

WHY A **NA-ALD** SOCKET

One of the indications of the progress of the radio art is the increased attention which is being paid to the design of individual parts.

Bakelite is one of the materials that has the combination of high insulating quality, and permanency of this quality, as well as mechanical strength. It has become to be accepted material for radio sockets and the importance is now being put on the uniform cross-section such as is found in all Na-Ald Sockets.

The actual current received in any radio set is extremely minute. The importance of avoiding losses or absorption cannot be overestimated. The best radio engineering practice of today calls for the elimination of as much material as possible in the neighborhood of the parts of the radio set which carry the radio frequency current. This applies not only to metallic substances but to insulating materials as well. Because of this, indications are that thick, heavy bases and walled Sockets, together with metal shells, will soon become as obsolete as single slide tuning coils.

Research conducted by one of the largest battery manufacturers also throws an interesting light on a Socket requisite that Na-Ald Sockets meet; namely, each contact is dependable and on most numbers of a wiping nature over as large an area as possible. In this way there is the elimination of poor connections that is one of the sources of "hissing" and "frying noises" which have often been attributed to B batteries and which research indicates in no instance exist in a battery itself.

WHAT TO BUILD?

Issued periodically by the Alden Mfg. Co.

Vol. II, No. 1

Price 15 cents



Selected and Tested Circuits ***1 to 5 Tubes***

*Including Neutrodyne, Reflex, Superdyne and
Two-Stage Amplifier*



John Alexander
Radio
Engineer
Author

FOREWORD

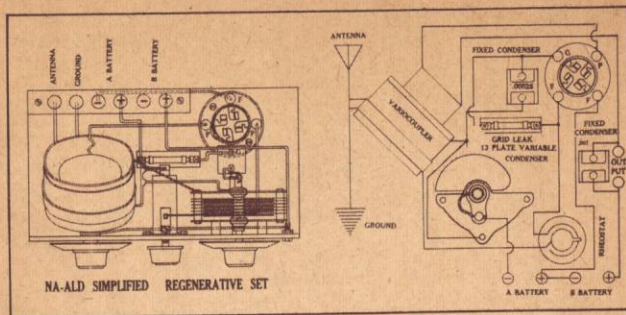
The group of circuits in this little booklet is printed for the purpose of answering to some extent the radio fan's question "what to build."

It is plainly impossible for us to print all the circuits in existence, so we have merely picked out a few which have points which especially recommend them. All of the sets shown have been built and tested and in our description we have confined ourselves to actual facts, rather than giving estimates, hopes, or expectations.

A large number of enthusiastically recommended hook-ups were tried and those shown are the result of a process of elimination. We know that the builder will get real satisfaction from the construction and operation of any of these receivers.

There is one point of construction which we believe will be interesting to mention. Many writers recommend that all instruments be mounted on the panel. This is undoubtedly an excellent idea from the viewpoint of appearance, but it often results in awkwardness in wiring and in the use of unnecessarily long leads. All of the sets shown are mounted on baseboards. This allows the vacuum tubes to be located in the rear of the set and allows the more sensitive wires to be kept away from the panel. There is no loss in efficiency, as no current conducting parts touch the base.

It is planned to issue further editions of this book from time to time, and we would appreciate comments, criticisms, or suggestions which will help us make it more valuable to you. Should you want your name placed on our preferred list to receive the first copies of our third edition, please send it with your correct address and 15 cents.



SINGLE TUBE REGENERATIVE SET

This set is intended for those who are making their first radio receiver, or for those who want a simple, efficient and inexpensive set for any purpose. It uses a minimum of apparatus and presents no difficulties to the builder. There are no tricks in this circuit and results are sure.

The experimental set was used in New York City with an aerial about 50 feet long on an apartment house roof. Local stations, such as WJZ, WOR, and WEA, came in with very good volume, and all the distant stations which are ordinarily heard in that locality, such as Chicago, Atlanta, Pittsburgh, Davenport, etc., were received with little difficulty. There are only two adjustments and the tuning is not at all difficult. The selectivity is good and the complete range of broadcasting wavelengths is covered. This type of receiver has an advantage over the ordinary single circuit receiver, in that it causes considerably less interference to neighboring receiving sets.

