New Model Type B Jim Wells Link Set—This Issue

Everybody's 5¢ RADIO WEEKLY

IVERSON C. WELLS, Editor and Proprietor

Vol. 3—No. 16 CHICAGO, SATURDAY, JANUARY 2, 1926 POSTPAID $2 BY THE YEAR

This Week

Broadcasting a HEALTHY *and* PROSPEROUS NEW YEAR

Readers' Free Service Bulletin

Everybody's Radio Free Service Station is conducted for the benefit of its readers. Its benefits are not confined to the helpful articles contained in the editorial pages, nor to the free mail service by the Question and Answer Department. We serve you every time you make a purchase of a receiving set or radio apparatus specified or advertised in these pages. No products are specified or advertised that have not passed the test of our laboratory and of actual practice. So sure are we of the worth of the advertised merchandise, we publish and have published since our first issue a guarantee in each issue which protects our readers. The guarantee of our advertisers is not an empty one. It means something to you. You should know how to get its full benefits.

How to Use Our Guarantee When Buying Apparatus

When you make a purchase from a retail dealer make sure first of all that he gives you a receipt as an evidence of purchase. This receipt should show the name and quantity of the article bought. If the article bought is advertised in EVERYBODY'S RADIO Weekly and it was through such advertising you were influenced to make the purchase, then immediately fill out the blank coupon at the bottom of this page and mail it promptly to the manufacturer. Be sure to DATE the coupon. This coupon is your Notice of Purchase. It tells the advertiser you have bought his products on the strength of his advertising and because of EVERYBODY'S RADIO Weekly guarantee you are holding him responsible for the performance and quality of his product.

The manufacturer will make a record of your purchase and should at any time the merchandise fail to live up to its maker's claim we have evidence of purchase and a prompt adjustment can and will be made.

The next and all other purchases you make of radio apparatus and supplies should be registered. Use the coupon below. If you do not do so our guarantee to you is void and shall not be binding on us.

Everybody's 5¢ RADIO WEEKLY

Dealers Co-operator

To avoid having readers chase here and there hunting for products advertised or specified in EVERYBODY'S RADIO Weekly we have arranged with the retail radio dealers, listed below, to act as our co-operators. They have agreed to stock merchandise advertised in this publication or to obtain same on a few hours' notice. Just tell them you're an "Everybody's" reader and you'll get prompt service.

Buy from These Dealers— *They're Trustworthy*

We have selected these dealers because they are in full sympathy with our quality merchandise policy and will stand back of their promises to you. They have agreed to cooperate with our readers and us because they know that all merchandise advertised in EVERYBODY'S RADIO Weekly has been TESTED and proven for QUALITY and PERFORMANCE and is safe to buy and sell.

LOOP DISTRICT—
CHICAGO RADIO APPARATUS COMPANY
407 S. Dearborn Street, Chicago
NEWARK ELECTRIC COMPANY
226 W. Madison Street, Chicago
NELSON ELECTRIC COMPANY
508 S. Dearborn Street, Chicago
SILVER-MARSHALL, INC.
106 S. Wabash Avenue, Chicago
W. A. WELTY & CO.
6th Floor, 36 South State St., Chicago

NORTH SIDE DISTRICT—
WONDER SALES COMPANY
3152 Irving Park Boulevard, Chicago

SOUTH SIDE DISTRICT—
H. & H. RADIO SHOP
5638 S. Ashland Avenue, Chicago
K-W RADIO SERVICE
1855 East 71st Street, Chicago
SIMONS ELECTRIC COMPANY
551 South Clark Street, Chicago
UNITED RADIO COMPANY
6336 Cottage Grove Avenue, Chicago
635 East 63rd Street, Chicago
6805 Stony Island Avenue, Chicago

NOTICE TO DEALERS: Your name will be added to this list without charge if you will qualify as an "Everybody's Radio Co-operator." Phone Mr. Morford, Calumet 3310, for particulars.

How to Play Safe When Buying Either Sets or Apparatus

When buying from a retail radio store to make sure you are doubly protected in your purchases, go to the stores whose names are listed in the panel in the center of this page. These are known as "Everybody's Radio Dealer-Co-operators."

These dealers have signed an agreement to keep in stock all the merchandise advertised in this magazine. If at any time they do not have the item you call for they will secure same for you at once. They also have agreed to stand back of all their transactions and to give you a fair and square deal.

These dealers were selected by us because of their established reputations for square-shooting and because they subscribed to the exacting conditions which we imposed upon them. They pay us nothing for this listing of their names and our only compensation is the satisfaction that we have served you.

If you make a purchase direct from the manufacturer, who is our advertiser, use the coupon below. It establishes a record of your desire to have the protection of our advertisers' guarantee. If you do not do this our guarantee to you is not binding on us.

NOTICE OF PURCHASE

Made through a guaranteed advertisement published in "Everybody's Radio Weekly."

Name of advertiser .....

His street address .....

His city and state .....

Dear Sirs: As a result of your advertisements in "Everybody's Radio Weekly" I have purchased from (Give dealer's name and address) ....

..... (Street) .....

(His city and state) .....

the following items .....

.....

Date: Jan. 2, 1926.

(Sign your name) .....

(Your street address) .....

(Your City and State) .....

MAIL THIS NOTICE TO ADVERTISER AT ONCE

GUARANTEE PURCHASE SLIP

(Name of advertiser) .....

(His street address) .....

(His city and state) .....

Send me by {Parcel Post / Express} the following items, for which I enclose the necessary payment .....

.....

.....

The above merchandise was purchased through your advertisement in "Everybody's Radio Weekly" and I am thus recording my purchase to make sure of the guarantee of you and your merchandise which Everybody's Radio Weekly makes for you.

(Sign your name here) .....

(Your street address) .....

(Your city and state) .....

Date: Jan. 2, 1926.

MAIL THIS ORDER TO ADVERTISER PROMPTLY

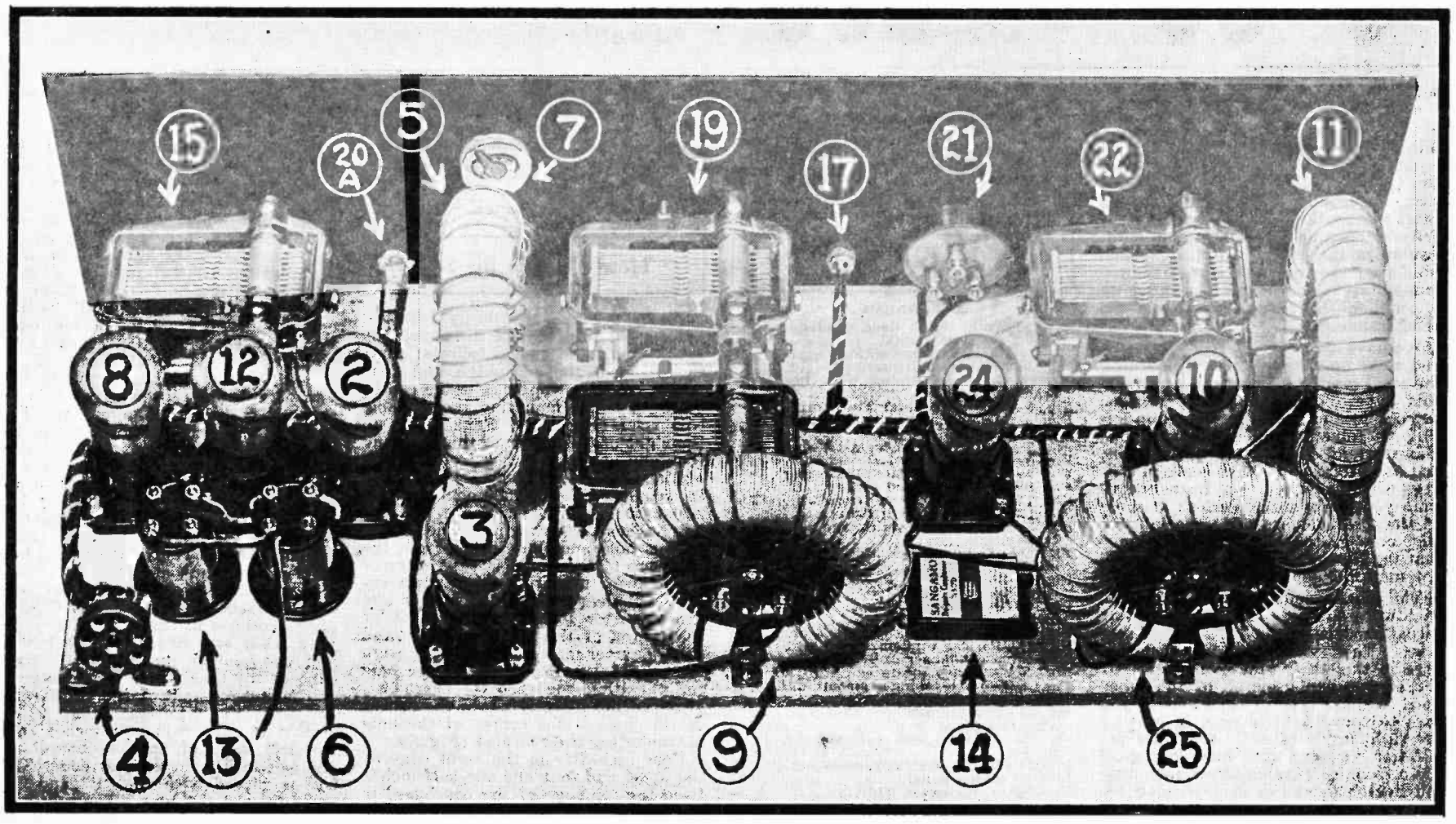
Published every Saturday by IVERSON C. WELLS, 2721 South Michigan Avenue, Chicago, Ill., Phone Calumet 2810. On all Newsstands at 5 cents per copy. $2.00 the year, postpaid. In Canada, $3. In Foreign Countries, $3.50. Entered as second-class matter October 4, 1924, at the Post Office at Chicago, Ill., under the act of March 3, 1879.

Everybody's 5¢ RADIO

IVERSON C. WELLS, Editor

JAMES GRAYAR WELLS
Technical Advisor

Vol. 3—No. 16 CHICAGO, SATURDAY, JANUARY 2, 1926



On account of the width of the tandem condenser, which is unusually wide, the placing of the coils are somewhat different from the usual location, however they are at such angles that there is no difficulty in interlocking of the magnetic fields. Do not try to place them in any other manner than that shown

Another Three-Stage R. F. Lossless Set

In This Set There Is Used a Tandem Condenser Controlled by Only One Knob

By IVERSON C. WELLS

BEFORE describing Model No. 2 of "Everybody's Three-Stage Radio Lossless," which is illustrated in these pages this week, I want to tell you of some of the experiences we have had in the Laboratory and Demonstrating room with last week's model set. It has done about everything a many-tube super-heterodyne is expected to do in the way of distance and volume and yet with a clarity of tone that no super ever claimed to have, least of all actually produces.

Last Sunday afternoon between the hours of 2 o'clock and 6 o'clock, before witnesses, I tuned in stations from Davenport and St. Louis on the west to New York City on the east and each and every station was on the loudspeaker and with volume that equaled the best of night reception on the average super-heterodyne. Bear in mind, too, that the afternoon was a stormy one and that the atmospheric conditions were not very conducive for good reception.

George Clarkson, 7000 Woodlawn avenue, Chicago, was one of the witnesses that heard all of the stations listed below. Mr. Clarkson had come out to the Laboratory to obtain some special blue prints and arrived just as the first of the stations was tuned in. Here is the list tuned in while he was present, in addition, of course, to the locals and nearby stations:

WOC, Davenport, Ia.
WAGH, Brooklyn, N. Y.
KSUO, St. Louis
WCCO, Minneapolis
W E M C, Berrien Spgs., Mich.
WLW, Cincinnati
WSUI, Iowa City, Ia.
KSD, St. Louis
WBAR, Sisiht, Wis.
WGR, Buffalo, N. Y.

That's a pretty fair list for a Monday night tuning bee for most receivers. It certainly is just about as good, as far as distance goes, as the best of the ten-tube superhets, can do in daylight work and far better than the average super can do.

Most all of the locals were on at the time these stations were tuned and KYW was blasting away only a few blocks to the north of us, while both KSUO and KSD of St. Louis were riding in, which is some feat in itself. In fact, frankly, we seldom get KSD or KSUO at this station at any time. I do not believe we have had KSD more than once or twice all season, and KYW was off the air at the time.

In one evening's tuning the past week, with all Chicago stations on, at a popular demonstration before a roomful of visitors, the set operating only for a brief spell, as there were other sets to be demonstrated and only a short time could be given to each set, we tuned in the following stations, without touching a single one of the locals:

WLIB, Elgin, Ill.
KDKA, Pittsburgh
WAHG, Brooklyn
WGR, Buffalo
WSMB, New Orleans
KOA, Denver
WSAI, Cincinnati
WBZ, Springfield
KGO, San Francisco
WGY, Schenectady
WTAM, Cleveland
WLW, Cincinnati
KFI, Los Angeles
WOC, Davenport
WBAP, Fort Worth
KSD, St. Louis
WHO, Des Moines

The above stations were tuned at two sessions in one evening. The reception was all on a loudspeaker with the volume that you usually expect to get from an eight or ten superheterodyne. The set was using but six tubes and the tone was as clear as any receiver you ever heard.

In offering "Everybody's Three-Stage Radio Lossless" we do not do so with the idea that everyone should or can build it. In the first place, the cost does not make it a good buy for the average pocketbook. In the next place, the construction of it offers difficulties that the average home builder will not be able to surmount. For the fellow that knows how to follow closely a design and who will not attempt to deviate even the least because he knows that the original design was made for a purpose, no difficulties greater than the construction of any tune radio frequency set will be met.

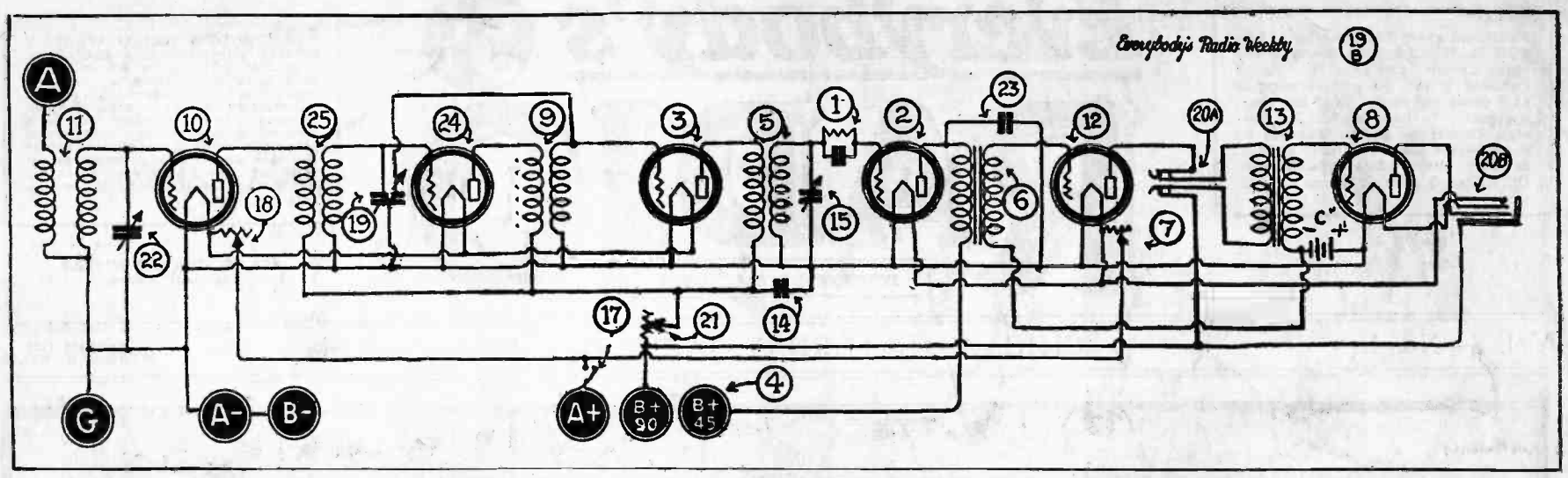
Take, for instance, this week's model. We have had a heck of a time in getting the condensers and coils located just right to overcome mechanical and electrical difficulties. The Peerless dual or tandem condenser is a monster in size. The Naxon radio frequency coils are in the same class. We tried first to use a sub-base, mounting the coils with their flat side directly against the bottom of this base and underneath. This allowed plenty of room for the coils, since they are supposed to have no intercoil coupling, but even then there was not more than an inch between each coil. We were willing to risk this close arrangement of the coils, because the mounting underneath the base gave us very short leads to the condensers above and to the sockets which also were above. But, when we came to mount the condensers we found that the Perlesz dual or tandem, when set directly on the top of the sub-base and opened up at half-mast, required about three inches more space than the seven-inch cabinet and panel which was planned to be used would allow. It would have required a twelve-inch deep cabinet and panel and that would not do.

Finally we were forced to start all over and return to the same general plan used last week with the Ellis "D" coils. This meant mounting the coils on the wooden baseboard and jamming them in between the condensers and the sockets. We have used a twenty-six inch panel, but if these same condensers and coils are used it might be advisable to allow a few inches more in length. Crowding even fieldless coils together is not good design.

For the purpose of obtaining short grid and plate leads from the coils we've had to place coils, condensers and sockets in such a manner that the cabled wiring plan looks like a crooked road to nowhere. We hope you can trace out the course from the photographs and, with the standard pictorial diagram we gave you last week and which we repeat this week, manage to in some way, in some manner, get the receiver hooked up so it will work efficiently.

We might have made it clearer to you had we omitted the cabling idea, but since it is necessary, and particularly so in this receiver, to keep the high potential battery lines especially as far away from the grid and plate leads as possible, this cabling job absolutely is required. The pictorial diagram shows which wires and how they should be cabled. The photographs show you where and how this is done.

