Stromberg-Carlson

No. 744

Radio Receiver

and

Electric Phonograph Combination

REFERENCE BOOK

Printed in U. S. A.

Stromberg-Carlson

No. 744

Radio Receiver and Electric Phonograph Combination

To Operate Without Antenna Directly from 105-125 Volt 50-60 Cycle Alternating Current

INSTRUCTIONS FOR INSTALLING AND OPERATING

Copyrighted 1927
by Stromberg-Carlson Telephone Mfg. Co.

Extra Copies Furnished at
One Dollar Each

Stromberg-Carlson Telephone Mfg. Co.
ROCHESTER, N. Y., U. S. A.
Chicago, Illinois Kansas City, Mo. Toronto, Canada
P-17556, Form 1269 (9-1-27)

GUARANTEE ON STROMBERG-CARLSON RADIO RECEIVERS

_____, of _____, _____
(Name of Purchaser) (Street Address) City)

has this day purchased from the undersigned, the following Radio Receiver: Code No. _____ Serial No. _____

This Receiver was manufactured by the Stromberg-Carlson Telephone Manufacturing Company of Rochester, N. Y., whose guarantee covering same is as follows:

GUARANTEE

"Stromberg-Carlson Radio Apparatus is thoroughly tested and calibrated before leaving the factory and is fully guaranteed against defective material and workmanship, under the following conditions:

Should any defect develop within one year from the date of purchase, any part or parts which are defective will be repaired or replaced by us, provided our inspection shows same to be defective, upon return thereof to our factory at Rochester, N.Y., transportation charges prepaid.

Any such apparatus claimed to be defective should be returned by the purchaser to the authorized Stromberg-Carlson dealer from whom it was purchased. If that dealer cannot remedy the claimed defect he will forward such apparatus to us.

Tubes, batteries, antenna outfits, radio cabinet tables and other accessories which accompany our radio receivers, or which are sold therewith, not being manufactured by us are not covered by this guarantee.

THIS GUARANTEE IS LIMITED TO THE ORIGINAL PURCHASER OF A NEW RECEIVER FROM AN AUTHORIZED STROMBERG-CARLSON DEALER WHO HAS OBTAINED THE RECEIVER DIRECT FROM THE STROMBERG-CARLSON FACTORY.

Subject to the above conditions, this guarantee shall become effective only when this form has been issued and countersigned by an authorized Stromberg-Carlson dealer and when the receiver covered hereby is registered at the factory by the original purchaser."

STROMBERG-CARLSON TELEPHONE MANUFACTURING CO.

W. Roy McCann
President.

The undersigned hereby certifies that he is an authorized Stromberg-Carlson dealer and that the radio receiver listed above is new apparatus obtained direct from the Stromberg-Carlson factory and that the purchaser above specified is the original purchaser thereof.

_____ _____
(Dealer's Store Address) *(Authorized Dealer.)*

NOTICE: This guarantee is valid only after the attached Registry Card has been received at the factory.

P-16545 Form No. 1205 7-10-26

Be sure to have Dealer sign.

(Owner to detach and mail this card to the Stromberg-Carlson Factory)

Serial No._____

REGISTRY CARD

Date_____

Gentlemen:

I have just purchased a Stromberg-Carlson Receiver bearing the above serial number from

Dealer's Name_____

Dealer's Address_____

Installed by_____

Accessories used_____

_____

_____

_____

_____

_____

_____

_____

Owner must fill out and mail this card

I hold guarantee countersigned by the above as a duly authorized Stromberg-Carlson Dealer and request your validating this guarantee by its registration.

Owner's Name_____

Address_____

Stromberg-Carlson Receiver type_____

Fig. 1—Registry Card and Guarantee Form which Dealer must countersign and present every purchaser of a new Stromberg-Carlson Radio Receiver

§ 1—GUARANTEE FORM AND REGISTRY CARD

The Guarantee Form and attached Registry Card, which should accompany each Stromberg-Carlson Radio Receiver, is reproduced in Figure 1. The Guarantee reads as follows:

> "Stromberg-Carlson Radio Apparatus is thoroughly tested and calibrated before leaving the factory and is fully guaranteed against defective material and workmanship, under the following conditions:
>
> Should any defect develop within one year from the date of purchase, any part or parts which are defective will be repaired or replaced by us, provided our inspection shows same to be defective, upon return thereof to our factory at Rochester, N. Y., transportation charges prepaid.
>
> Any such apparatus claimed to be defective should be returned by the purchaser to the authorized Stromberg-Carlson dealer from whom it was purchased. If that dealer cannot remedy the claimed defect he will forward such apparatus to us.
>
> Tubes, batteries, antenna outfits, radio cabinet tables and other accessories which accompany our radio receivers, or which are sold herewith, not being manufactured by us are not covered by this guarantee.
>
> THIS GUARANTEE IS LIMITED TO THE ORIGINAL PURCHASER OF A NEW RECEIVER FROM AN AUTHORIZED STROMBERG-CARLSON DEALER WHO HAS OBTAINED THE RECEIVER DIRECT FROM THE STROMBERG-CARLSON FACTORY.
>
> Subject to the above conditions, this guarantee shall become effective only when this form has been issued and countersigned by an authorized Stromberg-Carlson dealer and when the receiver covered hereby is registered at the factory by the original purchaser."
>
> STROMBERG-CARLSON TELEPHONE MFG. CO.
>
> W. Roy McKenna
>
> *President.*

Important:

Inasmuch as this guarantee is dependent upon the purchaser's possession of the Guarantee Card properly filled in to show that he is the original purchaser of a new receiver from an authorized dealer, it is imperative that every Stromberg-Carlson owner insist upon the dealer's issuing him a Guarantee Form countersigned with the dealer's name and store address and with a Registry Card attached. THE PURCHASER SHOULD FILE THIS FORM IN SOME SAFE PLACE.

Furthermore, inasmuch as this guarantee does not become effective until the Registry Card, properly filled in by the purchaser, is received at the Stromberg-Carlson factory, it is equally imperative that the new Stromberg-Carlson owner mail us this Registry Card immediately upon receipt of his receiver. Be sure to give the serial number and the type (Code No.) correctly.

The receipt of this Registry Card at our factory not only protects an owner by making effectual the guarantee contract form which he holds,

but also places him on our mailing list for service helps and information on improvements which may be made on his set.

It is the policy of Stromberg-Carlson engineers to so design improvements that they may be incorporated, as far as possible, in existing Stromberg-Carlson receivers. The original Stromberg-Carlson receivers have been brought up to date from time to time in accordance with this policy, and are by no means obsolete. Although the present series of Stromberg-Carlson receivers would seem to be the ultimate development which may be expected in radio receivers for many years, it is nevertheless to the purchaser's advantage to have his receiver and accessory equipment on file in our records, so that we may be able to suggest changes or additional apparatus which future research may show to be warranted.

This guarantee is further contingent on the radio receiving set not being changed mechanically or electrically after leaving the factory and that the black wax seals on the cover shields remain unbroken. The location of these seals and the design of the official seal that is applied at the factory is shown in Fig. 2.

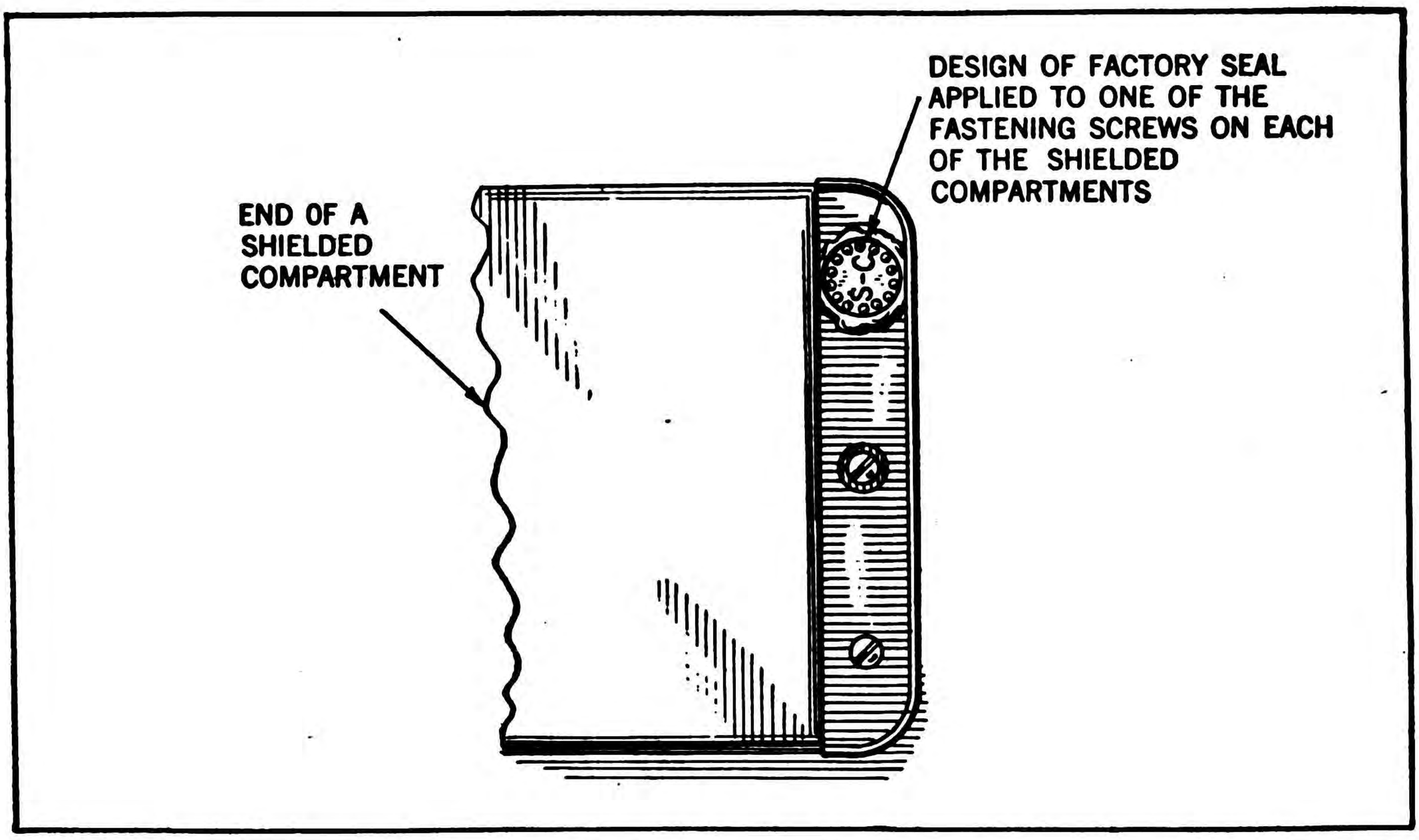


Fig. 2—Design of Protecting Seal as applied to each of the five shielded compartments of a Receiver. The factory guarantee is contingent on these Seals remaining unbroken.

§ 2—PATENT PROTECTION

The Stromberg-Carlson Telephone Mfg. Co. is licensed to manufacture and sell radio apparatus under patents of:

Radio Corporation of America
General Electric Company
Westinghouse Electric and Manufacturing Company
American Telephone and Telegraph Company
Hazeltine Corporation
La Tour Corporation
Radio Frequency Laboratories, Inc.
Lektophone Corporation
Conner-Crouse Corporation.

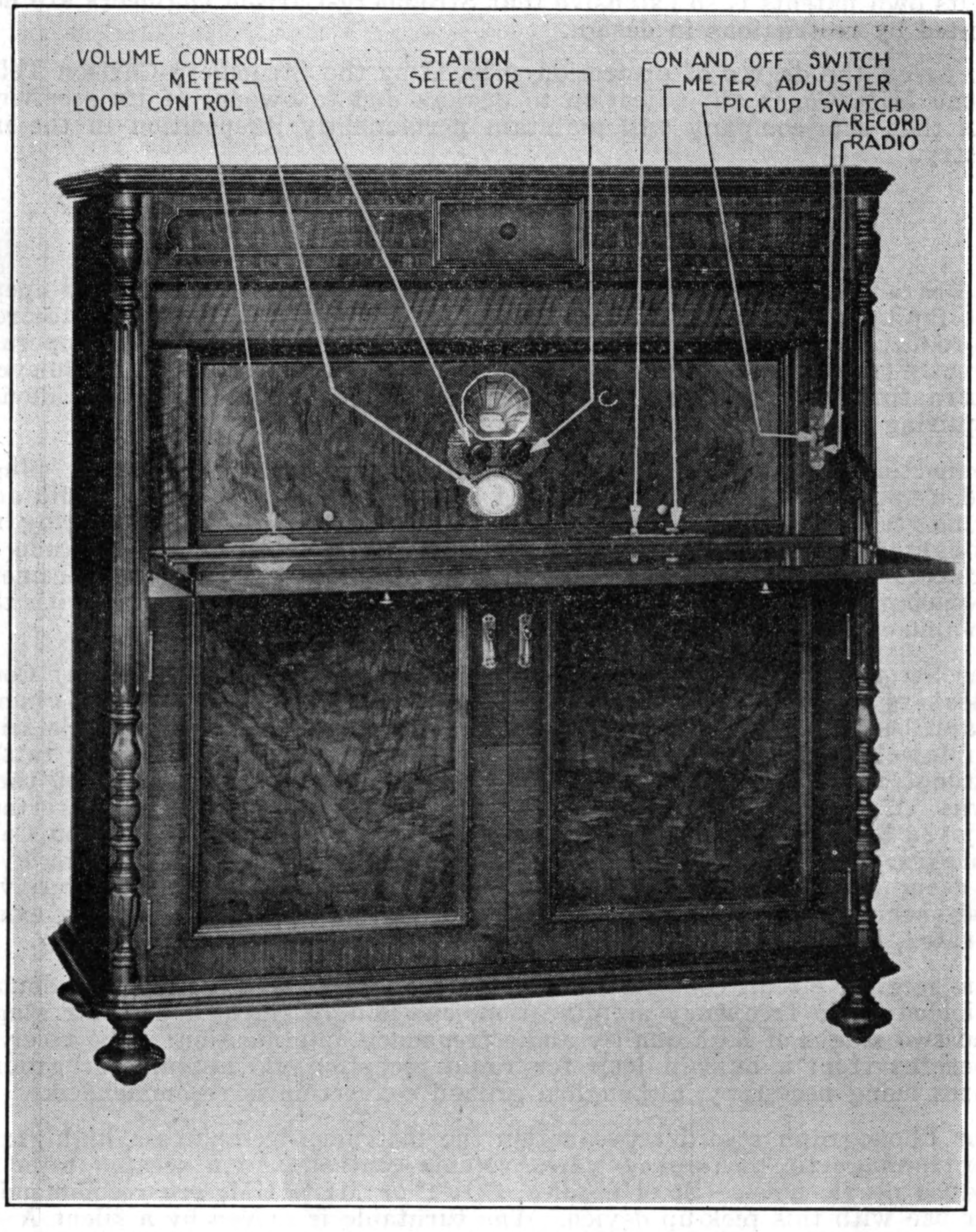


Fig. 3—Stromberg-Carlson No. 744 Radio Receiver and Phonograph Combination with Drop Panel open to show Location of Controls. Designed to use an External Cone Speaker, the Stromberg-Carlson No. 10 or No. 11 Cone Speakers being recommended

The field covered by the patents under which this company is licensed and by its own patents is so extensive that Stromberg-Carlson engineers are not limited by restrictions in design.

Moreover, the degree of protection enjoyed by the Stromberg-Carlson Telephone Mfg. Co. is an indication to dealers and to owners of its receiving sets that this company will maintain permanently its position in the industry.

§ 3—INTRODUCTION

The Stromberg-Carlson No. 744 Radio and Phonograph Combination opens two limitless fields of enjoyment in one instrument—"Radio" and "Record" reproduction. It is an instrument of the finest quality, arranged to operate directly from the usual house lighting system of 105 to 125-volt, 50-60-cycle alternating current without the use of batteries, liquids, or any device requiring frequent service or attention.

Connections between the several electrical units are all made by plugs and a specially constructed shoe, and are so simplified that this Radio and Phonograph Combination may be installed in semi-darkness, requiring no thought as to polarity, numbered or lettered terminals, or a color code of connections. Once installed it requires no attention except the replacement of vacuum tubes about once every two years, this period varying with the amount of use made of the instrument.

