

RADIO

FLASH

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Navy Set and Hook Up
Symbols Used in Radio Hook Ups
Easy Way to Learn Radio Telegraph Code

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No. 1

10
Cents



DIAGRAM FOR ANTENNA

MATERIALS REQUIRED

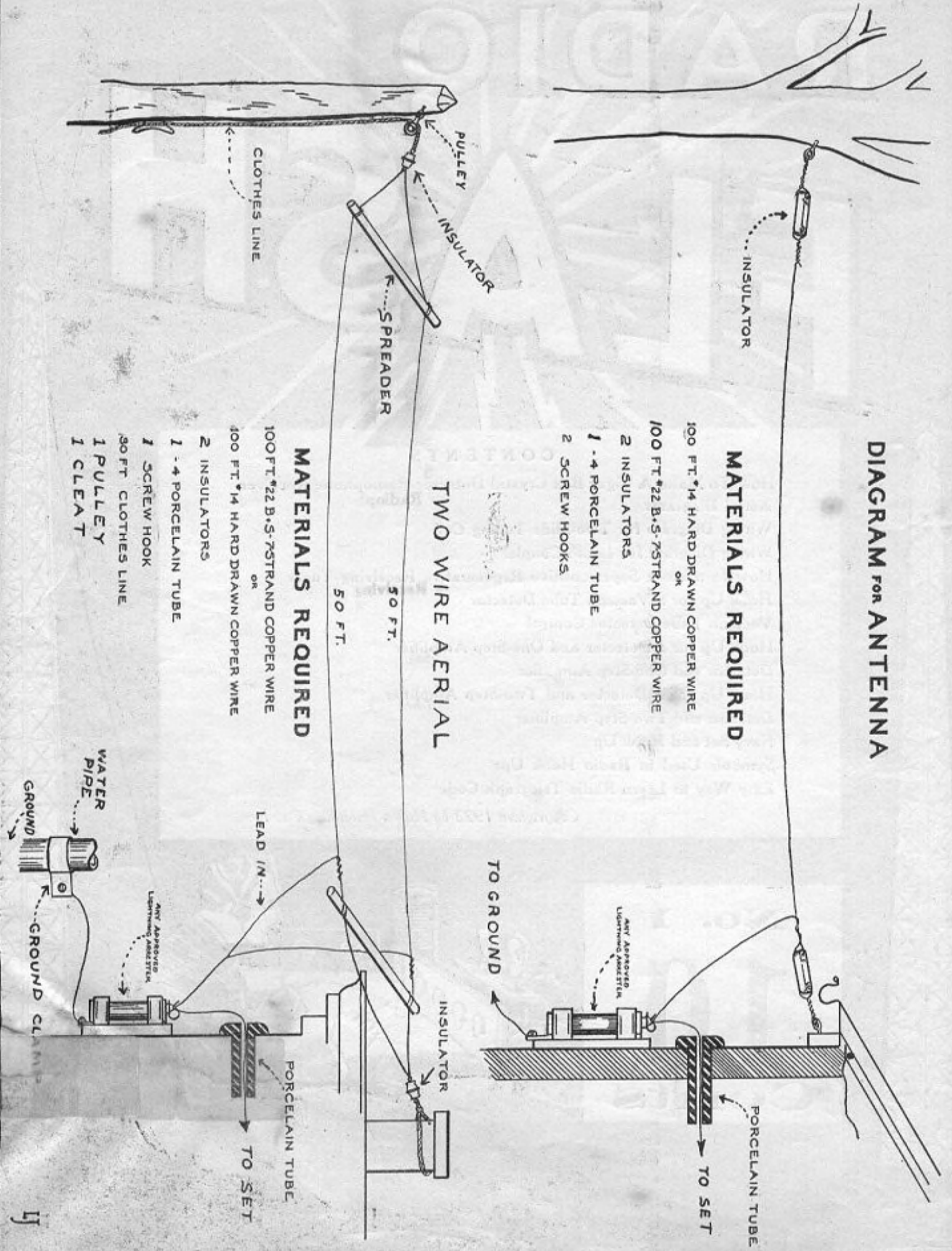
- 100 FT. #14 HARD DRAWN COPPER WIRE
- OR
- 100 FT. #22 B.S.-75 STRAND COPPER WIRE
- 2 INSULATORS
- 1 .4 PORCELAIN TUBE
- 2 SCREW HOOKS

TWO WIRE AERIAL

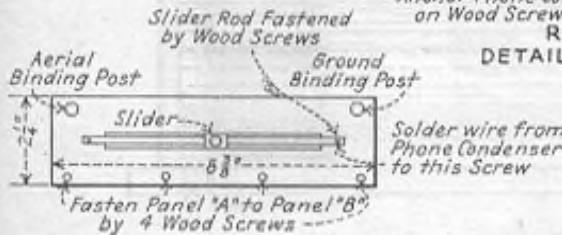
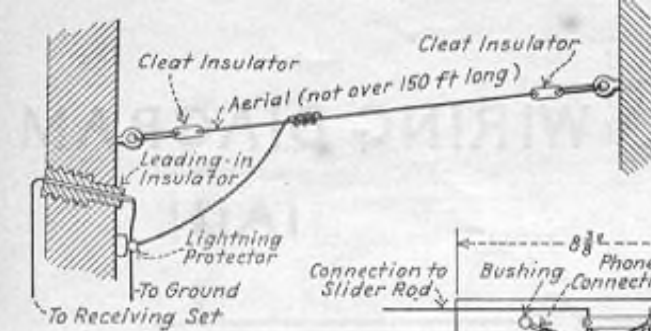
50 FT.
50 FT.
50 FT.

MATERIALS REQUIRED

- 100 FT. #22 B.S.-75 STRAND COPPER WIRE
- OR
- 100 FT. #14 HARD DRAWN COPPER WIRE
- 2 INSULATORS
- 1 .4 PORCELAIN TUBE
- 1 SCREW HOOK
- 30 FT. CLOTHES LINE
- 1 PULLEY
- 1 CLEAT

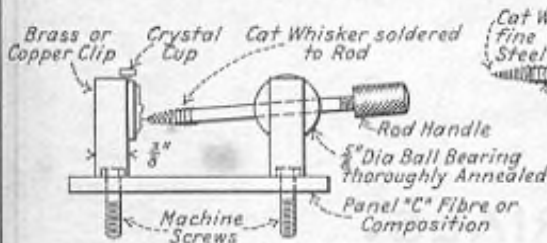


HOW TO MAKE A CIGAR BOX CRYSTAL DETECTOR RADIOPHONE RECEIVER

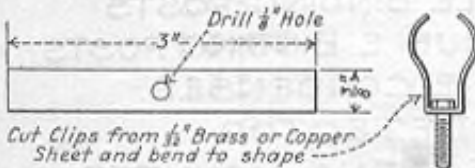


DETAIL OF PANEL "A"

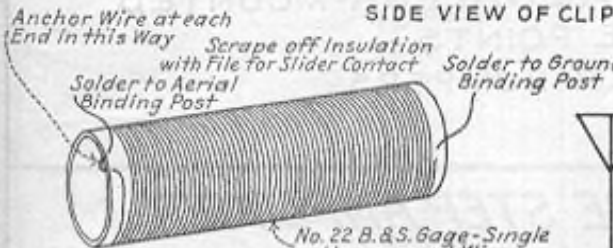
Note: First fasten Panel "A" to Panel "B" as indicated, solder up all connections and then fasten Panels to Cigar Box by means of small Wood Screws.