The Perlesz tandem or dual condenser really was designed by Mr. Perlesz at the suggestion of our Labo-



Schematic diagram in which three stages of radio frequency amplification are used in the set. The regular Low-Loss circuit is employed with two stages of Radio amplification. Jacks are used in the audio amplifiers so that only one stage of audio can be used if desired

ratory for this particular hookup. The regular tandem condenser of the Perlesz type is of an entirely different design, the condensers being set on a shaft horizontal to the panel, the condensers opening and closing at right angles to the panel. In this special condenser the condensers are mounted tandem style one behind the other on a common shaft very much like the usual tandem.

We have asked Mr. Perlesz to design and make up some of this type because the local market had no condensers of this type. Cardwell makes a good one but does not seem interested in letting us folks in Chicago have them. Hammerlund also makes a good one and has promised to have some in Chicago within a week or so. In the meantime you can get the Perlesz at most of the local dealers and especially at our co-operator dealers. We know that the Newark Electric has some and you may find some at the other places.

The Naxon coils used are the same that were so successful in one of our recent models of the Five-Tube Loss-Less. They work just as efficiently here in this three-stage receiver. Of course you can use any of the other good fieldless type of coils and, if you care to spend a little time in getting the right angle to avoid too much oscillation you can use most any good radio frequency transformer, including the Buell pancake or spider web coils.

For the audio we have used this week the Meloformers. This set must have not only volume but also pure tones, and the Meloformers give this to the receiver. We have had KFI and WEAF as loud on the model receiver as you have heard KDKA or WSMB on "Everybody's Five-Tube Loss-Less." That's saying a lot.

The list of parts used this week for Model No. 2 follow:

List of Parts Used

Essentials

Fig. 1—Muter .00025 fixed condenser and 2-meg. grid-leak	$ .85
Fig. 2—Buell standard socket	.75
Fig. 3—Buell standard socket	.75
Fig. 4—Jones Multiplug with base bracket	4.50
Fig. 5—Naxon Toroidal Transformer	4.00
Fig. 6—Meloformer multistage audio transformer	4.00
Fig. 7—Carter Imp. rheostat, 6-ohm	1.25
Fig. 8—Buell standard socket	.75
Fig. 9—Naxon Toroidal transformer	4.00
Fig. 10—Buell standard socket	.75
Fig. 11—Naxon Toroidal transformer	4.00
Fig. 12—Buell standard socket	.75
Fig. 13—Meloformer multistage audio transformer	4.00
Fig. 14—Dubilier ½ mfd. by-pass condenser	.90
Fig. 15—Perlesz S. L. F. .005 variable condenser	6.75
Fig. 17—Yaxley Midget battery switch	.50
Fig. 18—Carter Imp. rheostat, 6-ohm	1.25
Fig. 19—Perlesz tandem (.0005 mfd.) variable condenser	20.00
Fig. 20A—Yaxley interstage jack	.80
Fig. 20B—Yaxley single circuit filament control jack	.70
Fig. 21—Centralab 200,000 ohm, variable resistance	2.00
Fig. 22—Perlesz .0005 variable condenser	6.75
Fig. 23—Muter .002 fixed condenser	.40
30"x7" Celeron panel	4.92
Baseboard, hardware, etc	.50
Total for essentials	$71.07

Accessories

Six Continental tubes at $2 each	$ 12.00
Newark Electric Co. adjustable cabinet, over 26"	15.75
Two 45-volt Stuart "B" batteries	8.00
One Burns concert loud speaker	22.50
Bong 100-ampere 6-volt storage "A" battery	24.00
Total for accessories	$ 82.25
Total for complete outfit	153.32

How to Wire the Set

The panel measures 30 by 7 inches. Looking at the front of the panel, the holes to be drilled are as follows: Four inches from the left edge and four inches from the top edge is the center of the hole for mounting the variable condenser (Fig. 22). Four inches to the right of the center of this hole and four and one-half inches from the top of the panel is the center of the hole for mounting the 200,000 ohm variable resistance (Fig. 21). Four and one-half inches to the right of the center of this hole and four inches from the top edge of the panel is the center of the hole for mounting the tandem variable condenser (Fig. 19). Four and three-quarter inches to the right of the center of this hole and four and three-quarter inches from the top edge of the panel is the center of the hole for mounting the rheostat (Fig. 18). Three inches directly above the center of this hole is the center of the hole for mounting the rheostat (Fig. 7).

Four inches from the right edge of the panel and four and one-half inches from the top edge of the baseboard is the center of the hole for mounting the variable condenser (Fig. 15). The three sockets (Fig. 8, 12 and 2) are mounted edge to edge on a line three and one-half inches from the rear edge of the baseboard. The left edge of the last socket (Fig. 8) is even with the left edge of the baseboard. The two audio frequency transformers (Fig. 13 and 6) are mounted directly behind these three sockets centered and being separated by three-sixteenths of an inch between them.

The center of the hole for mounting the filament control jack (Fig. 20B) is one and one-half inches from the left edge of the panel and one and one-half inches from the bottom edge. Four and three-quarter inches to the right of the center of this hole and one and one-half inches from the bottom edge is the center of the hole for mounting the interstage jack (Fig. 20A). Nine inches to the right of the center of this hole and one and one-half inches from the bottom edge of the panel is the center of the hole for mounting the battery switch (Fig. 17).

The center of one of the mounting holes for the radio frequency transformer (Fig. 5) last on the left is four inches from the panel and seven and one-quarter inches from the left edge of the baseboard. The F and G posts of the coil are to the left. The socket (Fig. 3) is mounted directly behind it and one-quarter inch from the rear edge of the baseboard. The center of one mounting hole of the third radio frequency transformer (Fig. 9) is twelve and three-quarter inches from the left edge of the baseboard and one-half inch from the rear edge. This coil is placed with the "P" and "B" posts toward the rear. The center of one of the mounting holes of the second radio frequency transformer (Fig. 25) is four inches from the right edge of the baseboard and one-half inch from the rear edge. This coil is placed with the "P" and "B" posts towards the rear. The center of one of the mounting holes of the first radio frequency transformer is three and three-quarters inches from the panel and one-half inch from the right edge of the baseboard. This coil is placed with the "F" and "G" posts towards the left.

The by-pass condenser (Fig. 14) is placed between the coils (Fig. 25 and 9) one and one-quarter inches from the rear edge of the baseboard. The socket (Fig. 10) is two and one-half inches from the right edge of the baseboard and the right edge of the socket (Fig. 24) is two and one-quarter inches from the left edge of the socket (Fig. 10). Both sockets are three and three-quarter inches from the rear edge of the baseboard.

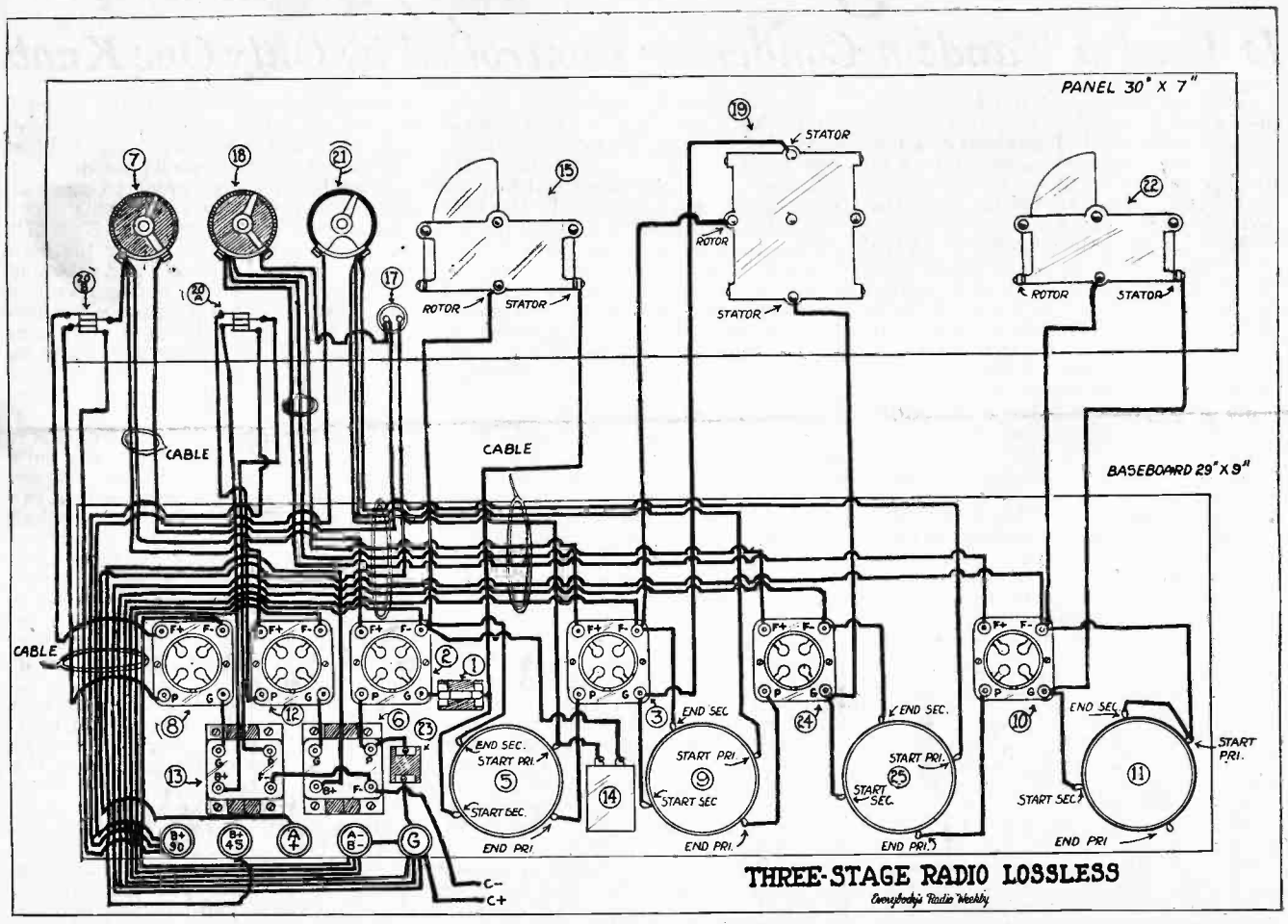
The Naxon antenna coil (Fig. 11) differs in markings of the posts from other three coils. Post "A" is antenna and the end of the primary winding. Post "G" is ground and it is the start of the primary winding. The other side of the coil has two posts. Post "F" is the end of the secondary winding and post "G" is the start of the secondary winding. The two secondary posts of each of the other three coils are marked "F" and "G" also, but the start of the primary winding is marked "B" and the end of the primary winding is marked "P" on all three.

The antenna lead-in is connected direct to the "A" post of the first radio frequency transformer (Fig. 11).

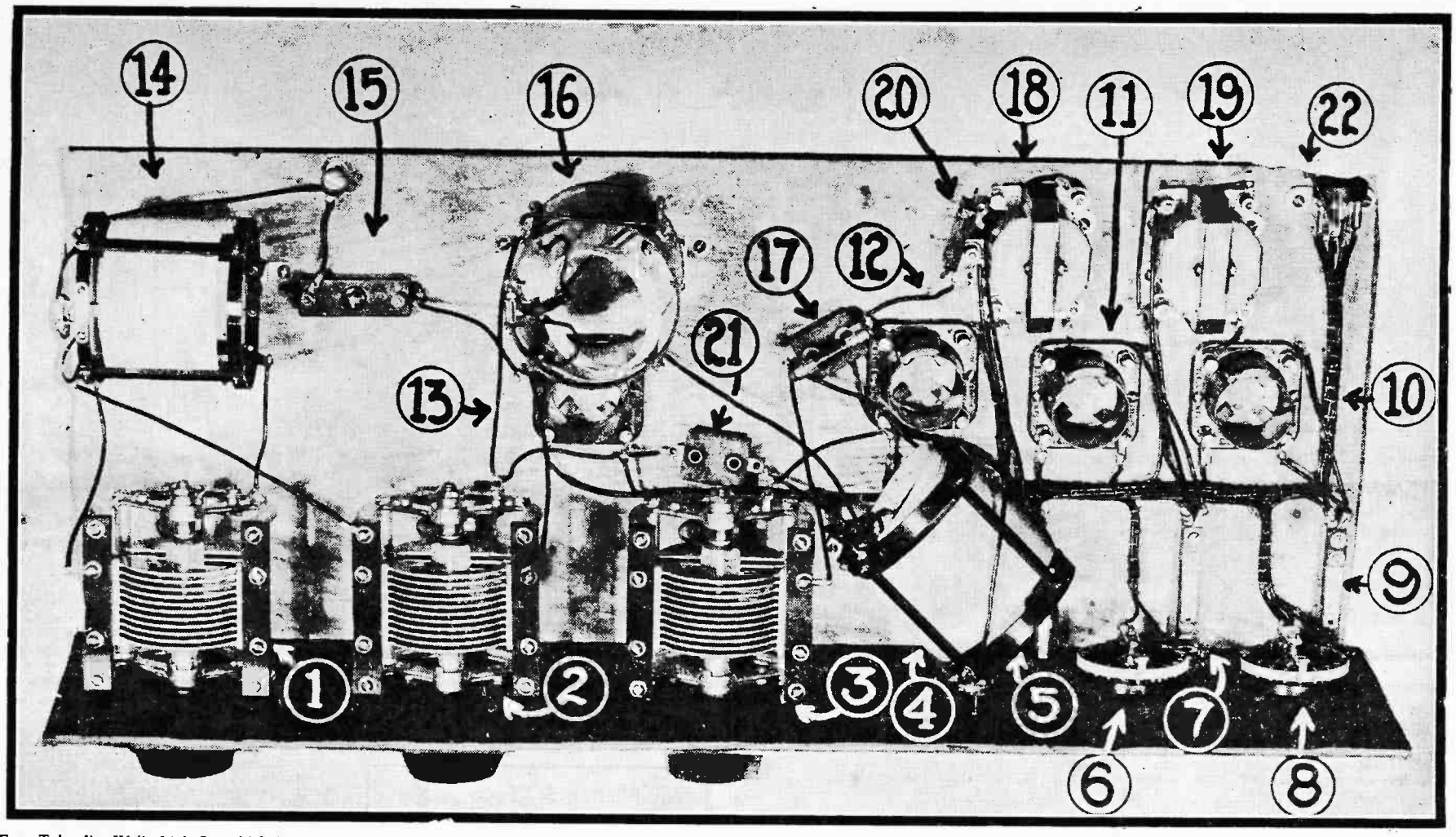
The pictorial diagram of this set is standard and the placing of the parts in this model, due to their construction, necessitated changing their location.

However, the placing of the parts is fully explained in the text and the diagram can be followed for the wiring which is exactly the same. The wires

(Continued on Page 11)



Pictorial diagram of the Three-Stage Radio Lossless set in which two stages of audio frequency is also used, making a six-tube set. This is another set of the 100 percent variety and it has tested up to standard



Four-Tube Jim Wells Link Set which is similar to last week's model except that it uses Aero coils. Note the position of these coils. They must be set as designated in order to have them function right in the set. This circuit employs one stage of radio frequency

Model No. 2, Type B, Jim Wells Link Set

This Is Another of the Type B Circuits in Which One Stage of Radio Frequency Is Placed Between the Linking Unit and the Detector Circuit

By JAMES GRAYAR WELLS

WE are showing another Laboratory model of Type B receiver of the Jim Wells Link Receiver. It is known to us in the Laboratory as Model No. 2, Type B. It uses the one stage of radio frequency inserted between the linking circuit and the detector circuit, just as last week's model used.

We have learned something about last week's model since publication was given in these columns of its performance, which gives us a higher opinion of its efficiency. If you will recall, we said that we were disappointed in the volume obtained. The receiver had to be constructed in too short a time for the usual exhaustive tests we give our model receivers.

Before the last edition had been run off the presses we discovered the source of trouble, corrected it and everything was alright. The trouble was in an open circuit. It was in the phone plug jack. The jack used was one that had been used in numerous model sets and in repeated soldering with resin core a careless helper had used too much resin too often. This had soaked into the fiber and bridged the gap between two of the contacts. A new jack was substituted and the volume came in. This little experience has a good moral somewhere within. We leave it to our readers to work it out.

The model described this week uses "AERO" coils and makes an unusually good set. The extra stage of tuned radio frequency gives a little added distance and volume, but complicates the tuning because it adds one more dial to the receiver to be manipulated. However, in these days of tuned radio frequency sets with their three dials, little objection should be had to this feature.

There was a little defect in some of the earlier productions of the "Aero" tuning units and we had considerable trouble in our Laboratory tests with them, as have a number of readers who bought some of the first sold tuners. This defect has been corrected and if any of our readers who have bought the "Aero" tuner and find the same trouble we and some of other readers had, we are quite sure the manufacturers will remedy the matter promptly, as they did with us the past week.

The tickler shaft, in the first manufacture, did not have any means for taking up the slack in the bushing. When the coil shaft was turned, if it had been assembled loosely, the tickler refused to function properly and forced the detector tube into oscillation too easily. The "Aero" people have designed a new shaft which has a spring tension and these can be inserted very easily. I am quite sure they will send one to anybody who has bought one of the old tuners if you will just write to them. The latest production of these tuners do not have this defect and as there were only a few of them out on the market before this defect was discovered it is likely yours is okay. The tuner, otherwise, is a highly efficient one and when used in connection with the "Aero" antenna coupler with the variable primary, as we do in this week's model, is a very happy combination for this circuit.