In the test set a Paragon Variocoupler was used. The number of turns on the stator, or outside coil, was reduced to 60. This winding formed the secondary and was connected to the variable condenser, and the grid and filament of the vacuum tube. Over the secondary, and in the same direction, were wound 10 turns of wire near the end which was connected to the filament. This winding formed the primary and was connected to the aerial and ground. The rotor or inside coil of the coupler was connected on the plate circuit as a tickler coil.

In receiving, the first operation is the adjustment of the vacuum tube. The rheostat is advanced until a hissing sound is heard in the phones, and then backed off until this sound just disappears. It will not be necessary to change this again except to compensate for changes in battery voltage.

The tuning is accomplished by advancing the tickler dial until a soft, popping sound indicates that oscillations have started, and then revolving the condenser until a whistling sound shows that a station is in tune.

The tickler coil is then moved in the reverse direction until the music or speech is cleared up. A slight readjustment all around will bring the volume up to maximum. The receiver should be kept in the oscillating state for as short a time as possible, as even this set causes some interference to others who may be listening in on the same wavelength.

The location of the instruments and the connections are shown on the accompanying diagrams.

While the layout shows a standard socket, and best results were secured with a UV 200 Vacuum tube, UV 199 or C 299 tubes also gave good results when used in the set with a Na-ald No. 429 Adapter.

When using a UV200 tube a grid leak of 1 megohm was used, and one of 4 megohms was used with the 299 tube. The best value will probably vary with different tubes of the same make.

The following material was used in the experimental set:

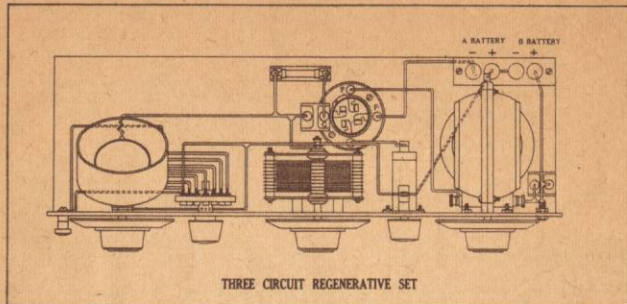
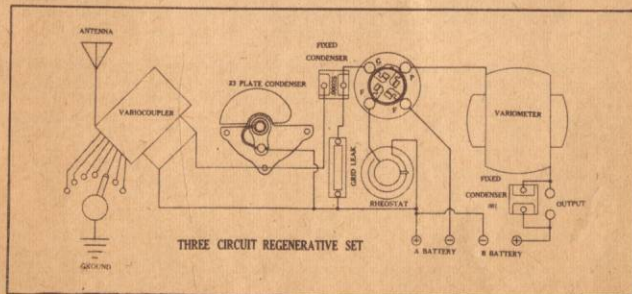
1 Base Board 7" x 10" x 1/2"	\$0.35
1 Condensite Panel, 7" x 10" x 3/16"	2.10
1 Paragon Variocoupler	3.50
1 13 plate Na-ald Condenser	3.25
1 Na-ald 4" Dial	.75
1 Filkostat	2.00
1 Dubilier Micadon Fixed Condenser, .00025	.35
1 Dubilier Micadon Fixed Condenser, .001	.35
6 Binding Posts	.60
1 Pair Na-ald Tip Jacks	.25
1 Daven Grid Leak and Holder	1.00
1 Na-ald De Luxe Socket	.75

\$15.25

THREE CIRCUIT REGENERATIVE SET

No group of circuits would be complete unless the famous Three-Circuit Regenerative Set were included. This circuit has been in use for about 10 years and the fact that it is still very popular shows its genuine merit. In fact, this particular combination of instruments has become the standard with which other circuits are compared. The writer personally believes that it still offers the best compromise between all the factors of first cost, up-keep, selectivity, volume, and ability to receive distant stations. It should be remembered that practically all records for distant reception are held by this type of receiver.

It is generally considered that the tuning of this instrument is difficult, but if the operator will intelligently study the effect of the various controls, he will have little trouble in mastering the trick in a short while. In fact, the tuning is less difficult than that of many of the so-called "simplified" sets, because it is entirely logical.



The writer has constructed and operated many sets employing this circuit, and at his home has received practically every station which has been received in his vicinity on any type of set. The test set was found sufficiently selective to receive many out-of-town stations, while the locals were in operation.