The Stromberg-Carlson No. 10 (Floor Type) or No. 11 (Wall Type) Cone Speakers are alone recommended for use with the No. 744 Radio-Phonograph because they will reproduce correctly the entire musical scale with ample volume to fill the largest living room of a home without paper rattle, without resonance frequencies, and without additional overtones of their own. A critical public will marvel at the fidelity to tone and overtone enjoyed by this A. C. Receiver when used with the Stromberg-Carlson Cone Speakers recommended. The new audio system employed in this receiver is designed to amplify all notes uniformly. This combination of receiver and speaker makes possible a "level" reproduction, no one tone being exaggerated, but all being retained with their proper volume and shading.

The receiver circuit comprises four stages of tuned, neutralized, and doubly shielded radio frequency amplification, one doubly shielded detector stage, and two stages of high quality audio frequency amplification. The receiver operates from a built-in loop for radio reception, no antenna or ground wires being necessary, although a ground connection is recommended.

For Phonograph record reproduction the instrument employs a high-grade electro-magnetic pick-up device, a volume control, and a scratch filter to reduce needle noise. Steel needles, SOFT or MEDIUM, are recommended for use with this pick-up device. The turntable is driven by a silent A. C. induction motor, and is equipped with an easily adjusted automatic stop.

Operating power is obtained from a Socket-Power Unit employing vacuum tubes and Tungar bulbs for rectification, and delivering ",A", "B," and "C" voltages in unfailing supply.

The instrument is housed in a cabinet of Figured Walnut, embellished with fittings and escutcheons of Statuary Bronze, and inverse French Marquetry on the receiver panel.

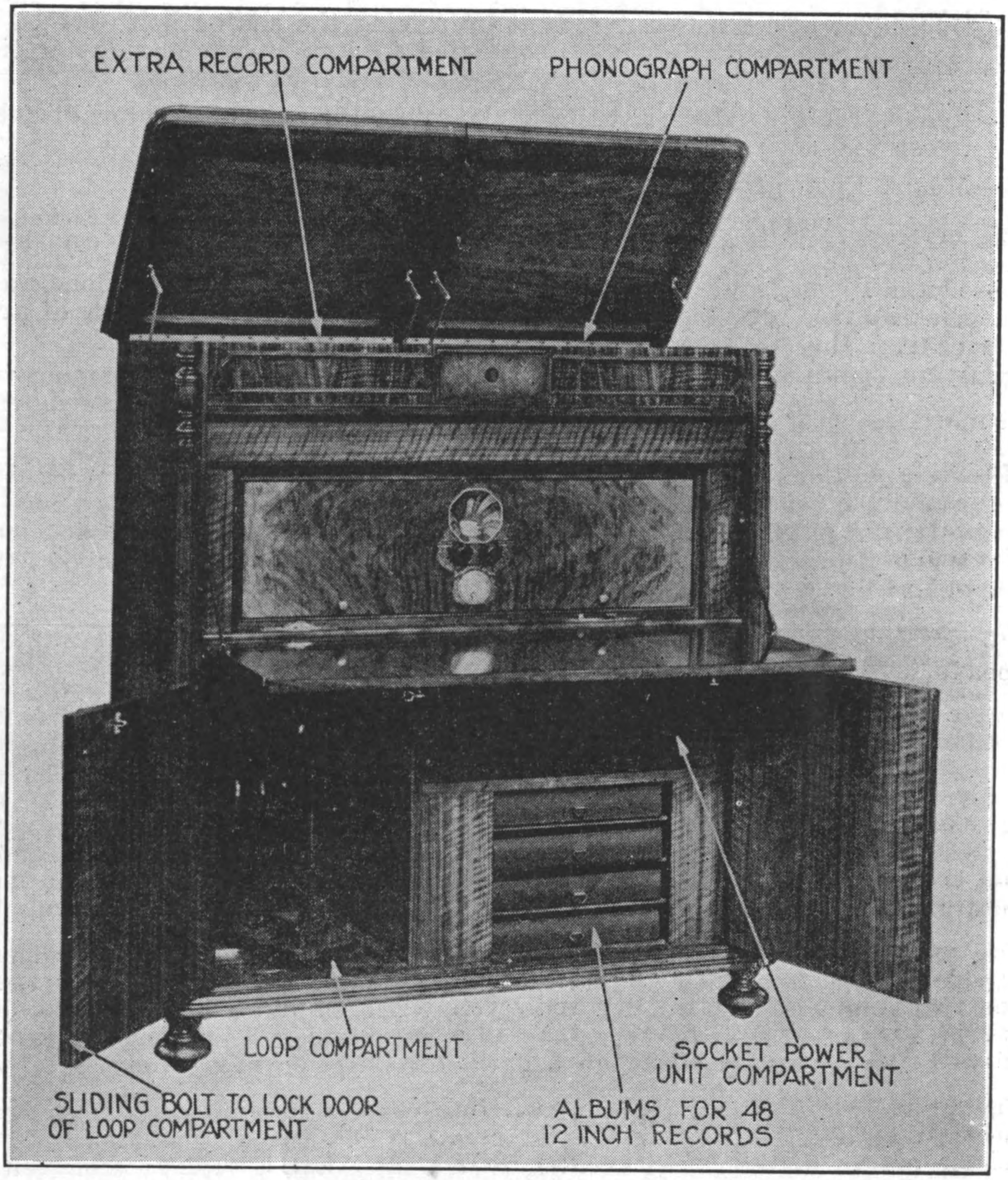


Fig. 4—All compartments open

§ 4—BRIEF INSTRUCTIONS FOR INSTALLING THE NO. 744 STROMBERG-CARLSON A. C. RECEIVER

1—Open door of Loop Compartment by raising the sliding bolt, located at lower edge of door. Untie Loop (tied to stop in upper right section of Loop Compartment). Close door and slide bolt down.

2—Remove soft cardboard wedges clamping Phonograph motor disc between magnet poles. (See Fig. 5.)

3—Mount Phonograph turntable on spindle.

4—Place 15-watt, 110-volt Mazda Candelabra base lamp in socket in Phonograph compartment. Mount guard over lamp. (Fig. 6.)

5—Untie Phonograph Pick-up arm. Plug electro-magnetic Phonograph Pick-up into receptacle in arm. Clamp with screw at underside of arm. (Fig. 7.)

6—Open rear hinged panel of power plant compartment by removing two screws. Remove front panel of power plant compartment by removing four corner screws. Untie radio power cord and shoe.

7—Slide No. 404 Socket-Power Unit into power plant compartment from the rear. The vacuum tube sockets must face the front.

IMPORTANT: Anchor Socket-Power Unit in place with six bolts through base, three on a side, into side compartments accessible from rear.

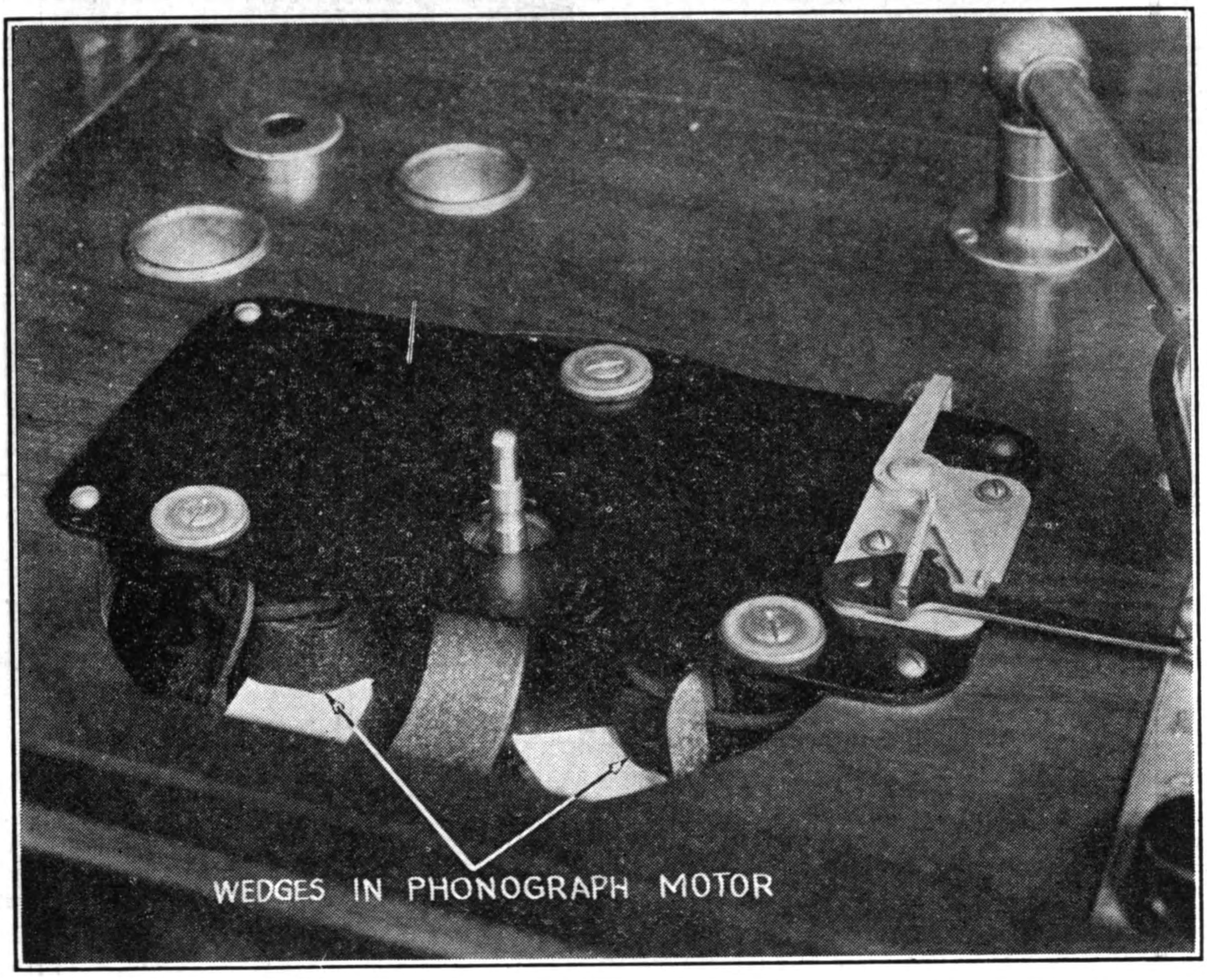


Fig. 5—Soft Cardboard Wedges Protect Phonograph Motor Disk during Shipment

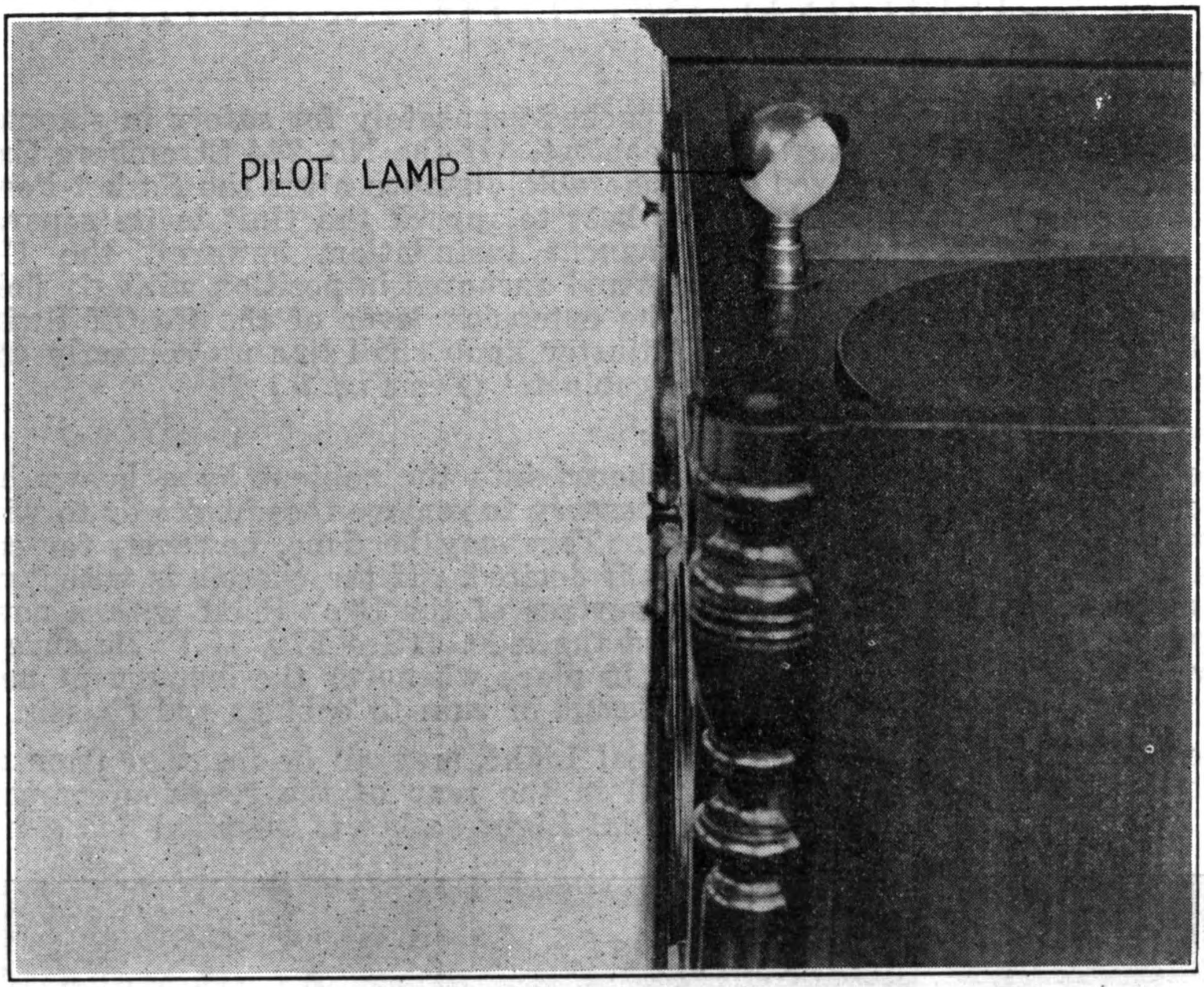


Fig. 6—Pilot Lamp (15W. 110V.)

8—Attach handle to On-Off switch. Set in "OFF" position.

9—Place METER ADJUSTER knob on shaft. Clamp with two set screws.

10—Connect terminal shoe on radio power cable to terminal strip at rear of No. 404 Socket-Power Unit. Insert pin plug on red cord into pin jack in power unit. (Figs. 10 and 11.)

11—Insert power cord and phonograph motor cord plugs into their respective outlets at rear in base of Socket-Power Unit. Close rear hinged panel of power plant compartment and fasten with screws.

12—Open rear hinged panel of radio receiver compartment. Place Radiotrons in their proper sockets. (Fig. 12.) See that Multiple Cord Connector is plugged in securely. Close rear hinged panel and fasten with screws.

13—Insert Cone Speaker plug in jack in base at rear of radio receiver chassis. Plug passes through hole in rear panel of cabinet. (Fig. 21.)

14—Tighten thumb screw on Cone Speaker Driving Rod.

15—Place two Tungar 1-ampere and two UX-216-B tubes in proper sockets in front of Socket-Power Unit. (Fig. 9.)

16—Connect lamp cord to 105-125-volt, 50-60-cycle socket or outlet.

17—Set two switches to "RADIO" and to "ON." Regulate METER ADJUSTER until meter pointer is on red line.

18—Allow receiver to run for five minutes to warm up Tungar tubes. Then adjust black knob on base at front of Socket-Power Unit (in line with sockets) for balanced condition of no hum. Replace front power plant compartment panel. Fasten in place with four corner screws.

§ 5—ADDITIONAL INSTALLING INFORMATION

No. 404 Socket-Power Unit:

The No. 404 Socket-Power Unit is packed separately for safety in shipment and for protection of the receiver cabinet. If the No. 744 Stromberg-Carlson Receiver is to be moved a considerable distance after the Socket-Power Unit has once been installed, it is best to repack the Unit in its separate container. When making a permanent installation, however, the Unit should be placed in its compartment and anchored in position with six bolts, three at each end, in order that the extension lever of the On-Off Switch and the extension of the Meter Adjuster knob shall line up correctly with the holes provided for them in the cabinet. (See Fig. 8.)