We are using another new comer to our family. It is the new Ambassador audio transformer. This is called by the Ambassador folks their "Low Boy" type. They are all-stage ratio and low ratio. There is another type, the "High Boy." If it is used only one should be employed, this in the first stage, and the "Low Boy" type in the second stage. We prefer the "Low Boys" in both stages. These transformers work very efficiently. They give good volume and without distortion. You will like them. We tested these some weeks ago, but this is the first opportunity we have had to use them in a receiver.

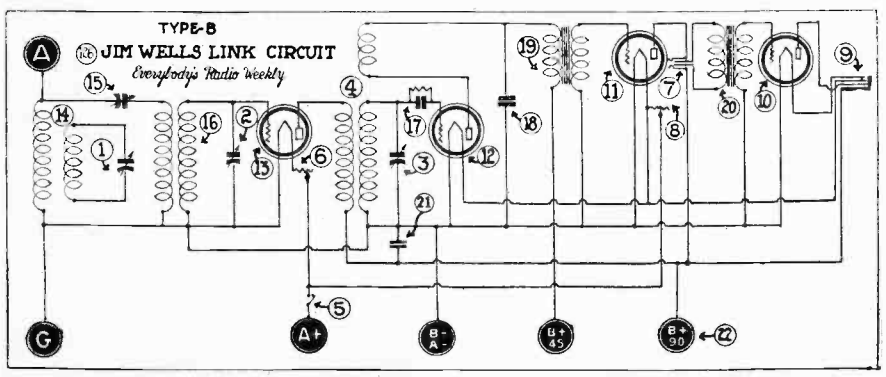
Reports from all over the country, as well as from the Chicago territory, indicate that the new circuit is making a hit. One of the remarkable features about the circuit is that the home-builder seems to have less trouble with it than any circuit we have ever published. Usually we receive a flood of letters to our Question and Answer department right after publication of a new circuit. This has not been the case with this circuit. Most of our mail on the circuit is reports on successful efforts. We do not know whether it is because the radio-phans are learning more about radio or whether the dependability of the circuit has something to do with it. We believe it is a little of both.

We have had so many letters and requests for further publication of the Model No. 2 Type A, using the Gen-Ral tuning unit and antenna coupler, we will show another picture of it next week in addition to the current model. This model No. 2-Type A was described first in the November 28 issue. The list of parts for it are printed elsewhere, as are the lists of all the other models.

The Welty Detector—Audio Amplifier Unit set, published as Model No. 4 in the December 12 issue, also, evidently, has made quite a hit, but our readers are complaining that the Welty unit is not to be found at many of the local stores. Dealers should stock this Welty unit as they should all the other parts listed and specified by us. There certainly is a demand for them. We do not know whether it is the fault of Friend Welty or of the dealer. We respectfully refer the complaints to both sources.

The Model No. 1-Type A, using the Buell coils and the Barret & Paden condensers, still seems to be giving the other models a good run for their money. This was published in the November 21 issue. It was the first model set published, and some of the best reports we have received of the performances of the Jim Wells Link circuit come from owners who have built this model.

The list of parts used in this week's model carries a little different combination than the previous models, which shows that any of the parts used and specified by us in any of the models may be interchanged, so long as you observe the general plan laid out for a particular coil.

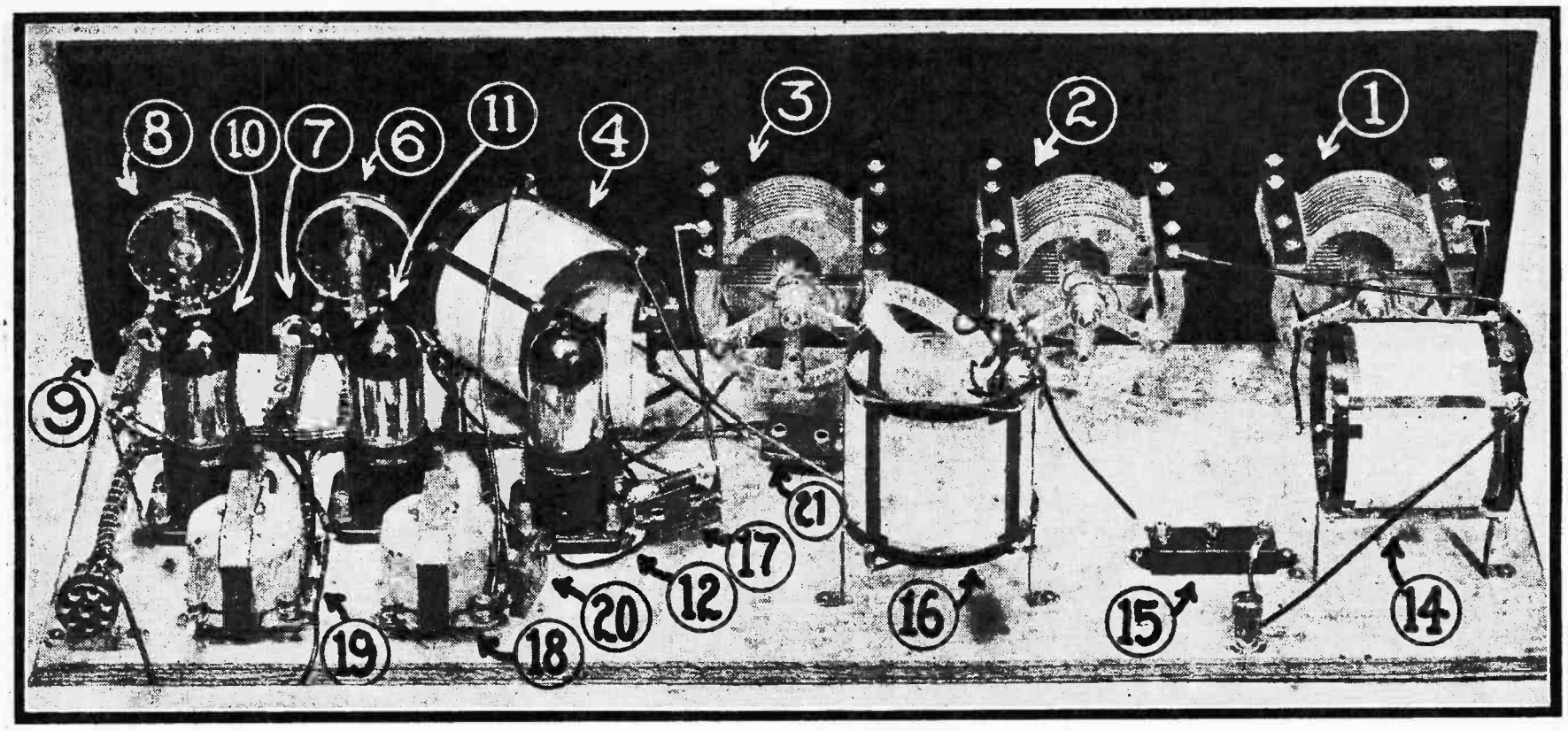


Schematic of the Jim Wells Link Circuit which uses one stage of radio frequency before the detector tube and two stages of audio amplification. This is a new type in the series of the Link Circuit

Model No. 2—Type B Set

Essentials

Fig. 1	—Buell .0005 mfd. variable condenser	$ 5.50
Fig. 2	—Buell .0005 mfd. variable condenser	5.50
Fig. 3	—Buell .0005 mfd. variable condenser	5.50
Fig. 4	—Aero three-circuit tuner in kit with antenna coupler (Fig. 14)	11.50
Fig. 5	—Yaxley Midget battery switch	.50
Fig. 6	—Yaxley air-cooled rheostat (25-ohm) with dial	1.35
Fig. 7	—Yaxley interstage jack	.80
Fig. 8	—Yaxley air-cooled rheostat (6-ohm) with dial	1.35
Fig. 9	—Yaxley single-circuit filament control jack	.70
Fig. 10	—Buell standard socket	.75
Fig. 11	—Buell standard socket	.75
Fig. 12	—Buell standard socket	.75
Fig. 13	—Buell standard socket	.75
Fig. 14	—Aero antenna coupler with adjustable primary	
Fig. 15	—X-L Vario Denser (Model G)	1.50
Fig. 16	—Aero antenna coupler with adjustable primary (separate)	4.50
Fig. 17	—Muter 2-meg. grid leak and .00025 fixed condenser	.85
Fig. 18	—Muter .002 fixed condenser	.40
Fig. 19	—Ambassador "Low Boy" audio frequency transformer, all stage	4.50



Arrangement of the parts on the baseboard as you would look directly down upon them when the set is out of the cabinet. This gives a good idea of how the coils should be placed to obtain the maximum of efficiency from the receiver. The one stage of radio frequency amplification is place d between the link unit and detector circuit

Fig. 20—Ambassador "Low Boy" audio frequency transformer, all stage	4.50
Fig. 21—Muter .006 fixed condenser	.60
Fig. 22—Jones Multiplug and base mount bracket	4.50
Starrett drilled and engraved standard panel "E"	4.65
X-L Push post	.15
Baseboard hardware, etc	.50
Total for essentials	$62.35

Accessories

One Balkwell & Patch cabinet 7x26 inches	$ 5.50
One Temple loud speaker	21.00
Two vertical heavy duty 45-volt Stuart "B" batteries	8.00
Four "QRS Red Top" tubes @ $2.50	10.00
One Firedry 6-volt "A" battery (100 ampere)	18.00
Total for accessories	$ 62.50
Total for complete outfit	$124.35

Model No. 1—Type B Set

In the December 26, 1925, issue the parts used in Model No. 1—Type B, were given as follows:

Essentials

Fig. 1—Barrett and Paden .00025 mfd. variable condenser	$ 6.00
Fig. 2—Barrett and Paden .00025 mfd. variable condenser	6.00
Fig. 3—Barrett & Paden .00025 mfd. variable condenser	6.00
Fig. 4—Gen-Ral three-circuit tuner	5.50
Fig. 5—Yaxley battery switch	.50
Fig. 6—Yaxley air cooled rheostat (25-ohm) with dial	1.35
Fig. 7—Yaxley interstage jack	.80
Fig. 8—Yaxley air-cooled rheostat (6-ohm) with dial	1.35
Fig. 9—Yaxley single circuit filament control jack	.70
Fig. 10—Buell standard socket	.75
Fig. 11—Buell standard socket	.75
Fig. 12—Buell standard socket	.75
Fig. 13—Buell standard socket	.75
Fig. 14—Gen-Ral antenna coupler	3.50
Fig. 15—X-L Vario Denser, Model "G" (.001 mfd)	1.50
Fig. 16—Gen-Ral antenna coupler	3.50
Fig. 17—Muter two-meg. grid leak and .00025 fixed condenser with mount	.85
Fig. 18—Muter .002 fixed condenser	.40
Fig. 19—Meloformer Multistage audio transformer	4.00
Fig. 20—Meloformer Multistage Audio Transformer	4.00
Fig. 21—Muter .006 fixed condenser	.60
Fig. 22—Jones Multiplug Cable and Base Mount Bracket	4.50
Starrett drilled and engraved Panel "E" 26"x7"	4.65
Baseboard hardware, etc	.50
Total for essentials	$ 59.20

Accessories

Bong 100-ampere, 6-volt storage "A" battery	$ 24.00
One Balkwill & Patch 7"x26" cabinet	5.50
One Burns concert loud speaker	22.50
Four Q. R. S. Red Top tubes at $2.50	10.00
Two vertical heavy duty 45-volt Stuart "B" batteries	8.00
Total for accessories	$ 70.00
Total for complete outfit	129.20

The list of parts specified in previous issues for the five laboratory models of the Type A series are given below for the benefit of those who want a handy reference. The pictorial and schematic diagrams of any of the previous issues will serve for either of these combinations. The constructional data on this week's set is given following the list of parts below:

Model No. 5—Type A Set

In the December 9, 1925, issue the parts used in the Model No. 5—A series, were given as follows:

Essentials

Fig. 1—Perlesz SLF .0005 variable condenser	$ 6.75
Fig. 2—Perlesz SLF .0005 variable condenser	6.75
Fig. 3—Ambassador three-circuit tuner	7.00
Fig 4—Yaxley Midget battery switch	.50
Fig. 5—Howard 25-ohm rheostat, with dial	1.10
Fig. 6—Howard 6-ohm rheostat, with dial	1.10
Fig. 7—Yaxley open circuit jack	.50
Fig. 11—Muter 2-meg. resistance and .00025 fixed condenser	.65
Fig. 1—X-L vario denser, model "G" .001 mfd.	1.50
Fig. 8—Pioneer socket	.75
Fig. 9—Pioneer socket	.75
Fig. 10—Pioneer socket	.75
Fig. 13—Ambassador antenna coupler	3.00
Fig. 14—Multistage Meloformer	4.00
Fig. 16—Multistage Meloformer	4.00
Fig. 17—Jones Multiplug, complete	4.50
Fig. 18—Pioneer socket	.75
Fig. 19—Multistage Meloformer	4.00
Panel "D" Starrett drilled and engraved, 21"x7"	3.95
(Alterations for extra condenser holes.)	
Two Fynur vernier dials, at $3.50 each	7.00
Baseboard, wire, etc	.50
Stuart 4½-volt "C" battery	.60
Total	$60.80

Accessories

Three "Continental" 201 A tubes at $2	$ 6.00
One "Newark" cabinet, 18"x26" adjustable	13.75
Welty loudspeaker (Type B)	18.75
"Firedry" storage "A" 100 ampere battery	18.00
One set of Bong "B batteries," 90 volts	45.00
Total accessories	$101.50
Total complete outfit	162.30

Model No. 4—Type A Set

Here is the list of parts used in Model No. 1—Type A, published in November 21, 1925, issue:

Essentials

Fig. 1—Silver-Marshall SLF .00035 variable condenser	$ 5.75
Fig. 2—Silver-Marshall SLF .00035 variable condenser	5.75
Fig. 3—Buell three-circuit tuner, new style	4.85
Fig. 4—*Filament switch	.....
Fig. 5—*Rheostat	.....
Fig. 6—*Rheostat	.....
Fig. 7—*Jack	.....
Fig. 8—*Last audio frequency socket	.....
Fig. 9—*Audio frequency socket	.....
Fig. 10—*Detector socket	.....
Fig. 11—*Grid leak and condenser	.....
Fig. 12—X-L Vario Denser, Model "G," .001 mfd	1.50
Fig. 13—Buell antenna coupler	3.75
Fig. 14—*Audio frequency transformer	.....
Fig. 15—*Fixed condenser	.....
Fig. 16—*Audio frequency transformer	.....
*These parts are incorporated in the Welty Detector-Amplifier units	19.50
Celeron panel, 21"x7"	3.45
Total for essentials	$ 44.55

Accessories

Three "Continental" or QRS "Red Top" tubes at $2.50 each	7.50
One 7x21 Balkwill & Patch cabinet	5.50
One "Firedry" Storage "A" battery	18.00
One 96-volt "Bong" Storage "B" battery	45.00
Total for accessories	$ 76.00
Total for complete outfit	120.55

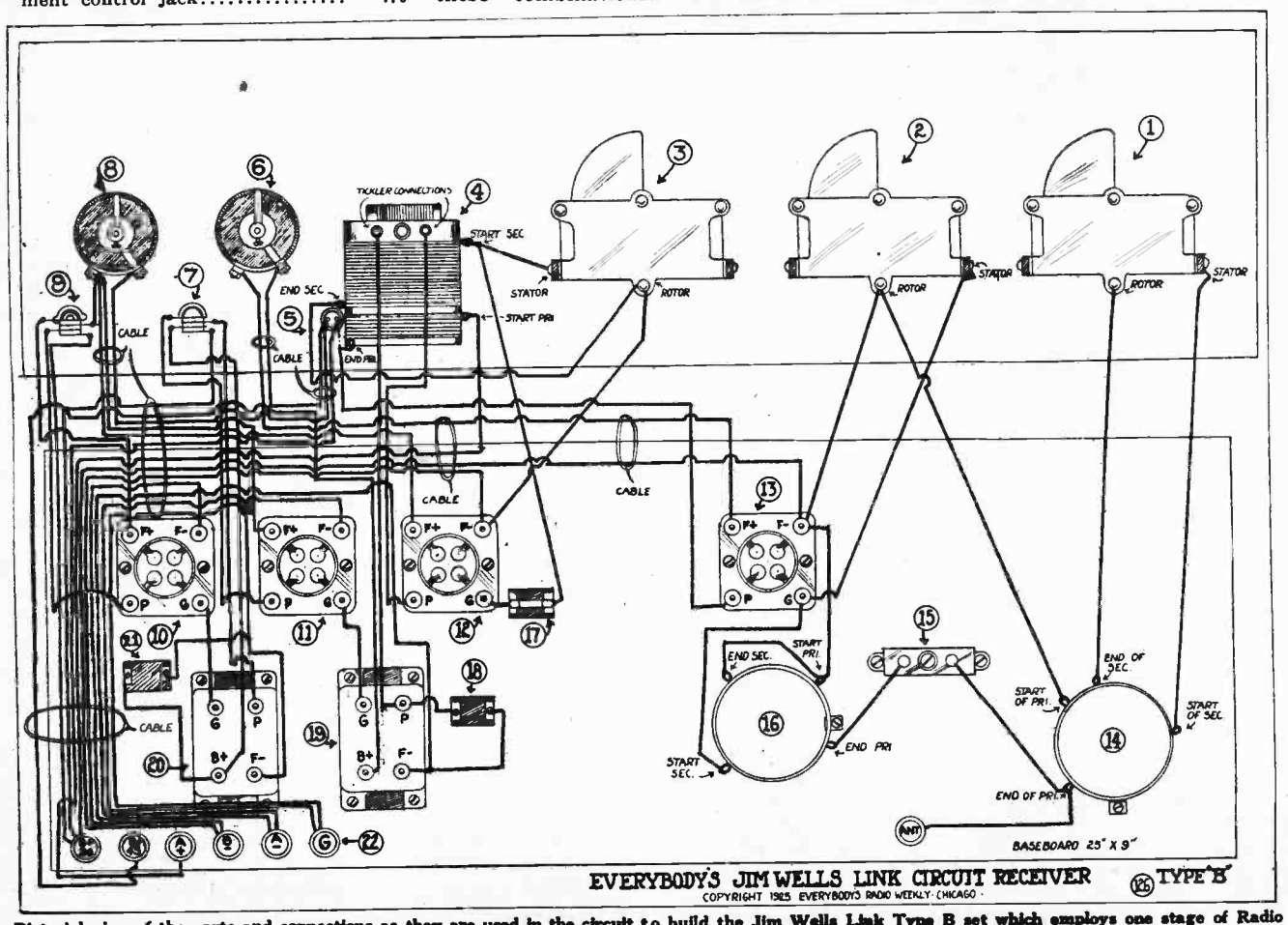
Model No. 3—Type A Set

The complete list of parts used in Model No. 3—Type A, published December 5, 1925, issue follow:

Essentials

Fig. 1—Karas .00037 Orthometric variable condenser	$ 7.00
Fig. 2—Karas .00037 Orthometric variable condenser	7.00
Fig. 3*—Aero coil, three-circuit tuner	.....
Fig. 4—Walbert filament lock switch	.50
Fig. 5—Carter improved 25-ohm rheostat	1.00
Fig. 6—Carter improved 6-ohm rheostat	1.00
Fig. 7—Yaxley open-circuit jack	.50
Fig. 8—Buell socket	.75
Fig. 9—Buell socket	.75
Fig. 10—Buell socket	.75
Fig. 11—Muter 2-meg. grid leak and muter .00025 condenser	.85
Fig. 12—X-L Vario Denser, model "G," .001 mfd	1.50
Fig. 13*—Aero coil antenna coupler.	.....
Fig. 14—Karas Harmonik, all-ratio audio frequency transformer	7.00
Fig. 15—Muter .002 fixed condenser.	.40
Fig. 16—Karas all-ratio audio frequency transformer	7.00
Fig. 17—Jones Multiplug complete	4.50
Panel 21"x7" Starrett drilled and engraved model "100C" walnut finish	3.95

(Continued on Page 8)



Pictorial view of the parts and connections as they are used in the circuit to build the Jim Wells Link Type B set which employs one stage of Radio Frequency before the detector tube. The loops show the lines to be included in the cable

Practical Helps for Home Set Builders

Contest Weekly Develops a Wealth of Practical Ideas for Home Experimenters

HOME-MADE AIR COILS

Contest Entry

By OTTO J. PAVEL,
718 S. 8th Avenue, Maywood, Ill.