There are no particular difficulties in the wiring, and the layout and circuit diagram should be sufficient to enable anyone to construct the set.

The selectivity depends to quite an extent on the variocoupler used. The Paragon coupler was chosen on account of the small diameter of the rotor, or revolving coil. Best operation of this circuit is found at low values of coupling; that is, when the rotor coil is nearly at right angles to the primary or outside coil, and there is an appreciable air space between the two windings. The variometer should be one of fairly large inductance, having at least 60 turns on both the rotor and stator, or 120 turns in all.

A soft tube, such as the UV 200, is best for this circuit, and should be adjusted as usual just below the hissing point. Probably the best way to become familiar with the tuning operations is to first experiment with some nearby station. Set the variocoupler at about 50, and adjust the variometer until a pop indicates that the set is oscillating. Now revolve the condenser dial until a whistling sound shows that a station is tuned in. Turn back on the variometer until this disappears and the voice or music is clear. Then adjust the coupling and the switch on the coupler until the signal is loudest. Study the effect of varying each control and in a short time you will be tuning distant stations with ease. This set does not cause very much interference with other receivers, but should nevertheless be kept in the oscillating condition for as short a time as possible in the interest of general good reception.

The writer has used No. 199 and No. 299 tubes with very good results in this set. In this case a 4 megohm grid leak is about the right value.

In the experimental set the following apparatus was used:

1 Base Board, 7" x 18" x 1/2"	\$ 0.50
1 Panel Condensite, 7" x 18" x 3/16"	3.78
1 Na-ald Cogswell 23 Plate Condenser	3.90
1 Paragon Variocoupler	3.50
1 Paragon Variometer	5.00
1 Filkostat	2.00

(over)

1 Mounted Inductance Switch.....	1.25
1 Na-ald De Luxe Socket.....	.75
1 Pair Na-ald Tip Jacks.....	.25
3 Na-ald 4" Dials.....	2.25
6 Binding Posts.....	.60
1 Strip Condensite, 5" x 1".....	.20
1 Dubilier Micadon Fixed Condenser, .00025.....	.35
1 Daven Grid Leak and Mounting.....	1.00

\$25.33

TWO-STAGE AMPLIFIER

This instrument has been designed to be used in connection with any of the sets described, when more volume is desired. Due to the use of the "C" battery and the proper combination of transformers, a high degree of amplification is secured. A signal which is clear and fairly strong in the ear phones may be amplified to a volume sufficient to fill a fair-sized room, with any small loud-speaking device. In New York we have danced to music from Chicago, using this amplifier, a three-circuit regenerative set, and a Timmons Talker.

The set is designed for dry cell tubes, 199 or 299 on account of the small circuit consumption, but may be used with larger tubes by changing the sockets. It may be used on a 6-volt storage battery by connecting the tubes in series as shown in the small diagram. In the latter case, the circuit drain is so small that a 60 ampere hour battery will operate the amplifier for 1,000 hours without recharging.

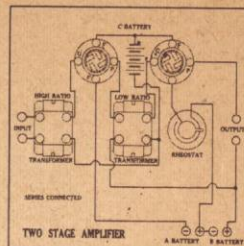
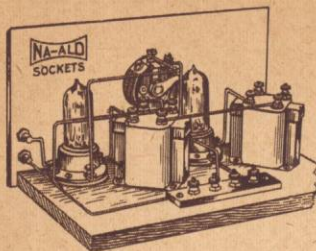
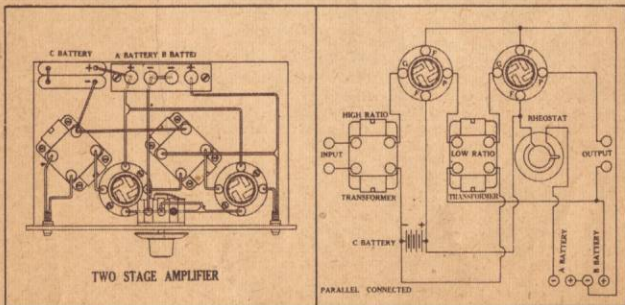
The connections are clearly shown in the diagrams and layout drawings. There is no particular advantage in the staggered arrangement of transformers other than convenience in wiring. The "C" Battery has its negative (-) terminal connected to the transformers and its positive (+) terminal to the filament. This amplifier unit is to be operated by connecting the input to the phone terminals of the set from which the signals are to be amplified. Increasing the voltage or number of cells on the B Battery will give greater volume.