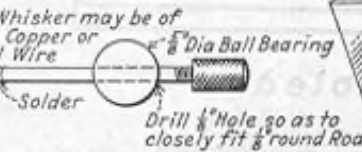
FULL SIZE ASSEMBLY OF DETECTOR



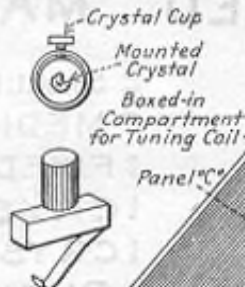
SIDE VIEW OF CLIP



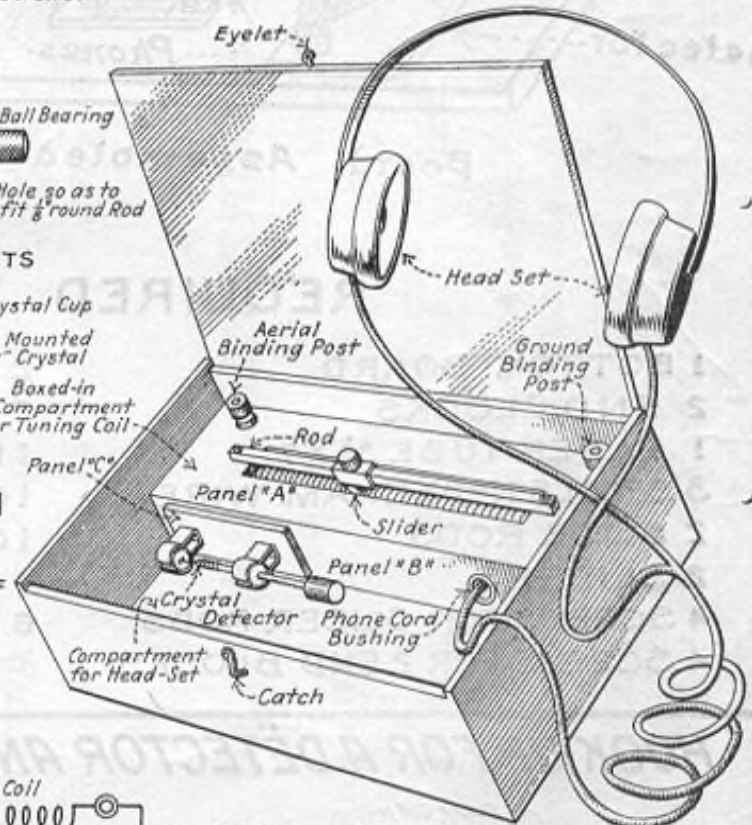
Cut Mailing Tube so that it will fit tightly into Cigar Box
DETAIL OF TUNING COIL



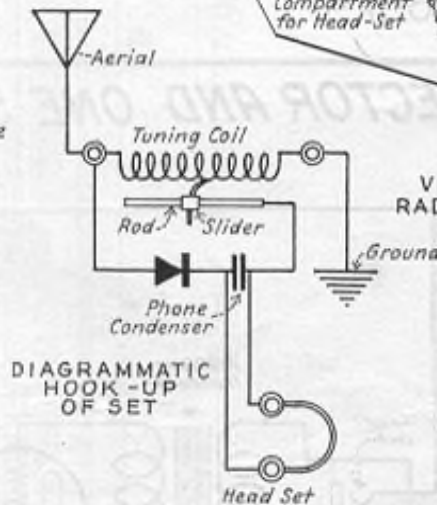
DETAIL OF DETECTOR PARTS



DETAIL OF SLIDER



VIEW OF COMPLETE RADIOPHONE RECEIVER



DIAGRAMMATIC HOOK-UP OF SET

A COMPLETE LIST OF OTHER MATERIALS AND PARTS WHICH MUST BE OBTAINED IN ORDER TO START RECEIVING THE BROADCAST CONCERTS ETC

- 150ft No. 14 B.&S. Copper Aerial Wire
- 2 - Cleat Insulators
- 1 - Lead-in Insulator
- 1 - Lightning Arrester (Required by Underwriters but not essential to operation of Set.)
- 1 - Ground Switch
- 1 - Ground Clamp
- 1 Pr - 2000 Ohm tested Telephone Receivers

DIRECTIONS:

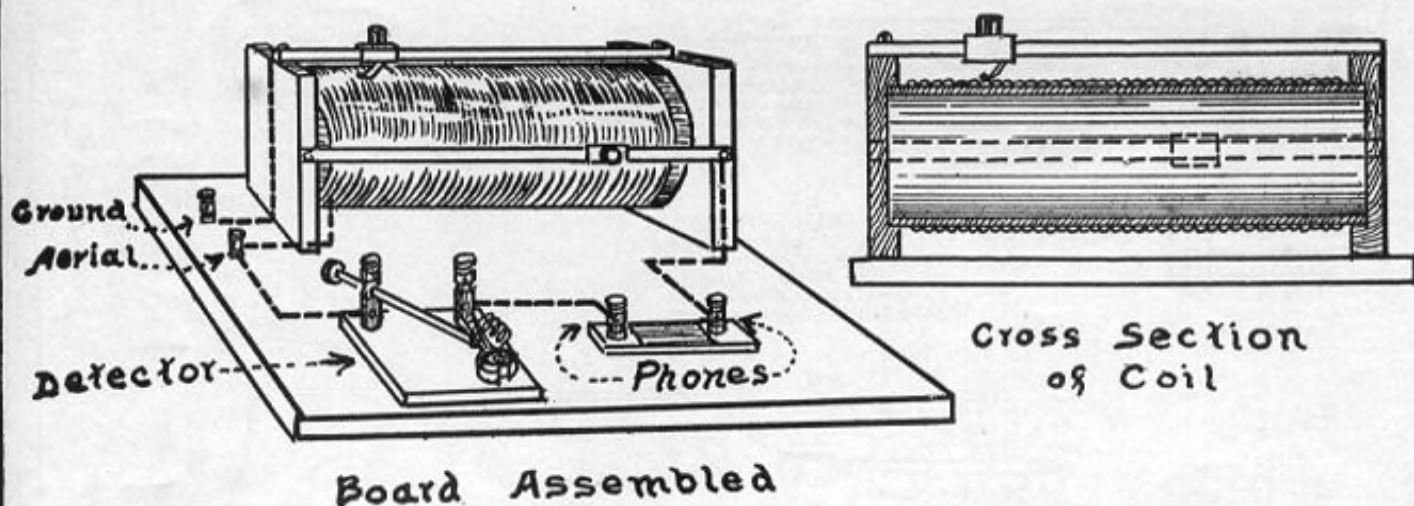
In installing the aerial great care should be taken to have all parts well insulated. All permanent connections within the cigar box should be soldered. In connecting the ground wire to the water pipe or other grounded pipe it is best to use a copper ground clamp. - Scrape the pipe clean before applying the clamp and solder the wire to the clamp. - If no clamp is available the bare wire can be wound tightly around the pipe after both have been filed clean and the wire should then be soldered directly to the pipe. To obtain best results with a crystal detector radiophone set, two things are absolutely essential. - First, a sensitive crystal and second a sensitive head set. - Be sure both these articles have been thoroughly tested before purchasing them. A good crystal can be spoiled by careless handling. Keep the fingers off the surface of the crystal. The crystal can be cleaned by washing it with benzine or naphtha. - The galena crystal works best when the cat whisker makes LIGHT contact.

LIST OF MATERIALS

No Req	Description	Size	Material
1	Cigar Box	8 1/2 x 5 1/2 x 2 1/2"	Wood
1	Panel "A"	8 1/2 x 2 1/2 x 1/4"	"
1	Panel "B"	8 1/2 x 1 1/2 x 1/4"	"
1	Panel "C"	2 1/2 x 1" x 1/8"	Compos. or Fibre
1	Mailing Tube		Card Board
100ft	S.C.C. Wire	No. 22 B.&S. Gage	Copper
1	Slider Rod	1/2 Sq x 7 1/2" long	Steel or Brass
1	Slider	To fit Rod	"
2	Clips for Detector	Holder	Brass
1	Phone Condenser	.001 M.F.	"
1	Mounted Crystal		Galena
1	Crystal Cup		"
2	Machine Screws for Clips	1/8" x	Brass
4	Nuts for Clip Screws		"
	Wood Screws		"
2	Binding Posts	Small	Nickel Finish
1	Ball Bearing	3/8" Dia	Steel
1	Round Rod	1/8" Dia x long	"
1	Cat Whisker		"
1	Knurled Rod Handle		Composition
1	Phone Cord Bushing	1/8" Dia	"
1	Fastening Catch	Hook	Brass

Note: In general it will be cheaper to purchase the phone condenser, mounted crystal, crystal cup, slider etc., rather than to attempt to construct them.

