then select in order four or five taps from this coil and connect them successively to the switch points mounted in the panel.

If the coil is provided with more taps than these they are not to be used.

From the switch lever run another wire to the ground binding post. Note that a wire branches off from this one and runs to an A battery binding post. It is not necessary that this second wire be connected at the particular point shown; instead it may lead to the ground binding post or to the switch lever.

If you examine the tickler coil you will find that the winding connects to two fixed terminals. In Figure 1 these terminals are, for the sake of clearness, shown at each end of the fixed coil. Connect one of them to terminal P—plate—on the tube socket, and the other to the left phone binding post. Follow through the rest of the wiring as indicated in Figures 1 and 2.

On most tube sockets the filament terminals are marked F plus and F minus. These positive and negative signs are purely arbitrary. In Figure 1 the upper F—filament—terminal of the tube socket *becomes* F plus because it connects through a binding post to the positive terminal of the A battery.

When all the parts have been wired together upon the base you are ready to connect the A and B batteries to the four binding posts at the right. Observe great care in making these connections, as an error will render the set inoperative or apply the high voltage of the B battery to the filament of the electron tube—which is placed in the socket later—burning it out instantly.

In Figure 1 the A battery is made up of two dry cells connected in *parallel*. This parallel arrangement is used for any tube listed in the table of last week as requiring a single dry cell for filament operation.

For any type of tube a single B battery unit of 22½ volts is sufficient. Connect it to the B battery posts as shown in Figure 1. The extra terminals of this battery are only for special use. Connect the antenna wire, the ground wire and the phones to their respective binding posts as shown. One of the phone terminals usually has a red marking, and this should be connected to the phone binding post farthest to the right. Figure 1.

To operate the set place the electron tube in the socket and make sure that the springs maintain firm contact on all four pins in the base of the tube. Turn the knob of the filament rheostat to the right until the filament glows. With a dry-cell tube the filament is only dull red.

You are now ready to tune the set to a broadcasting station. Turn the switch lever to the contact point farthest to the right so as to cut into the circuit all the turns on the fixed coil. Rotate the tickler coil until its axis coincides with the axis of the fixed coil—the "100" mark on the dial should now be opposite the mark on the panel—and turn the condenser knob *slowly* through half a revolution.

If this dial has been properly adjusted as previously described its numerals will pass the mark on the panel, from zero to 100.

At some setting on the condenser dial you will notice a distorted or whistling sound. Now turn the tickler coil *back* and carefully readjust the condenser—preferably with the vernier—until these sounds reappear. Repeat this process of alternately adjusting the tickler coil and the condenser and the sounds will become clearer and gradually take the form of music or voice. If no sounds are heard, set the switch lever on successively different points and repeat the process.

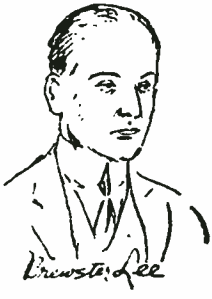
As soon as you hear the whistle of the transmitting station, turn the tickler coil *back*, at the same time readjusting the condenser slightly until the whistling sounds just disappear and the music or voice becomes clear and undistorted. When this condition is secured, the adjustment of the circuit is that of maximum regeneration or just below the point where it begins to oscillate. If the set does not oscillate, reverse the wires leading to the terminals of the tickler coil.

The 2-Tube Tone Beauty

By Brewster Lee

Radio Engineer.

FOR earphone use the Tone Beauty is hard to excel. Not only do signals rich in quality actuate the phones, but distant reception is accompanied by undiminished quality. The set has three controls, two of which depend on wavelength (the variable condensers C1 and C2) and the tickler. While even the tickler has some relationship to wavelength, the setting depends on other considerations, too, including the degree of heating of the filaments of both tubes. The tickler can not be logged. It is the regeneration control.



The action of the combination L4C2 is to tune the plate to the same wavelength as the grid is tuned to, this being resonance. But the usual accompaniment of regeneration, due to such synchronized tuning, is not present, due to the tickler L3 usurping the regenerative function. Thus, if the tickler is set far below the saturation point, perhaps no signals will be heard at all, a phenomenon of tickler feedback. One might expect a tickler to afford the reception of signals no matter in what position below resonance it may occupy, since the plate is connected to the phones under any conditions. L4 may be called a resonator, a wavelength synchronizer, robbed of regenerative effect by the absorption factor in L3.