The proper value of "C" Battery to be used is shown in the table below, with various "B" Battery voltages.

B Battery
45 volts
67½ volts
90 volts

C Battery
3 volts
4.5 volts
6 volts

No. of Cells in C Battery
1
2
3



The material used in the set illustrated was as follows:

1 Base Board 6" x 10" x ¼".....	\$0.35	1 Thordarson Low Ratio Transformer.....	4.00
1 Condensite Panel 7" x 10" x 3/16".....	1.00	1 Thordarson High Ratio Transformer.....	4.50
1 General Radio 30 ohm rheostat.....	1.25	2 Pair Na-ald Phone Tip Jacks.....	.50
2 Na-ald 499 Sockets.....	1.00	4 Binding Posts.....	.20
1 Na-ald 2" Dial.....	.35	4 Feet Bus Wire.....	.20
1 Strip Condensite 1" x 5" x 3/16".....	.20		
		Total cost of material.....	\$13.55

Na-ald Socket, No. 499

Price 50c Canada 70c

Making a socket for UV-199 and C-299 tubes would seem comparatively simple. When we came to design the No. 499 socket, we did not find the task so easy. Compactness and neatness were requisites; and to be true to Na-ald standards this socket required a dependable contact. Owing to the shortness of the tube terminals, the dual-wipe contact of our De Luxe socket was impossible. In the No. 499 we avoided capacity effect and secured positive contact over the full surface of the end of the tube terminals. This again justified the phrase "it's the contact that counts."



Socket No. 499
For UV 199
and C-299 Tubes

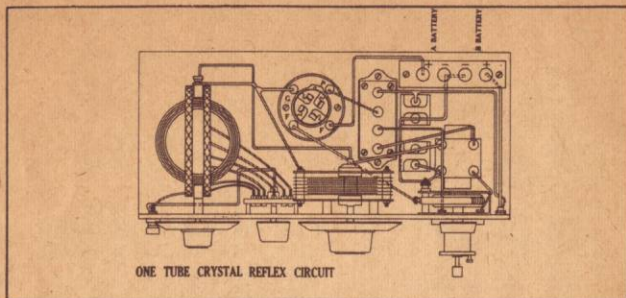
Na-ald Adapter, No. 429

Price 75c Canada \$1.00

Have you realized that the matter of design in anything as simple as an adapter will make a big difference in the result obtained with a UV-199 or C-299 tube? Na-ald No. 429 Adapter makes it possible to use these excellent tubes in regular standard sockets. Not only must means be provided for holding the tube, but had we used flat springs or allowed broad, flat surfaces to run parallel in this adapter, the capacity would rob this tube of much of its effectiveness. Again, full surface, positive contacts were necessary. These are provided by plunger pads backed with music wire springs pressing against metal cross-overs moulded in solid Bakelite. Na-ald Adapters cost but 75c, a very reasonable price in view of their assurance of the highest tube efficiency.



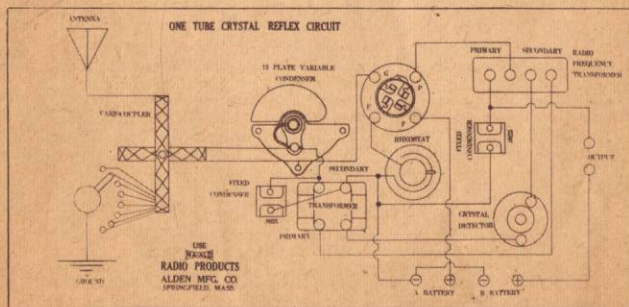
Adapter
No. 429



SINGLE TUBE REFLEX CIRCUIT

This little set gives a surprising volume for a single tube and in addition has no howls and squeals of its own. The experimental set in New York City gave good volume on a loud speaker with the local stations, and was superior to a single tube regenerative set on distance work. While it is a little broad, there was no difficulty in separating WJZ, WEA, and WOR, all of whom are very close. We believe it is sufficiently selective for most locations, and if extreme selectivity is desired, a series condenser in the antenna circuit will do the trick.