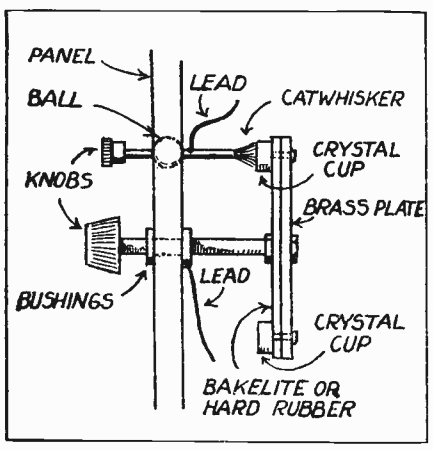
For a suggestion to fellow readers of EVERYBODY'S RADIO magazine, I would like to say that any one having a tinker toy set of the kind most boys have for constructing playthings out of, have an ideal set of coil mounts. Different lengths of sticks in the set allow you to make different sized coils. After winding the coil on the form you make, the sticks can be pulled out of the hub and the hub will fall out, leaving an air coil. This may not be clear to you, but if you will examine one of the tinker toy sets, I think you will see what I mean.

VARIABLE CRYSTAL DETECTOR

Contest Entry

By PAUL H. WOFFORD, JR.

The illustration shows a mechanical arrangement that will secure a sensitive spot on a crystal. Two crystal cups are mounted as shown. By turning the shaft either one of the crystals can be brought in contact with the catwhisker. The shaft of the catwhisker is a ball joint to enable it to cover the entire surface of each crystal. A sensitive spot is always found by this method.



JACKS AND SWITCHES

Jacks and switches which are used in various amplifiers and on other parts of sets to change from one circuit to another, or from one part of a certain circuit to another part, require attention. In purchasing, avoid fiber insulation between the springs of jacks. Hard rubber strips are far superior and should be looked upon with favor.

Also be sure that the flat strips in the jack or switch, as the case may be, are springy and capable of retaining their position. In the case of jacks, also make sure that the contact points are of a generous size and long enough to make perfect contact with each other.

Thus, and thus only, can the correct operation be obtained. Switch bases should be of hard rubber or porcelain and, in any event, the contact between the moving and stationary parts of the switch should be perfect.

HOW TO PROLONG LIFE OF TUBE

It is not necessary to replace tubes often. You can be sure of at least 1,000 hours of operation from each tube and frequently a tube will last for a much longer time than this if proper care is exercised. If a receiver is used on an average of two hours a day it is fairly certain that there will be no tube trouble for fifteen months or more, provided the filaments are burned at the proper temperature during that time. The proper temperature is the lowest temperature at which maximum volume and clearness are obtained.

It will be found that as the rheostats are turned on, while a broadcasting station is tuned in, the volume of signals gradually increases as the rheostat is turned up. A point will be reached, however, beyond which there will be no noticeable increase in volume. This is the point at which the

EVERYBODY'S RADIO Weekly will give away one radio set each month for the best and most useful suggestion made by a reader—an "Everybody's 100% Low-Loss" One Tube receiver built in our laboratory. Who wants it? Subjects may range from how to wind a coil to a new super-het hookup. Judges to be Everybody's experimental laboratory. No manuscripts entered in this contest can be returned. Drawings or pictures to illustrate your ideas are desirable but not essential. Judgment will be on practicability of idea, not literary merit. All manuscripts entered to become the property of this publication. In case of tie prize will be duplicated. Address Home-builder Contest Editor, EVERYBODY'S RADIO Weekly, 2721 S. Michigan Ave., Chicago. Rules—All letters MUST be in ink or typewritten, on ONE SIDE OF PAPER, and addressed as above to help us serve you.

EVERYBODY'S STATION FINDER

This list of stations is arranged for the convenience of the DX-getter. It does not make any pretensions of being a complete list. It has only those stations that "come in easy and often." For a more complete list refer to any of the "Call" books published for this purpose.

LIST OF STATIONS BY CALL LETTERS

Call—Location	Meters
CFCA, Toronto, Ont.	357
CKAC, Montreal, Que.	411
CKNC, Toronto, Ont.	357
CYB, Mexico City, Mex.	270
CYL, Mexico City, Mex.	480
KDKA, Pittsburgh, Pa.	309
KFAB, Lincoln, Nebr.	341
KFDM, Beaumont, Tex.	316
KFI, Los Angeles, Cal.	468
KFKX, Hastings, Nebr.	288
KFMX, Northfi'd, Minn.	337
KFNF, Shenandoah, Ia.	266
KFOA, Seattle, Wash.	454
KFVE, University City, Mo.	240
KFWB, Hollywood, Cal.	252
KGO, Oakland, Cal.	361
KHJ, Los Angeles, Cal.	405
KLDS, Indep'dence, Mo.	441
KNX, Hollywood, Cal.	337
KOA, Denver, Colo.	322
KOIL, Council Bluffs, Ia.	278
KPO, San Francisco, Cal.	428
KPRC, Houston, Tex.	290
KSD, St. Louis, Mo.	545
KTHS, Hot Spr'gs, Ark.	375
KWKH, Shreveport, La.	261
KYW, Chicago, Ill.	535
PWX, Havana, Cuba	400
WAHG, Richmond, N.Y.	316
WBAP, Ft. Worth, Tex.	476
WBBM, Chicago, Ill.	226
WBCN, Chicago, Ill.	266
WBZ, Springfield, Mass.	333
WCAE, Pittsburgh, Pa.	461
WCAP, Washington, D. C.	468
WCBD, Zion, Ill.	345
WCCO, Minneapolis, Minn.	416
WCX, Detroit, Mich.	417
WDAF, Kansas City, Mo.	366
WDWF, Providence, R. I.	441
WEAF, New York, N.Y.	491
WEAO, Columbus, O.	294
WEAR, Cleveland, O.	389
WEBH, Chicago, Ill.	370
WENR, Chicago, Ill.	266
WFAA, Dallas, Tex.	476
WFI, Philadelphia, Pa.	394
WGES, Oak Park, Ill.	250
WGN, Chicago, Ill.	370
WGR, Buffalo, N. Y.	319
WGY, Schenectady, N.Y.	379
WHA, Madison, Wis.	535
WHAD, Milwaukee, Wis.	275
WHAR, Atlantic City, N. J.	275
WHAS, Louisville, Ky.	400
WHAZ, Troy, N. Y.	379
WHB, Kansas City, Mo.	366
WHO, Des Moines, Ia.	526
WHT, Chicago, Ill.	238
WIBO, Chicago, Ill.	226
WIP, Philadelphia, Pa.	508
WJAR, Providence, R.I.	306
WJJD, Mooseheart, Ill.	303
WJY, New York, N. Y.	405
WJZ, New York, N. Y.	454
WKAR, Lansing, Mich.	285
WKRC, Cincinnati, O.	422
WLIT, Philadelphia, Pa.	394
WLS, Chicago,	345
WMAQ, Chicago, Ill.	447
WMBB, Chicago, Ill.	250
WMBF, Miami, Fla.	384
WMC, Memphis, Tenn.	500
WOAI, San Antonio, Tex.	394
WOAN, Lawrenceburg, Tenn.	283
WOAW, Omaha, Nebr.	526
WOC, Davenport, Ia.	484
WOK, Homewood, Ill.	217
WOO, Philadelphia, Pa.	508
WOR, Newark, N. J.	405
WORD, Batavia, Ill.	275
WOS, Jefferson City, Mo.	441
WPG, Atlantic City, N. J.	300
WQJ, Chicago, Ill.	447
WRC, Washington, D.C.	468
WREO, Lansing, Mich.	285
WSAI, Cincinnati, O.	326
WSB, Atlanta, Ga.	428
WSM, Nashville, Tenn.	283
WSMB, New Orleans, La.	319
WSUI, Iowa City, Ia.	484
WTAM, Cleveland, O.	389
WWJ, Detroit, Mich.	353

LIST OF STATIONS BY WAVE LENGTHS

Met.	Call	Location
217	WOK	Homewood, Ill.
226	WBBM	Chicago, Ill.
226	WIBO	Chicago, Ill.
238	WHT	Chicago, Ill.
240	KFVE	University City, Mo.
250	WGES	Oak Park, Ill.
250	WMBB	Chicago, Ill.
252	KFWB	Hollywood, Cal.
261	KWKH	Shreveport, La.
266	KFNF	Shenandoah, Ia.
266	WBCN	Chicago, Ill.
266	WENR	Chicago, Ill.
270	CYB	Mexico City, Mex.
275	WHAD	Milwaukee, Wis.
275	WHAR	Atlantic City, N. J.
275	WORD	Batavia, Ill.
278	KOIL	Council Bluffs, Ia.
283	WOAN	Lawrenceburg, Tenn.
283	WSM	Nashville, Tenn.
285	WKAR	Lansing, Mich.
285	WREO	Lansing, Mich.
288	KFKX	Hastings, Neb.
294	WEAO	Columbus, Ohio
297	KPRC	Houston, Tex.
300	WPG	Atlantic City, N. J.
303	WJJD	Mooseheart, Ill.
306	WJAR	Providence, R. I.
309	KDKA	Pittsburgh, Pa.
316	WAHG	Richmond, N. Y.
316	KFDM	Beaumont, Tex.
319	WSMB	New Orleans, La.
319	WGR	Buffalo, N. Y.
322	KOA	Denver, Colo.
326	WSAI	Cincinnati, Ohio.
333	WBZ	Springfield, Mass.
337	KNX	Hollywood, Cal.
337	KFMX	Northfield, Minn.
341	KFAB	Lincoln, Nebr.
345	WLS	Chicago, Ill.
345	WCBD	Zion, Ill.
353	WWJ	Detroit, Mich.
357	CFCA	Toronto, Ont.
357	CKNC	Toronto, Ont.
361	KGO	Oakland, Cal.
366	WHB	Kansas City, Mo.
366	WDAF	Kansas City, Mo.
370	WGN	Chicago, Ill.
370	WEBH	Chicago, Ill.
375	KTHS	Hot Springs, Ark.
379	WHAZ	Troy, N. Y.
379	WGY	Schenectady, N. Y.
384	WMBF	Miami, Fla.
389	WEAR	Cleveland, Ohio.
389	WTAM	Cleveland, Ohio.
394	WLIT	Philadelphia, Pa.
394	WOAI	San Antonio, Tex.
394	WFI	Philadelphia, Pa.
400	PWX	Havana, Cuba
400	WHAS	Louisville, Ky.
405	WOR	Newark, N. J.
405	WJY	New York, N. Y.
405	KHJ	Los Angeles, Cal.
411	CKAC	Montreal, Que.
416	WCCO	Minneapolis, Minn.
422	WKRC	Cincinnati, Ohio
428	WSB	Atlanta, Ga.
428	KPO	San Francisco, Cal.
441	WOS	Jefferson City, Mo.
441	KLDS	Independence, Mo.
441	WDWF	Providence, R. I.
447	WMAQ	Chicago, Ill.
447	WQJ	Chicago, Ill.
454	KFOA	Seattle, Wash.
454	WJZ	New York, N. Y.
461	WCAE	Pittsburgh, Pa.
468	KFI	Los Angeles, Cal.
468	WRC	Washington, D. C.
468	WCAP	Washington, D. C.
476	WFAA	Dallas, Tex.
476	WBAP	Fort Worth, Tex.
480	CYL	Mexico City, Mex.
484	WSUI	Iowa City, Ia.
484	WOC	Davenport, Ia.
491	WEAF	New York, N. Y.
500	WMC	Memphis, Tenn.
508	WIP	Philadelphia, Pa.
508	WOO	Philadelphia, Pa.
517	WCX	Detroit, Mich.
526	WOAW	Omaha, Neb.
526	WHO	Des Moines, Ia.
535	WHA	Madison, Wis.
535	KYW	Chicago, Ill.
545	KSD	St. Louis, Mo.

AVOID CHIPPING PANEL

Bear in mind when you have a panel to drill and want to have a neat job with no chipping around the edges of the hole, that it is an excellent idea to try a one-eighth to one-half standard taper reamer for the larger holes. First drill the panel for an eighth-inch hole, then run the reamer through until the hole is large enough for the shaft or jack that is required. The reamer will work as easily in tough bakelite as in hard rubber and the hole will have no chipped edges.

SELECTIVE ANTENNA

Contest Entry

By FRANCIS D. FINLAYSON
4447 N. Seeley Avenue, Chicago, Illinois

Being located close to three high powered broadcasting stations, I have had considerable trouble with interference, so I made a number of experiments to see if I could improve the situation. My set is a three-tube low-loss, with nine turns on the primary of the tuner. I had found that decreasing the primary also decreased the volume considerably and shortening the aerial had the same effect.

After experimenting with various combinations I removed the ground wire and attached a 60-foot length of lamp cord to the ground binding post of the set; the lamp cord being laid along the baseboard around the room and the aerial wire attached as usual.

The results were that stations which formerly covered twelve to fifteen points on the dial were reduced to two or three, with no loss of volume whatever. Attaching the ground wire in addition greatly increased the volume and is a good combination for silent night when selectivity is not so important.

The inside ground wire acts as a counterpoise and improves the tone of the set, as it does not pick up stray induction currents from telephone and lighting mains.

GETTING BETTER SELECTIVITY

In view of the fact that more and more high power broadcasting stations are coming on the air, the problem of increased selectivity is becoming more and more acute. Usually there are two ways to increase the selectivity of almost any receiver.

The first is to cut down the length of the antenna, a sixty-foot aerial being very efficient. The second way is to reduce the number of turns in the coil to which the antenna is connected or to increase the spacing between the primary and secondary coils. These methods result in a reduction in the sensitiveness of the receiver which means a choice between two evils.

Perhaps the best compromise is to have two antennas, a long one for use after the local stations have gone off the air and a short one to which you can switch when interference is particularly bad.

GET BEST TUBE SOCKETS

The receptacles which hold the tubes, or sockets as they are usually called, should be quite carefully selected. A "mud" insulated socket may cause considerable trouble in a set. Often under the influence of the heat of the tube, sockets made up of this material melt somewhat and close around the base of the tube so it sometimes becomes impossible to remove it.

Sometimes the softening of a socket of this nature acts in the opposite direction. The socket swells outward and the tube will not be held in firm contact with the prongs. Therefore, purchase sockets made either of molded bakelite and so stamped or made with a bakelite ring at the base and a metal shell. "Mud," to which we have referred several times in this article, is an inferior insulating compound made to imitate bakelite in appearance. It is usually composed of some resinous material which melts at a very low temperature. Tar is also present in some of these compositions.

EFFICIENT "B" BATTERY TEST

Test the "B" battery with a voltmeter having a scale reading up to 50 volts; test one unit at a time, and never subject the voltmeter to a higher voltage than it is intended for. One terminal of the voltmeter is marked positive. This is brought in contact with the positive terminal of the battery and the other terminal to the negative post on the battery to obtain the reading. This is an important test when the receiver has suddenly lost its "pep," which often is caused by low voltage "B" batteries. Be sure not to leave the voltmeter across the battery too long, as some of the meters on the market would reduce the "B" battery voltage to a great extent.