TWO SLIDE TUNING COIL WIRING DIAGRAM

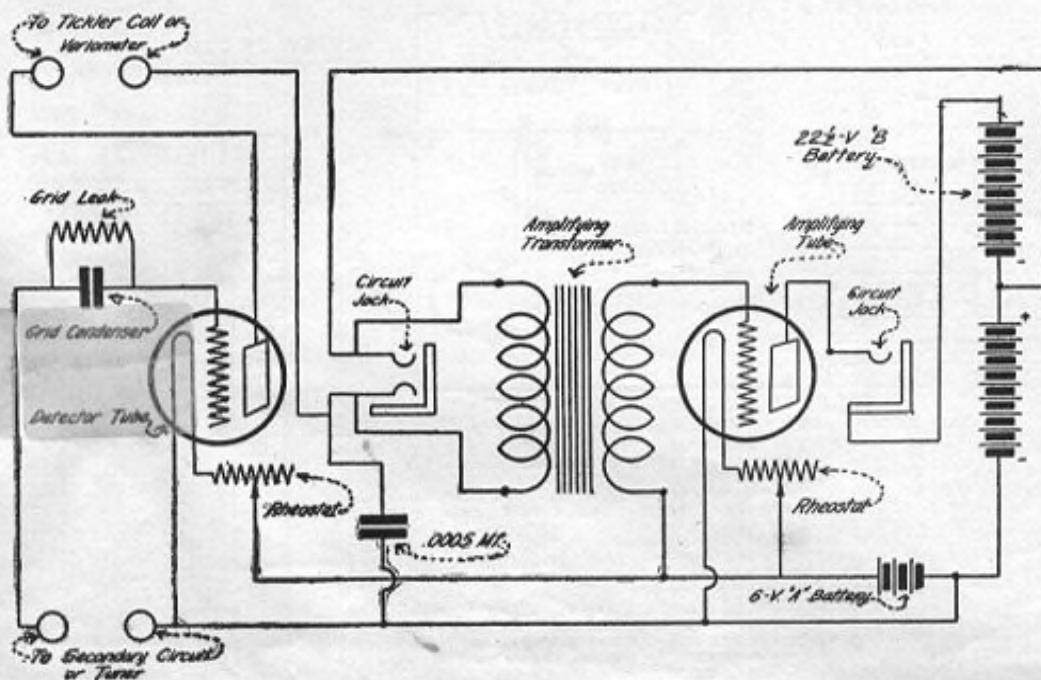


REQUIRED MATERIALS.

- 1 BOTTOM BOARD
- 2 END BLOCKS
- 1 PAPER TUBE 3½" x 7"
- 3 SPOOLS NO. 22 ENAM. WIRE
- 2 SLIDE RODS
- 2 SLIDERS
- 4 SCREWS FOR SLIDER RODS
- 4 SCREWS FOR 2 END BLOCKS

- 2 SMALL SINGLE BINDING POSTS
- 2 MEDIUM DOUBLE BINDING POSTS
- 1 FIXED PHONE CONDENSER.
- 1 CRYSTAL DETECTOR
- 1 CRYSTAL GALENA-MOUNTED
- 4 PHONE POINTS
- 6 RUBBER BUMPERS.

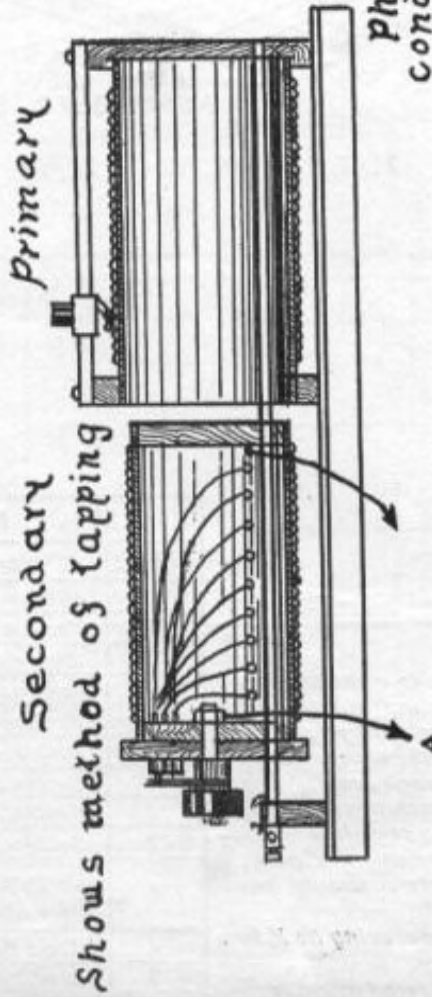
HOOK UP FOR A DETECTOR AND ONE STEP AMPLIFIER



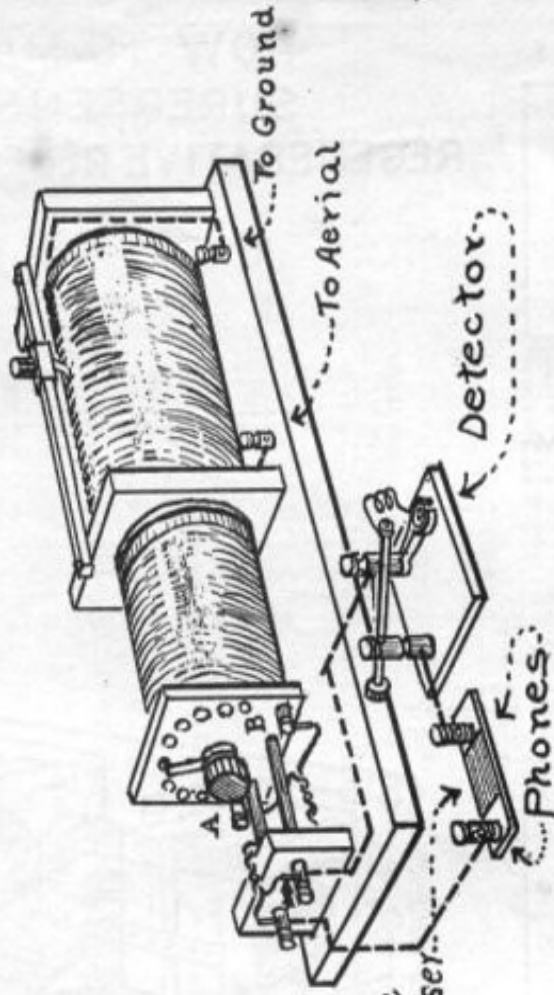
LOOSE COUPLER WIRING DIAGRAM

Condenser and detector connected to coupler.

Cross-Section of Coupler



Shows method of tapping



REQUIRED MATERIALS.

SECONDARY COIL:

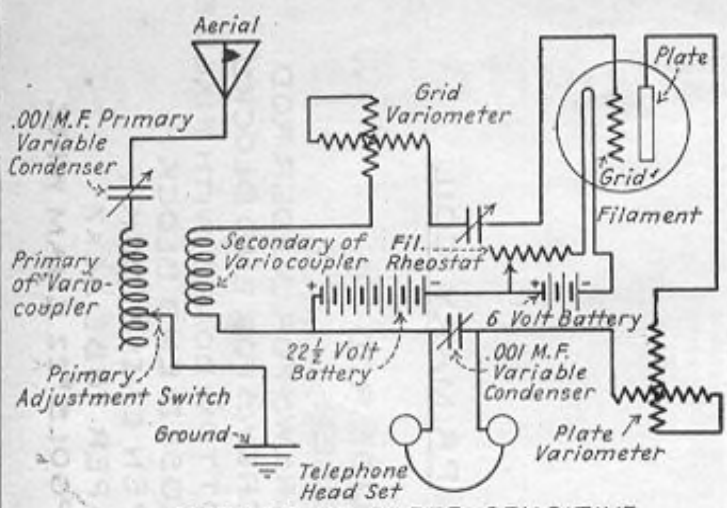
- 3 SPOOLS #22 ENAM WIRE.
- 9 SWITCH POINTS
- 1 SWITCH COMPLETE
- 2 SMALL SINGLE BINDING POSTS
- 1 3 ROUND INSIDE BLOCK
- 1 3½ DRILLED OUTSIDE BLOCK
- 1 3 PAPER TUBE