The important point in the construction of this set is the choice of proper values for the fixed condensers. It should be noticed that the condenser in the plate circuit has one side connected to the radio-frequency transformer, and that the other side goes directly to the filament of the vacuum tube. The fixed condenser across the audio-frequency transformer has a marked effect on the performance of the set, due to possible variations in aeriels and instruments. It is recommended that several sizes, from .0005 to .003, be tried. If the condenser in this position is too large, the set will oscillate; that is, a popping sound will be heard at certain adjustments of the condenser, and there will be noticeable distortion of the incoming signals. If



the condenser is too small the volume will not come up to maximum. A value of .0025 was used in the experimental set.

As this is a radio-frequency amplifier and there is no regeneration to make up for losses, a high-grade variocoupler should be used. We found the Sickles variocoupler very satisfactory in this set.

It is rather hard to give directions for tuning, as the controls are to some extent dependent on each other. However, it is not difficult. We called in a gentleman who is only slightly familiar with radio, and with no directions at all he succeeded in tuning in five different stations in less than three minutes.

While this set is primarily intended for use with UV 201-A tubes, very good results were secured with No. 199 and No. 299 tubes, in connection with the Na-ald Adapter.

The adjustment of the crystal detector is not particularly critical. When the crystal is out of adjustment, sometimes oscillation and squealing will start up. When everything is properly connected, a slight readjustment of the crystal contact will improve reception on distant stations.

The photograph and the circuit diagrams we believe make further directions on this set unnecessary.

In the experimental set the following apparatus was used.	used.
1 Base Board, 6" x 14"	\$0.75
1 Condensite Panel, 7" x 14" x 3/16"	2.30
1 Na-ald Coggswell 13 Plate Condenser No. 113	3.50
1 Sickles Variocoupler	4.50
1 Thordarson High Ratio Transformer	4.50
1 Acme R2 Radio Frequency Transformer	3.50
1 Na-ald De Luxe Socket	.75
1 Inductance Switch	1.20
2 Dubilier Micadons, .0025	.70
6 Binding Posts	.60
1 Pair Na-ald Phone Tip Jacks	.25
1 Strip Condensite 1" x 5"	.30
1 Cutler Hammer Rheostat	1.00
1 Pacent Crystal Detector	1.30

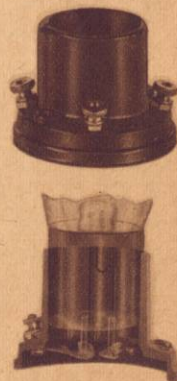
\$25.05

Na-ald De Luxe Socket, No. 400

Price 75c Canada \$1.00

Have you ever had the experience—the failure of your set to operate, and, although the filament in the tube lighted, signals refused to come in because the socket clips were not pressing against the plate and grid terminals of your tube? And after finding out that this was the case, it being necessary to hunt for a button hook or other device in an endeavor to bring the socket contacts back into their proper position?

If you are using the No. 400 Na-ald De Luxe, this trouble is over. The dual-wipe contacts of this socket press on both the sides and ends of the tube terminals. The strips are laminated like an automobile spring to insure continued resiliency. A De Luxe socket, but priced at only 75c! In comparison to the cost of other parts of your set, can you afford to use inferior sockets? Na-ald De Luxe is becoming the standard of particular set manufacturers.





3 3/4 inch DIAL
No. 3783—3784



3 inch DIAL
No. 3003—3004



2 inch DIAL
No. 3023—3024

Na-ald De Luxe Dials

Na-ald DeLuxe Dials do double duty on your radio receiver. They are beautiful. They give that final touch of distinction which completes the attractive appearance of your set, and adds to your pride of ownership. They help you tune. The big, generous knobs fit your fingers perfectly. The graduations are even, and marked with a permanent, brilliant white. The numerals are exceptionally clear and are placed on the bevel. There are no finger cramps when you tune with a Na-ald Dial. Na-ald Dials are made of black Bakelite, and are so designed and moulded as to retain their trueness and high gloss finish. Absorption losses reduced to a minimum. The set screw used in attaching is in a brass bushing.