One Stage of R. F. Used in Jim Wells Link Circuit

(Continued from page 6)

Sub panel 20"x7" Celeron	3.45
X-L antenna push binding post	.15
Wire, hardware, etc	.50
* Total for Aero-Coil Kit consisting of three-circuit tuner and antenna coupler with adjustable primary	11.50
Total for essentials	$ 60.05
Accessories	
Three "Q. R. S. Red Top" tubes at $2.50	7.50
One Balkwill & Patch 7"x21" cabinet	5.50
One 100-ampere, 6-volt "Bong" Storage "A" battery	24.00
One Welty (Type A) loudspeaker	25.00
One set 96 volts "Bong" Storage "B" battery	45.00
Total for accessories	$107.00
Total for complete equipment	165.55

Model No. 2—Type A Set

The apparatus used in Model No. 2, published in November 28, 1925, issue, is included in the following bill of specifications:

Essentials	
Fig. 1—Crest convertible variable condenser	$ 5.00
Fig. 2—Crest convertible variable condenser	5.00
Fig. 3—Gen-Ral three-circuit tuner	5.50
Fig. 4—Yaxley Midget battery switch	.50
Fig. 5—Yaxley air-cooled, 25-ohm rheostat with dial	1.35
Fig. 6—Yaxley air-cooled, 6-ohm rheostat with dial	1.35
Fig. 7—Yaxley open-circuit jack	.50
Fig. 8—Howard socket	1.25
Fig. 9—Howard socket	1.25
Fig. 10—Howard socket	1.25
Fig. 11—Muter .00025 fixed condenser with mount and Muter 2-meg. grid leak	.85
Fig. 12—X-L Vario Denser (Model "G" .001 mfd.)	1.50
Fig. 13—Gen-Ral antenna coupler	3.50
Fig. 14—Multistage Meloformer	4.00
Fig. 15—Muter .002 fixed condenser	.40
Fig. 16—Multistage Meloformer	4.00
Fig. 17—Jones Multiplug (completed)	4.50
Starrett drilled and engraved panel model, mahogany finish (Model 100C), 21"x7"	3.95
Baseboard 20"x9", hardware, wire, etc.	.50
Total for essentials	$ 46.15
Accessories	
Three "Q. R. S. Red Top" 201A tubes at $2.50	7.50
One Kuersten cabinet 21x7x9	7.00
One Burns concert loud speaker	22.50
One 100-ampere "Fireday" storage "A" battery	18.00
Two 45-volt vertical large size Stewart "B" batteries at $4	8.00
Total for accessories	$ 63.00
Total for complete outfit	$109.15

Model No. 1—Type A Set

Here is the list of parts used in Model A, published in November 21, 1925, issue:

Essentials	
Fig. 1—Barrett & Paden .00025 variable condenser	$ 6.00
Fig. 2—Barrett & Paden .00025 variable condenser	6.00
Fig. 3—Buell three-circuit tuner, new style	4.85
Fig. 4—Walbert filament switch	.50
Fig. 5—Howard 25-ohm rheostat with dial	1.10
Fig. 6—Howard 6-ohm rheostat with dial	1.10
Fig. 7—Yaxley open-circuit jack No. 1	.50
Fig. 8—Howard socket	1.25
Fig. 9—Howard socket	1.25
Fig. 10—Howard socket	1.25
Fig. 11—Muter .00025 fixed condenser with clips and Durham 2-meg. grid-leak	1.10
Fig. 12—X-L Vario Denser, Model "G" .0001 mfd	1.50
Fig. 13—Buell antenna coupler	3.75
Fig. 14—Karas audio frequency transformer, all stage	7.00
Fig. 15—Muter, .002 fixed condenser	.40
Fig. 16—Karas audio frequency transformer, all stage	7.00
Fig. 17—Jones Multiplug, complete	4.50
Starrett drill and engraved panel, model 100C	3.95
Baseboard, 20"x9", wire, hardwood, etc.	.50
Total for essentials	$ 53.50
Accessories	
Newark cabinet 18" to 26" adjustable	13.75
Three Continental tubes	6.00
Temple loud speaker	21.00
Fire dry 6-volt "A" battery (100-ampere)	18.00
Two 45-volt Stewart "B" batteries, vertical heavy duty	8.00
Total accessories	$ 66.75
Total for complete outfit	$120.25

How to Wire Up Set

The panel used for the model receiver shown this week measures 26x7 inches and is the same as the standard five-tube panel. The three-circuit tuner fits the hole for the variable resistance as used in the five-tube "Lossless" receiver. This panel is model "E."

The first hole for mounting variable condenser (Fig. 1) is three inches from the left side, looking at the front. The center of the hole for variable condenser (Fig. 2) is five inches to the right of the center of the first hole. Five inches to the right from the center of this hole is the center of the hole for the variable condenser (Fig. 3). The centers of three holes are three and one-half inches from the top of the panel. Two inches from the right edge of the panel is the center of the hole for mounting rheostat (Fig. 8). Three inches to the left of the center of this hole is the center of the hole for mounting rheostat (Fig. 6). Three inches to the left of the center of this hole is the center of the hole for three-circuit tuner (Fig. 4). These three rheostat holes are four inches from the top of the panel.

One inch up from the bottom of the panel and one inch to the left is the center of the hole for mounting filament control jack (Fig. 9). One inch up from the bottom of the panel and two and three-quarter inches to the left of the center of this hole is the center of the hole for mounting the interstage jack (Fig. 7).

Two and three-quarter inches to the left of the center of this hole is the center of the hole for mounting the filament switch (Fig. 5). There are four one-eighth inch holes, the centers of which are one-quarter of an inch from the bottom. The center of one is three inches from the left edge of the panel. The center of the next hole is six and eleven-sixteenths inches from the center of the first hole. The two holes on the other side measure the same distance as these two.

The baseboard measures twenty-five by nine inches.

The Aero coils used in this model are the three-circuit tuner and two antenna couplers with adjustable primaries. The start and the end of the windings can be easily determined by looking at the inside of the coil. The two primary connections are on either side of the hinge supporting the primary coil on the bakelite ring. The start of the secondary winding is labeled "G" and the end of the secondary winding is labeled "F." The tickler connections are on either side of the shaft. The secondary consists of sixty-one turns, the primary is eight turns on all three coils and the tickler of the three circuit-tuner is twelve turns.

The pictorial diagram is the standard and uses "dummy" parts. The antenna coupler (Fig. 14) at the right is placed with the primary end toward the right and the other coil is placed with the primary coil to the rear as shown in the photographs. The three-circuit tuner extends over the baseboard causing the detector socket to be moved slightly back out of alignment from the rest of the sockets. A "C" battery is used in this week's model, but we shall describe the wiring first according to the diagram and describe how to put in the "C" battery later.

Looking at the set from the rear, a lead goes from the rotor post of the variable condenser (Fig. 1) to the end of the secondary winding of the antenna coupler (Fig. 14). A lead goes from the stator of the variable condenser (Fig. 1) to the start of the secondary winding of the antenna coupler (Fig. 14). A lead goes from the rotor of the variable condenser (Fig. 2) to the "F" minus post of the radio frequency socket (Fig. 13). A lead goes from the start of the primary winding of the antenna coupler (Fig. 14) to the "F" minus post of the radio frequency socket (Fig. 13). A lead goes from the end of the primary winding of the antenna coupler (Fig. 14) to the antenna binding post and from here continues to one post of the X-L Vario Denser (Fig. 15) A lead from the other post of the X-L Vario Denser (Fig. 15) goes to the end of the primary winding of the second antenna coupler (Fig. 16).

A lead from the "F" minus post of the radio frequency socket (Fig. 13) goes to the start of the primary winding of the second antenna coupler (Fig. 16) and from here continues to the end of the secondary winding of the same antenna coupler (Fig. 16). A lead from the start of the secondary winding of the second antenna coupler (Fig. 16) goes to the "G" post of radio frequency socket (Fig. 13) and from there continues to the stator post of variable condenser (Fig. 2).

One prong of the fixed condenser and grid-leak (Fig. 17) is attached to the "G" post of the detector socket (Fig. 12). A lead goes from the stator post of variable condenser (Fig. 3) to one prong of the grid-leak and condenser (Fig. 17) and from here continues to the start of the secondary winding of the three-circuit tuner (Fig. 4). A lead goes from the rotor of variable condenser (Fig. 3) to the end of the secondary winding of the three-circuit tuner (Fig. 4) and from here continues to the "F" minus post of the detector socket (Fig. 12). A lead goes from the post marked "P" the end of the primary winding of the three-circuit tuner (Fig. 4) to the "P" post of the radio frequency socket (Fig. 13).

A lead goes from the start of the primary winding of the three-circuit tuner (Fig. 4), to the "B" plus 90 connection on the Multiplug bracket (Fig. 22). A lead goes from one tickler post of the three-circuit tuner (Fig. 4) to the "P" post of the first audio frequency transformer (Fig. 19). A lead goes from the other tickler post of the three-circuit tuner (Fig. 4) to the "P" post of the detector socket (Fig. 12).

A lead goes from the left post of the rheostat (Fig. 6) to the "F" plus post of the radio frequency socket (Fig. 13). A lead from the right post of the rheostat (Fig. 6) goes to the left post of the filament switch (Fig. 5). A lead from the left post of the rheostat (Fig. 8) goes to the "F" plus post of the detector socket (Fig. 12).

A lead goes from the left post of the rheostat (Fig. 8) to the "F" plus post of the first audio socket (Fig. 11). A lead goes from the left post of the rheostat (Fig. 8) to the second prong of filament control jack (Fig. 9).

A lead goes grom the right post of the rheostat (Fig. 8) to the left post of the filament switch (Fig. 5). A lead from the right post of the filament switch (Fig. 5) goes to the "A" plus connection on the Multiplug bracket (Fig. 22).

A lead goes from the top prong of the interstage jack (Fig. 7) to the "P" post of the first audio socket (Fig. 11). A lead goes from the next to the top prong of the interstage jack (Fig. 7) to the "P" post of the last audio frequency transformer (Fig. 20). A lead goes from the third prong from the top of the interstage jack (Fig. 7) to the "B" plus post of the last audio frequency transformer (Fig. 20). A lead from the bottom prong of the interstage jack (Fig. 7) goes to the "B" plus 90 connection on the Multiplug bracket (Fig. 22).

A lead goes from the "B" plus post of the first audio frequency transformer (Fig. 19) to the "B" plus 45 connection on the Multiplug bracket (Fig. 22). A lead goes from the "F" minus post of the first audio frequency transformer (Fig. 19) to the "A" minus, "B" minus, ground connection on the Multiplug bracket (Fig. 22). A lead goes from "F" minus post of the last audio frequency transformer (Fig. 20) to the "A" minus, "B" minus, ground connection on the Multiplug bracket (Fig. 22).

A lead goes from the top prong of the filament control jack (Fig. 9) to the "F" plus post of the last audio socket (Fig. 10). A lead goes from the third prong from the top of the filament control jack (Fig. 9) to the "P" post of the last audio socket (Fig. 10). A lead goes from the bottom prong of the filament control jack (Fig. 9) to the "B" plus 90 connection on the Multiplug bracket (Fig. 22).

A lead goes from the "F" minus post of the radio frequency socket (Fig. 13) to the "A" minus, "B" minus, ground connection on the Multiplug bracket (Fig. 22). A lead goes from the "F" minus post of the detector socket (Fig. 12) to the "A" minus, "B" minus ground connection on the Multiplug bracket (Fig. 22). A lead goes from the "F" minus post of the first audio socket (Fig. 11) to the "A" minus, "B" minus, ground connection on the Multiplug bracket (Fig. 22). A lead goes from the "F" minus post of the last audio socket (Fig. 10) to the "A" minus, "B" minus, ground connection on the Multiplug bracket (Fig. 22). The "A" minus, "B" minus and ground posts should be connected together.

The fixed condenser (Fig. 18) is mounted with one prong on the "P" post of the first audio frequency transformer (Fig. 19) and a lead goes from the other prong of this condenser to the "F" minus post of the detector socket (Fig. 12). Fixed condenser (Fig. 21) is mounted with one prong on the "B" post of the three-circuit tuner (Fig. 4). A lead goes from the other prong of this tuner to the "F" minus post of the socket (Fig. 11).

A 4½-volt is not shown in the diagram and can be inserted in the circuit as follows: Disconnect the two leads going from each of the "F" minus posts of the audio frequency transformers to the "A" minus, "B" minus, ground connection on the Multiplug bracket. Run a lead from the "F" minus post of the last audio frequency transformer (Fig. 20) to the "F" minus 1 post of the first audio frequency transformer (Fig. 19) and from here to the minus post of the "C" battery. A lead from the plus post of the "C" battery goes to the "A" minus, "B" minus, ground connection on the Multiplug. Disconnect the lead going from one side of the fixed condenser (Fig. 18) and run it to the "A" minus, "B" minus, ground connection on the Multiplug bracket (Fig. 22).

How to Tune the Link Set

Assuming that you have used the proper parts and the right constants in the Jim Wells Link Receiver and that these have been correctly located in the set and that they have been properly wired, it is necessary to adjust the four different circuits that constitute the completed receiver before you can expect good results.

There are five adjustments to be made in the completed receiver. Three of these, once made, need not and should not be disturbed. The other adjustments are those that must be made in all receivers and may be classed as tuning adjustments. They relate to the wavelength changes which the variable condensers control, the regeneration which the tickler coil of the three-circuit tuner regulates and the small balancing or linking condenser (Fig. 12) which links the antenna circuit to the tuning or detector circuit.

The three adjustments are most important. After you have satisfied yourself that the tubes are working efficiently, that your audio end is delivering its expected volume and clarity and that your aerial and ground connections are the best you can have under your conditions, light up the filaments of the tubes and turn on the "B" battery current.

For the three-tube or Type A receivers, open up the coupling between the primary and secondary of the antenna coupler (Fig. 14) by setting the primary coil, which is the one with the smallest number of turns of wire. Leave it just about one-half an inch away from the other coil. Open up the coupling of the tuning unit (Fig. 3) but this should be as wide as possible.

With the coils in this position, turn up the tickler coil of the tuning unit (Fig. 3) until the usual regenerative sound is heard in the phones or the loudspeaker. This is characterized by a rushing sound. It usually begins after you hear a slight CLICK in the phones or loudspeaker. Now, turn both condenser dials (Fig. 1 and 2) until you tune in on a local station, selecting one of the lower wave stations as a preference. Clear it up the best you can with your tickler coil adjustment in the usual manner with regenerative hookups. Do this, if you are unfamil-

(Continued on page 10)

Your Questions Are Answered Here

Everybody's Clearing House for Troubled Set Builders

An Expert Aid on Construction and Operation of Sets

QUESTIONS can be answered only by mail. Write your query on only one side of the sheet and enclose diagram of your circuit whenever it will aid us in locating your trouble. Address all letters for this department to Question and Answer Department, care of this magazine. Inclose stamped and addressed envelope if answer by mail is desired. In writing to other departments, use a separate sheet of paper. This will aid us considerably in serving you quickly.

Jim Wells Link Set

5200—CHICAGO, ILL.: A friend of mine recently built for me a three-tube "Jim Wells Link Circuit" receiver. It has performed wonderfully on local stations, but it seems that I cannot get out of Chicago. The article in the December 12 issue, I dare say, will make anybody's "mouth water" when you speak of distance that you have been able to get. We have used only the best parts that money can buy, but it seems that the set oscillates so quickly that the minute I turn the rheostat on the detector tube, and keep on turning, it oscillates, and I cannot get anything else.

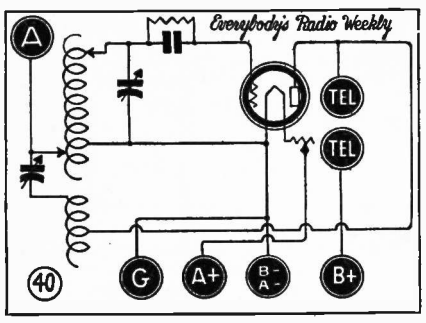
Perhaps you have the wrong rheostat. If you use a single rheostat for only the detector tube, and employ a 201A tube, the rheostat should have from 25 to 30 ohm resistance. If WD12 tube, a six-ohm resistance. If a 199 tube, a 40-ohm resistance. Try disconnecting the .001 or .002 mfd. bypass condenser on the first stage audio. Readjustment of the vario-denser may help you control oscillation. It is possible you have your grid return lead too close to your plate leads on the detector tube. The same may be true of other leads that carry radio frequency currents. Study our pictorial diagram carefully, and notice how we run all leads. Perhaps your aerial is too short. One at least of 125 feet is best.

—

Flewelling Super

5154—BUFFALO, N. Y.: I would like to see a circuit of the Flewelling type. Have you a circuit on hand?

The Flewelling circuit was quite popular a couple of years ago and a great many phans received a lot of instruction from it, but it has not



been in use much of recent date. However, we show here the original Flewelling circuit. It is a one-tube superregenerative circuit. The coils are of the honeycomb type; however, a variocoupler may be used in their stead.

—

D Coils in Five-Tube Lossless

5191—YUMA, ARIZONA: I built your 5-tube lossless, using "D" coils, .0005 Stewart variable condensers, General Radio audio transformers, Carter rheostats, C. R. L. 200,000-ohm resistance, 201A tubes, aerial 125 feet, including 20-foot lead-in, using your latest 1926 model circuit for this set. Distance and volume good and the set is all right except for:

It does not log. Stations below 400 meters come in at a different place on the dial every night about 8 to 12 lines apart on different occasions.

The dials do not tune anywhere near each other as high as fifteen lines difference between the dials.

Are these the coils? In your instructions you wind the primary separate from secondary. The coils I bought are Ellis "D" coils, and the primary is wound right next to the secondary, in fact four or five turns are wound right into the secondary.

What causes a station of 220 meters to come in on the dials farther up than a station of higher wave length when it should come in down below?

In answer to your first question about stations not logging the same night below 400 meters, we would suggest that possibly there is some mistake in your hookup for the by-pass condenser. If these by-pass condensers are not hooked up correctly, the charging and discharging action will be variable at different times under operation, and stations will always log differently. We suggest that you look over your primary connections on the radio frequency, particularly where the by-pass condensers are connected. As to the difference in the dial reading, the second radio frequency and detector tuning dial should turn approximately the same. But as to the antenna coupler condenser, this will vary, due to the difference in the antenna construction and link. This should not vary the reading more than five or six degrees, and it might be well to count the secondary turns on the "D" coils. Then write us back about the results.