PRIMARY COIL:

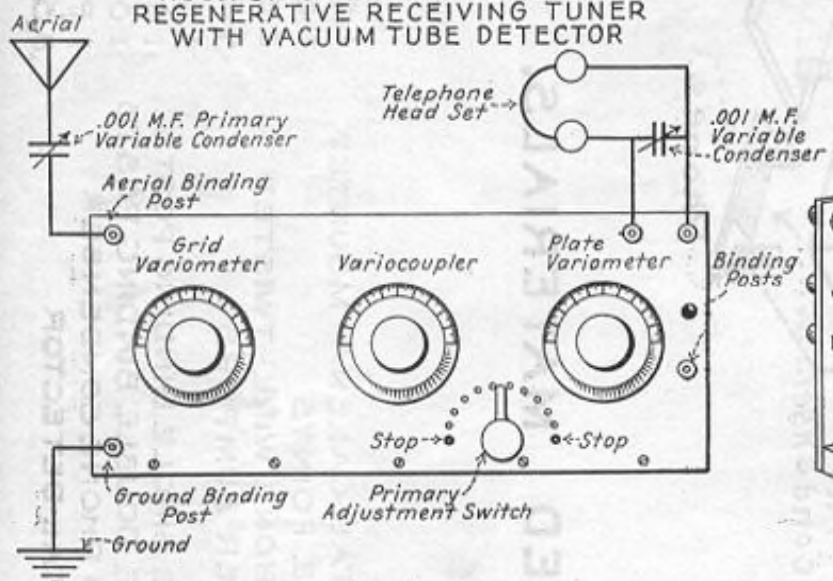
- 1 SLIDE ROD
- 1 SLIDER
- 2 SCREWS FOR SLIDER ROD
- 4 SCREWS FOR END BLOCKS
- 1 BOTTOM BOARD WITH FIXED END
- 1 CLOSED END BLOCK
- 1 OPEN END BLOCK
- 1 PAPER TUBE 3½ x 7"
- 3 SPOOLS #22 ENAM WIRE

- 1 CRYSTAL GALENA-MOUNTED
- 4 PHONE POINTS
- 12# OF PHONE WIRE-TWISTED
- 6 RUBBER BUMBERS
- 4 LARGE SINGLE BINDING POSTS
- 2 LARGE DOUBLE BINDING POSTS
- 1 FIXED PHONE CONDENSER
- 1 CRYSTAL DETECTOR

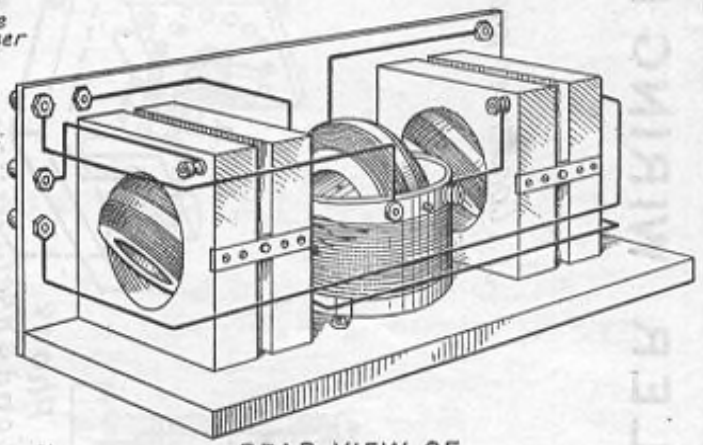
HOW TO MAKE A SUPERSENSITIVE REGENERATIVE RECEIVING TUNER



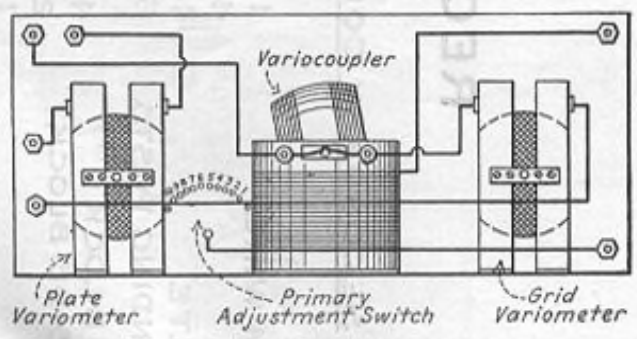
HOOK-UP OF SUPER-SENSITIVE REGENERATIVE RECEIVING TUNER WITH VACUUM TUBE DETECTOR



FRONT VIEW OF PANEL



REAR VIEW OF ASSEMBLED SET



REAR VIEW OF PANEL

DIRECTIONS

This short wave regenerative tuner is especially designed for connection to a vacuum tube detector. - The variometers are used for tuning and the circuits are inductively coupled. Broadcasting received with this circuit will come in very loud and extremely sharp tuning is also obtainable. - In constructing this tuner, a pattern the exact size of the panel should be laid out on a sheet of paper. - The position of the various switch points, binding posts, center shafts of variometers and vario coupler, attachment screws, etc., should then be marked on the paper and this can be used as a template in locating the positions of the holes to be drilled in the panel. - The variometers and vario couplers should be screwed to the wooden base. - The variometers should be rotatable through 180 degrees.

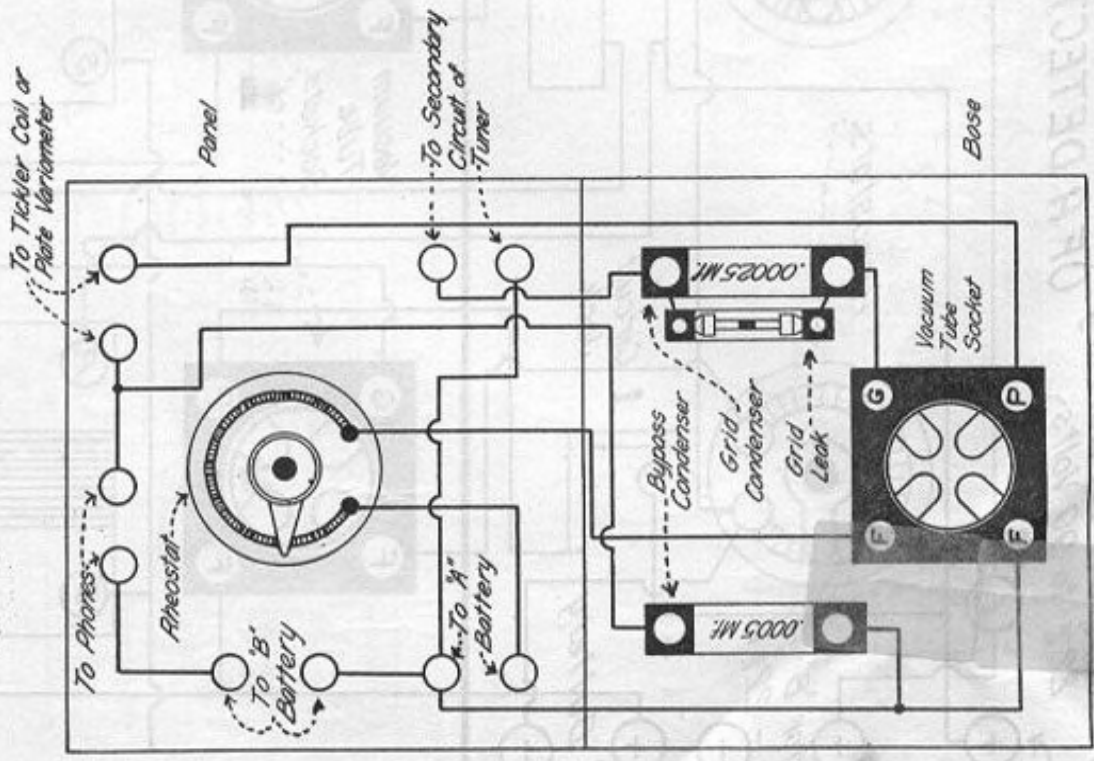
The wiring should be of the bus bar type, using No.16 bare copper wire in order to get necessary rigidity.

All connections should be carefully soldered using rosin as a flux in preference to other kinds of flux.