Inserting Vacuum Tubes in Chassis:

The Radio Receiver chassis is anchored into the cabinet by a heavy bolt at each end. **It should never be necessary to remove these bolts** or to withdraw the chassis from the cabinet. This may be done, however, for convenience in replacing vacuum tubes if desired. If the chassis is withdrawn from its compartment, protect the surface of the Drop Shelf with a newspaper extending over both ends and the side. (See Fig. 15.) **Be sure to have the chassis securely anchored in place whenever the instrument must be moved.** Failure to do so may result in ruin to cabinet and chassis.

The vacuum tubes, including the Dial Light, may all be inserted from the rear by lowering the Hinged Panel in the rear of the receiver compartment. The bracket on which the Dial Light socket is mounted has a pro-

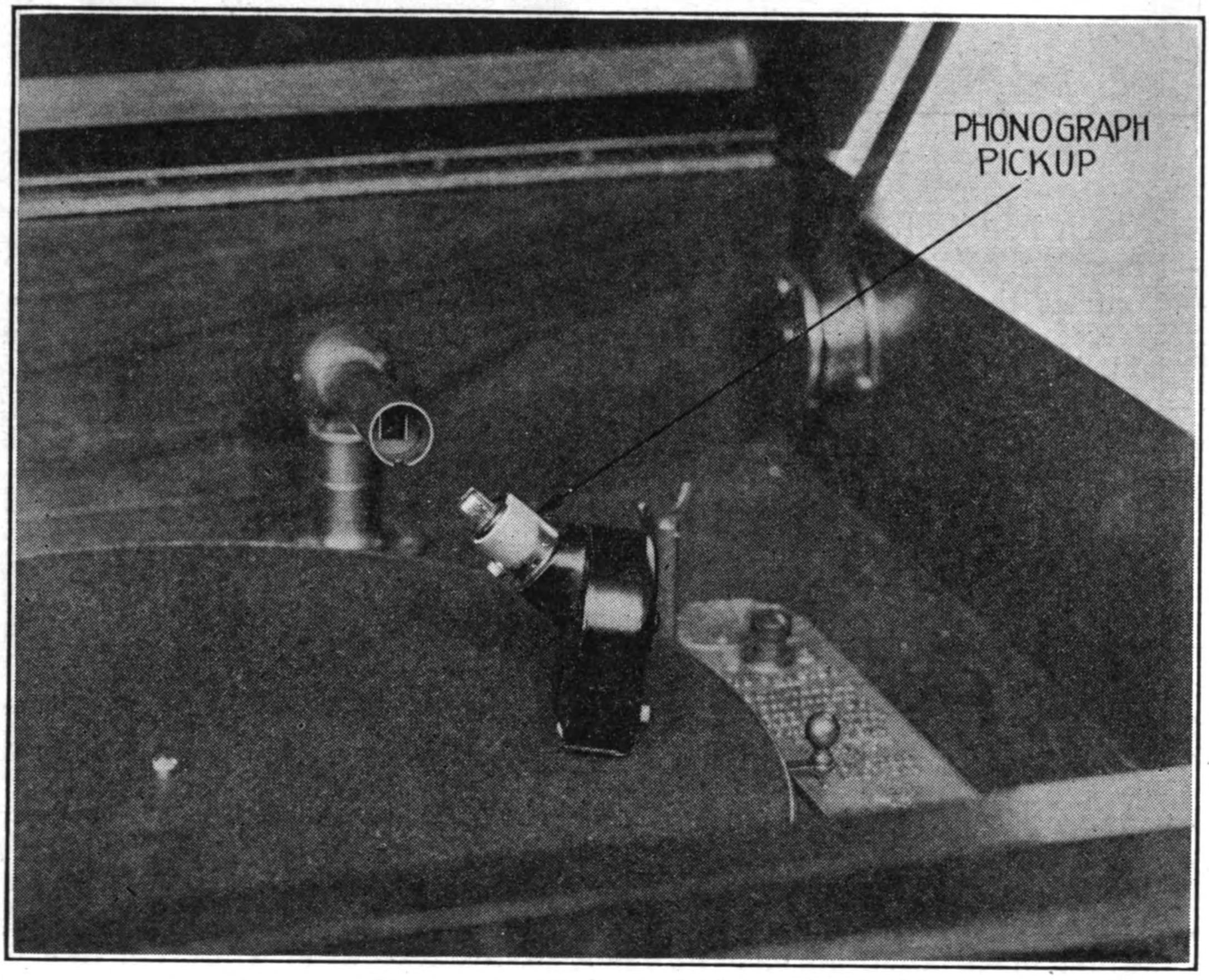


Fig. 7—Magnetic Pickup for Phonograph

truding tab or lug which, when pushed with the finger, will rotate the socket outward from the panel for convenience in inserting the bulb. (See Fig. 16.) After all tubes are in place and the receiver is operating, this bracket should be adjusted to locate the lamp for proper illumination of the Dial. A friction spring used in conjunction with the rotating bracket will then hold it in its position. This dial light comes already installed and should not require any attention when first installing the receiver.

Vacuum Tube Filaments:

The filaments of the six five-volt receiving tubes are all connected in series and, therefore, if one vacuum tube is missing from its socket or if one filament is burned out, all of the receiving tubes, except the UX-210 Power Output Amplifying Tube, will fail to light.

Use of a Ground Connection:

A connection to ground is not necessary for operating the No. 744 A. C. Radio Receiver, but is strongly recommended where it is possible to obtain a short connection to a cold water pipe or a good earth ground. The use of a ground will do two things, as follows:

1. A short direct connection to a good ground will reduce the background of radio noise and will, therefore, allow quieter operation of the receiving set. A long lead to ground, which will pick up noises from local electrical or atmospheric disturbances, defeats this purpose and is really detrimental to quiet operation. Likewise, a connection to a poor ground, such as rods driven in dry sandy soil or a ground wire attached to the heating system pipe, will also act as noise collectors.

2. Without a ground connection, the loop is directionally selective within 180°, so that there are two positions of the loop where a desired station will be received at maximum volume, and two at right angles to these where it will be at a minimum. A ground makes the loop directionally selective within 360°, with only one point of maximum and minimum response. This increased selectivity is often valuable in tuning for one of two stations on wave channels close together.

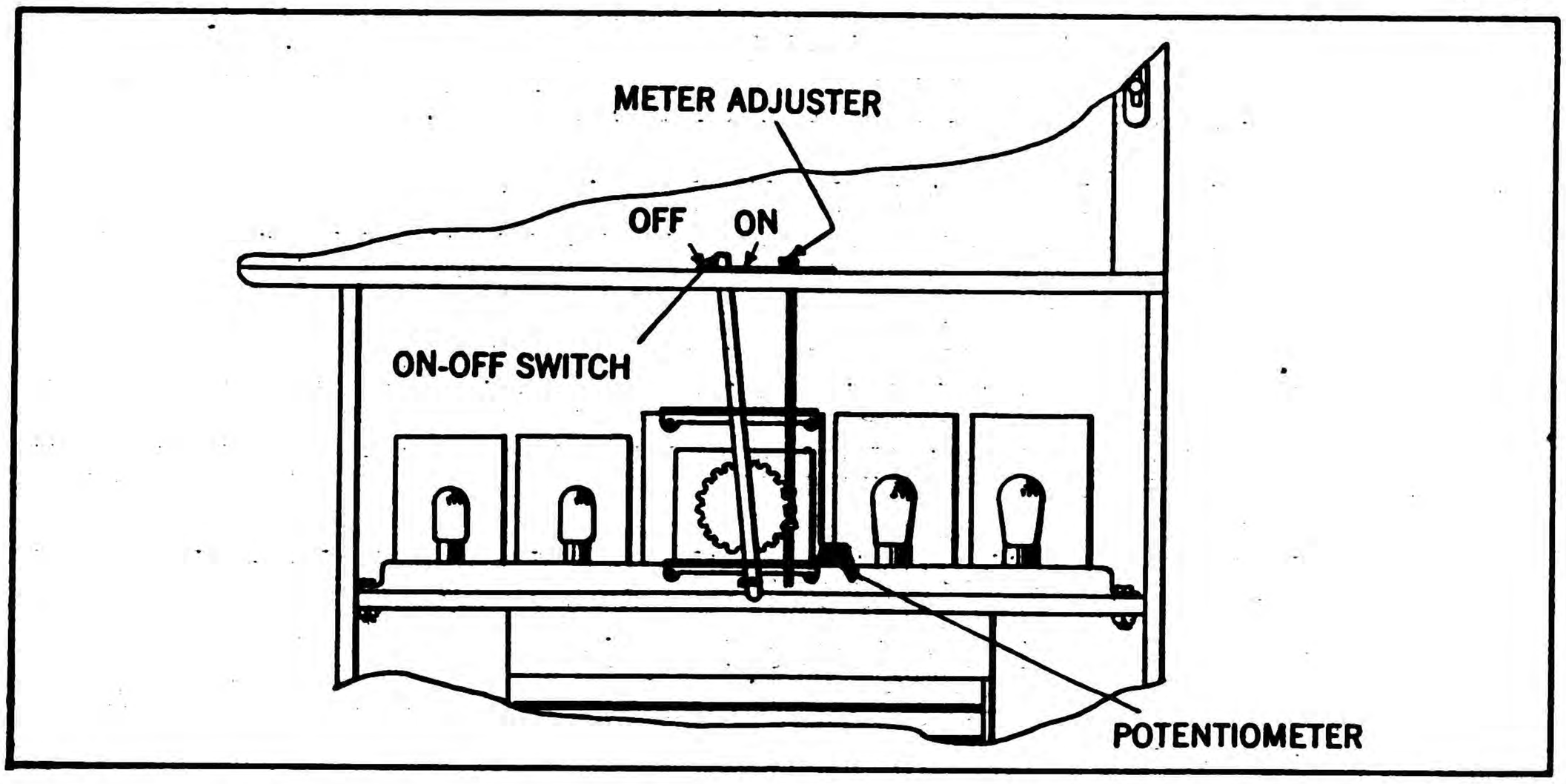


Fig. 8—No. 404 Socket-Power Unit in its compartment

Installing a Ground:

A Ground connection should be made with an approved ground clamp to a cold water pipe from which all paint and rust have been scraped, or to galvanized iron rods or piping at least six feet long which have been driven into moist earth, as shown in Figs. 17 and 18. The Ground Lead, connecting the receiver to the Ground Clamp, should be a short single piece, if possible, of fairly heavy wire. (No. 14 B. & S. Gauge is recommended.) If it is necessary to make splices or joints in the Ground Lead, they should be tightly spliced and well soldered.

Fastening Shut the Socket-Power Compartment:

The front panel of the compartment in the cabinet which houses the No. 404 Socket-Power Unit is designed to be fastened in place by machine screws at the four corners. Be sure to replace these after the receiver is installed and operating and the potentiometer knob has been adjusted for quiet operation.

It is never necessary to reopen this compartment except to replace Rectifier Tubes after the end of their useful life or to readjust the potentiometer knob after a new UX-210 Power Output Tube is installed in the chassis. Moreover, the closing of this panel will prevent inexperienced persons from meddling with the Socket-Power Unit while the receiver is operating, and thereby avoid any possibility of electrical shocks.

Meter Adjuster:

The Meter Adjuster knob operates a worm which is geared with a very high reduction ratio to the Meter adjustment controlling device. Therefore, the Meter adjustment is varied gradually and slowly, and it may be necessary to turn the Meter Adjuster knob a number of revolutions when installing the instrument to bring the Meter pointer to the red mark on the scale.

Power Consumption of the Receiver:

The power consumed by the No. 744 Stromberg-Carlson Radio and Phonograph Combination is at maximum when reproducing phonograph music and varies somewhat with the line voltage of the local house lighting system. The maximum power input which the instrument can draw from the house lighting circuit is 260 watts. To this must be added the power consumed by the Bridge Lamp or Reading Lamp or any other device plugged into the electric light outlet in the rear of the cabinet.

Location of Cone With Respect to Radio Receiver:

A long connecting cord and plug are supplied with the No. 10 and No. 11 Cone Speakers to allow the sound radiator to be placed at a considerable distance from the radio receiving set for the following reasons:

(a) To allow for correct judging of volume when tuning the receiver.

(b) To allow the speaker to be located in the most convenient position in the room.

(c) To select a separation between the speaker and the radio receiver that will avoid "acoustic coupling." This is a steady tone that can occur when the detector tube is "microphonic" and is best remedied by selecting a non-microphonic tube for a detector. (See Section 7.)