The primary winding as you describe in each coil is of correct design, and should work very efficiently.

Your trouble in getting the 220 meter stations at a place above on the dials or a higher wavelength than it should be, is undoubtedly a harmonic. Some stations emit a harmonic wavelength which is almost as strong as the main waves themselves. This may be checked by dividing or adding one-half the wave, or one-third the wave, or one-fourth the wave, and so on. These harmonics are called respectively, first harmonic, second harmonic, third harmonic, etc. You will find that on your 220 wave the first harmonic will come in at 440 meters, second harmonic will be 330 meters, and third harmonic about 293 meters. If a station is operated efficiency, usually these harmonics are trapped out.

—

Size Wire on Coils

5201—CHICAGO, ILL.: I have several questions which I would like advice on as I have never seen them answered in your radio department. In a three-circuit tuner some are built with a primary and secondary of heavy wire like the Transcontinental coils, while some use a small wire like the B. T. coils and both give good results; now, which is the best to use in the tuner and R. F. coils, heavy wire of about No. 20 or a fine wire like No. 24 or No. 26?

2. In a three-circuit tuner with primary and secondary wound in basket style, should the tickler coil be wound in basket or spider web form? I have both and do not seem to get as good a result out of the one wound in spider form.

I live about four miles from stations WSBC and WENR and find that they are real broad tuning. Are they broad tuning or is it just my set?

1. The finer wire will allow compactness of turns on the coil, and consequently, the inductance of the coil is brought in closer to the coil center. It is best to use about No. 26 wire.

2. It is not a question of the form of winding but the number of turns you have. Count the number of turns on both coils and see the difference. This difference will give you the results of good or bad reception.

Some stations are very broad and it requires a lot of patience for the set owner to tune them out. It can be done to a certain extent but a broad station will hog the air in spite of the best of sets.

—

Turn Used in Coil Windings

5195—CICERO, ILLINOIS: Being a reader of the best radio magazine published, and this is no bunk, I would like to build the Jim Wells Link circuit. Want to wind my own coils, but am unable to locate any information as to the number of turns and size of wire to use.

In winding your own coils for the Jim Wells Link Circuit you must have the right number of turns for your condenser, which you intend to use. That is why the number of turns was not given. Here is a list of turns for condensers:

For a 23-plate condenser with a capacity of .0005, you must have 45 turns on the secondary. With a 17-plate condenser of a .00035 capacity, 55 turns on the secondary are required; and for an 11-plate condenser or .00025 capacity, 62 turns are needed on the secondary. All coils require 10 turns on the primary.

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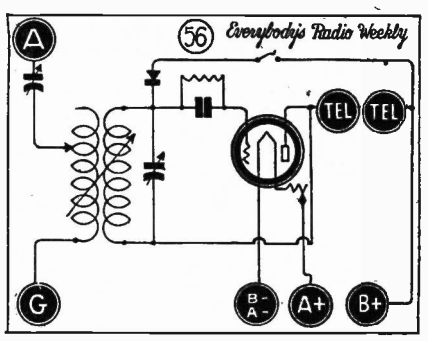
Crystal Hookup

5155—TOLEDO, OHIO: Will you please show me how I can make a combination circuit in which I can use either a tube or crystal?

The illustration is that of a combination tube and crystal set. The switch



is for cutting in and out the crystal circuit. The tube should not be lit when the crystal is being used.

—

Twelve-Tube Set

5185—CHICAGO, ILLINOIS: As most any other phan, I have my radio troubles and have come to you for some help.

Send me a pictorial diagram and list of parts for a twelve-tube set. Will I have a chance at Europe with this set? If not, send me a diagram of one that will.

How can I locate the wave-lengths on the dials of "Everybody's" three-tube set, containing the Jim Wells Link circuit; on the dials of "Everybody's five-tube Lossless"; on the twelve-tube set I have asked you to send me?

In your issue of November 21, page 13, the first column, a coil is described. Could I use this coil in the Jim Wells Link circuit successfully?

You ask for a pictorial diagram of a 12-tube receiver for European reception. To date, we have not run across anything of this type that is very practical. We have published in several of our issues some super-heterodynes that will do about the best that we know of, providing they are constructed in the very best way with the very best apparatus. As to consistence, reception from Europe on the broadcast wavelength, there is none, but we hear of reports now and then of freak reception from high-powered stations in England and France.

There is a new station in the northern part of England that is broadcasting on about 1,500 meters. As the reception is very good on these higher waves, we believe that a well-designed five-tube radio frequency receiver would be expected to receive that meter wave. This would take special equipment in the receiver as well as a special wave-length antenna.

The secondary coil winding to cover this range would be 200 turns for .0005 condensers with 40 turns for the primaries. As to the diagram you may follow our regular "Five-Tube Lossless," and substitute the special coils for the ones we show.

The wave-length may be located in the "Jim Wells Link Circuit," by referring to an article in the April 11, 1925, issue, page six (6). This article gives a very thorough information on how to calibrate a receiver.

The coil described in the November 21 issue, on page 13, will do very well in the Link circuit.

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Resistance Coupled Amplifier

5104—CHICAGO, ILL.: I want to get some advice on a resistance-coupled amplifier, three stage. I know the clarity and volume of this amplifier.

I would like to know how to connect a "C" battery into a resistance-coupled amplifier so that my "B's" will last a few months. Also tell me how I can use as low as 22½ volts on the detector tube instead of 90 or 135, as I would have to if I connected the amplifier on to the detector unit instead of connecting it thru one stage of transformer-coupled amplification as you have done in your five-tube reflex?

It is not necessary to use the "C" Battery in your circuit until the "B" Battery output on the plates is at least 90 volts. The plate of the tube will only receive 50 per cent of the battery voltage.

The usual way to get 22½ volts on the detector tube is to run a line from the 22½ tap on the "B" Battery.

—

Incorrect Windings

5202—CHICAGO, ILLINOIS: I built a three-tube Low-Loss as shown in your paper of September 19, 1925, but I am unable to make it step out the way it should.

I am using a General Radio coupler on which I changed the winding to primary 9 turns No. 22, secondary 55 turns and the tickler 46 turns of No. 26 wire. The diameter of the secondary coil is about 2¾ inches and the rotor is 1¾ inches. I use two General Radio No. 285 transformers, 2 to 1 ratio, one 30-ohm rheostat on the detector tube, one 6-ohm rheostat on the amplifier. A .00025 variable General Radio condenser, .00025 Dubilier fixed condenser and Freshman 2-meg. grid lead and a .001 Dubilier condenser across the first transformer, as a .002 which is specified did not bring results, for it made the set squeal more.

The trouble, I believe, is in the tuner, for when I turn up my detector rheostat about one-quarter way it immediately goes into oscillation and the tube chokes up and then I am compelled to turn it down to the start, which practically eliminates the station.

In turning up the rheostats on the amplifier, it does not increase in volume but lights the tubes brighter. I also notice in turning up amplifier rheostat, a whistle such as one hears at a peanut stand is made when certain notes of a musical instrument are played.

The .00025 variable condenser which I use I am unable to bring in KYW, and the stations WMBB and WBCN come in loud and cannot be separated. WLS, WMAQ and WQJ do not come in clear and I am unable to tune in any out of town stations at all. I live about one mile from WMBB and two miles from WBCN. I use a 100-foot outside aerial with a 35-foot lead-in and 6-volt tubes. "R. C. A."

Can you advise me how many turns and number of wire should be used on my three-circuit tuner, as I intend to use a 23-plate .0005 General Radio variable condenser?

Your coil windings are incorrect. You have too many turns on the tickler coil. Instead of 46 turns, place on only 21 turns. The other parts mentioned are correct.

If the tickler winding is changed your condenser will give you better selectivity.

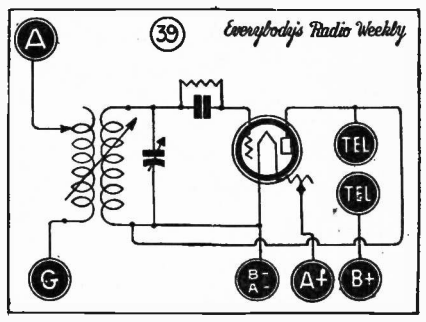
If you intend to use a .005 condenser, place 45 turns on the secondary, 10 turns for the primary, and 21 on the tickler.

—

One-Tube Set

5153—DETROIT, MICHIGAN: I desire to procure a one-tube regenerative feedback hookup. Can you illustrate this circuit?

A capacity regenerator, such as you desire, is shown in the illustration. A



standard variocoupler is employed in this circuit.

—

Modulation System

5210—CHICAGO, ILLINOIS: I have an eight-tube Superhetrodyne receiver, Intermediate transformers and filter (75000 KC.).

This type of set is wired as a modulation system, and is identical with the Ultradyne circuit, except no regeneration is used.

The question I would like cleared up is this: I have tried to obtain regeneration by using a midget condenser between the plate of the first detector tube and the loop, but it seems this merely becomes a neutralizer in the modulation system.

A midget condenser can not be used effectively in the circuit you mention. The midget condenser acts as a bypass condenser for the oscillator current around to the grid condenser of the first detector.

In the modulation system, if it be constructed correctly, there should be no reason for increasing regeneration as it is just on or under the point of oscillation continuously.

R. F. USED IN JIM WELLS LINK SET

(Continued from page 8)

iar with this operation, in this manner: The station should come in on a regenerative whistle, even with local stations, if your set is working efficiently. If not, it will come in with very little tuning. In either case, turn both condenser dials until the signal is at its loudest. If the whistle is heard, tune both dials until the whistle is at its lowest pitch, keeping the tickler coil (the knob that controls Fig. 3, or the tuning unit) forced forward or upward until the detector tube ALMOST squeals through excessive regeneration. If the tube squeals or howls then it is oscillating, which is not a desirable condition. Keep the tickler just BELOW this point—a hair adjustment is the proper one. Repeat your effort until your fingers learn how to master this hair-line treatment. After a few trials you will be able to do this unconsciously. Then readjust the two condenser dials just slightly. A vernier dial will be a great advantage to you in doing this. This second adjustment should get the signal in clear and without distortion. The music or voice comes in at that point on the condenser dials where the signal sound is at its lowest pitch and where to turn the condenser dials either to the right or left will cause the signal to rise in its pitch. It is in this trough or gutter of the signal where the music and voice comes in the clearest and loudest. If it is still mushy and distorted, it is because you have not properly adjusted the tickler coil. So, return to it and move it back until the distortion disappears. You may have to move the tickler back up again slightly to approach that hair-line point just BELOW oscillation.

Assuming that you have tuned in the station properly, we are ready now to adjust the two coils and the little Vario-Denser (Fig. 12). It is not very likely that the adjustments already made will be sufficient and you will have the desired selectivity and volume in your receiver. However, if the local station comes in with other local stations in the background, the Vario-Denser (Fig. 12) needs attention. Turn the little set screw, which is on top of the Vario-Denser and near its center, either to the right or left until SOME one station comes in loudest and clearest without any other station interfering. You may have originally tuned in on, say, WJJD at 370 meters, but this readjustment of the Vario-Denser may bring in WGES at 250 meters. If this readjustment does not produce that result, no matter how you may turn the Vario-Denser, then go back to the coupling of the antenna coil (Fig. 13) and either move the primary closer to the secondary or pull it further away. A slight readjustment of the primary coil on the tuner (Fig. 3) likewise may have to be made.

Now, return to the Vario-Denser once more and try the adjustment of that little linking condenser. Using your screwdriver once more, try turning the adjusting screw to the right or left, irrespective of what station is tuned in, until SOME station comes in WITHOUT interference. There is a hairline spot in this adjustment which is RIGHT. To move it one way or another throws the entire adjustment off again.

It is desirable, after you have made this adjustment on a local station to tune in on a distant station in the same manner. It would be better to make this adjustment on a low-wave station such as KDKA (Pittsburgh) while WLIB or WGB (Chicago) are in operation, or any similar local and distant stations which are close to each other as to wavelength. But make this second adjustment of the set AFTER you have made the one already referred to on the local stations. It is not likely that this last adjustment will have to be made, but if it does, then it will be only slight.

Bear in mind to change the Vario-Denser or the primary on the tuner (Fig. 3) after these adjustments are made will change the wavelength of your set and consequently any previous loggings you may have recorded of stations tuned in. Once you have your receiver adjusted do not disturb these two adjustments. You may change the primary on the antenna coupler at any time without affecting the logging.

If you have the Type B receiver, the one using one stage of tuned radio frequency in between the link circuit and the detector circuit, a slightly different adjustment is necessary as a different condition exists in the circuit. Make your preliminary adjustments of the variable condensers and the tickler as previously advised up to the point of adjusting the primary coils and the Vario-Denser. In this type of the Jim Wells Link Circuit receiver you have THREE coils to look after. There is the first antenna coupler (Fig. 14), the second antenna coupler (Fig. 16) and the three-circuit tuner (Fig. 12) which is now a radio frequency transformer. You will find, after your first experience with the receiver that an entirely different coupling of these coils is necessary. The primary of the two antenna couplers must be more or less wide open while the primary of the tuning unit (Fig. 12) must be CLOSELY coupled. Vary all three of these primaries in your adjustments but it is very likely that the primary on the tuner (Fig. 12) will always have to be closely coupled. Make the adjustment of the Vario-Denser and the primaries of the two

(Continued on page 12)

THREE STAGE R. F. LOSSLESS

(Continued from Page 4)

are cabled in the usual way, using No. 22 Belden rubber-covered wire.

To wire the set we will describe the "A" minus, "B" minus, ground leads. A lead from the "F" post of the first radio frequency transformer (Fig. 11), the end of the secondary winding, goes to the "F" minus post of the first R. F. socket (Fig. 10).

A lead from the "B" post, the start of the primary winding of the first radio frequency transformer (Fig. 11) is connected to the post marked "F" of this same radio frequency transformer.

A lead from the rotor post of the variable condenser (Fig. 22) goes to the "F" minus post of first R. F. socket (Fig. 10). A lead from the "F" minus post of the first R. F. socket (Fig. 10) goes to the "A" minus, "B" minus, ground connection on the Multiplug bracket (Fig. 4). A lead from the "F" post of the second radio frequency transformer (Fig. 25), the end of the secondary, goes to the "F" minus post of the second R. F. socket (Fig. 24). A lead from the rotor post of the tandem condenser (Fig. 19) goes to the "F" minus post of the second R. F. socket (Fig. 24). A lead goes from the "F" minus post of the second R. F. socket (Fig. 24) to the "A" minus, "B" minus, ground connection on the Multiplug bracket (Fig. 4). A lead goes from the post marked "F" of the third radio frequency transformer (Fig. 9) to the "F" minus post of the third R. F. socket (Fig. 3). A lead goes from the rotor of the tandem condenser (Fig. 19) to the "F" minus post of the third R. F. socket (Fig. 3). A lead goes from the "F" minus post of the third R. F. socket (Fig. 3) to the "A" minus, "B" minus, ground connection on the Multiplug bracket (Fig. 4).

A lead goes from the post marked "F" of the last radio frequency transformer, the end of the secondary, to the "F" minus post of the detector socket (Fig. 2). A lead goes from the rotor of the variable condenser (Fig. 15), goes to the "F" minus post of the detector socket (Fig. 2). A lead goes from the "F" minus post of the detector socket (Fig. 2) to the "A" minus, "B" minus, ground connection on the multiplug bracket (Fig. 4). A lead goes from the "F" minus post of the first audio frequency socket (Fig. 12) to the "A" minus, "B" minus ground connection on the Multiplug bracket (Fig. 4). A lead goes from the "F" minus post of the last audio frequency socket (Fig. 8) to the "A" minus, "B" minus, ground connection on the Multiplug bracket (Fig. 4).

A lead goes from the "F" minus post of the last audio frequency transformer (Fig. 13) to the "F" minus post of the first audio frequency transformer (Fig. 6) and from here it continues to the minus post of the 4½ volt "C" battery. A lead goes from the plus post of the "C" battery to the "A" minus, "B" minus, ground connection on the Multiplug bracket (Fig. 4). One prong of the bypass condenser (Fig. 14) has a lead going to the "F" minus post of the detector socket (Fig. 2).

A lead goes from the stator post of the variable condenser (Fig. 22) to the "G" post of the first radio frequency socket (Fig. 10) and from here continues to the start of the secondary winding of the first radio frequency coil (Fig. 11).

The tandem condenser (Fig. 19) is in reality composed of two variable condensers having a common rotor connection and two stator connecting posts, one for each condenser. A lead goes from one of these stator posts of the variable condenser (Fig. 19) to the "G" post of the second radio frequency socket (Fig. 24) and from here continues to the start of the secondary winding of the second radio frequency coil (Fig. 25). A lead goes from the other stator post of the variable condenser (Fig. 19) to the "G" post of the third radio frequency socket (Fig. 3) and from here continues to the start of the secondary winding of the third radio frequency coil (Fig. 9).

One side of the grid leak and condenser (Fig. 1) is attached to the "G" post of the detector socket (Fig. 2). A lead goes from the stator post of the variable condenser (Fig. 15) to one side of the grid lead and condenser (Fig. 1) and continues from here to the start of the secondary winding of the radio frequency coil (Fig. 5).

The antenna post is placed near the rear edge of the baseboard between radio frequency coils (Figs. 11 and 25). It is mounted on a bakelite washer to keep it away from the aluminum.