Use a 7x18" Panel

The set may be made on a 7x18" panel and afford all the room necessary. It is hardly advisable to use a smaller panel. A larger one, say 7x21" or preferably 7x24", will be necessary if audio stages are to be added for speaker operation.

The selectivity is good, the volume is great and the quality wonderful. A little hard to control at times, this circuit is not particularly suitable for general family use, as on distant stations the tickler setting may be rather critical.

Avoid Stray Coupling

Losses are sustained if the coils, intended to be out of each other's fields, are coupled by strays, therefore it is well indeed to put the coupler L1L2L3 at left and the plate coil L4 at right, the two inductance elements even being placed at right angles as an additional safeguard. This results in a long plate lead, but it is a happy compromise, since to shorten this lead (the plate coil's connection to the tickler) would necessitate closing up the valuable intervening space. Even with the long plate lead, no harmful results were noticed, whereas when stray couplings were tolerated the set became almost impossible to handle successfully. The solution, therefore, is an excellent one, for the circuit when made as shown in Figs. 2 and 3, gave very satisfactory results.

May Use Commercial Coupler

The coupler L1L2L3, a 3-circuit tuning coil, may be any commercial type suitable for the value condenser to be used across the secondary. Usually this condenser is .0005 mfd., normally 23 plates. If C2 also is a .0005 mfd. variable condenser the plate coil L4 may be so designed that the two condensers not only may be logged but will tune approximately in step (same dial readings on both for the same stations).

The tickler may be regarded as a volume control, therefore even if it could be logged there would be small advantage, if any.

The coupler consists of a primary, secondary and a tertiary (tickler), the primary and secondary being a single winding. In commercial coils this type is not usually made, but if a factory product is employed, the same results are obtained by joining the end of the primary to the beginning of the secondary, using a short piece of wire. This lead is connected to A battery minus. The fact that in Fig. 1 the primary and the secondary look like two entirely different coils should not confuse the constructor, for a glance at the picture diagram of the wiring (Fig. 4) will elucidate this point. If the coil is home-made the tap system may be used with better facility, otherwise the wired connection between the posts on the coil as explained.

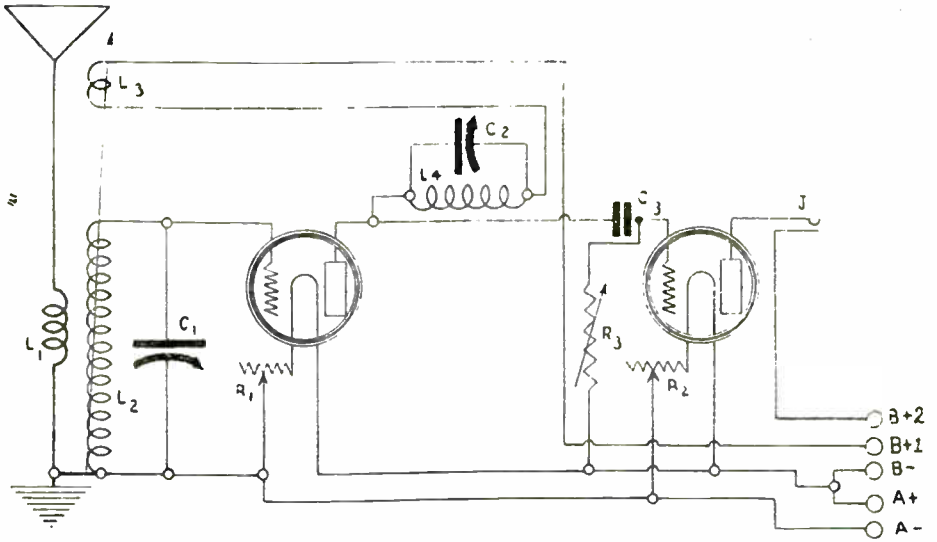


FIG. 1, circuit diagram of the Tone Beauty L1L2L3 is a 3-circuit coupler, L4 a single winding, the two inductances being kept out of each other's fields. C1 is a .0005 mfd. variable condenser, tuning the coupler secondary; C2 is of the same capacity and tunes the plate coil. The grid leak R3 is the Bretwood, newly introduced in the United States, after having won remarkable popularity in Great Britain R1 and R2 are rheostats of a resistance depending on the type of tubes used. The circuit comprises one stage of tuned regenerated RF and a non-regenerative detector. The set is extremely fine for reception of programs from distant stations.