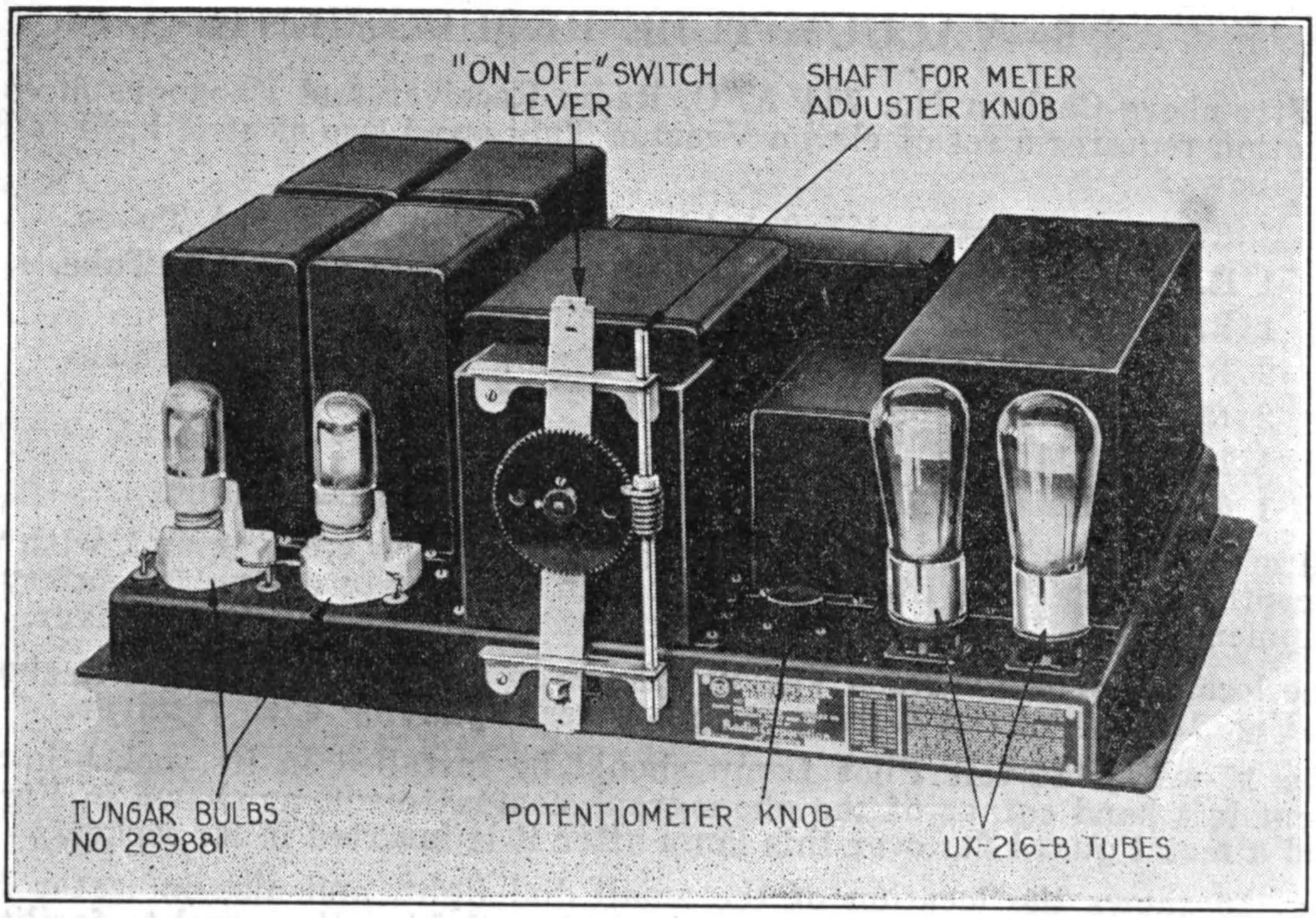


Fig. 9—No. 404 Socket-Power Unit, Showing Tubes and Controls

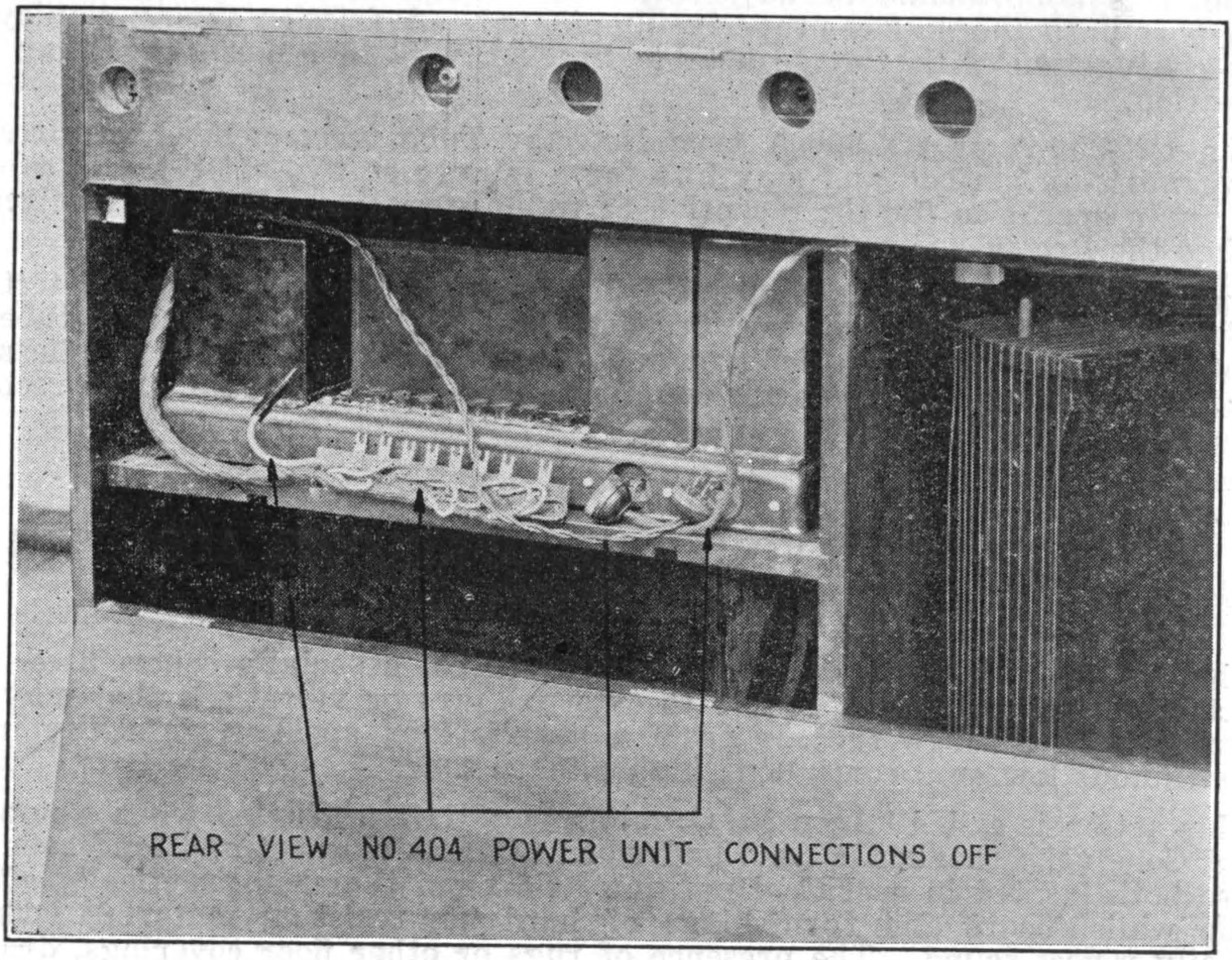


Fig. 10—Rear view No. 404 Socket-Power Unit, connections off

§ 6—VACUUM TUBE REQUIREMENTS

A Stromberg-Carlson No. 744 A. C. Radio Receiver and Phonograph combination requires a set of eleven Vacuum Tubes and two electric light bulbs, as follows:

5 R. C. A. Radiotron UX-201-A or Cunningham CX-301-A Tubes.
1 R. C. A. Radiotron UX-200-A or Cunningham CX-300-A Tube.
1 R. C. A. Radiotron UX-210 or Cunningham CX-310 Tube.
2 R. C. A. Radiotron UX-216-B or Cunningham CX-316-B Tubes.
2 R. C. A. No. 289881 Tungar Bulbs.
1 15-watt, 110-volt Candelabra Base Pilot Lamp.
1 6-volt Miniature Base Pilot Lamp for use as a Dial Light.

All of these tubes and bulbs are furnished with each receiver and, with the exception of the Dial Light, are packed in a separate carton for safety in shipment. The Dial Light is shipped already installed in the receiver.

The location of the various Vacuum Tubes in their proper sockets is shown in Fig. 13 and on the Wiring Diagram accompanying each receiver.

The 15-watt, 110-volt Pilot Lamp should be installed in its socket in the front left hand corner of the phonograph compartment, as shown in Fig. 6, and a metal guard fits over this lamp after it is inserted in its socket.

Fig. 16 shows the location of the small dial light, and also indicates how the socket for this light may be swung outward from the panel to facilitate installation or replacement of the Lamp. After the receiver is in operation, this lamp should be adjusted, if necessary, by rotating the bracket support until the dial is properly illuminated. A friction spring employed in conjunction with the adjustable bracket will then keep the lamp in position.

The UX-200-A or CX-300-A type Detector Tube recommended requires a "warming-up period" and may hiss for a minute or two after the Receiver is set in operation for the reception of radio programs. It is not in circuit when the Receiver is reproducing Phonograph music.

Some people prefer the use of a UX-201-A or CX-301-A tube as a detector. This is not advisable, however, because the UX-201-A or CX-301-A tube is not nearly so sensitive a detector and is more likely to be microphonic and thereby a source of "acoustic coupling" than the UX-200-A tube recommended. (See Sec. 7.)

§ 7—HOW TO AVOID AND OVERCOME ACOUSTIC COUPLING

The internal elements of some vacuum tubes, especially when used for detector purposes, are sensitive to external jars or vibrations that may be transmitted through the air from a nearby loud speaker, resulting in a continuous low or a continuous high pitched tone.

This action is called "Acoustic Coupling" and is accentuated when a powerful Cone type speaker is used and when the receiving set and loud speaker are both located in a critical position in a room that has practically all of the walls, floors and furnishings of hard non-resisting materials, which easily reflect sound. The presence of rugs or other floor coverings, drapes or other soft wall coverings, upholstered furniture, or even the presence of a

number of people in the room, tends to prevent these sound reflections or echoes, and besides reducing the possibilities of acoustic coupling, give naturalness to the reproduction in the loud speaker.

The Vacuum Tube Cap of the Detector radio shield is provided with prongs or fingers padded with felt to steady the detector tube against vibrations which will set up this microphonic action. Therefore, always be careful to place this special cap over the detector tube (front right-hand shielded compartment).

If the loud speaker is provided with a long cord, such as those furnished on the Stromberg-Carlson No. 10 and No. 11 Cone type speakers (see Sec. 18), so as to be located a distance from the receiving set, it is usually possible to find a location where the acoustic coupling will be at a minimum or where no audible disturbing tone will be reproduced. Changing the location of the loud speaker only one or two feet from a position where acoustic coupling exists, often will completely overcome this disturbance. Moreover, rotation of the cone, even at a fixed short distance from the receiver, will often have a marked effect. It will ordinarily be found that acoustic coupling may be reduced by turning an edge rather than a face of the cone towards the receiving set.

Never attempt to use a Loud Speaker mounted directly on top of the receiver cabinet, since vibrations will be transmitted to the vacuum tubes from a speaker in this position by the cabinet as well as by sound waves in free space.

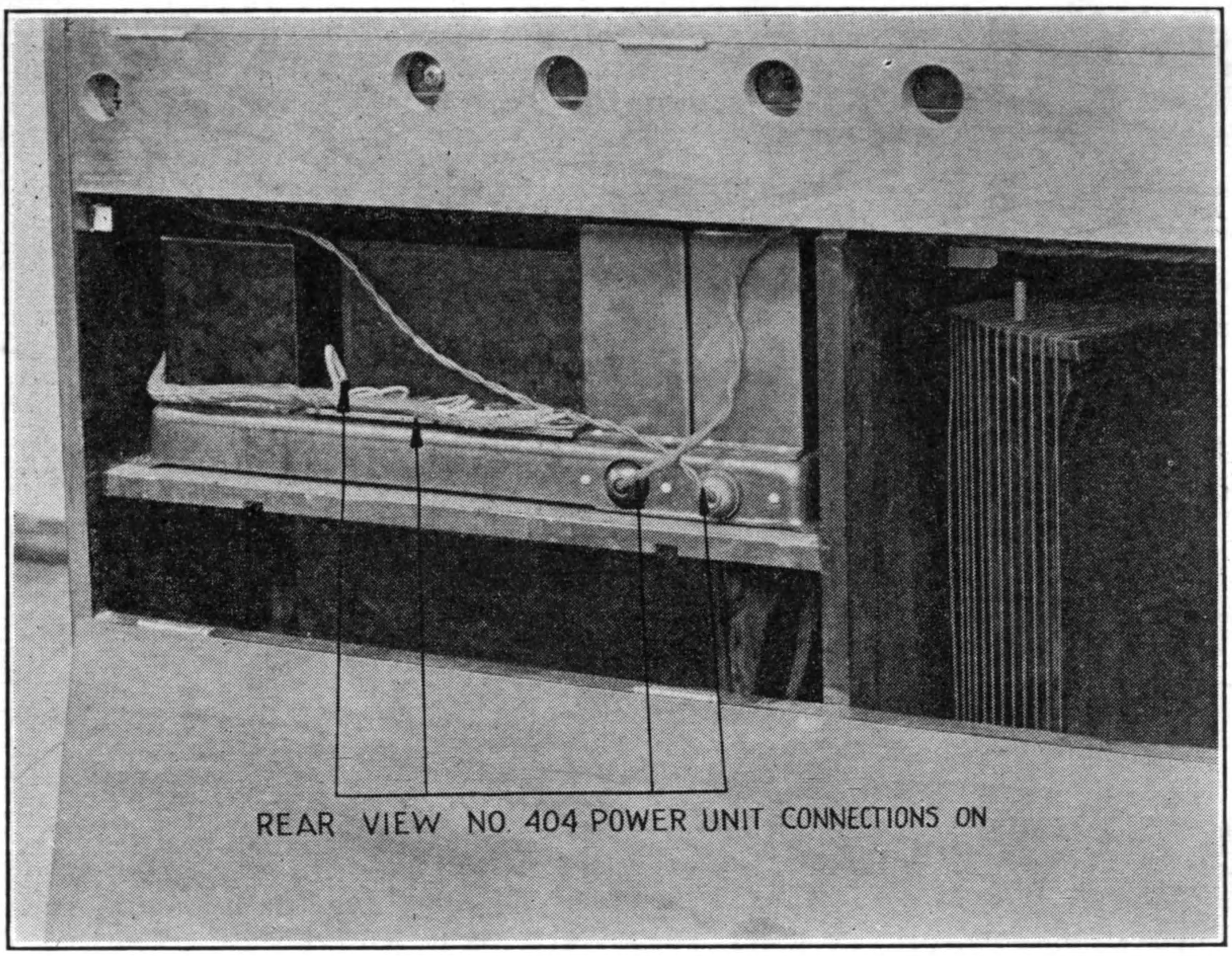


Fig. 11—Rear view No. 404 Socket-Power Unit, connections on

When making a test to overcome "acoustic coupling" be sure that the tube cover having the four inner spring fingers is placed over the detector tube (right-hand shielded compartment) and that the receiver chassis is completely pushed into the cabinet.

If none of these suggestions prove effective in overcoming acoustic coupling, the only recourse left is to have a dealer replace the detector tube with one less microphonic.

Some people prefer to use a UX-201-A or CX-301-A tube as a detector, although this practice is not recommended. The 201-A type of tube is less sensitive as a detector than the 200-A type, and more likely to be microphonic. It does not require the three-minute "warming-up period" of the super-sensitive UX-200-A detector tube, however, and a choice for the least microphonic of the six UX-201-A tubes is available by trying each in turn in the detector socket. If a UX-201-A or CX-301-A tube is used to function as a detector, do not attempt to use the super-sensitive 200-A detector type of tube in any other stage.

§ 8—SELECTION OF RADIO FREQUENCY AMPLIFIER TUBES

For best results, good, sensitive Radiotron UX-201-A or Cunningham CX-301-A tubes must be used in the four radio amplifier sockets. (Fig. 13.) The selection of these tubes should be made with care. This selection can

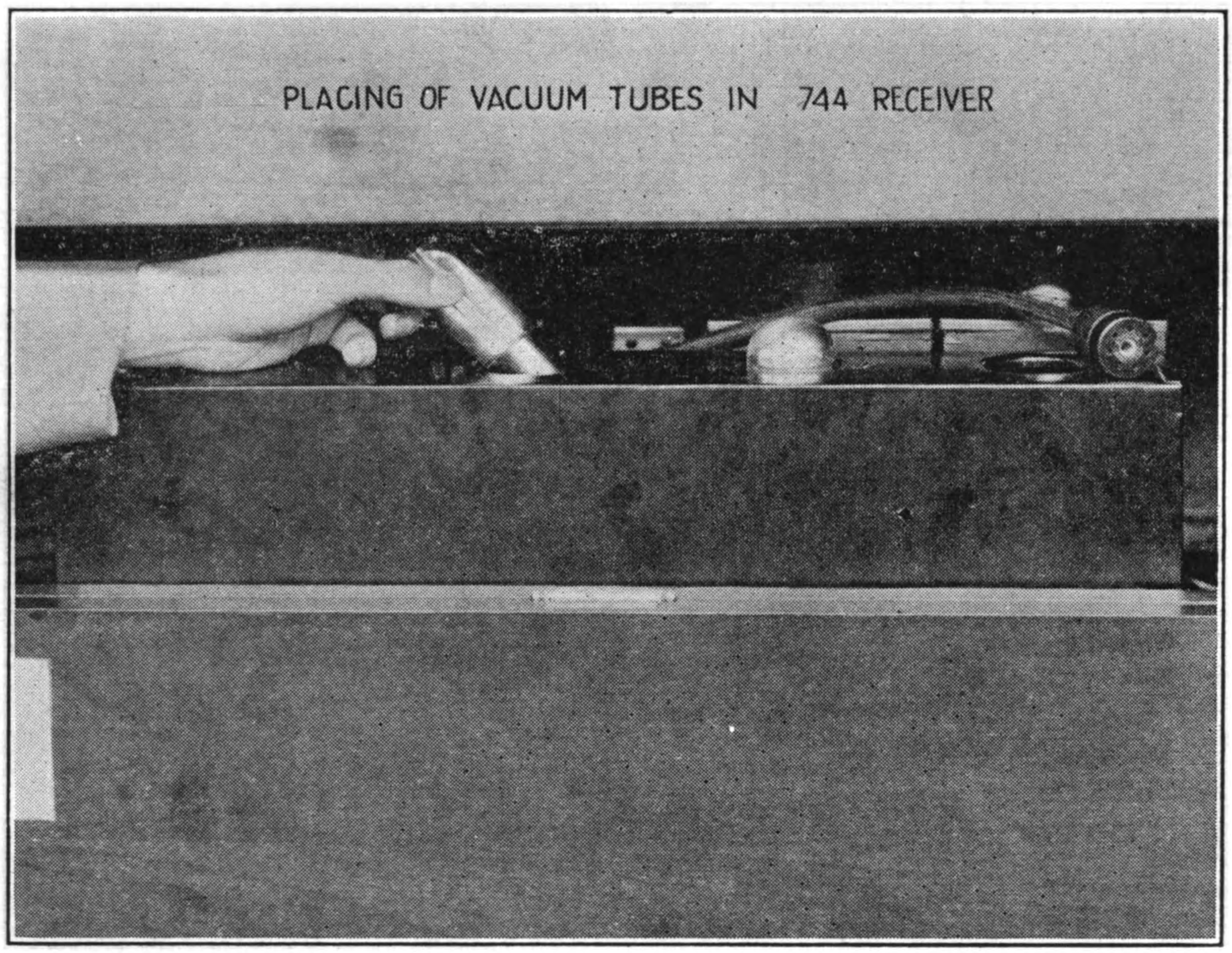


Fig. 12—Placing Vacuum Tubes in No. 744 Receiver

be made by tuning in a fairly weak broadcast signal and changing around the tubes suitable for use in these sockets, retuning the Station Selector for maximum signal each time a change of tubes is made until the best combination of tubes is found. Be sure to turn off the power before removing any tubes from their sockets to make a change. Always have the meter set at the red mark on the scale when making these tests.