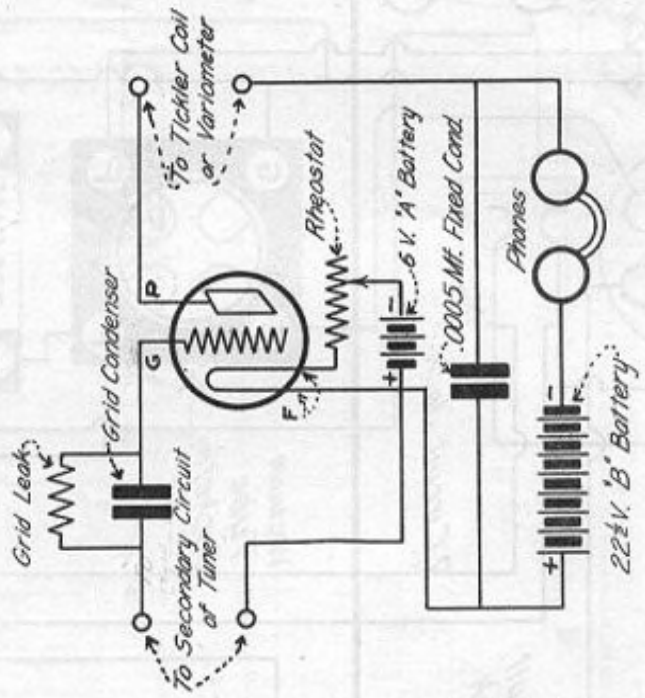
LIST OF MATERIALS

No. Req'd.	Description
2	Variometers
2	Variometer Knobs
2	Variometer Dials
1	Vario coupler
1	Vario coupler Knob
1	Variocoupler Dial
1	Switch Lever
10	Switch Points
2	Switch Stops
1	Composition (Bakelite, etc.) or Hard Rubber Panel 18 x 7 x 3/16"
1	Wood Base 18 x 7 x 5/8"
6	Binding Post
	Wood Screws
	Wire for Connections, No.16 B & S.

BACK VIEW OF PANEL & TOP VIEW OF BASE OF A VACUUM TUBE DETECTOR
TUBE DETECTOR CONTROL

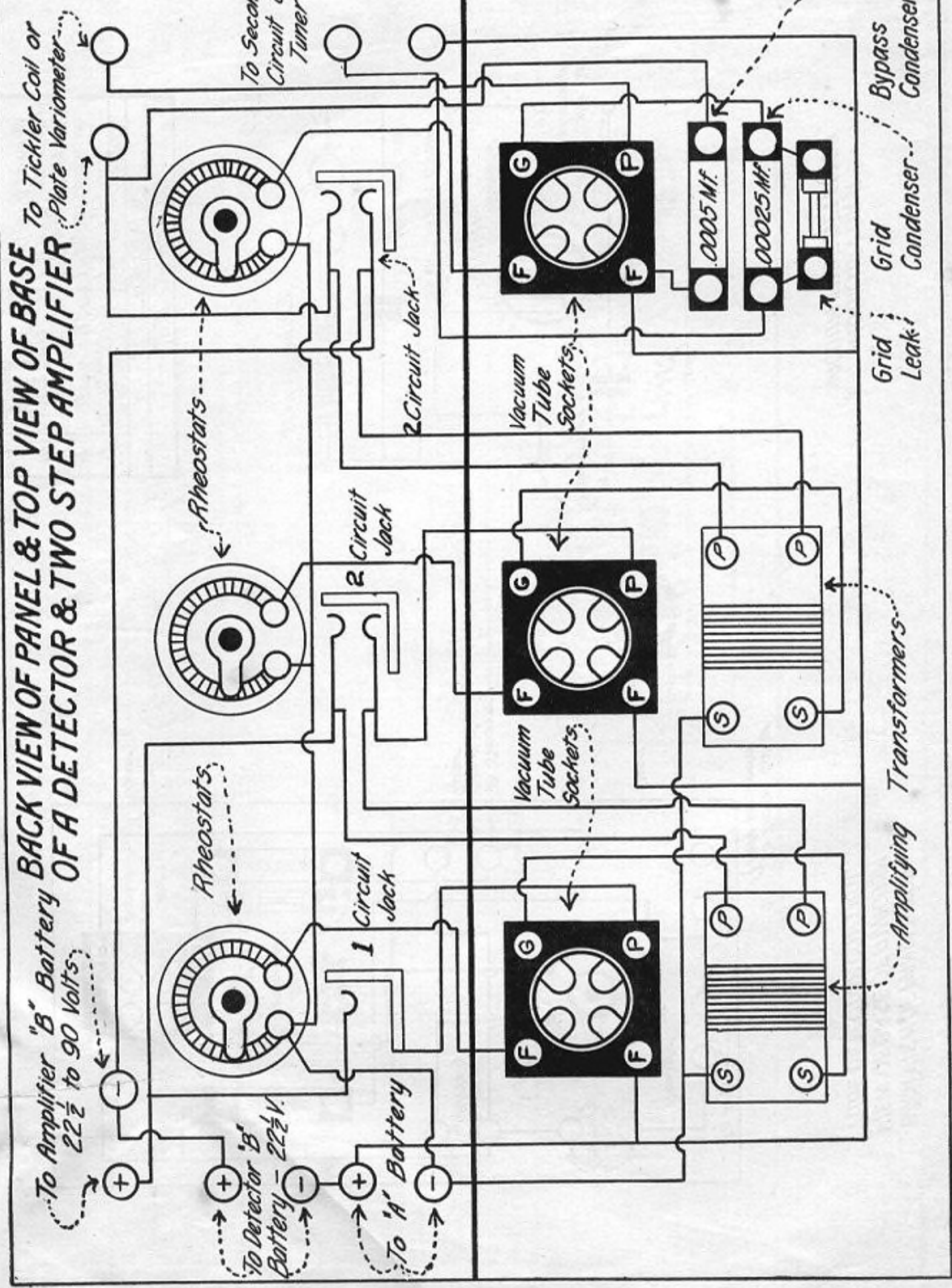


HOOK UP FOR A VACUUM TUBE DETECTOR



LIST OF PARTS	
REQ.	DESCRIPTION
1	Panel about 4"x6"
1	Base " 4"x6"
1	Rheostat
10	Binding Posts
1	Socket
1	Grid Leak
DETECTOR CONTROL	
REQ.	DESCRIPTION
1	Grid Condenser
1	Bypass Condenser
1	Vacuum Tube Detector
1	6 Volt "A" Storage Battery
1	22 1/2 Volt "B" Batteries

BACK VIEW OF PANEL & TOP VIEW OF BASE OF A DETECTOR & TWO STEP AMPLIFIER



To Amplifier "B" Battery
22 1/2 to 90 Volts

To Detector "B" Battery - 22 1/2 V.