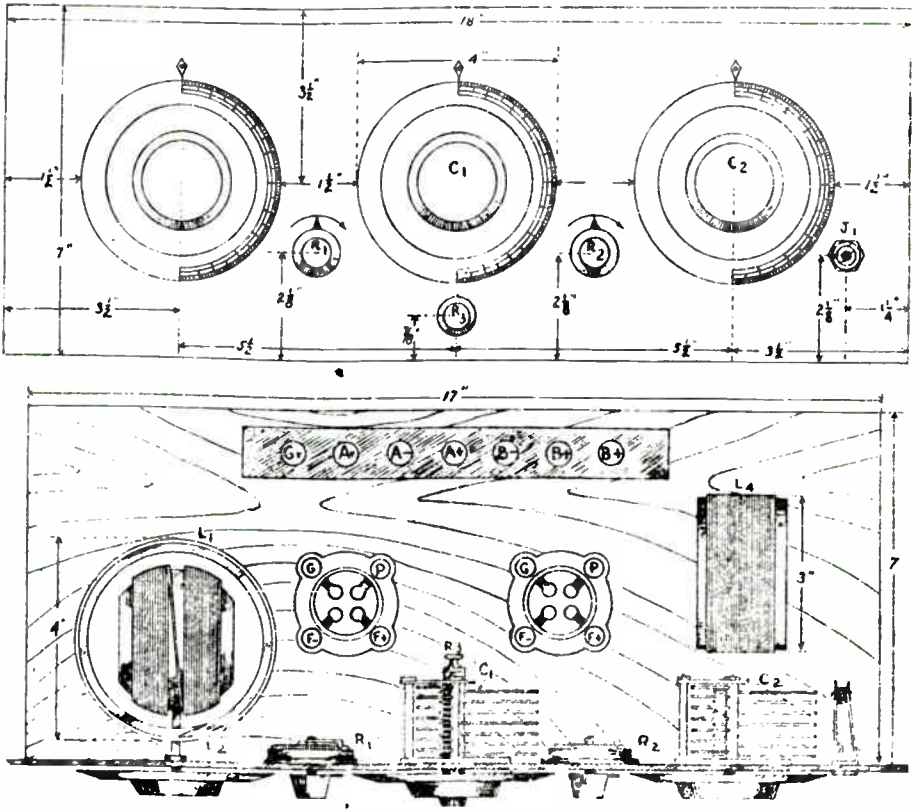


FIG. 2, the panel layout (above) and Fig. 3, the assembly plan.

Works Well on Dry Cell Tubes

The dry cell tubes may be used very successfully, particularly the WD11 and WD12, which require 1½ volts to heat the filament. Two such cells should be connected in parallel. The UV199 and C299 tubes are good, too. The UV201A and C301A will give more volume. The detector may be the C300 or UV200, a 6-volt storage battery is to be used and there is no objection to the large current consumption. Two WD12s were used in the original model.

Discussion of Parts

The grid condenser C3 is .00025 mfd., preferably of the mica dielectric type. R3 is a variable grid leak. The Bretwood was used. This has a range from ¼ to 10 megohms and its smooth variation helps considerably in getting clear reception of distant stations, and in reducing tube noises.

J is a single-circuit jack, the frame (right-angle) of which is connected to B plus No. 2, normally 22½ volts, but try all voltages from 16½ to 45 for best results. The amplifier B battery voltage (B plus No. 1) should be tested from 22½ to 90.

Tips on Wiring

In wiring the set care should be exercised on the following points:

1. The rotor plates of the condenser C1 should connect to ground, to terminal of L1, to terminal of L2 and to negative A battery, while the stator plates go to grid of the radio-frequency tube (at left, Fig. 1).

2. The stator plates of C2, the condenser tuning the plate coil, should connect to that terminal of L4 that goes direct to plate of the detector tube, the connection that is also made to one side of the grid condenser.