§ 9—REPLACEMENT OF VACUUM TUBES

In making any replacements, be sure to obtain genuine R. C. A. Radiotrons or Cunningham tubes of the "X" type. Moreover, in order to insure satisfactory operation, be sure to obtain genuine R. C. A. Tungar Bulbs, **bearing the Stromberg-Carlson label on the carton,** from an authorized Stromberg-Carlson dealer.

Before replacing any Vacuum Tubes turn off the current.

The filaments of the tubes in the Receiver Chassis (except the UX-210 Tube) are connected in series and, therefore, if one filament burns out, all will fail to light. It then becomes necessary to try a new tube in one socket after another with the other tubes all in place until the defective tube is located. Turn off the power each time before withdrawing any tube from its socket and leave it off until tubes are in place in all sockets.

To replace Vacuum Tubes located in the receiver, remove the caps which shield the Vacuum Tubes and replace the tube in its socket. Be sure to have the locating pin on the base of the tube pointing in the direction of

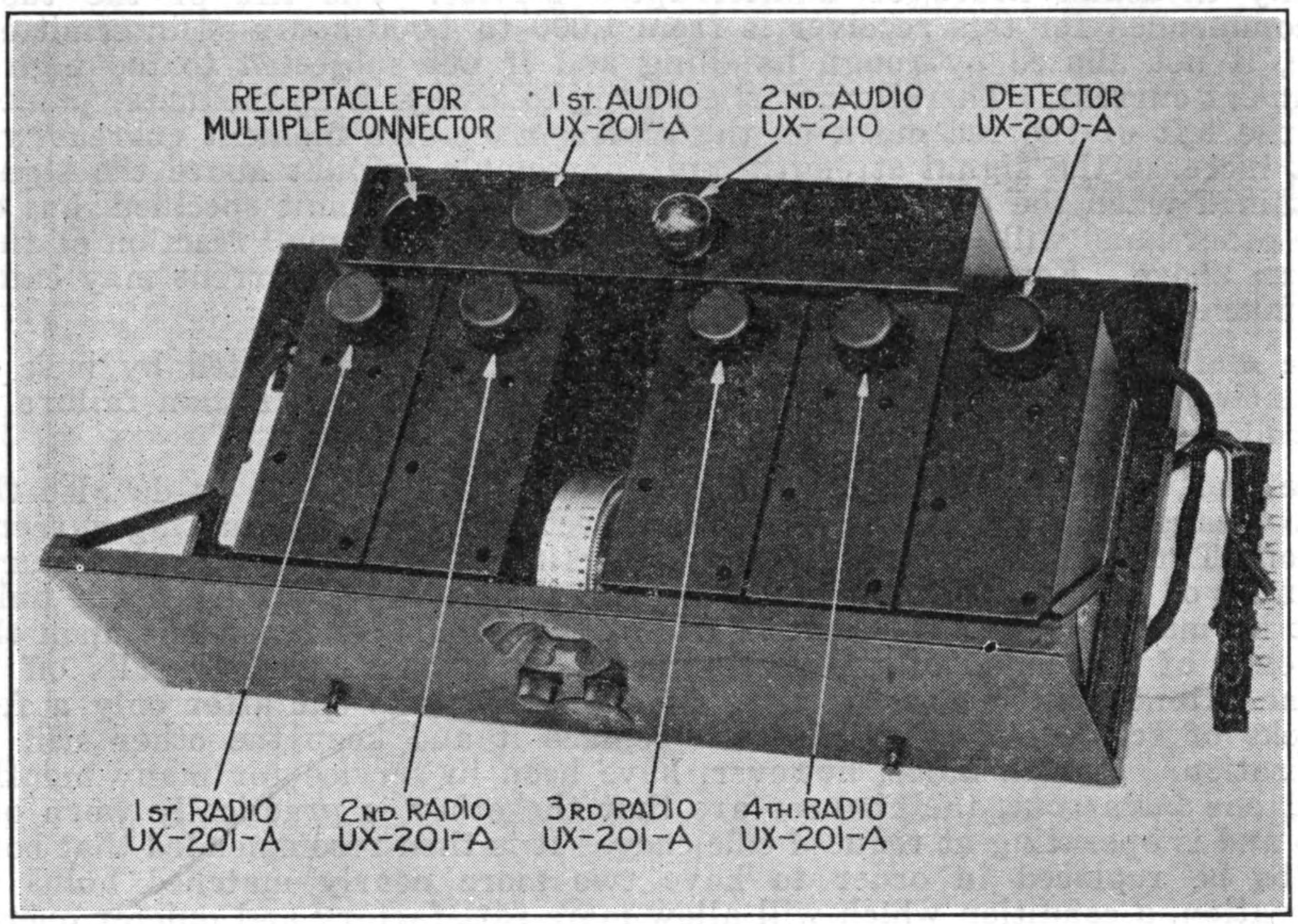


Fig. 13—Chassis of No. 744 Receiver

the arrow for that tube, as shown in Fig. 14. When the new tubes are in their sockets, replace the Vacuum Tube Caps in the shields, being careful to replace the cap with the four felt-padded spring fingers over the detector tube. (See Article 5 for special instructions regarding "Inserting Vacuum Tubes in Chassis.")

All vacuum tubes are fragile and must be handled with extreme care to prevent damage to the inner elements. The spacing of these elements is made close, in order to obtain electrical efficiency, and unless accidentally dropped or otherwise mechanically damaged, the accuracy of this spacing will be maintained indefinitely.

A slight displacement of the internal tube elements, that would not cause actual short circuiting of the plate to the grid or the grid to the filament, might decrease the electrical efficiency so that the receiver will not operate correctly. On the other hand, internal short circuits in the tubes may damage the receiver wiring or the Socket-Power Unit. Therefore, remove immediately from the receiver any tube which "flashes" or does not seem to be operating correctly and efficiently.

§ 10—USEFUL LIFE OF VACUUM TUBES

The Receiver Tubes (UX-200-A and UX-201-A), which are the viatl part of the receiver, are the large-sized, 5-volt Direct Current type; this being standard stock size of tried and proven worth and long active life charactreistics.

The Rectifying Tubes used in the associated A. C. Socket-Power Unit (UX-216-B and the two No. 289881 Tungar Bulbs) are designs that insure many thousand hours of uninterrupted service. The life of the tubes recommended for this receiver is from 1,000 to 4,000 hours of intermittent use, if not abused by rough handling and if not subjected to too high a filament current. Therefore, it is economy to always keep the meter pointer to the left of the red mark on the scale. Excessive filament current will not increase the signal strength any appreciable amount above the signal obtained when the tubes are worked within the safe limit specified, but on the other hand will greatly reduce the active life to a small fraction of that given above. For example, a 10% increase in filament current may cause as much as 50% decrease in useful life of the tube.

The end of the useful life of the Vacuum Tube is indicated by lack of sensitiveness or a rattling noise in the cone speaker, rather than failure of the filament to light.

The two UX-216-B Rectifier Tubes supplement each other, as do also the two Tungar Bulbs, to supply full wave rectification of alternating current. If one Tungar Bulb or one UX-216-B Rectifier Tube burns out after many months of service, it is advisable to replace not only the burned out bulb, but its mate as well. The active life of these bulbs is dependent upon the amount of use made of the receiving set, and their efficiency falls off to some extent with increasing age. If one bulb burns out after only a few weeks of service, it is all right to replace it and keep the other still in operation. If both bulbs, however, have been in service for many months and one burns out, the chances are that the other is practically worn out too and is operating at reduced efficiency. It is then recommended that both bulbs be replaced in order to have two more nearly matched bulbs in operation, a condition which will allow more satisfactory and quieter operation of the receiving set than could be possible with one efficient and one inefficient rectifying tube.

§ 11—THE STROMBERG-CARLSON NO. 404 SOCKET-POWER UNIT

The No. 404 Socket-Power Unit is a radio power plant of the finest quality manufactured to Stromberg-Carlson Specifications by the General Electric Company and furnished us through the Radio Corporation of America.

The audio amplification system of the Stromberg-Carlson No. 744 Receiver is so effective and the No. 10 or No. 11 Cone Speakers recommended for use with this receiver are so sensitive to a fundamental of low notes that only the most complete rectification and filtration attainable must be employed in this unit. Any less efficient filter or rectifier would cause an objectionable 60-cycle hum when operating this Receiver.

The Socket-Power Unit requires two R. C. A. No. 289881 Tungar Bulbs and two R. C. A. UX-216-B Radiotrons or Cunningham CX-316-B tubes. Any replacement Tungar Bulbs used with this unit should be purchased from an authorized Stromberg-Carlson dealer and should bear the Stromberg-Carlson label on the carton to indicate that they have been tested and approved by us for satisfactory operation in this unit. No charge is made for this inspection service.

If one of the UX-216-B type rectifier tubes or one of the Tungar Bulbs burns out after a considerable length of time in service, it is advisable to replace not only the burned out rectifier, but its mate as well. (See Section 10 on "Useful Life of Vacuum Tubes.")

The No. 404 Socket-Power Unit supplies A, B and C voltages and has sufficient current carrying capacity to operate six 5-volt D. C. type tubes with filaments in series, together with a UX-210 Super-Power Output Tube, supplying approximately 350 volts of Direct Current to the plate of the latter.

The Unit is housed in a compartment directly below the receiver chassis on the right hand side of the cabinet of the No. 744 Receiver. Once installed and operating quietly, it is never necessary to open this compartment except to replace rectifier tubes or to readjust the balancing potentiometer

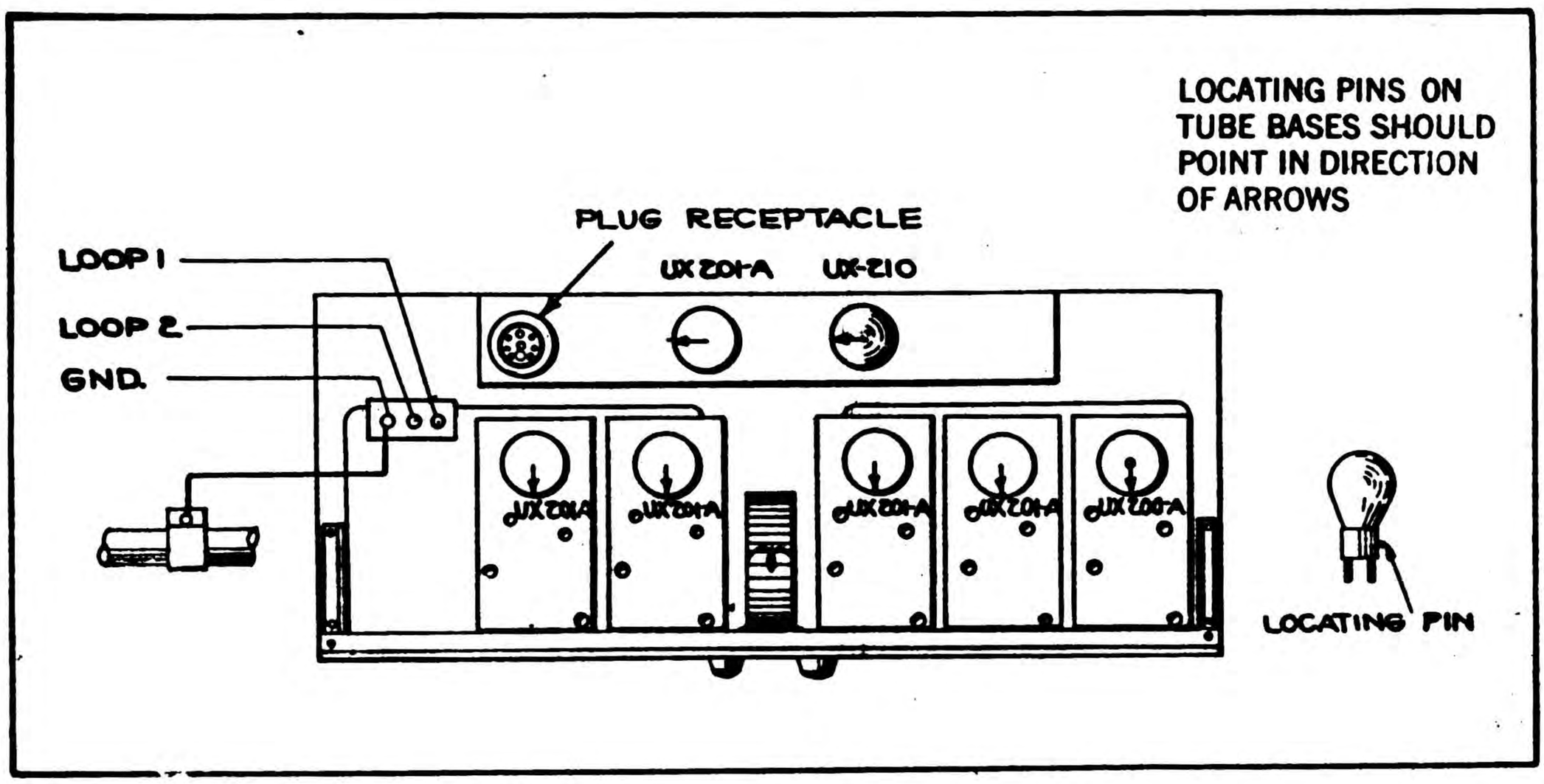


Fig. 14—Chart for location of Vacuum Tubes

when a new UX-210 (Super-Power Output) tube is installed in the chassis. **This panel should be closed and fastened with the locking screws provided** at all times when the receiver is in operation so as to prevent unauthorized persons from getting in contact with live electrical circuits and obtaining an electrical shock.

§ 12—LOCATION OF INSTRUMENT

There are three considerations which affect the choice of a location for the No. 744 Radio Receiver and Phonograph Combination, as follows:

1—This A. C. Radio Receiver operates with the loop type of antenna, and care must be taken to select a position in the room where the loop will not be shielded from the broadcasting station signal by metal lathing in the walls, concealed pipes, radiators, etc. The best location for a loop type of pick-up is determined by experiment testing the reception of the desired broadcasting signals with the receiver in various positions in the room. Usually a position near a window and along an outside wall of the building gives best results.

2—Select a position in which the cabinet will fit into the furniture arrangement.

3—Choose a location from which a short, direct lead may be run to a cold water pipe or good earth ground. This consideration, too, will sometimes favor a position near an outside wall.

It is not necessary to consider the acoustics of the room when selecting a location for this instrument, since all the sound output radiates from the external loud speaker employed, and the Stromberg-Carlson No. 10 and No. 11 Cone Speakers recommended for use with this Radio and Phonograph Combination are provided with long cords for connection to the instrument and may be positioned anywhere in the room and should be located several feet from the receiver.

§ 13—OPERATION OF THE NO. 744 RECEIVER AND PHONOGRAPH COMBINATION FOR RADIO RECEPTION

The operation of the A. C. Receiver for tuning in radio broadcast stations is both simple and positive. There is one tuning control for selecting stations, one volume control, and one directional control of the loop providing great selectivity.

Set the On-Off Switch to "ON," and the Pick-up Switch to "Radio," and turn up the Volume control knob clockwise as far as it can go, or as far as local atmospheric electrical conditions (static) will permit without an unbearable volume of noise. If the program of a particular station is desired and its wave length is known or may be obtained from a printed table or from a newspaper, proceed according to the instructions in Section 16. If no particular station is desired, follow the directions in Section 15. The probable behaviour of the loop in tuning is described in Section 14.

§ 14—OPERATION OF THE LOOP

The best location of a loop receiver for picking up broadcasting station signals is dependent on local conditions, such as the presence of large metal surfaces, radiators, piping, metal lath or wiring in the walls of the building that may absorb some of the energy of the radio waves. Thus, it is advisable to determine the best location by comparing the operation of the receiver in different parts of the room.

Usually the best results are obtained when the receiver is located near a window or close to the outside walls of the building.

When the receiver is used without the ground connection recommended there are two positions of the loop at which the signal strength will rise to maximum for each transmitting station, also two other positions at right angles where the signal will be at a minimum.

If the desired stations are not heard, when operating the Station Selector, then rotate the loop a quarter of a turn from its former position, and repeat the tuning operations.