No.				U. S. A.	Canada
3024	2-in.	Bakelite Dial	1/4 in. Insert	35c., 3 for \$1	\$.50
3023	2 in.	Bakelite Dial	3/16 in. Insert	35c., 3 for \$1	.50
3004	3 in.	Bakelite Dial	1/4 in. Insert	35c., 3 for \$1	.50
3003	3 in.	Bakelite Dial	3/16 in. Insert	35c., 3 for \$1	.50
3784	3 3/4 in.	Bakelite Dial	1/4 in. Insert	.75	1.00
3783	3 3/4 in.	Bakelite Dial	3/16 in. Insert	.75	1.00
3154		Bakelite Knob	1/4 in. Insert	.20	.30
3153		Bakelite Knob	3/16 in. Insert	.20	.30

Na-ald Vernier Dial

In operating the Na-ald Finger-Touch Vernier adjustment, the Condenser is broadly tuned with the hand on the Knob.

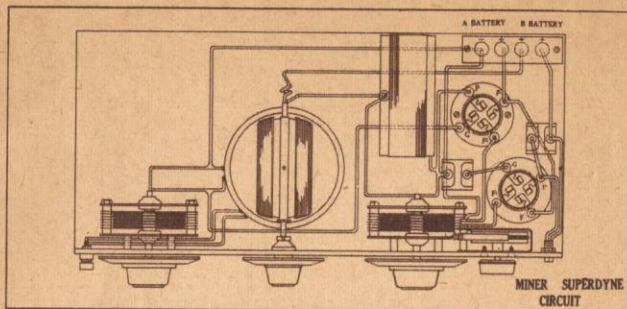
Through the combination of leverages and gear action, the very minutest adjustment in either direction is obtained. As the hand in making these adjustments is a considerable distance from the device being tuned, there is a minimum capacity effect. A further advantage of this adjustment over other methods lies in the fact that by operation of this Vernier adjustment micrometer movement can be made over the entire scale of the Dial, so that sharply tuned stations that might not otherwise be located will be received by this method of tuning.



3 inch Dial
3 7-8 inch Dial

Canada
\$1.75
2.30

U. S. A.
\$1.25
1.65



THE MINER SUPERDYNE CIRCUIT

This is one of the very recent circuits which have appeared and we have found it the most successful of the many attempts to combine the advantages of regeneration and radio-frequency amplification. While we would not recommend that it be attempted by one who is building his first set, still it is not beyond the ability of anyone with a little experience in radio construction.

This circuit differs from the usual radio-frequency circuit in the use of the "tickler" coil. It is found in all tuned radio-frequency circuits that when the circuits of all the stages are tuned alike, oscillations begin. The effect of these oscillations is either to make the set go entirely "dead" or to cause a squeal. Various methods have been used to neutralize this tendency, such as potentiometers, the neutralizing condensers in the Neutrodyne Circuit, and straight resistances. In the Superdyne Circuit it is accomplished through the tickler coil which may be adjusted so as to bring back just enough energy from the plate circuit to the grid circuit in the reverse direction to counteract this effect. In this circuit in particular the size of the winding forms, size of wire and number of turns must be followed very carefully if success is to be obtained.

It may seem that the 4 1/4" coils are rather cumbersome, but it should be remembered that this size gives the most inductance with the least wire at the particular value of inductance used.

With the experimental set which is shown in the diagrams, we secured a greater volume than that from a standard three-circuit regenerative tuner, which shows that actual amplification was being obtained from the radio-frequency tube. This is more than can be said of the usual single stage radio frequency set. In addition, we heard a number of stations which had not previously been received. The operation of tuning is not difficult once the "hang" of the set is secured, but it will probably take several hours to become familiar with all the controls. Fortunately, however, once a station has been received, it may be logged, and then easily picked up again.

In the wiring diagram, the variocoupler is used to provide the feed-back control. The stator consists of 42 turns of No. 22 wire, wound on a form 4 1/4 inches in diameter. Over this are wound 4 turns of the same wire spaced 1/4 inch between turns. This latter winding is connected to the antenna and ground. The rotor is of the

ball type, $3\frac{3}{8}$ inches in diameter, wound with 18 turns of the same wire on each side, making 36 turns in all. The coil which is shown in the plate circuit is also $4\frac{1}{4}$ inches in diameter and is wound with 46 turns of No. 22 wire. There are several couplers on the market which will furnish the parts for this piece of apparatus. They will, of course, have to be re-wound.

In the assembly of the set, the layout as shown in the photograph should be followed closely, in particular, the wires leading to the plate and grid of the first tube should be kept as far from each other as possible, and not be run parallel to each other. This is accomplished by making the plate leads as short as is permitted by the spacing of the parts.