3. The grid leak should be connected from the grid post of the detector tube socket to the positive A battery. It should NOT be connected to the plate side of the grid condenser.

4. The connections to the tickler should be made in either fashion, and if regeneration is not readily obtainable and controlled that way, the tickler connections should be reversed; that is, the lead that went to B battery would go to the end of L4 and the one that went to L4 would go instead to B battery.

Description of Circuit.

The set consists of a stage of tuned radio-frequency amplification, in which regeneration is present, and a non-regenerative detector tube. A capacity is used to couple the RF output (plate of the tube at left) to the detector input (grid of the tube at right). This capacity is the grid condenser, which thus serves a double purpose. The fine quality of the signals is due in part to a sane conservation of voltage step-up, many receivers distorting because of too great radio-frequency voltage impressed upon the tubes. This overloading impairs the general utility of a set to a marked degree. Overloading of tubes does not refer usually to the filament heating, but to the RF current. Of course, keep the tubes lighted as low as is possible yet consistent with the desired results. Use 6-ohm rheostats (R1 and R2) for the 11 and 12 type tubes, 20 ohms for the 201A and 301A class. For the 200 or 300 a vernier rheostat is necessary, such as the Fil-ko-stat.

Winding the Coils

L1L2L3 is made as follows: On a 3½" diameter tubing 4" high (cardboard, bakelite, fiber, etc.), wind ten turns, make a small twisted loop for a tap, and wind 41 more turns, a total of 51 turns. The wire is No. 20 double silk covered. Anchor terminals in pinholes in tubing. The first to tenth turns inclusive are the aperiodic primary, the remaining 41 turns the secondary, although both are one winding.

The tickler is wound on a 2¾" diameter tubing 2" high and consists of 30 turns of No. 26 single silk covered wire. L4 is wound on a 3" diameter tubing 3" high (not on a 3½" diameter tubing), and consists of 43 turns of No. 24 double cotton covered wire. It is a single winding and is not tapped.

These coils require different tubing and wire sizes because the dielectric element was carefully considered in connection with the so-called "shape ratio" as determined by the Bureau of Standards for best results. This subject was treated very fully by J. E. Anderson in the March 7 and 14 and April 18 issues of RADIO WORLD.

List of Parts

Two standard sockets.
Two WD12 tubes.
Two 6-ohm rheostats.
One variable grid leak.
One single-circuit jack.
One 7x18" panel.
One 7-17" baseboard.
One cabinet to match.
Two 1½-volt No. 6 dry cells.
Two 45-volt B batteries.
One .00025 mfd. grid condenser.
¼ lb. No. 20 double silk covered wire.
¼ lb. No. 24 double cotton covered wire.
¼ lb. No. 26 single silk covered wire.
One tubiug 3½" diameter, 4" high.
One tubiug 3" diameter, 3" high.
One tubing 2¾" diameter, 2" high.
Two .0005 mfd. variable condensers.
One pair of earphones, aerial wire, internal connecting wire (bell wire or No. 18 DCC); 50 ft. No. 14 insulated leadin wire; ground clamp, ligbtning arrester.