When the receiver is grounded there will be only one position in an entire revolution of the loop at which the signal will rise to a maximum. Start with the Loop Control wheel set at 0°. Tune the Selector knob to the wave lengths of the desired stations, rotating the dial a few degrees above and below the desired wave length as read on the right-hand scale on the dial in each case. If they are not heard, repeat the process with the Loop Con-

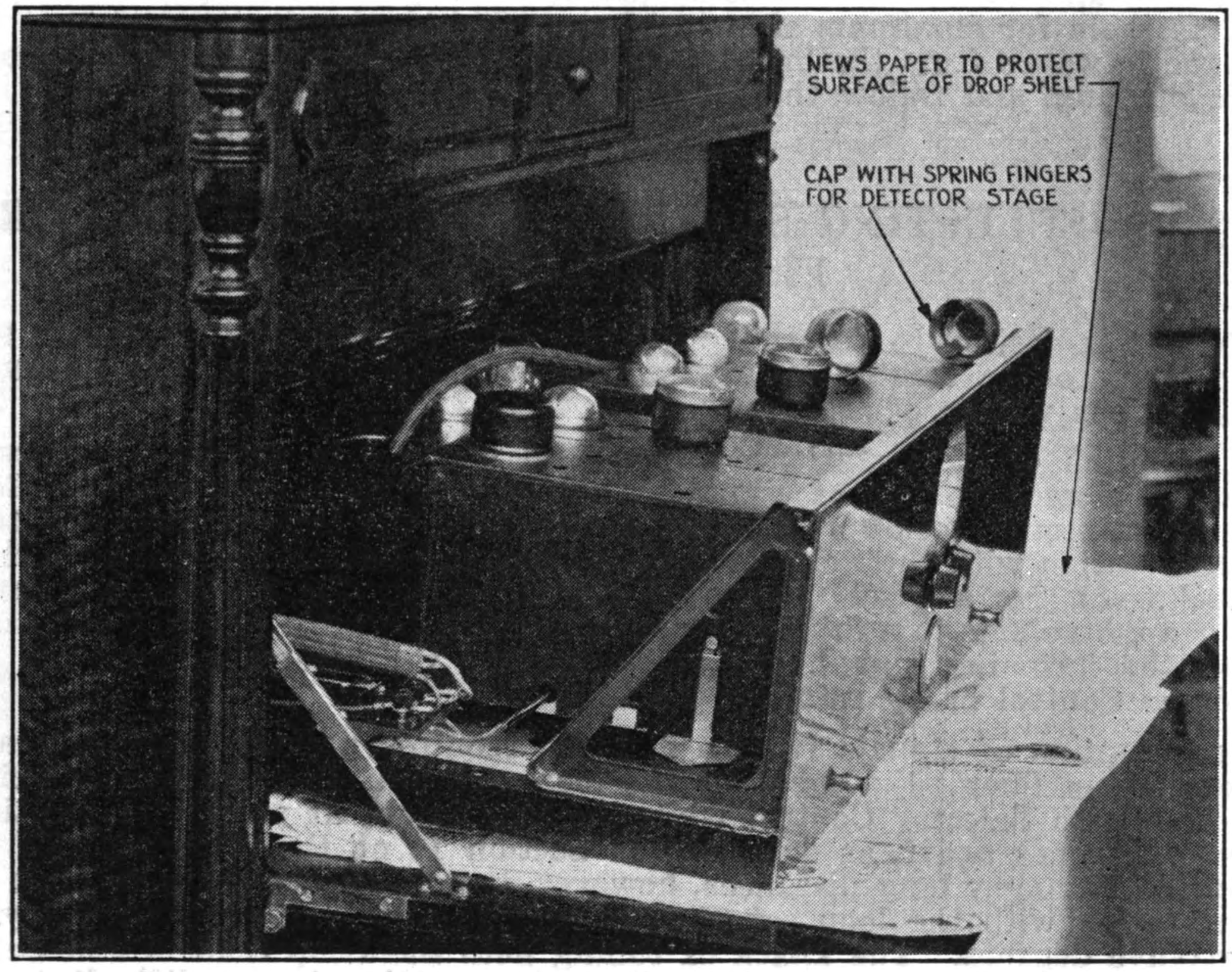


Fig. 15—Chassis pulled out of Cabinet

trol wheel set at 90°. If the stations still are not heard, try the 180° and then the 270° position of the Loop Control.

In some cases, this selectivity of the loop can be used to advantage in cutting out an undesired local or powerful broadcasting station, or a local electrical disturbance and still bring in a desired station. The loop should be rotated to the position where the best results are secured, endeavoring to locate the position where the interference does not come in, but the desired signals do.

It is obvious from the foregoing that the rotated position of the loop can be used as a second means for reducing the volume of signal in the loud speaker, thus one or both of the following methods can be used:

(a) By using the "VOLUME CONTROL" knob.

(b) By rotating the loop to the best position for the desired volume of signal.

Always rotate the loop to obtain best results for selectivity and signal volume for each station tuned-in.

It has been found in practice that the signal waves from any particular broadcast station do not always come from the same direction, and this condition may gradually change during the reception of one program. Thus, it is advisable to test the position of the loop, when the signals fail to come through with the customary volume.

When the loop equipped receiver is located in a modern apartment building or other building with steel structure and metal lath work in the walls, it will be found that the loop usually points directly towards the nearest wall of the room for maximum signal pick-up. This is due to the fact that the magnetic waves from the broadcast station enter the window, or other outside opening, and follow the inner contour of the room walls.

§ 15—SELECTING STATIONS BY THE HUNTING OR FISHING METHOD

When it is desired to determine quickly what stations are coming in satisfactorily or to locate stations without a radio program, the following instructions will be of assistance.

If reception of local stations or powerful stations in nearby localities is desired, a good volume of signal should be obtainable even with the loop set for minimum pick-up. Therefore, disregard the Loop Control and tune in the station with the Selector knob, having the Volume Control turned up (clockwise) for a good volume of signal. After the station is located, reduce the volume to a faint whisper, **retune the Selector to exact resonance with the incoming signal,** and then readjust the volume either with the Volume Control or by rotating the loop.

The reception of signals from a distance requires greater sensitivity and, therefore, a finer adjustment of the loop pick-up. It is usually sufficient to tune with Selector Control while the loop is set at successive positions ninety degrees apart, as described in Section 14 on the "Operation of the Loop." For very long distances, however, it may be necessary to hunt for the station with the loop set at intermediate positions, such as thirty or forty-five degrees. The knack of tuning both the Loop Control and Selector knob simultaneously for long-distance reception is not difficult to acquire and will come easily after a little practice.

§ 16—TUNING FOR THE SIGNAL OF A PARTICULAR STATION

If the program from some particular station is desired, tuning is reduced to a very simple operation indeed.

Determine the wave-length (in Meters) of the desired station, either from the columns of a newspaper or from a printed list of broadcasting stations, and turn the Selector Control until the right-hand scale on the drum dial reads approximately the wave-length of the station. Now with the Volume Control turned up (clockwise) to give a good volume of signal, rotate the loop. If the station is not heard, continue to rotate the loop, turning the Selector knob so that the dial reads a few meters more or less than the stated wave-length, as you do so.

When the station is located on the dial, turn down the Volume Control (counter-clockwise) until only a faint signal remains, and **retune the Selector to maximum response.** Then readjust the Volume Control to suit your taste. In order to obtain the best quality of reproduction the Selector must be tuned in this way to maximum response to the signal. However, detuning with the Loop Control so as to reduce volume does not affect quality.

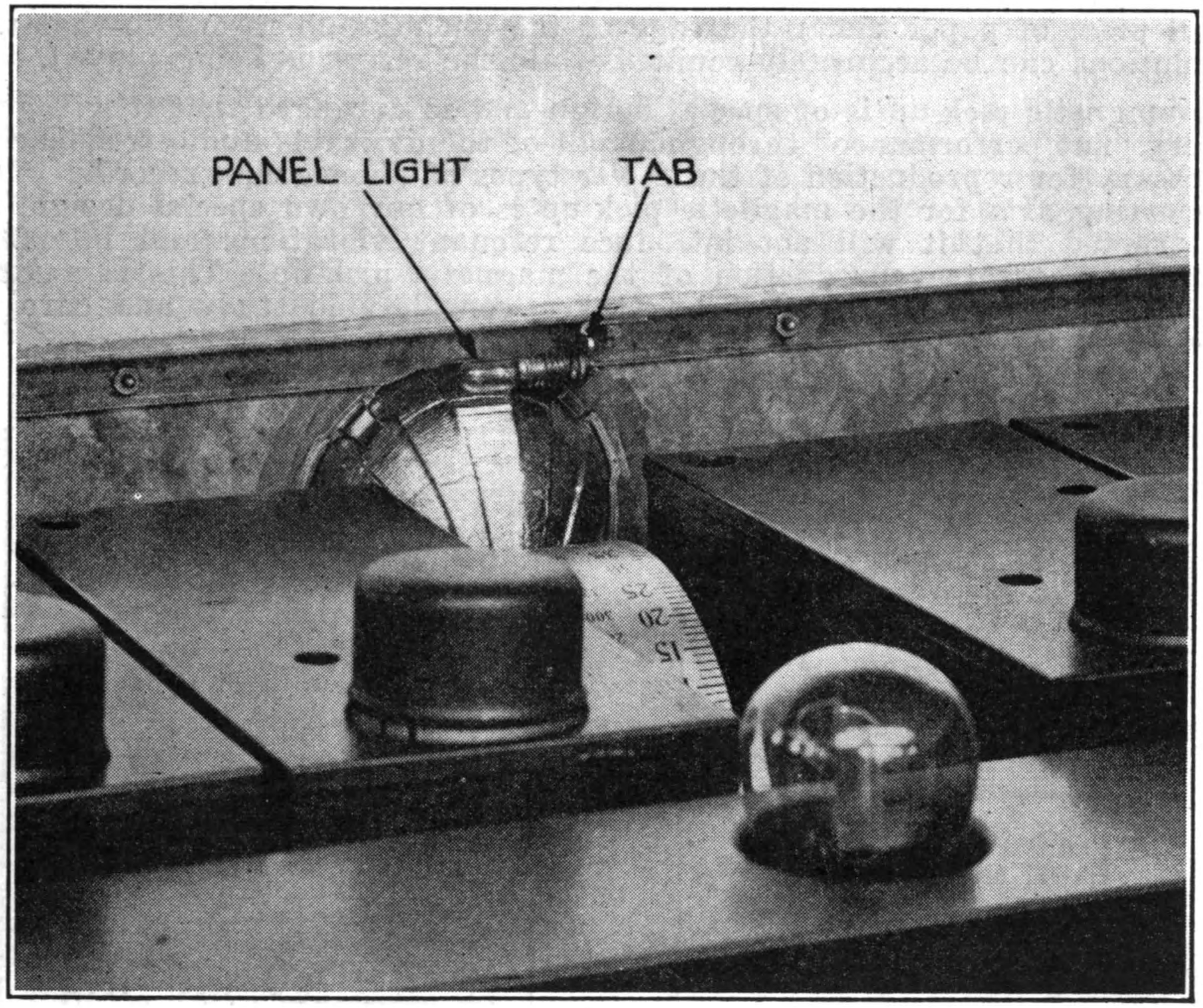


Fig. 16—Dial Light

§ 17—OPERATION OF THE NO. 744 RADIO AND PHONOGRAPH COMBINATION FOR PHONOGRAPH RECORD REPRODUCTION

The phonograph portion of this No. 744 instrument consists of a General Electric induction type phonograph motor, designed to give constant speed within the range of voltage between the limits of a minimum of 100 volts and a maximum of 125 volts, 50-60-cycle A. C. current. This motor contains no commutator or brushes, or revolving wire, therefore, cannot be damaged if the turn table is held from turning by hand.

The current for operating the phonograph motor is controlled by means of switch contacts that are attached to the end of the motor and which are actuated by an automatic stop of our own design. This stop is so arranged that it can be quickly and accurately set for opening the circuit when the needle of the magnetic pick-up reaches the last groove in the record. This type of stop makes it possible to use any design or make of lateral cut phonograph record. It is set by merely depressing a button.

The speed of the phonograph motor is regulated by a governor and this in turn has a "tabulator" or regulating knob which will allow for changes in the speed of the turntable to be made by the owner. It is to be noted here that there is only one correct speed for the turntable; that is, 78 revolutions per minute, or approximately 20 revolutions for 15 seconds as read on the second hand of a watch. A quick way to read this speed is to insert a small piece of paper under the edge of the phonograph record so that the revolutions can be accurately counted while the record is being played.

The magnetic pick-up is of special design and so arranged that it will give a very "flat performance" throughout all of the desirable audio frequencies necessary for reproduction of the newer types of phonograph records. The supporting arm for the magnetic pick-up is of our own special design, so constructed that it will not introduce resonant vibrations and interfere with the accurate reproduction of the magnetic pick-up. This is a very important point and one that has taken considerable study and care to provide.