To "A" Battery

To Secondary Circuit of Tuner

To Ticker Coil or Plate Variometer

Rheostats

Circuit Jack

Circuit Jack

Vacuum Tube Sockets

Vacuum Tube Sockets

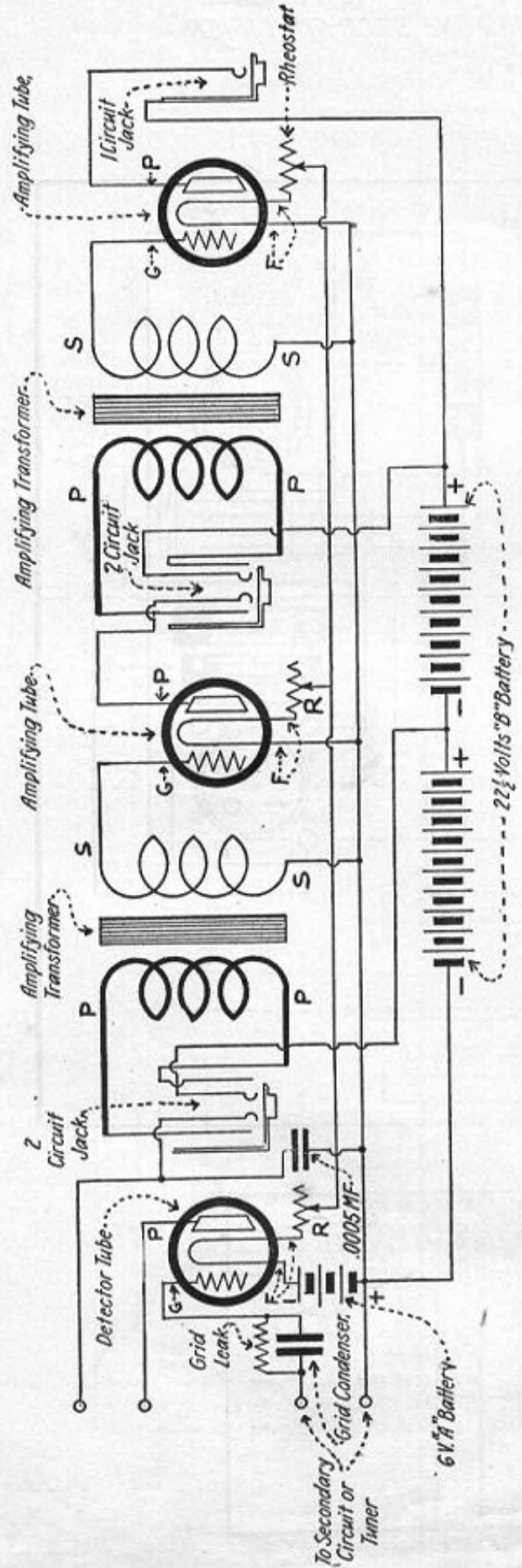
Amplifying Transformers

Grid Condenser

Grid Leak

Bypass Condenser

HOO K UP FOR A DETECTOR AND TWO STEP AMPLIFIER



DIRECTIONS

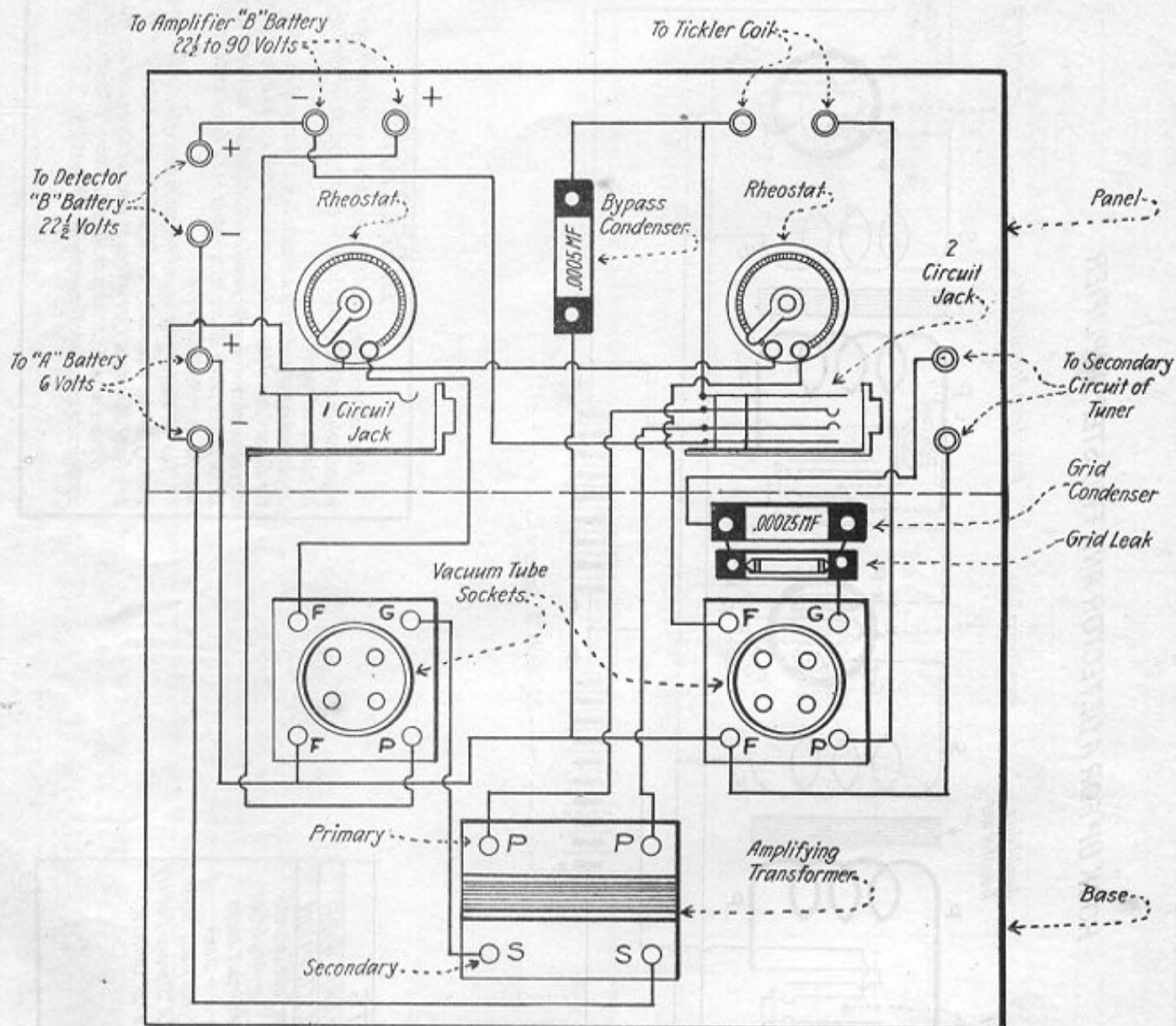
These detector and amplifiers may be used with any type of Tuner. If no regenerative effect is to be had the binding posts for the tickler coil should be connected together.

In making any of these units, the layout work will be greatly simplified if the dimensions of the parts are marked full size on a piece of paper which may be stretched over the panel, so that the holes may be drilled thru both at the proper place. All contacts should be soldered and the wiring made with No. 16 or No. 18 B.S. Wire.

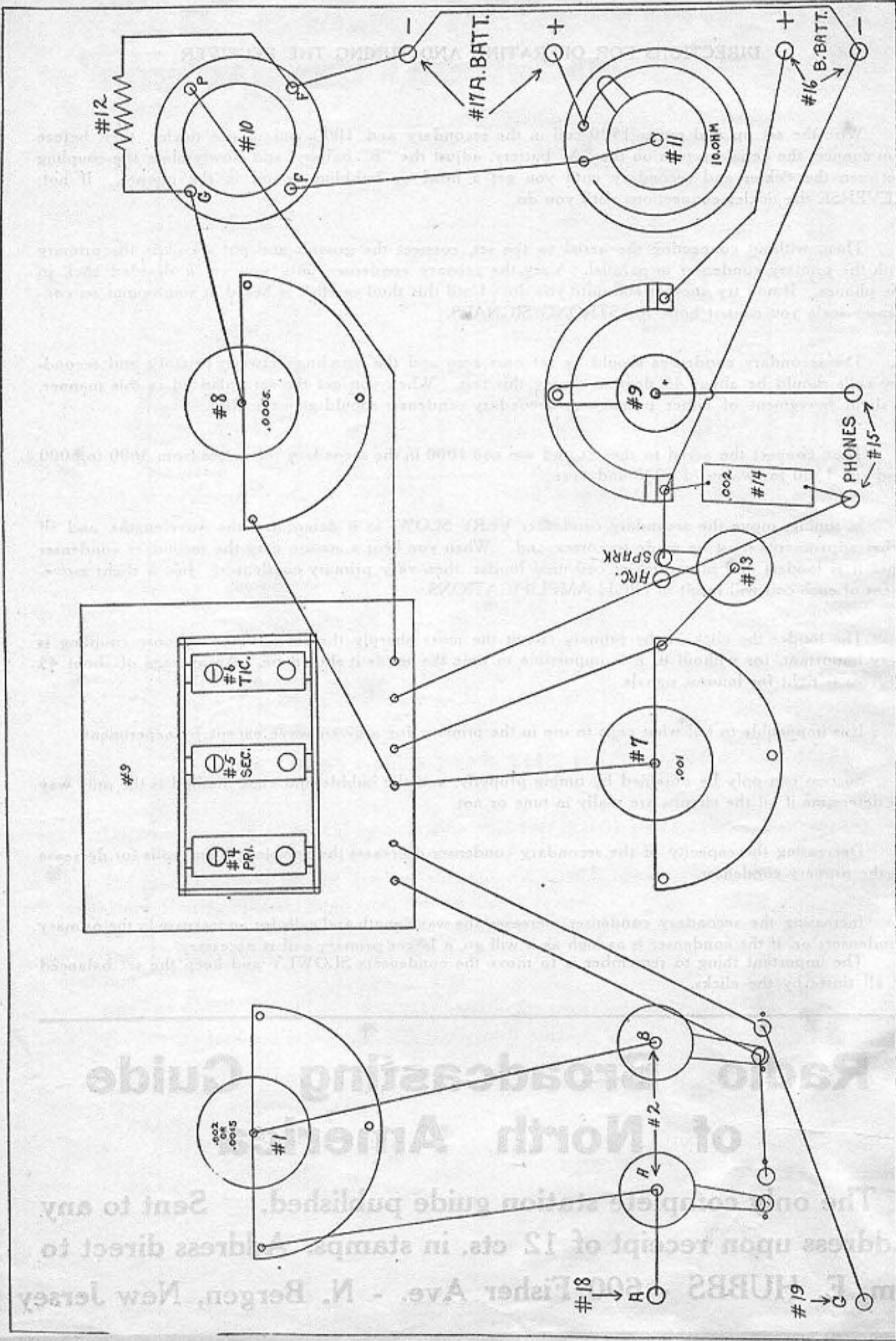
The "A" battery for any of the units described above is a 6 Volt storage battery having a capacity of 40 to 80 ampere hours. The "B" batteries may be of any standard type although those of large size are to be recommended. If more amplification is desired 3 or more "B" batteries may be connected in series to constitute the amplifier "B" battery.