A flexible lead goes from the "F" plus post of the first radio frequency socket (Fig. 10) to the left post of the rheostat (Fig. 18). A lead goes from the "F" plus post of the second radio frequency socket (Fig. 24) to the left post of rheostat (Fig. 18). A lead goes from the "F" plus post of the last radio frequency socket (Fig. 3) to the left post of the rheostat (Fig. 18). A lead goes from the right post of the rheostat (Fig. 18) to the right post of the filament switch (Fig. 17). A lead goes from the "F" plus post of the detector socket (Fig. 2) to the left post of the rheostat (Fig. 7). A lead goes from the "F" plus post of the first audio frequency socket (Fig. 12) to the left post of the rheostat (Fig. 7). A lead goes from the top prong of the filament control jack (Fig. 20B) to the left post of the rheostat (Fig. 7). A lead goes from the right post of the rheostat (Fig. 7) to the right post of the filament switch (Fig. 17). A lead goes from the left post of the filament switch (Fig. 17) to the "A" plus connection on the Multiplug bracket.

A lead goes from the end of the primary winding of the second radio frequency coil (Fig. 25) to the "P" post of the first radio frequency socket (Fig. 10). A lead goes from the end of the primary winding of the third radio frequency coil (Fig. 9) to the "P" post of the second radio frequency socket (Fig. 24). A lead goes from the end of the secondary winding of the fourth radio frequency coil (Fig. 5) to the "P" post of the last radio frequency socket (Fig. 3).

A lead from the "B" plus post of the first audio frequency transformer (Fig. 6) goes to the start of the secondary winding of the last radio frequency coil (Fig. 5). A lead from the "P" post of the first audio frequency transformer (Fig. 6) goes to the "P" post of the detector socket (Fig. 2). One prong of a .002 fixed condenser (Fig. 23) is attached to the "F" minus post of socket (Fig. 12) and a lead from the other prong of the fixed condenser (Fig. 23) goes to the "P" post of the detector socket (Fig. 2). A lead from the "G" post of the first audio frequency transformer (Fig. 6) goes to the "G" post of the first audio frequency socket (Fig. 12).

A lead from the "P" post of the last audio frequency transformer (Fig. 13) goes to the next to the top prong of the interstage jack (Fig. 20A). A lead from the "B" plus post of the last audio frequency transformer (Fig. 13) goes to the third prong from the top of the interstage jack (Fig. 20A). A lead from the top prong of the interstage jack (Fig. 20A) goes to the "P" post of the first audio socket (Fig. 12). A lead from the bottom prong or frame of the interstage jack (Fig. 20A) goes to the "B" plus 90 connection on the Multiplug bracket.

A lead from the "G" post of the last audio frequency transformer (Fig. 13) goes to the "G" post of the last audio socket (Fig. 8). A lead from the next to the top prong of the filament control jack (Fig. 20B) goes to the "F" plus post of the last audio socket (Fig. 8).

A lead from the "P" post of the last audio socket (Fig. 8) goes to the third prong of the filament control jack (Fig. 20B). A lead from the bottom prong of the filament control jack (Fig. 20B) goes to the "B" plus 90 connection on the Multiplug bracket.

A lead goes from the start of the primary winding of the second radio frequency transformer (Fig. 25), goes to the right post of the variable resistance (Fig. 21). A lead goes from the start of the primary winding of the third radio frequency transformer (Fig. 9) to the right post of the variable resistance (Fig. 21). A lead goes from the start of the primary winding of the last radio frequency transformer (Fig. 5) to the right post of the variable resistance (Fig. 21). A lead goes from the left post of the variable resistance (Fig. 21) to the "B" plus 90 connection on the Multiplug bracket (Fig. 4).

For the benefit of those who may prefer to use the parts or a part of them from Model No. 1 published last week, we are again presenting the bill of specifications. It is our advice, however, that you do not attempt to switch the parts around. Better stick to the specifications of each model closely. You will avoid grief that way.

Model No. 1 List of Parts

Essentials

Fig. 1—Muter two-meg. grid leak and .00025 fixed condenser	$ .85
Fig. 2—Benjamin socket	1.00
Fig. 3—Benjamin socket	1.00
Fig. 4—Jones Multiplug and cable complete	4.50
Fig. 5—Ellis "D" radio frequency coil	2.50
Fig. 6—Karas Harmonic all stage audio frequency transformer	7.00
Fig. 7—Howard 6-ohm rheostat, with dial	1.10
Fig. 8—Benjamin socket	1.00
Fig. 9—Ellis "D" radio frequency coil	2.50
Fig. 10—Benjamin socket	1.00
Fig. 11—Ellis "D" radio frequency coil	2.50
Fig. 12—Benjamin socket	1.00
Fig. 13—Karas Harmonic all-stage audio frequency transformer	7.00
Fig. 14—Muter one-half mfd. by-pass condenser	.90
Fig. 15—Cardwell .0005 mfd. variable condenser	5.00
Fig. 17—Walbert battery switch	.50
Fig. 18—Howard 6-ohm. rheostat, with dial	1.10
Fig. 19—Cardwell Dual Condenser (tandem)	10.00
Fig. 20A—Yaxley interstage jack	.80
Fig. 20B—Yaxley filament control single circuit jack	.70
Fig. 21—Centralab 200,000 ohm variable resistance	2.00
Fig. 22—Cardwell .0005 cap. variable condenser	5.00
Fig. 23—Muter .002 fixed condenser	.40
30"x7" Celeron Panel	4.92
Four sheets each 30"x7" No. .20 half-hard aluminum and two sheets 7"x9" each	2.70
Baseboard, wire, etc	.50
X-L push post	.15
Total essentials	$ 62.62

Accessories

Six "Continental" 201A tubes at $2.	$ 12.00
Newark adjustable cabinet over 26"	15.75
Firedry 6-volt "A" battery (100 amperes)	18.00
Temple loud speaker	21.00
Two 45-volt Stuart heavy duty vertical "B" batteries	8.00
Total for accessories	$ 64.75
Total for complete outfit	127.37

The Perlesz tandem condenser is made of two variable condensers mounted on a metal frame. Underneath each one of the condenser units is a screw for adjusting the capacity. A hole must be drilled in the baseboard under each screw so that the screw easily can be turned with a screwdriver from underneath. This screw is mounted on a metal crosspiece on the metal base under the plates of each of the condenser units. When tightened the screw presses against a tension spring or trimmer varrying the capacity a trifle and in this way both the capacities of condensers, tubes and coils can be equalized.

THE MOST EFFICIENT GROUND

Use a water pipe (preferably the cold water pipe) for the ground to your receiving set. It will almost invariably give you better results than other grounds, such as the radiator, the gas pipe or fire escapes. Of course, it does no harm to use them all at once if you like, then you will be sure of getting at least one good one. Usually the cold water pipe is sufficient, however.

Home Built Switch

The average radio phan may be surprised to learn that a battery switch can be made with a couple of clips, two machine screws, a switch stop and a binding post top. Nevertheless it has been accomplished and an excellent switch was the result.

By referring to the accompanying

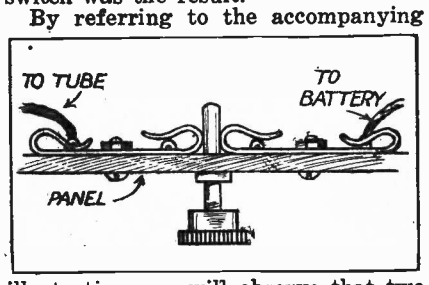
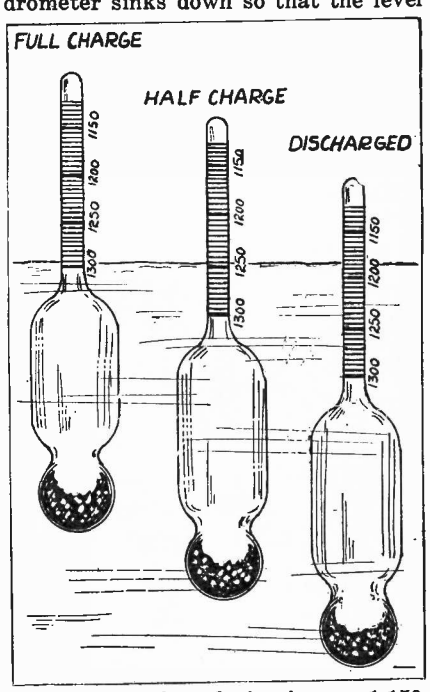


illustration you will observe that two double Fannestock clips are mounted end to end, on the panel, so that a switch stop will fit neatly between them. A hole is drilled in the panel big enough for the switch stop or small brass rod which is treaded at one end so a binding post can be screwed on the said rod, thus forming a knob which is composed of rubber. The rod makes a contact with the sides of the clips and thereby turns on the tube lights. When the rod is pulled out the lights are off. The outer end of the clips are connected, as shown in the sketch, to the battery and filament terminals of the tubes.

HYDROMETER READINGS

In order to get the greatest value from your storage "A" battery it is important to prevent it from running down. If this should happen it means that the tubes will not function normally in your radio set. Therefore the use of the hydrometer is very necessary and no up-to-date radio phan can operate his set without one.

In the accompanying illustration you will observe that when the hydrometer sinks down so that the level



of the top of the solution is near 1,150, as shown at the right, the battery is practically discharged and should be recharged at once until the hydrometer floats up nearly to 1,300, as shown at the left. Study the sketch, for it shows clearly just what the hydrometer readings really mean.

R. F. IN NEW LINK SET

(Continued from page 10)

antenna couplers in the same manner as with the Type A receiver.

Where you are using the Jim Wells Link Receiver Unit, that is, the circuit that is built as a separate unit to be attached to some old receiver already built and which is not selective, treat the adjustment of the unit as you would if it were a part of the receiver itself. Where the Unit is attached or built in a five-tube tuned radio frequency receiver, practically the same adjustments will have to be made as for the Type B receiver, but with these exceptions in tuning. First of all, make sure that the receiver proper has an antenna coupler with an aperiodic primary—that is, a coupler whose primary is below ten or twelve turns of wire. If this primary is adjustable that much the better. However, a fixed primary coil can be used. Most neutrodynes have the aperiodic primary antenna coupler as have all the other types of tuned radio frequency receivers. But, do not confuse the old UNTUNED radio frequency receivers with the TUNED radio frequency receivers. The untuned radio frequency sets have an iron core transformer.

In operating the tuned radio frequency receivers with the Jim Wells Link Unit attached an entirely different tuning experience will be met than with receivers that employ a tickler feedback circuit such as the usual three-circuit regenerative hookups liks "Everybody's 100% Low-Loss" receivers, the Ambassador three-tubers and others of a similar type.

In the case of the neutrodynes and the other five-tube receivers of the tuned radio frequency type, the Jim Wells Link Unit acts more like a wavetrap of highly efficient characteristics, although it still has a tuning effect and can be used either way. The simplest and easiest way is to work it as if it was a wavetrap.

Set all three of the dials of the receiver proper to bring in a certain station. Adjust your dial on the Jim Wells Link Unit so it will be in complete resonance with the other three dials. You will find that the signal will come in much louder with the Unit attached than it did before it was attached. Now, leave the Jim Wells Link Unit dial setting where it is and proceed to tune in any other station. As long as you do not touch the Link Unit dial you will not have any interference from the station originally tuned in. So, if you wish to get away from an interfering station, tune all four dials to that station, leave the Link Unit dial on that station and then go and tune in any other station desired.

If you desire a more critical or sharper tuning use all four dials and keep them in resonance. In other words, tune just as you would with the three dials on the original set.

The length of your aerial is going to have much to do with the distance and volume of your Jim Wells Link Receiver, whichever type you use. Our Laboratory standard aerial is 135 feet in length from the open or free end to the point where it connects to the receiver. One hundred of these 135 feet are OUTSIDE. This aerial is about thirty-five feet above the roof, which is, to all purposes, the same as the ground, inasmuch as the roof IS grounded. The nearest you come to that length of aerial the better you will be. In most of our demonstrations we have used a special aerial 176 feet in length. We do not do this because it is necessary, but because we wanted to show that these receivers, built with the Jim Wells Link Circuit even would tune SHARPLY on an aerial of that broad-tuning type. If you can use that much length it would be a good thing to do, but is asking a whole lot of any receiver, even the Jim Wells Link, to tune sharply on it. You can insert a variable condenser in series with the aerial, such as a .0005 mfd., and cut that 176 feet down to the size of your set, if you do have that length, and be sure to get maximum distance and volume because of the long aerial. However, if you cannot erect such a long aerial, don't let that fact disturb you. The 135-foot aerial is a real good one and good enough for anyone. It may be that you cannot have even that much of an aerial outside.

(Continued on page 15)

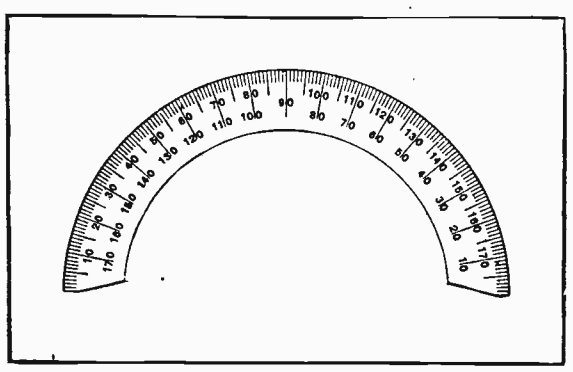
Odds and Ends of Radio Information

Practical Stunts and Tips to Speed Up Construction

SCALES FOR CONDENSERS

Scales for variable condensers, etc., can be easily made in the following way:

Obtain a semicircular celluloid protractor used for mechanical drawing. Place the protractor in a photographic printing frame and a piece of sensitized paper behind it. Take a print in the usual way, the protractor, being transparent acts as a



negative. If black tones are desired the paper should be either bromide or gaslight. After the print is developed, fixed, washed and thoroughly dry, the part not wanted can be cut away carefully. Mount neatly on a piece of ebonite and use the upper reading which is clockwise.

PROTECT CARPET

Put a pan underneath your storage battery of the porcelain type to catch drippings. The acid from the battery will eat through the carpet, and will ruin any object with which it comes in contact.

MOUNTING TUBES

Vacuum tubes, such as the UV200, 201 and 201A, should not be mounted horizontally, as the filament will sag and touch the grid and the tube will become inoperative.

ALL SOCKETS WORK—BUT

Almost any socket will work but too much importance cannot be attached to the selection of this article. A poor socket may cause you no end of trouble. You're welcome.

CHANGING CONDENSER CAPACITY

Any enterprising home set builder can change the capacity of his variable condenser to correspond with the tuner used and thus insure better tuning, clarity volume and distance.

It is of especial value in a transmitting set, and you will note in the illustration the method of making this condenser which was originally constructed extra large in dimensions, but for receiving it can be built smaller if desired.

If you have occasion to remove the plates you can do this by detaching every other plate of the rotor and stator, as shown in Fig. 2. Place washers

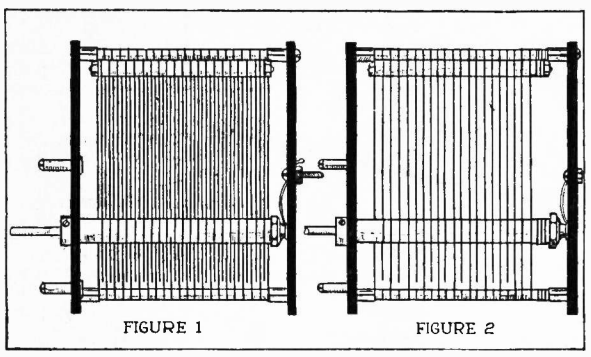


FIGURE 1 FIGURE 2

between plates and to compensate for the width of the plates removed use extra washers to space out at each end. Fig. 1 shows the condenser as it is originally.

By removing or replacing of plates you can make your condenser suitable to any capacity. There is a condenser on the market which is convertible or detachable. It is the Crest Convertible Condenser, which you can obtain if you do not wish to devote the time to remodel one.

CAUSE OF "B" BATTERY SQUEAL

If you cannot make the tickler work, it may be due to a partially exhausted "B" battery. One bad cell in the whole block will sometimes cause a loud squeal that is hard to find.

DIPS HIS SOLDER LUGS

A reader says he keeps a small metal pot with solder in it. When he wires up a set he cuts all his wire to the proper length and attaches the solder lugs. He puts in the solder paste and dips the lug end into the solder pot. This gives a sure connection and makes a much neater job.

TAKE TIME WHEN DRILLING

Don't do the rush act when drilling the panel. If you take your time there will be no danger of the drill slipping. Nothing looks worse than a panel full of dents and scratches. Hence take your time. It pays. You're welcome.

WHEN SPEAKER RATTLES

High resistance headsets when used as a loudspeaker unit, give off a rattling or rasping sound when overtaxed or after months of continuous use. This may be reduced, if not eliminated by cutting a thin washer of cardboard the same thickness as the receiver case and placing it between the diaphragm and the cord. This holds the diaphragm away from the magnet and keeps it from vibrating too freely. You're welcome.

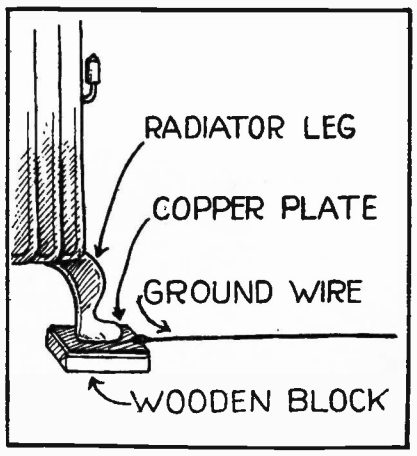
NOISES IN THE SET

Noises in sets can often be traced to poor contact in grid leaks and grid condensers. If this happens to a sealed-in tube leak—throw it away and use a new one. However, before you discard the unit make positive that the trouble comes from the inside and not from the clips. You're welcome.

A GOOD RADIATOR CONNECTION

The average phan is well aware that a steam or hot water radiator serves as a splendid ground, but yet he sometimes has trouble in making a good connection to it. The ordinary radiator ground clamp will before long develop a coating or layer of oxide due to the heat of the radiator.