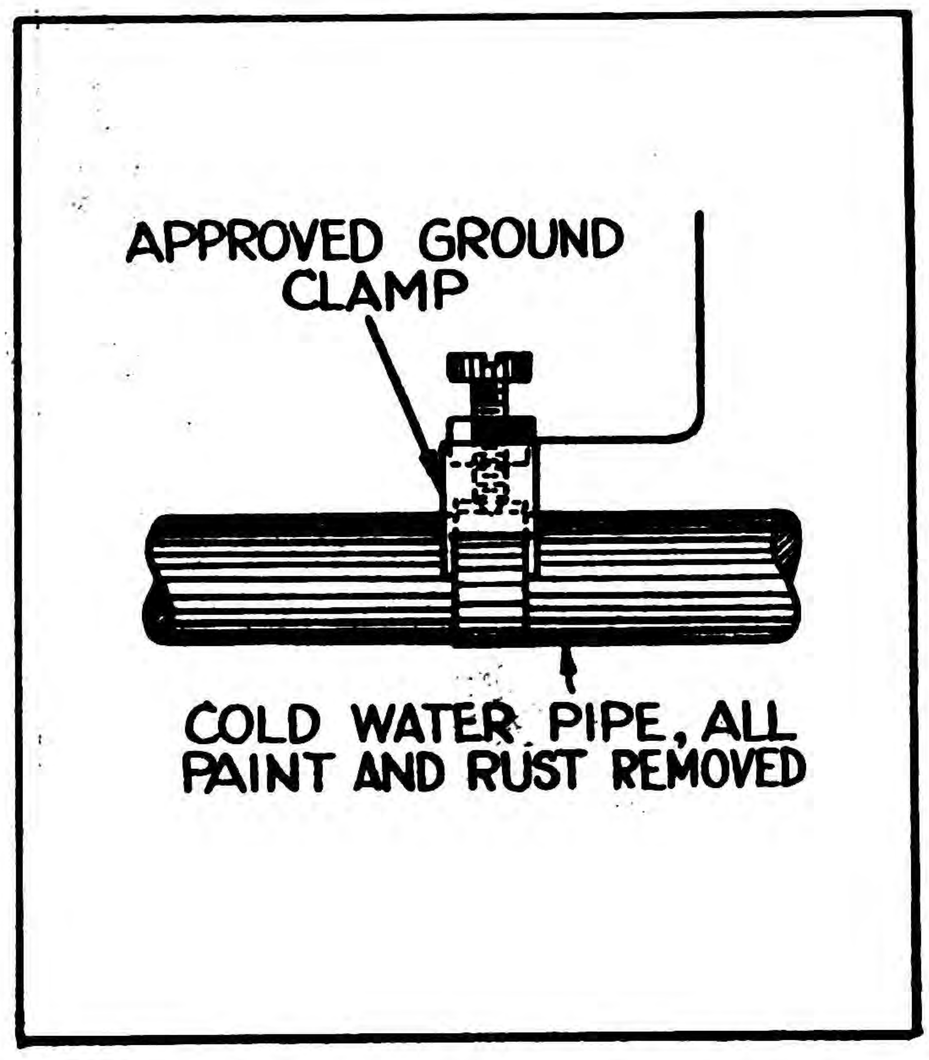


Fig. 17—Water Pipe Ground

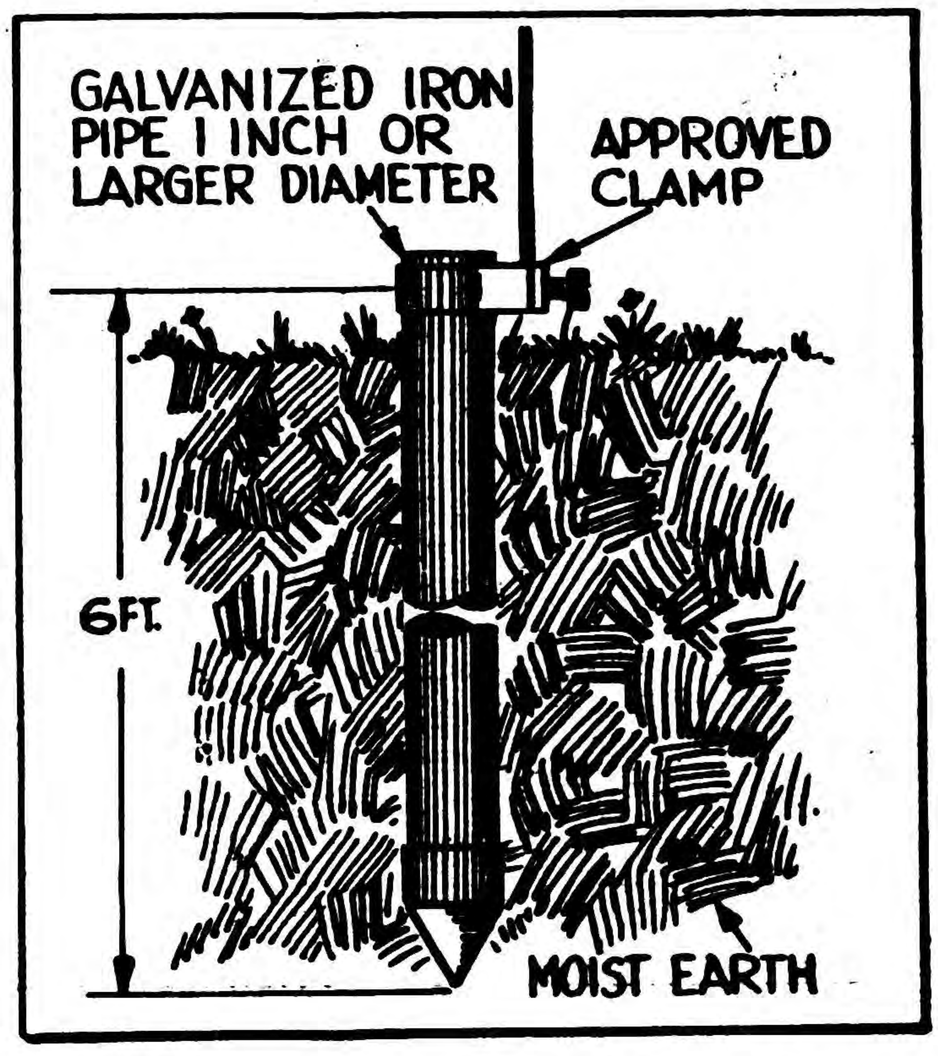


Fig. 18—Earth Ground

The volume control for this magnetic pick-up is operated through a knob, which is located at one end of a large escutcheon upon which the instructions for operating the phonograph portion of the receiver is inscribed.

This phonograph compartment also contains a 15-watt, 110-volt candelabra pilot lamp which lights when the main switch of this radio-phonograph instrument is turned "on" and remains lighted until the switch is turned "off." This lamp is so arranged as to completely illuminate the record and other phonograph apparatus in this upper compartment. It also is arranged to furnish light for a pilot lense, the latter being placed at the upper portion and front of the cabinet, so as to be in view at all times and show the illumination from the lamp when the receiver is turned on.

The upper left hand portion of the cabinet of the No. 744 instrument has the same type of cover or lid as that used for the phonograph compartment. In this upper left hand compartment, a large space is provided for loose phonograph records, a heavy felt covering being provided on the bottom of the space for the protection of the records. It has been found from experience that a large compartment of this design provides the most satisfactory plan for storing of the phonograph records that are used continuously and which are seldom, if ever, returned to an album or other filing system or compartment. By raising both the upper right and left hand lids or covers, it is possible to select records and transfer the same to the phonograph turn table quickly and without requiring the handling of any albums, or the referring to indexes to locate records which might otherwise be kept in special filing fixtures. The mere closing down of both covers provides a means for quickly restoring the cabinet to its normal condition and thereby prevents the leaving of records on nearby tables, chairs, etc.

In the right hand lower portion of the cabinet of the No. 744 instrument are provided shelves for holding four 12-inch record albums. Each album is provided with space for 12 records. Thus, there is storage space for 48 of the 12-inch records in this lower compartment. It is intended that this compartment will provide a space for the type of records that are not used constantly. Such records can be indexed and always returned to these album files after being played.

§ 18—NO. 10 AND NO. 11 CONE TYPE LOUD SPEAKERS

For use with the No. 744 Stromberg-Carlson Receiver only the No. 10 and No. 11 Cone type loud speakers are recommended. The No. 10 speaker is of the furniture type, mounted on a walnut floor pedestal. A 21-inch cone is employed and this speaker comes equipped with a long cord and a No. 60 Radio Plug to allow for quick installation. The total height of this speaker on its pedestal is 37 inches.

The cone or radiator and the mechanism of the No. 11 Speaker are identical to those of the No. 10 floor type, but the No. 11 Speaker is designed to hang on a wall. This speaker is provided with a heavy decorative suspension cord with tassel and a long connecting cord with No. 60 Radio Plug attached. The connecting cord is brought into the cone speaker through the suspension cord from the picture moulding. The connecting cord can then be brought down to the receiver from the picture moulding along a window frame or in a corner of the room, so that all connections are practically out of sight.

The cone used in these speakers is made from acoustic fiber, which has been gathered on a form to make up a seamless, water-proofed cone with no

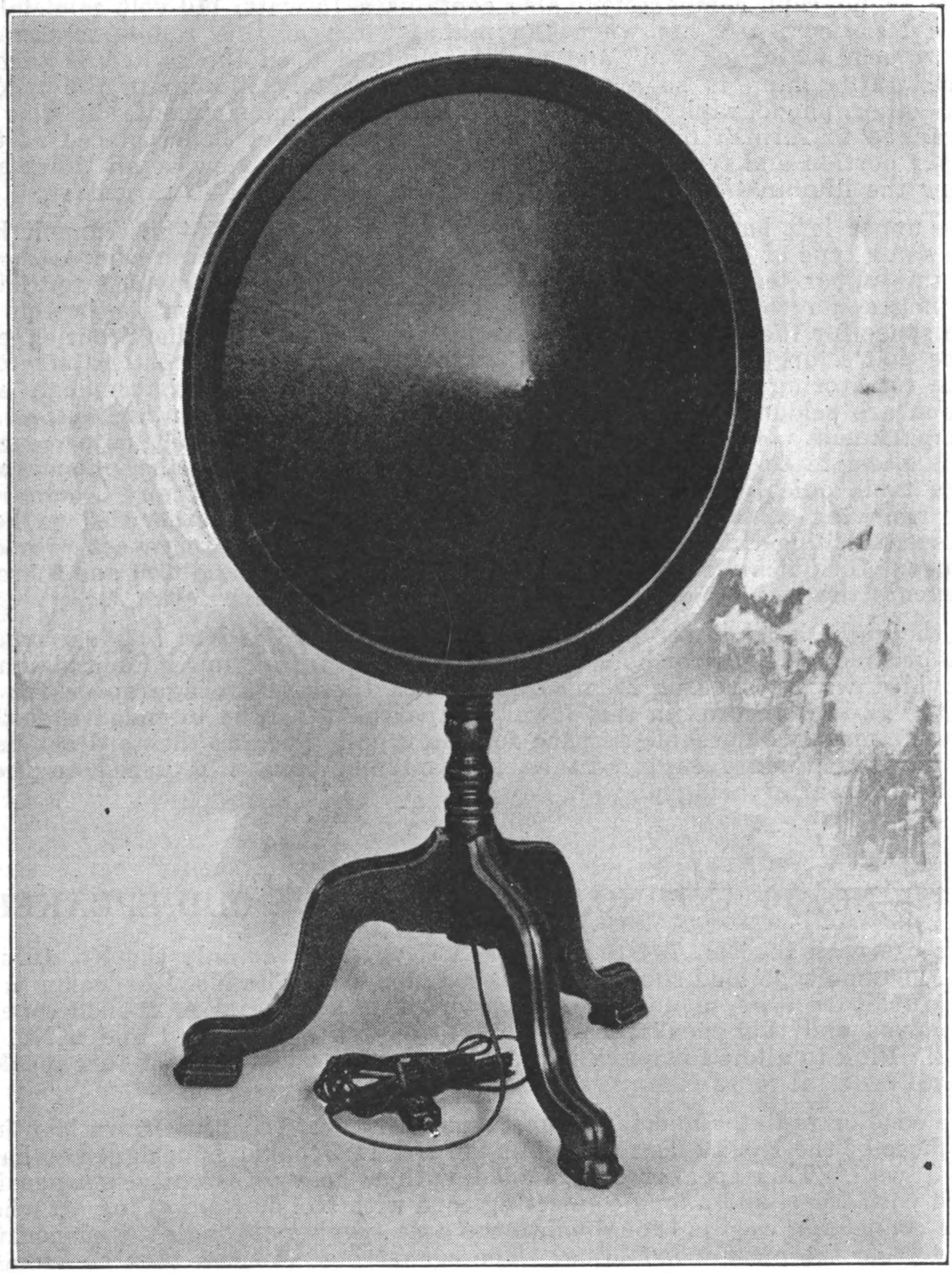


Fig. 19—No. 10 Cone Type Loud Speaker

grain to the parchment. The cone is tapered, being thicker at the outside rim than at the apex or center of the cone. A 21-inch size of diameter has been found ample in a cone speaker to handle all of the desirable audio frequencies at a volume level as high as can be used in a small hall or in the largest living room of a home.

The many novel features incorporated in this Cone Speaker have overcome the two objectionable characteristics which cone speakers have had in the past. Tapering a cone, built up of seamless tough material with no grain or weakness in any one direction, has overcome the oil can effect, known as "paper rattle." Moreover, this cone is capable of reproducing faithfully and correctly all of the notes in the entire musical scale from below 50 cycles to above 4,700 cycles with a relatively small degree of movement of the apex and driving mechanism. This has made possible the use of a stiffer driving mechanism than could be employed with former inefficient cone speakers and the new mechanism will retain permanently the adjustment given it at the factory.

No other cone speaker tested in our Acoustical Laboratories will bring out, as faithfully, the bass notes which these receivers are capable of reproducing. Other speakers will not reproduce these notes, but only the higher second harmonic. In fact, very few reproduce fundamental frequencies below 150 cycles.

The naturalness of the reproduction of the No. 10 and No. 11 cone type speakers is due to the absence of tone quality. Tone quality is the result of the resonance of some portion of the instrument. This is of value in musical instruments, but it is a decided disadvantage in a loud speaker. It is often erroneously thought that cone speakers of high quality should have a pleasing and distinctive tone all their own. A good speaker, however, should have no resonance points, should not exaggerate any particular tones or bring out prominently any particular overtones. True fidelity of reproduction can only be obtained from a speaker which produces only those tones and overtones of the musical instrument whose sounds are being reproduced without adding any new overtones of its own.

One of the most simple tests for correct reproduction is listening to speech, especially when the voice of the speaker is known to the listener. Reproduced speech should be just as natural as the original. The voice should be as clear and understandable as though the distant speaker was in the room.

Location of Cone With Respect to Radio Receiver:

A long connecting cord and plug are supplied with the No. 10 and No. 11 Cone Speakers to allow the sound radiator to be placed at a considerable distance from the radio receiving set for the following reasons:

(a) To allow for correct judging of volume when tuning the receiver.

(b) To allow the speaker to be located in the most convenient position in the room.

(c) To select a separation between the speaker and the radio receiver that will avoid "acoustic coupling." This is a steady tone that can occur when the detector tube is "microphonic" and is best remedied by selecting a non-microphonic tube for a detector. (See Section 7.)

The Stromberg-Carlson Company is licensed by the Lektophone Corporation under its patents to manufacture Cone Speakers.

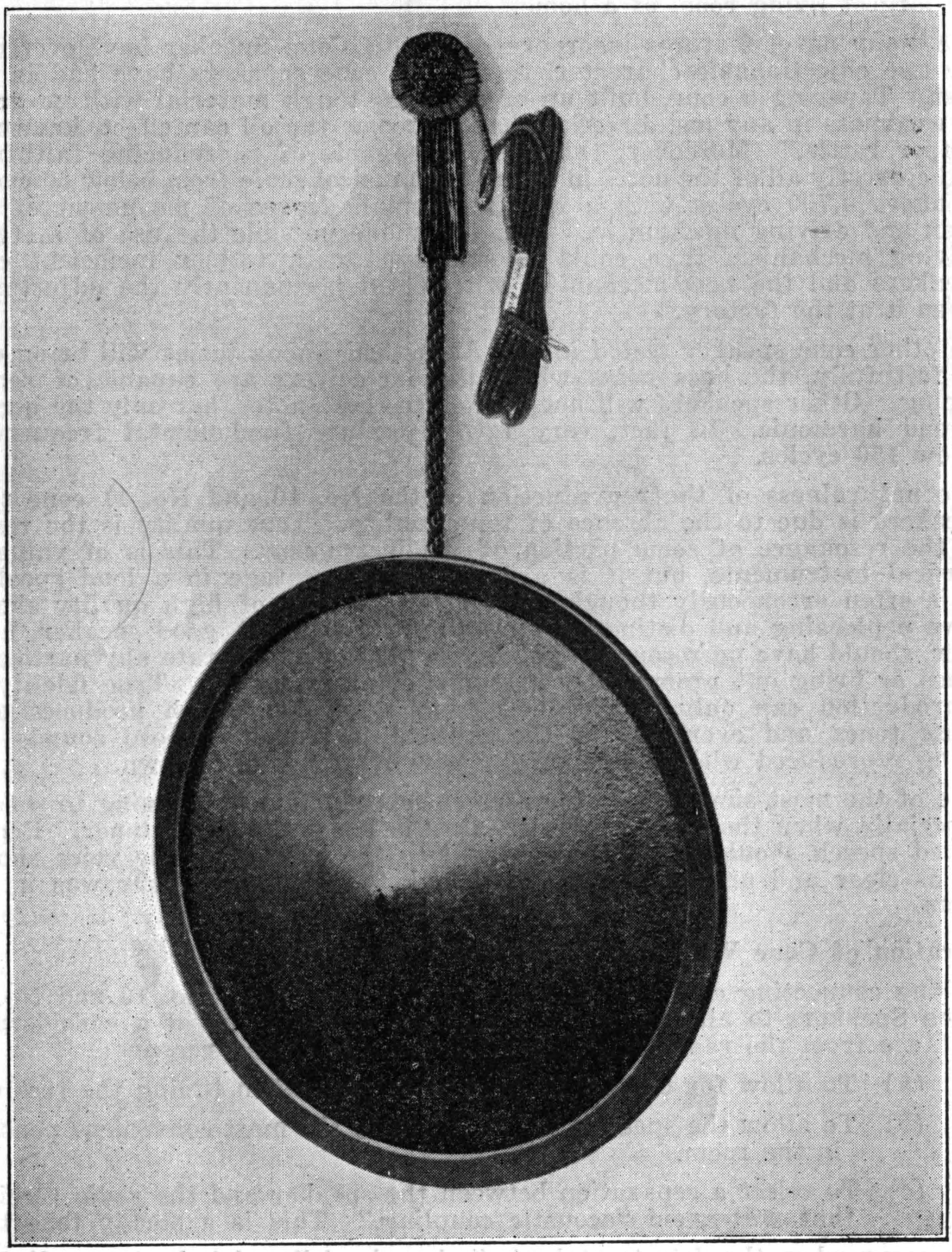


Fig. 20—No. 11 Cone Type Loud Speaker

§ 19—UNPACKING AND SETTING UP THE NO. 10 CONE SPEAKER

The No. 10 Cone Speaker is packed for shipment in a special reinforced box of corrugated board. The cone assembly and the three metal feet are removed from the pedestal.

Carefully preserve this specially constructed box for future use if for any reason it is desired to reship this cone speaker.