After the set is completed and before the final connections are made, the effect of reversing the connections to the rotor of the coupler should be tried. If all connections are properly made, there should be no oscillation or popping no matter at what value the two condensers are set, when the winding of the rotor is parallel to the winding of the stator.

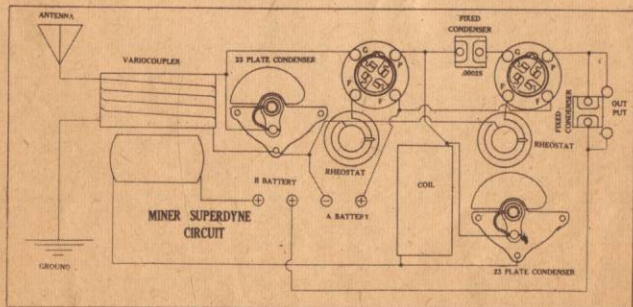
In tuning, set the condenser in the plate circuit at, say 10, and with the other condenser at a similar low value, revolve the rotor dial until a popping sound indicates that oscillations have started. Turn back until another popping sound shows that oscillations have stopped. Now revolve the two condensers together, keeping just below the point of oscillation until a station is heard. A slight readjustment all around will bring the station up to considerable volume.

This set works much better with the large tubes than with the 199s or 299s. A UV 200 was used as detector, and a UV 201-A was used as amplifier. It was also found that operation was much easier when one or two stages of audio-frequency amplification were used. When using the set without an amplifier on some antennas, it may be found that it is very sensitive to the operator's hand. If this is the case, disregard the regular primary winding and connect the antenna directly to the grid side of the variocoupler and ground the filament battery. The latter may use the small tubes to good advantage, thus avoiding battery drain.

The negative of the B Battery should be connected to the positive side of the A Battery.

The following parts were used in the experimental set:

1 Base Board, 9" x 18" \$0.50



1 Condensite Panel, 7" x 18" x 3/16"	2.95
2 Na-ald Cogswell 23 plate Condensers, No. 123	
\$3.90 each	7.80
2 Cutler-Hammer Rheostats	2.00
1 Rotor $3\frac{3}{8}$ " diameter	1.00
2 Condensite Tubes, 2" x $4\frac{1}{4}$ " diameter	.60
1 Dubilier Micadon, No. 601, .00025 mfd.	.35
2 Na-ald 4" Dials, No. 3784	1.50
2 Na-ald De Luxe Sockets	1.50
1 Dubilier Micadon b, .001 mfd.	.35
6 Binding Posts	.90
1 Strip Condensite, 1" x 5"	.20
$\frac{1}{2}$ lb. No. 22 No. S.C.C. Wire	.50
1 Pair Na-ald Phone Tip Jacks	.25

\$20.40

Note: 2 13-Plate Condensers may be used, but the wave-length will be limited to about 510 meters.

Na-ald Cogswell Condensers

Na-ald condensers are built for the particular man—and the price is no higher than that of an ordinary condenser. You can move this condenser with the slightest touch. And yet, once set, it holds its position until you wish to tune again. A double cone bearing takes care of that. This bearing also eliminates side play and automatically takes up the wear.

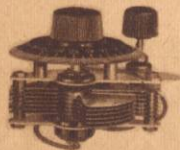
The plates are built of duraluminum—a non-magnetic material having the strength of steel. This material is specified by the U. S. Signal Corps for use in all their condensers and insures a rigid non-bending plate. These plates are spaced by means of a solid post construction which eliminates the inaccuracies usually found in condensers employing washers.

Insulation is of Bakelite, moisture-proof and non-warping. Braided tinsel pig tails are used to eliminate contact noises. Binding Posts are conveniently located.

The movable plates are shaped according to the Bureau of Standards Square law design, which gives uniform wavelength increase.

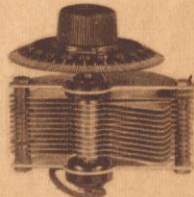
Na-ald Vernier Condensers are unique. The Vernier has independent bearings and pig tail connections. Noise from loose contacts cannot develop with this adjustment. It can be attached at any time and does not have to be purchased with the condenser.

Losses so low that they could not be measured with any instrument at the Westinghouse Electric and Manufacturing Co. Laboratory at Springfield, Mass.