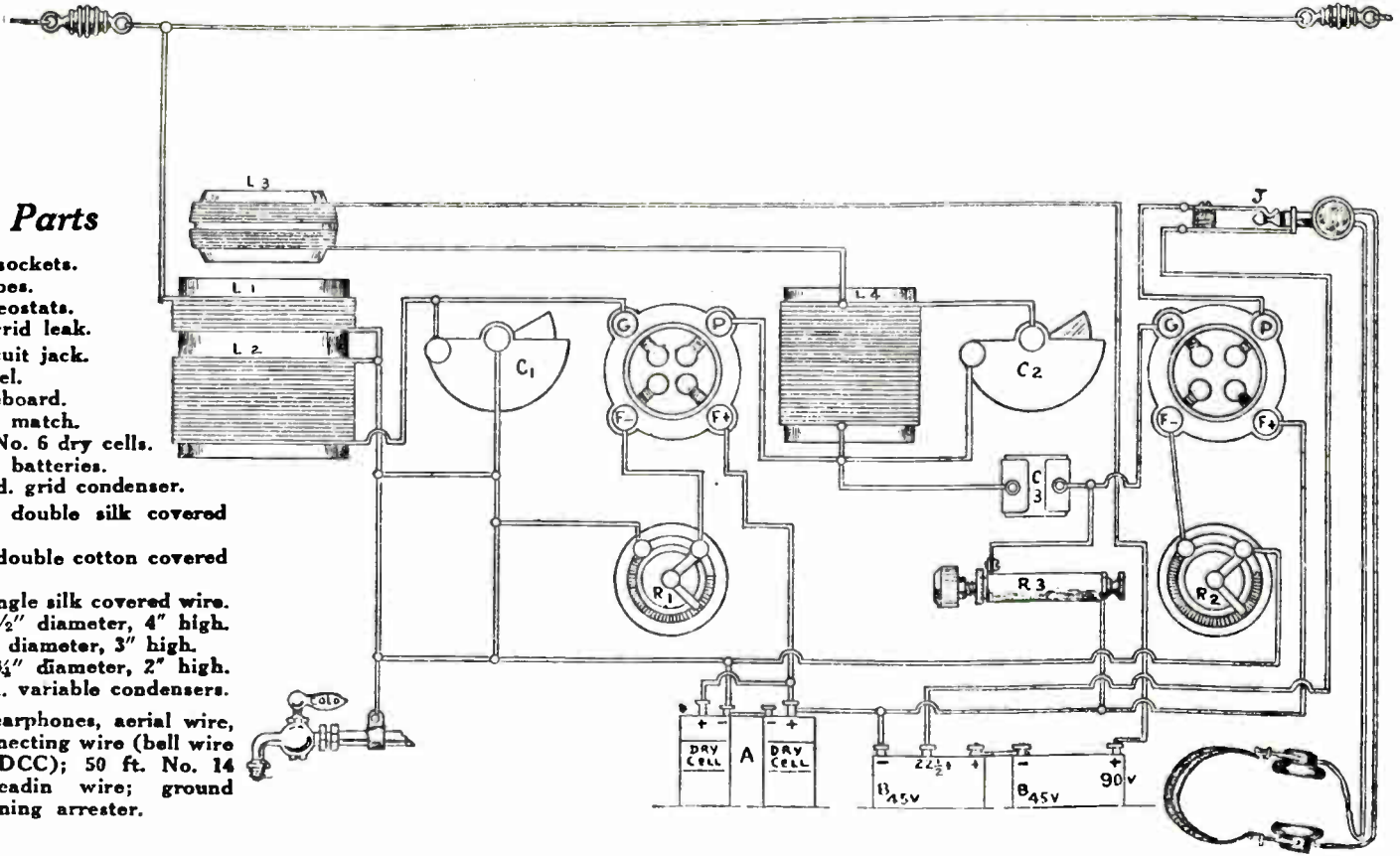


FIG. 4, picture diagram of the wtring of the Tone Beauty. This corresponds in every particular with the schematic diagram (Fig. 1).

THE NEW FAITH

Christmas! Time of jubilation;
Time of keen anticipation—
Which in women, men and children everywhere
Brings a re-birth of good feeling,
Into one young soul brought stealing
A conviction Santa Claus was all hot air.

He was quite hard-boiled and seven,
While the only bit of leaven
To his poor despairing parents was a yen
With which he had been inspired
For a radio just acquired,
And to which he deigned to listen now and then.

He had lain year even near eighty
Santas, short, tall, lean and weighty,
In the stores and on the corners 'round the town:
'Til his mind was all confusion,
Bringing with it disillusion
And sophisticated doubt that wouldn't down.

But in our young unbeliever,
The new radio receiver
Soon instilled the makings of a sense of awe.
Voices, music—from the spaces,
Of their source no visional traces,
Sort of got him ready for a mental flaw.

So, one evening just preceding
Christmas, from the horn proceeding
Came a voice robust and hearty, pleasant, deep:—
"This is Santa Claus who's speaking,
"Through the clouds I'll come a-streaking,
"To put presents in your stockings while you sleep."

To the youthful face, a-glowing,
Came a radiance bestowing
What appeared to be the dawning of new trust,
And he cried aloud with pleasure,
As if finding some new treasure:
"Gee, if that ain't Santa Claus, I hope to bust!"

—*W. A. Wolf*