Nearly all metals produced cheaply enough for daily household use will oxidize quickly at radiator pipe temperature. Efforts to solder the ground to the radiator is not often accomplished owing to the pipes conducting the heat from the soldering iron



so quickly that soldering temperature cannot be continued until a connection is made that will remain without considerable difficulty.

It has been found that a very efficient ground can be made without the use of a clamp or the necessity of soldering to the pipes as follows: Secure a piece of wood about half an inch thick and an inch square. Tip the radiator back and slip the block under one of the front legs of the radiator. The other front leg must also be free from contact with the floor.

Clean the bottom of the free leg with a fairly coarse file, making a thorough job or removing all rust and dirt. Solder the ground lead to a piece of sheet copper or brass about an inch square. All that remains to be done is to put the copper under the free leg and lower the radiator by removing the block.

Remember that the copper plate should be held firmly by the weight of the radiator so that it can scarcely be moved with the weight of the fingers. If the radiator leg does not grip the plate, the radiator is not setting level. To overcome this fault it is only necessary to tip the radiator and slip a thin wooden block under the radiator.

Excellent results will be attained with this ground and it is much neater in appearance than a clamped or soldered connection.

RADIO OF TRANSFORMERS

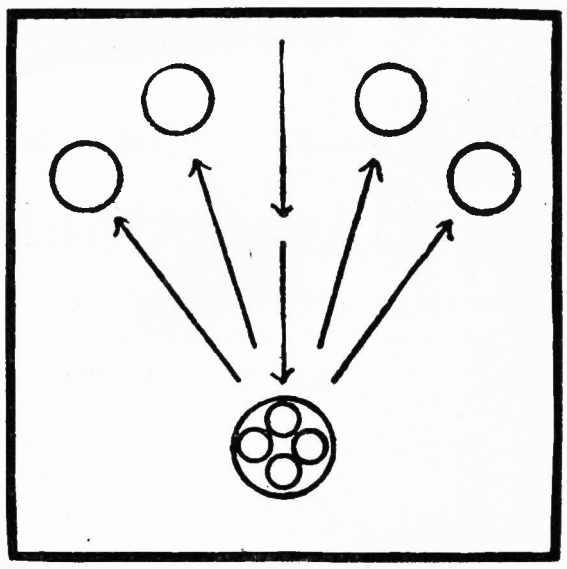
When it is said that a transformer number is 9 to 1 the meaning is that the number of turns of wire on the secondary is nine times as great as the number of turns on the primary. Some manufacturers recommend a high ratio transformer on the first stage and a low ratio on the second stage because they feel that the voltage on the first stage is low enough to warrant the use of a high ratio transformer without distortion.

A high ratio transformer on the second stage increases the voltage to such an extent that distortion may occur. Minimum distortion is obtained with low ratio transformers such as 5 or 3 to 1 ratio on both stages. If distortion results from the use of a high ratio transformer on the first stage it is very likely that the distortion will be intensified as well as the signal by the second amplifier. You're welcome.

HOW ELECTRONS CARRY SIGNALS

Scientists tell us that it is a current of electrons that constitute the current of electricity. If we alternate this current, for example, in a transmitting antenna, we send the electrons surging first in one direction along the wire and then in the reverse direction.

Every time these rapidly surging electrons are reversed, particles still smaller than the electrons



or "electricdust" are jerked loose, as it were, and sent flying in all directions in straight lines.

This dust, according to Professor Max Planck, a noted physicist, consists of extremely minute "bags of dust" which he calls "quanta."

He declares that it is this infinitesimal "quanta" which carries the radio messages at the speed of 183,000 miles per second from the transmitting station to your receiver.

In the accompanying drawing we present Professor Planck's interesting theory showing how an electron composed of several infinitesimal particles throws off the "quanta" which conveys the signals from the transmitting station to the receiving set at the tremendous speed per second previously mentioned. In the diagram the four circles represent the "quanta" emitted from the electron shown below.

Different theories, of course, are advanced by scientists with regard to the nature and action of electrons in the transmission and reception of radio signals. The one advanced by Professor Planck, while it may not perhaps be acceptable to other scientists, at least is a theory both fascinating and interesting.

BLOW AWAY THE DUST

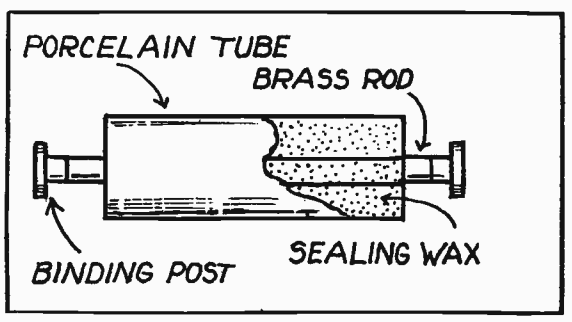
When cleaning the dust out of a set, it is difficult to get in all the corners due to the wiring, which interferes with the fingers. An automobile tire pump may be used to good advantage in this case. The nozzle should be pointed at the dusty spot and the dust blown out. You're welcome.

LOW WAVE CONDENSERS

A variable condenser to cover the waveband of between seventeen and eighty-seven meters, should have a capacity of 500 micromicrofarads.

INSULATOR FOR A LEAD-IN

A lead-in device for cutting down energy losses is made as follows: Procure a porcelain tube 1½ inches or 2 inches in diameter and a copper tube, ¼ inch in diameter, and about one inch longer than



the porcelain tube. Bore a hole ½ inch deep in a board large enough to accommodate the brass rod which is placed in it. Place the porcelain tube over the rod so that the rod is in the exact center.

Melt some sealing wax and pour it into the porcelain tube until it is even with the top. When the wax is hardened solder a binding post to each end of the brass rod. A wire going to the set is attached to one binding post and the lead-in is fastened to the other binding post.

SPEAKERS IN SERIES

By connecting them in series, several loud speakers can be used simultaneously. Thus you can have dance music which may be clearly audible in a large-sized ballroom.

Phans Phorum

Brings in the Bacon

Leonardo J. Maese, 915 N. La Salle Street, Chicago, tells us the results he has obtained with the New Jim Wells Link circuit in a letter as follows:

I have built your four-tube set, "De Luxe" model, and oh boy, it surely does bring in home the bacon from coast to coast on the loud speaker. I also made the Link circuit unit, and have had very excellent results with both. When I used my link unit on my four-tube "De Luxe" set, I have tuned in KDKA, WOC and KFI from coast to coast on the loud speaker. I live four blocks from WGN. I wish you success of your "Marvel Link Receiver," for it can't be beat.

Most of the home set builders have wonderful results with the building of sets. This is one of them, yet there are a few that fail. Why is there a few that cannot build a thing right for results? That few are always with us.

—

Fixed Condenser Fixes Set

Peter Boag, 8003 Ingleside Avenue, Chicago, Illinois, pleases us with a letter as follows:

I wish to thank you for your letter suggesting the placing of a .00025 condenser across the phone terminals to increase the volume of reception with my one-tube Low Loss set. I have done this, and the set now seems to be everything you have claimed for it.

I now have no difficulty in bringing in Cleveland and other outside stations while all of the local stations are operating.

Again I thank you, not only for your reply, but for the promptness of your response.

Just a little help sometimes is worth a good deal to a set builder. This little phone condenser is not always used, but in this case it settled the set so that good reception was the result.

—

Understandable Language

Louis F. Schuck, 1000 Lincoln Building, Philadelphia, Pennsylvania, writes:

I picked up an issue of EVERYBODY'S RADIO Weekly recently, and was impressed wtih the manner in which much valuable information and many helpful hints were set out in language which a layman, as regards the art, can understand. I dare say there are a great many owners of radio sets who would welcome an opportunity to acquire a working knowledge of the functions of the various parts in their sets, in order that they might become more expert in their operation, and I am recommending your publication to all my acquaintances.

Perhaps our education has not been along big words, but the radio has brought out a lot of them that are not in the dictionary and we have had to coin words. The simplest language is always the best at all times.

—

Read for the First Time

Chas. Maudi, Jr., 292 Fairmount Avenue, Newark, N. J., is very much with us after seeing the first copy of EVERYBODY'S RADIO and writes us about it:

Saturday for the first time I noticed on the newsstands your radio weekly. I am so digusted with the radio magazines for sale in Newark, because they contain nothing but pages and pages of advertisements. At first I hesitated in buying your magazine, but on second thought I decided to get one and try it. I expected it to contain foolish ads, and one or two half-baked articles on radio. But to my surprise I found it to be one of the best I have read in the past three or four years. Your articles and helpful hints on radio attracted my attention. When I got home I was greeted by nine of my friends (radio bugs, too). We read over the interesting and instructive articles in your magazine and have decided to give up such trash as we have been reading in favor of your wonderful magazine.

There is no reason for a magazine to exist unless it does furnish information for the reader. Your ideas are right and know that you will be benefitted by reading EVERYBODY'S RADIO every week.

—

Holiday Post Cards

Albert E. Fisher, 114 W. 32nd street, Minneapolis, Minnesota, writes:

I am watching your "ad" columns, as I want to buy some postcards thanking broadcasters, and a station log.

EVERYBODY'S reaches me regularly now. Many thanks.

I see I am entered in the monthly contest. All right! If I win an up-to-date one-tuber, I shall scrap my old bloop, although with some regret for I get fairly good results. Taking what I can get, but not what I choose.

Your paper, print, and reading matter are ""A-1" now, so why change? I think if it is made ten cents, I would buy it only intermittently, when there will be something that particularly interests me.

We wish to advise you, in response to your inquiry, that Charles F. Krause, 32 South Clark St., Chicago, carried advertisements with us last July on appreciation cards, offering some very good ones at 50 for one dollar. But, evidently, so few of our

readers called for cards, he found it unprofitable, and quit.

If many of your friends write him, telling him that this is the season to advertise, and not mid-summer, perhaps he will try it again, and this time, with better luck.

—

Builds Own Tuner

Phil Hofman, 214 Third street, Milwaukee, Wis., has built a one-tuber with good results, but has his grief. He says:

I am more than pleased and surprised with the results I have obtained with the one-tube set I made according to your papers. These are the stations I have received in one week's time since I started to hook up set: WSMB, WBAP, WSAI, WREO, KYW, WORD, WHT, WGT, WLS, WENR and WOC at 2 p. m. Sunday afternoon, and they all tune in on a pair. So far so good. Now here you must come in again. I built my own tuner as per your plans. I placed fifty turns on the secondary, ten on primary and twenty on the tickler. My enemy is WHAD—comes in all over dials. Would like to make tuner using spider web form, seventeen spokes. Please help me to cut them out so that they come in like the rest of the stations. I have spoken to a radio man where I buy all my parts and your wonderful paper. He said I get the best that can be gotten. He told me WHAD was too strong. Tell me how the phan in Chicago tunes out 5,000-watt stations. Now, I have followed you to the letter in everything but the tuner. Everybody tells me that's where my trouble is, so straighten it out for me.

It is very likely you wound the primary too close to the secondary. Try separating the coils by nearly an inch. Move closer or further away until you get the right selectivity. If you move too far away you will lose too much volume. There is a happy medium—find it and keep it.

Bricks & Bouquets

Mr. O. Lanford, 1753 E. 19th, St., Cleveland, Ohio, says: I have been unable to purchase copies of EVERYBODY'S at newsstands here since the issue of October 3. Upon inquiring at dealers, get no information as to the reason. Has the publication been discontinued, or is it the fault of the distribution?

Although I have only been a reader of EVERYBODY'S for a short time, I have both enjoyed and benefited from it to quite an extent.

I sincerely hope that nothing has happened to EVERYBODY'S, as it was a relief to read it, after reading some of the "bunk" radio publications now on the market.

—

Mr. E. Mann, 2123 N. Kedvale Ave., Chicago, Ill., writes: I have read your magazine from the first issue and believe it is better than a lot of them costing four and five times as much.

—

Mr. J. C. Haley, St. Joseph, Missouri, writes: "Please send your October 30 issue to me. You have a wonderful radio weekly."

—

C. P. Oswald, 92 St. Marks Place, New York, N. Y., writes: "I bought a copy of EVERYBODY'S RADIO Weekly issue of October 31, 1925, and found it very interesting. I showed your magazine to quite a few radio phans and you may be sure we were sorry it did not appear on the New York newsstands after the issue of October 3."

Type B Link Set

(Continued from page 12)

In that case erect as much as you can OUTSIDE and bring the rest of it inside of your room or house and run it around the picture molding before it is connected to your set. By this method you will get your full 135 feet. Naturally, with so much of your wire inside of the house you are not going to get as good service from your aerial as you would if ALL of it was outside, but one must be contented with the best he can have under the existing conditions.

An aerial less than one hundred feet overall is not good enough for any regenerative receiver which requires, to obtain maximum service, one hundred or more feet, aerial and leadin included in the measurement. An aerial of fifty or sixty feet makes a set oscillate too freely, if that set is of the regenerative type. This is why so many broad tuning radio frequency sets, like the neutrodyne, have to use a short aerial to get the best out of them. These receivers are broad tuning and do not oscillate very easily. Therefore, the extra oscillations produced by the short aerial is a help to them in getting selectivity. They also help in getting better distance stations.

If, with these instructions, you do not get desired results, the fault will lie in your construction, adjustment of the receiver or your tuning, or in faulty apparatus or tubes. Tubes are a common source of trouble nowadays. Poor batteries, poor grounds and poor aerials also give much trouble.

You Can Use GEN-RAL Coils

In the JIM WELLS LINK Circuit Receivers or Any Other Circuit Receivers and Make Sure of Your Inductance.

When you buy GEN-RAL Coils you're taking no chances. They're scientifically designed and conscientiously constructed to insure minimum losses and maximum inductance.

Where TRUE inductance is required, as it is in all circuits that require two or more tuning controls, GEN-RAL Coils give perfect synchronization because they're carefully matched.

GEN-RAL Coils especially are efficient in the Jim Wells Link Circuit receivers. In the three and four tube models GEN-RAL Three-Circuit Tuner and GEN-RAL Antenna Coupler are highly successful. They not only assist in giving the receiver the desired selectivity but they supply the power and range that good inductance is supposed to give.

Not only do the GEN-RAL Tuner and the GEN-RAL Antenna Coupler work as highly efficient parts in the new "Everybody's Jim Wells Link Circuit," but they equally are as efficient in any circuit that requires this type of inductance. Use them wherever high inductance and low losses are essential. We have a book of hookups that every set-builder should have. A copy is yours for the asking.

CHICAGO JOBBERS

Atwood Electric Co., 3122 W. Madison St.
Apex Electric Co., 6914 S. Halsted St.
Amber Elect. Co., 553 W. Madison St.
Beckley-Ralston Co., 18th and Michigan
Chicago Elect. Supply Co., 360 W. Madison St.
Izenstarck Radio, Inc., 509 S. State St.
Electric & Radio Sup. Co., 165 N. Wells St.
Hudson-Ross, 116 S. Wells St.
E. O. Jackson & Co., 504 S. State St.
Nelson Elect. Co., 508 S. Dearborn St.
Pioneer Hardware Co., 225 N. Wells St.
Prairie State Radio Co., 39 W. Adams St.
Silver-Marshall, Inc., 504 S. Wabash Ave.
Telephone Maint. Co., 205 S. Wells St.
Wm. A. Welty Co., 36 S. State St.
Haynes-Griffin, Inc., 111 S. Clark St.

Kentucky and Ohio
Southern Sales Agcy., Box 223, Newport, Ky.

Minneapolis. Minn.
W. P. Johnson Elec. Co.

Oneonta, N. Y.
Crouch-Wilson Co.

Binghamton, N. Y.
Parlor City Elec. Co.

New Brunswick, N. J.
A. K. Fleming.

Write for "Gen-Ral" Hookups. They work!

GENERAL MFG. CO.
6637 Cottage Grove Avenue, CHICAGO
Phone: Fairfax 6965

Price $5.50 at Dealers

GEN-RAL Three-Circuit Tuner

The GEN-RAL is the first Three-Circuit Tuning Unit that does not have to offer an apology. Scientifically designed as to inductance, relation of inductance and mechanical action of inductance, it gives maximum efficiency. It is highly selective. It gives the utmost in volume and its tickler action is smooth. It aids materially in getting the best out of any circuit. Price..... $5.50

GEN-RAL Antenna Coupler

Price $3.50 at Dealers

The GEN-RAL Antenna Coupler is constructed on the same efficient plan and in a similar design to the GEN-RAL Three-Circuit Tuner Unit shown in the illustration. It has a variable primary. It makes an ideal antenna coupler in all radio frequency circuits and when used in connection with the GEN-RAL Three-Circuit Tuner makes a most selective four-tube set with the volume of the average five-tube set. At all dealers or by mail, postpaid, each.. $3.50

GEN-RAL Transformer Variable Primary

The GEN-RAL Transformer is used in all circuits that require radio frequency amplification. They're used in Everybody's Five-Tube Lossless, in Neutrodynes and in all tuned radio frequency circuits. They have semi-adjustable primaries and when two of these coils are used in connection with the GEN-RAL antenna coupler you get the utmost out of a five-tube set. Price, each, at all dealers or by mail, postpaid $2.75

$2.75

$1.90

GEN-RAL Transformer

Fixed Primary

This is the popular flat type spider-web coil and is considered very efficient for use in tuned radio frequency set due to its small external field. This transformer has the Gen-Ral air spacing feature between the primary and secondary windings. It is wound with green silk covered wire, as are all the Gen-Ral coils and is very efficient in five tube tuned radio frequency set when used with a .00025 condenser. Neutralizing capacities are not necessary. The transformer is mounted on "Formica" Strip, with plainly marked soldering lugs to prevent any mistake in installing. Price, each, at all dealers, or by mail postpaid $1.90