Condenser with Vernier

No. 113V, \$4.50
No. 123V, \$4.90
No. 143V, \$5.70



Condenser Without Vernier

No. 113, \$3.50
No. 123, \$3.90
No. 143, \$4.70



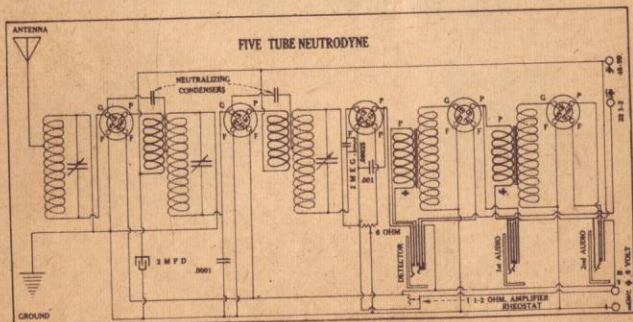
FIVE TUBE NEUTRODYNE RECEIVER

By J. H. FREED, Chief Engineer
 THE FREED-EISEMANN RADIO CORP., LICENSEES UNDER THE
 HAZELTINE NEUTRODYNE PATENTS

The Neutrodyne Receiver represents the very latest type of broadcast receiver. It consists of two stages of tuned radio frequency amplification with neutralization of capacity coupling, a non-regenerative detector, and two stages of power audio amplification.

The set is the most selective of any type known today, and has the advantage of bringing in stations from very great distances without distortion. Stations on the Pacific Coast have often been heard in New York City.

The success of this set depends upon having the proper parts and in having these parts properly arranged. It is inadvisable to attempt to build a neutrodyne receiver unless all the parts are purchased from a licensed manufacturer. We recommend, to anyone who desires to build a neutrodyne receiver, that he purchase the complete knock-down 5-tube receiver known as the "Freed-Eisemann KD-50 Knock-Down Neutrodyne Receiver." A cut of this complete receiving set is shown.



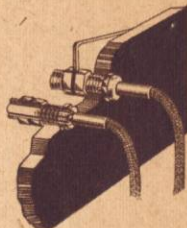
The complete set has been carefully designed and, when assembled in accordance with the full size blueprints and instructions which accompany it, has invariably given satisfaction.

This Freed-Eisemann knock-down set includes Alden Manufacturing Company 4" dials, 2" dials and sockets. The remaining parts are carefully chosen and matched by the manufacturer so that the person who buys the complete knock-down set will be assured of good results.

Na-ald Phone Tip Jack

Na-ald Phone Tip Jacks make a very easy and a very satisfactory means of connecting as many sets of Phones and Loud Speakers as are desired, connecting them either in series or in parallel. To install these jacks all that is necessary is to bore $\frac{1}{4}$ " holes in the panel, clamping the bus wire under the nut and lock nut provided. Extra sets can be connected either in series or parallel.

The Na-ald Jack grips all sizes of terminals, making positive contact and holding them firmly. This result is secured by means of a split tubing drawn together by a coiled music wire spring. At the same time the tension is such that they can be easily removed and changed from one stage of amplification to another.



Na-ald Phone Tip Jack
 No. 12—25c a pair

Na-ald Small Space Radio Frequency Socket, No. 401

35c, 3 for \$1.00

In the No. 401 we have produced the closest to the engineer's ideal in socket design. This socket is only excelled by our No. 400 De Luxe with its dual wipe contact. The engineer's ideal calls for the highest insulation with a minimum of material. Excess or heavy uniform walls, even of Bakelite, do not have the same dielectric properties as a uniform, thoroughly cured Bakelite. Metal shells, which short-circuit part of the insulation and provide low resistance leakage paths are avoided. The reinforced slot, and high quality material make this socket durable as well as efficient. Again, it requires only a minimum of mounting space and is provided with a laminated dual-pressure contact.



Small Space Socket
 No. 401
 35c, 3 for \$1.00

Na-ald W. D. 11 Socket, No. 411

Price 75c Canada \$1.00

This socket was developed for use with the W. D. 11 tube. Used with this tube, it has no equal, as the tube slips readily into place and is held firmly by a wiping contact over a broad surface. The tube cannot jump out as the wiping contacts grip it securely. This socket will also accommodate British and French Tubes.



Na-ald W. D. 11
 No. 411
 Price 75c