LIST OF PARTS			
REQ.	DESCRIPTION	REQ.	DESCRIPTION
1	Panel about 6 1/2"	1	Vacuum Tube Detector
1	Base " 6 x 12"	2	" " Amplifier
3	Rheostats	2	Double Circuit Jacks
10	Binding Posts	1	Single " Jack
3	Sockets	2	Amplifying Transformers
1	Grid Leak	1	6 Volt "A" Storage Battery
1	Grid Condenser	2	or more "B" Batteries
1	Bypass Condenser		

BACK VIEW OF PANEL & TOP VIEW OF BASE
OF A DETECTOR AND ONE STEP AMPLIFIER



LIST OF PARTS			
DETECTOR AND ONE STEP AMPLIFIER			
REQ.	DESCRIPTION	REQ.	DESCRIPTION
1	Panel about 6"x8"	1	Vacuum Tube Detector
1	Base " 6"x8"	1	" " Amplifier
2	Rheostats	1	Double Circuit Jack
10	Binding Posts	1	Single " "
2	Sockets	1	Amplifying Transformer
1	Grid Leak	1	6 Volt "A" Storage Battery
1	Grid Condenser	2	or more "B" Batteries
1	Bypass Condenser		



- No. 1—Primary Condenser.....
- No. 2—Series and Shunt Switch.....
- No. 3—Coil Mountings (1 inch apart).....
- No. 4—Primary Plug.....
- No. 5—Secondary Plug.....
- No. 6—Ticker Plug.....
- No. 7—Secondary Condenser.....
- No. 8—Grid Leak.....
- No. 9—Grid Condenser.....
- No. 10—Chap-Farnham Graphite Potentiometer (5000 ohms).....
- No. 11—Tube Socket.....
- No. 12—Rheostat.....
- No. 13—Grid Leak.....
- No. 14—Ato and Spark Switch.....
- No. 15—Bridging Condenser (fixed).....
- No. 16—Phone Binding Posts.....
- No. 17—Phone Binding Posts.....
- No. 18—Phone Binding Posts.....
- No. 19—Phone Binding Posts.....
- No. 20—B Battery Binding Posts.....
- No. 21—A Battery Binding Posts.....
- No. 22—Aerial Binding Post.....
- No. 23—Ground Binding Post.....

Panel should be of Bakelite or Formica, about 12 x 18 inches and 3-16 inch thick. Disconnect one side of B Battery when not in use.

DIRECTIONS FOR OPERATING AND TUNING THE RECEIVER

Wire the set up and put a 1500 coil in the secondary and 1000 coil in the tickler, then before you connect the aerial up turn on the "A" battery, adjust the "B" battery, and slowly close the coupling between the tickler and secondary until you get a howl or bubbling sound in the phones. If not, REVERSE the tickler connections until you do.

Then, without connecting the aerial to the set, connect the ground and put a coil in the primary with the primary condenser in parallel. Vary the primary condenser until you get a decided click in the phones. If not, try another coil until you do. Until this thud or click is heard at some point on condenser scale you cannot hope for STRONG SIGNALS.

The secondary condenser should be set near zero and the coupling between primary and secondary coils should be about 45 degrees during this test. When you get the set balanced in this manner, a slight movement of either primary or secondary condenser should give the click.

Then connect the aerial to the set and use coil 1000 in the secondary for waves from 3600 to 6000 and coil 1500 for waves of 6000 and over.

In tuning, move the secondary condenser VERY SLOW, as it determines the wavelengths, and all other adjustments must be made to correspond. When you hear a station vary the secondary condenser until it is loudest and move tickler coil until louder, then vary primary condenser. Just a slight movement of each coil will result in HIGH AMPLIFICATIONS.

The louder the click in the primary circuit the more sharply the set is tuned. Loose coupling is very important, for without it, it is impossible to tune the set as it should be. An average of about 45 degrees is right for loudest signals.

It is impossible to tell what coils to use in the primary for a given wave except by experiment.

Success can only be obtained by tuning properly, and the bubble and click method is the only way to determine if all the circuits are really in tune or not.

Decreasing the capacity of the secondary condenser decreases the wavelength and calls for decrease in the primary condenser.

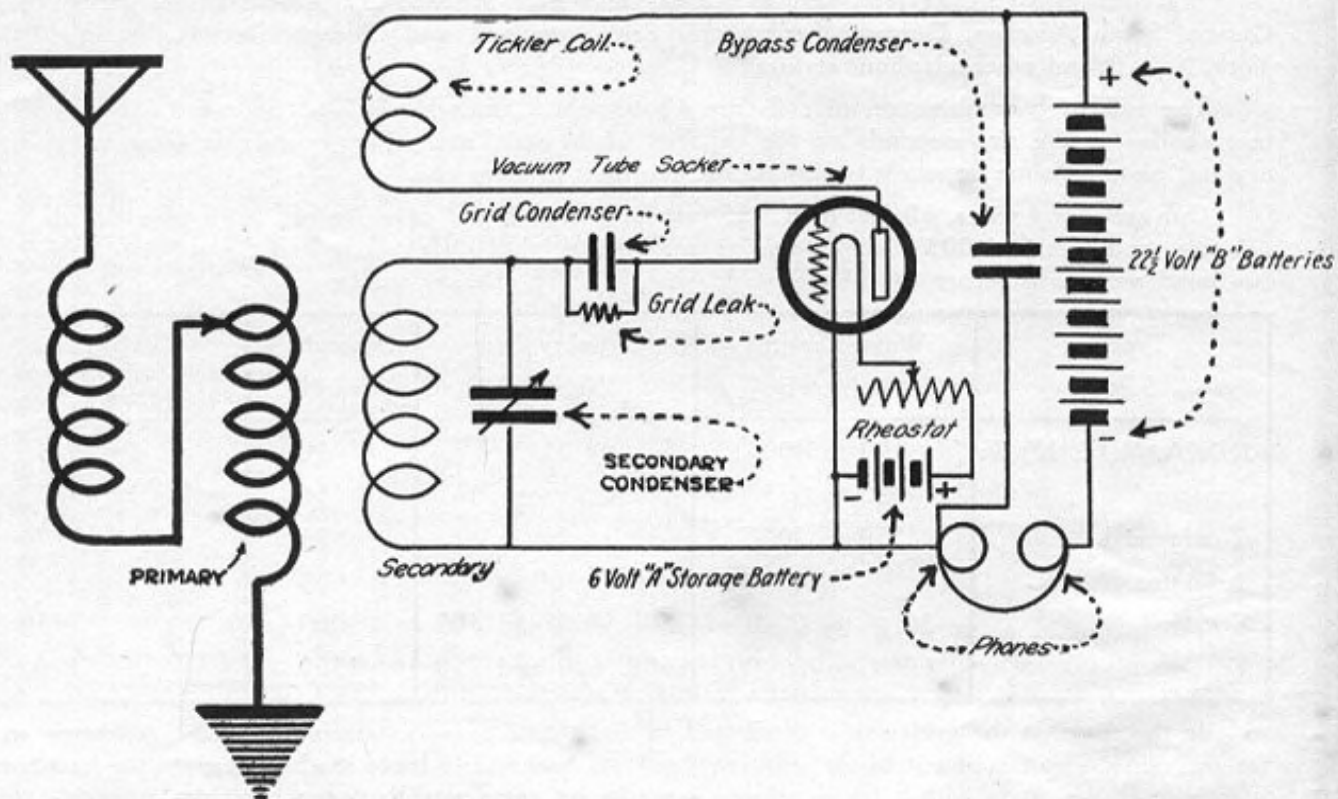
Increasing the secondary condenser increases the wavelength and calls for an increase in the primary condenser; or, if the condenser is as high as it will go, a larger primary coil is necessary.

The important thing to remember is to move the condensers SLOWLY and keep the set balanced at all times by the clicks.

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FEED BACK RECEIVING SET FOR DAMPED AND UNDAMPED WAVES



CONSTANTS FOR THE RECEIVER.

The secondary coil is shunted by a variable condenser of .001 mfd. maximum capacity, and one with a vernier will be a great help in telephone work.

The grid condenser may be fixed or variable. A variable one of .0005 mfd. will be the most satisfactory, if using different tubes from time to time.

The bridging condenser may be fixed or variable and should have a capacity of .002 mfd.

The "A" battery should be a 6 volt storage battery.
operation.

The "B" battery should be at least $22\frac{1}{2}$ volts for the most successful operation.

No primary load coil is required with honeycomb coils.

INSTRUCTIONS FOR WIRING THE RECEIVER

In our receiver we use DeForest Duo Lateral Honeycomb Coils for all wavelengths and they give us remarkable results. They are superior to anything we have ever tried in our experience of over eight years in the Radio game.

We hear amateurs as far West as Kansas and New Mexico; also Honolulu, California, British Guiana, South America, German, French and British stations, and Chicago, Detroit, Cincinnati, New York, Newark and other telephone stations.

The following combination of coils are what we use, and while it is not so easy to choose the primary coils—as the size depends on the capacity of the aerial and primary condenser—once the secondary and plate coils are known it is easy to find the right primary coil.

Our aerial is 4 wires, 60 feet high, 165 feet long, and has a capacity of .0006 Microfarads. Our primary condenser is a .003 mfd. A one or two wire aerial, 100 feet long and 30 or 40 feet high, will be found very satisfactory for phone work, with a .0015 primary condenser.

Type of Station	Wave Lengths in Meters	Primary Coil Number	Secondary Coil No.	Tickler Coil Number
KDKA, WJZ, KYW.	150 to 400	25	50	35 or 50
Amateur	330 to 375	25, 35 or 50	50	35, 50 or 75
Commercial	550 to 700	25	75	75
Arlington	2500	100	600	300
Foreign	3600 to 6000	300, 400 and 600	1000	750
Foreign	6000 to 20000	400, 600 and 750	1500	1000

In the diagram the grid leak is connected to the negative (—) terminal of the "A" battery, but we recommend connecting it to the positive (+) for trial and to leave it where it gives the best results. It may easily be made with a few lead pencil marks on cardboard between two binding posts; or, if a tubular Audiotron, UV200 Radiotron or Electron Relay Tube be used, a Remler grid leak and fixed condenser may be purchased for 90 cents and will be satisfactory.

It is important that the leads to the tickler coil be reversed and left where the valve circuit oscillates steadily. The correct connection is readily determined when an undamped station is sending.

The diagram shows the proper connections, and it is important they should be duplicated in detail. We recommend that the "B" battery be varied with a Clapp-Eastham 5000 OHM Graphite Potentiometer, but should you prefer to use a 22½ volt variable "B" battery with Radiotron UV200 Tube, connect wire from plus "B" battery post to right hand phone post and do not buy potentiometer.

All connections must be **SOLDERED** and the set wired with No. 18, or larger, annunciator wire.

The diagram shows a series condenser in the primary circuit, but we get the best results with it shunted around the primary coils. It is desirable to have a series parallel switch so it can be used either way. If possible, get a .003 for the primary circuit. It is of more real value to the set than an amplifier, when used with a large aerial and long wave lengths.

To use loose coupler with this set, plug primary and ground in No. 4, secondary in No. 5, and short No. 6 with a piece of wire.

Dealers

Drawings of Amplifier copied from Radio plans published by

S. NEWMAN & CO.

RADIO DESIGNING & ILLUSTRATING
74 Dey Street, Dep't H New York City

The following plans ready for delivery, ask for our interesting proposition.

- 1-Crystal Receiving Set
- 2-Super Selective Regenerative Tuner
- 3-V. T. Detector with 1 or 2 Step Amplifiers
- 4-Loop Aerial
- 5-Short Wave Regenerative Set
- 6-Medium Wave Tuner 180 to 3500 Meters
- 7-Amplifier
- 8-Radio Frequency Amplifier
- 9-Armstrong's Super Regenerative Tuner

EASY WAY TO LEARN RADIO TELEGRAPH CODE

While enjoying the radio telephone concerts each day, the new radio enthusiast will probably hear a great deal of dots and dashes on certain tunes other than the radio telephone one (360 meters). After a while he or she may wish to learn to read these dot and dash messages. Indeed, there is great fascination and romance in being able to do this. Briefly, there is a combination of dots and dashes representing each letter of the alphabet and numerals. The best thing to do is to memorize five characters at a time. Having mastered these, pass on to the next five. When these are mastered go back again to the first five and memorize the entire ten letters, so that you will not forget any of them as you go along. Take the end of a pencil or coin and tap out each letter as if the object were a regular telegraph key. Keep on doing this for several days and at frequent moments until you can tap out the entire alphabet and numerals rapidly and without having to think but an instant for each letter.

After you are certain you can "read off" all characters, you are ready to purchase a learner's set and learn to send properly and with a regular telegraph key.

When you can send clearly at a rate of 10 or 15 words per minute you should begin to learn to receive or copy the code. This can best be done by having an operator friend send slowly to you until you recognize each character instantly and without having to think too long. If you cannot get an operator's assistance, you may purchase an automatic sender.

After this preliminary stage, it is only a matter of constant and regular sending and receiving practice. It usually requires from two to four months of daily practice to become an amateur radio telegrapher.

MEMORIZE ONE GROUP AT A TIME

1st Lesson	2nd Lesson	3rd Lesson	4th Lesson
A ●—	F ●●—●	K ●—●—	P ●—●—
B ●—●●●	G ●—●—	L ●—●●●	Q ●—●—
C ●—●—●	H ●●●●●	M ●—●—	R ●—●—
D ●—●●●	I ●●—●—	N ●—●—	S ●●●●●
E ●—	J ●—●—●—	O ●—●—●—	T —
5th Lesson	6th Lesson	7th Lesson	
U ●●—	1 ●—●—●—	6 ●—●●●●	
V ●●●—	2 ●●—●—	7 ●—●●●●	
W ●—●—	3 ●●●—	8 ●—●●●●	
X ●—●—●—	4 ●●●●—	9 ●—●●●●	
Y ●—●—●—	5 ●●●●●	0 ●—●—●—	
Z ●—●—●●			
8th Lesson	9th Lesson		
Period ●●●●●●	Colon —●—●●●●		
Semicolon —●—●—●—●	Interrogation ●●—●—●●		
Comma ●—●—●—●—	Distress Call ●●●●—●—●●●●		

SYMBOLS USED IN RADIO HOOK-UPS

The following shows some of the symbols used in diagrams illustrating the methods of connection for radio circuits.