After unpacking the three metal feet should first be attached to the pedestal and then the cone assembly mounted by two screws. A 35-foot cord and plug are provided with this speaker, one end of the cord already being drawn up through a hole in the stem of the pedestal and provided with spade tips for connecting it to the two binding posts of the loud speaker mechanism. This connection can easily be made by hand, no tools being required.

In order to protect the operating mechanism, this loud speaker is packed with the small thumb nut on the front of the cone loosened. This nut is so designed that it will not completely unscrew and become lost, and it is recommended that this thumb nut always be loosened when moving the speaker from place to place. However, when ready for use tighten this thumb nut securely **with the fingers.**

Occasionally, it is advisable to loosen this adjusting nut for an instant and immediately re-tighten with the fingers, in order to compensate for expansion or contraction of the cone. This adjustment should be made also at such times when the loud speaker fails to operate satisfactorily.

Always operate with the volume control of the receiver **below the overloading point of the tubes,** otherwise the naturalness of the reproduction will be destroyed and a "rasping" or "rattling" effect will result.

§ 20—UNPACKING AND SETTING UP THE NO. 11 CONE SPEAKER

The No. 11 Wall Type Cone Speaker is shipped completely assembled in a specially designed box of reinforced corrugated board. It is provided with a 45-foot cord and a No. 60 Radio plug already connected and is ready for operation when hung on a picture hook or from the moulding.

Carefully preserve this special box for future use if, for any reason, it is desired to re-ship this cone speaker.

In order to protect the operating mechanism, this loud speaker is packed with the small thumb nut on the front of the cone loosened. This nut is so designed that it will not completely unscrew and become lost, and it is recommended that this thumb nut always be loosened when moving the speaker from place to place. However, when ready for use tighten this thumb nut securely **with the fingers.**

Occasionally, it is advisable to loosen this adjusting nut for an instant and immediately re-tighten with the fingers, in order to compensate for expansion or contraction of the cone. This adjustment should be made also at such times when the loud speaker fails to operate satisfactorily. Always operate with the volume control of the receiver **below the overloading point of the tubes,** otherwise the naturalness of the reproduction will be destroyed and a "rasping" or "rattling" effect will result.

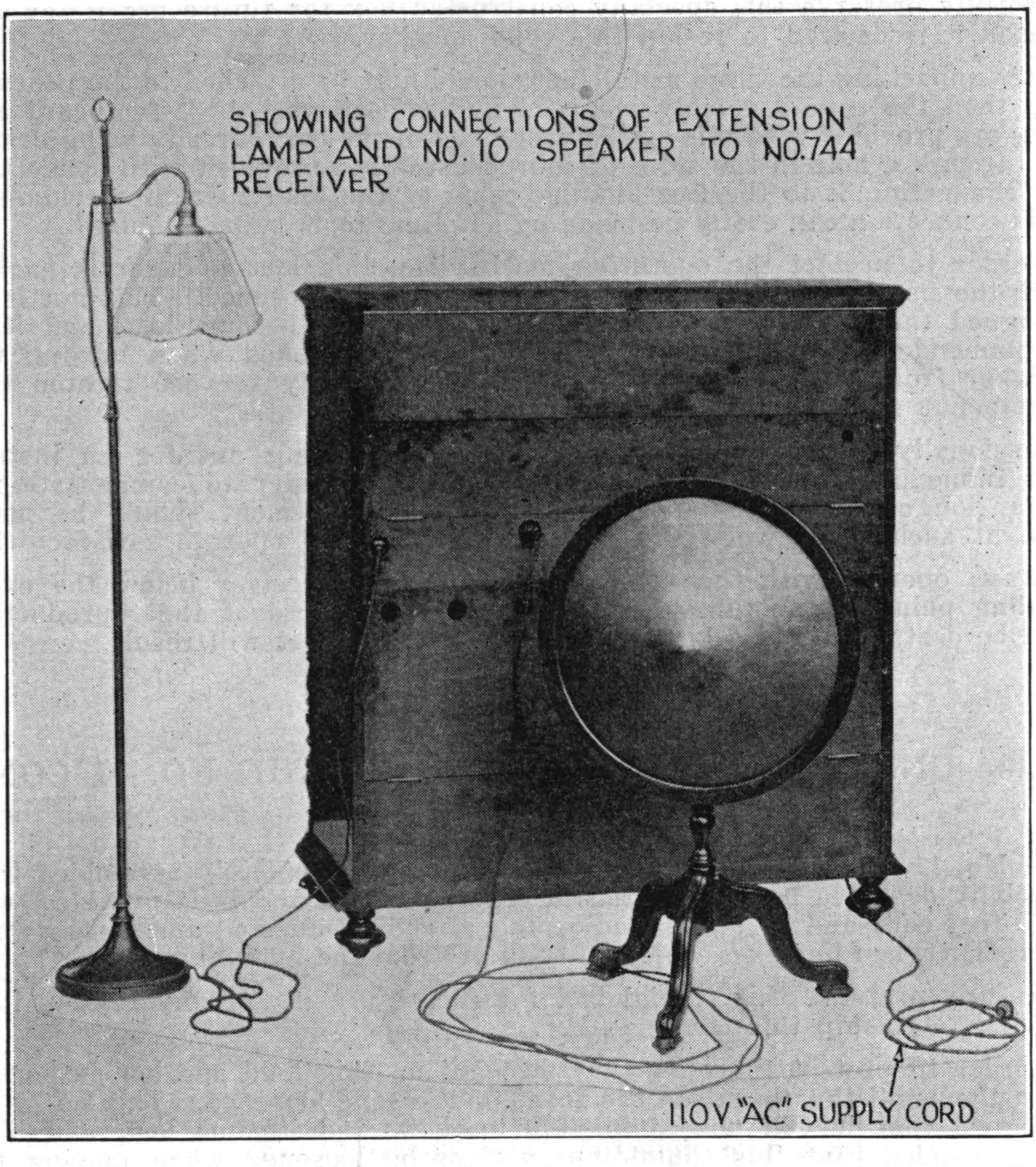


Fig. 21—Rear view of No. 744 Receiver showing reading lamp and loud speaker connections

§ 21—HOME SERVICING OF RECEIVERS

Barring accidental damage in shipment or in handling, the No. 744 radio receiver will operate correctly when installed in accordance with the instructions contained in this book, providing the tubes and loud speaker are in good working condition. If the receiver should fail to operate correctly when first installed or at any later date, the following condensed list of possible reasons for the failure should be investigated and the "Special Service Instruction" followed to provide a suitable remedy:

(a) No Signal in Loud Speaker

(1) Switch not turned to "ON."
(2) House Current Supply turned off.
(3) Station Selector not set correctly.
(4) Volume Control not turned up.
(5) No station broadcasting.
(6) Loud Speaker not connected.
(7) Defective Tube or Tubes in Receiver or Socket-Power Unit.
(8) Tubes not making contact in sockets.
(9) Defective connections to Socket-Power Unit.
(10) Defective Loud Speaker.

(b) Weak Signal in Loud Speaker

(1) Station Selector not set correctly.
(2) No nearby or powerful stations broadcasting.
(3) Volume Control not turned up.
(4) Meter Control not set so pointer is on red line.
(5) Loop shielded by steel building, metal lathing or damp brick walls.
(6) Inefficient tubes.
(7) Tubes not making contact in socket.
(8) Poor atmospheric conditions.
(9) Signals fading.
(10) Tubes other than R. C. A. Radiotrons or Cunningham Tubes.
(11) Loud Speaker incorrectly adjusted.

(c) Noisy Reception in Loud Speaker

(1) AC supply plug inserted wrong way in socket or outlet.
(2) Stations on nearly the same wave length causing whistle.
(3) Loose joints in Ground circuit.
(4) Trouble at broadcasting station.
(5) Defective Tube or Tubes.
(6) Unavoidable noise picked up by Loop.
(7) Poor or loose contact with tube in socket.
(8) Broken or defective Loud Speaker Cord.
(9) Loose connections to Socket-Power Unit.
(10) Microphonic Detector Tube.
(11) Acoustic coupling between Loud Speaker and Receiver.
(12) Volume Control set too high.
(13) Poorly soldered Ground connections.
(14) Overloaded Loud Speaker or tubes.
(15) Waterpipe or earth ground not used.
(16) Poorly constructed Loud Speaker.
(17) Foreign material between condenser plates.

(d) Signals Not Clear

(1) AC Supply Plug inserted wrong way in socket or outlet.
(2) Heterodyning or squealing of two stations on same wave length.
(3) Whistle from nearby radiating receiver.
(4) Poor quality of modulation at broadcast station.
(5) Acoustic coupling of Loud Speaker to set, shown by one or more musical notes unduly accented or prolonged.
(6) Oscillation in receiving set from use of poor first radio tube.
(7) Volume Control set too high, thus overloading tubes or Loud Speaker.
(8) Loud Speaker of poor construction.
(9) Station Selector not set for maximum response for desired station.
(10) Defective tube or tubes.
(11) Socket-Power potentiometer not adjusted correctly.

§ 22—SPECIAL SERVICE INSTRUCTIONS

The following paragraphs give servicing hints that will be of assistance to the owner who wishes to look after his own receiver installation:

1—Incorrect Tuning: In order to receive maximum clarity and best tone quality, the station selector must be set at the point of maximum signal strength for the desired station. Do this with the "Volume Control" turned down so as to get a sharp indication of the peak response.

2—Incorrect Connections: Care should be taken that the Socket-Power connections are all according to the correct circuit diagrams in this Instruction Book. Check carefully. (See Fig. 22.)

3—Loose Connections: All connections should be carefully checked to make sure that they are tight. The terminals on the shoe of the A-B-C Supply cable should be tightly held under the thumb nuts of the binding posts of the terminal board of the Socket-Power Unit. Tighten these connections by using a pocket metal disk as a screw driver, inserted in the slot in the thumb nut.

4—Poor Contact in Tube Sockets: If the prongs of the vacuum tubes are corroded or dirty, they will not make good contact with the springs of the tube sockets. Remove the tubes and scrape the tube prongs clean. If this does not help, the socket springs must be readjusted by someone equipped with tools designed for this purpose. A Stromberg-Carlson dealer can do this.

5—Poor Connections in Ground System: The ground wire when spliced or connected to ground clamps, etc., should be soldered whenever possible. In any case, a good, firm, clean contact is necessary.

6—Inefficient Ground Connections: The ground connection should be as short as possible to a cold water pipe or other good ground. (Section 5.) If the ground lead is long or is connected to a system of steam or similar pipes, it is liable to be high resistance. Noisy reception will generally result. Inspect the ground clamp (if used) for tightness and for presence of dirt or paint between clamp and pipe.

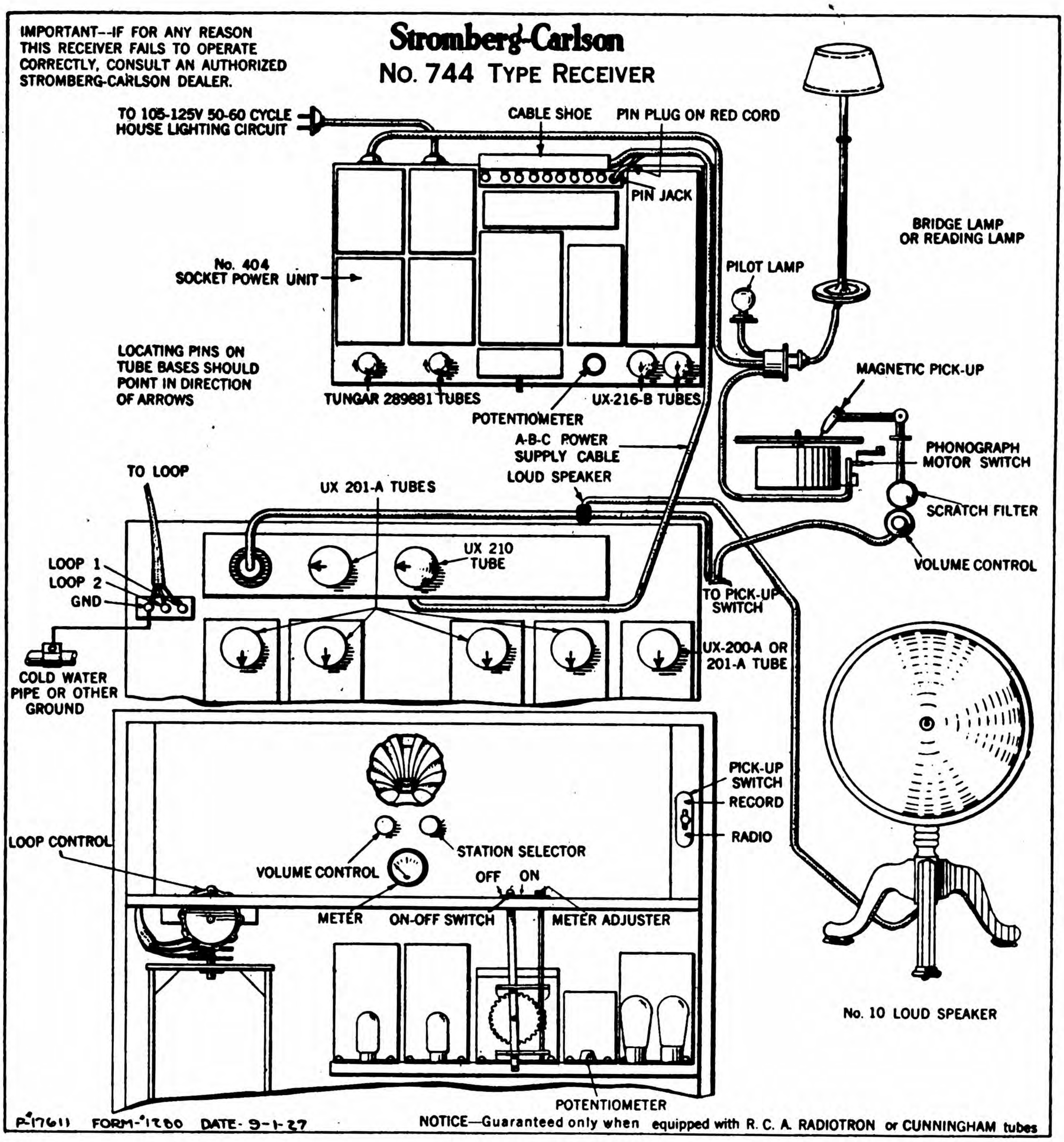


Fig. 22—Complete external connections of No. 744 Type Receiver

7—Defective Tubes: Tubes may be defective in several ways. There may be an inter-element short circuit or the filament emission may be low. Check tubes by exchanging them, one at a time, with a tubes that is known to be good. If one tube is found to be poor or defective, check the rest carefully again so as to be sure that there are no more. Sometimes the vacuum tubes can be damaged by rough handling so that the filament becomes broken or the elements of the tube short circuited. See Section 9.

8—Acoustic Coupling: If a steady howl is given by the loud speaker, but not by a headset when plugged in, try moving the loud speaker in various positions in the room, keeping it well away from the receiver, also follow the directions concerning microphonic detector tubes in Section 7.

9—Incorrect Adjustment of Loud Speaker: If the signals sound badly distorted or the loud speaker seems to rattle, the speaker should be adjusted according to the maker's instructions. (See Section 18 for information covering the Stromberg-Carlson No. 10 and No. 11 Cone Type Speakers.)

§ 23—INTERFERENCES AND DISTURBANCES

Disturbances that interfere with the clear reception of broadcast programs can be due to two causes:

First—Noises that are generated in the radio receiver circuit.

Second—Noises that are generated outside of the radio receiver and that are picked-up by the loop and amplified, along with the desired broadcast signals.

The Stromberg-Carlson No. 744 Radio Receiver completely avoids all noises usually generated in the receiver itself by the special balancing of the circuits and the use of shielding over the tuning coils. Incorrect operation of the receiver, in no case, will generate noises that will radiate from the loop antenna and interfere with neighboring receivers.

However, noises that are caused by natural "static," locally used electrical appliances and neighbors' radiating receivers, and collected by the loop, naturally are magnified or amplified by the radio receiver, along with the desired signals, and are heard in the loud speaker. The sole function of any radio receiver is to amplify, without distortion, all of the signals that are tuned-in at any particular wave length or frequency. It is not possible to "sift" out these "noise" frequencies as most of them are of the same character as the frequencies of the desired signal.

It is obvious that the eliminating of these disturbances must be by either one or both of the following methods:

(a) Eliminate or reduce the disturbance at its source.

(b) Locate or arrange the loop of the radio receiver, so as to be in a favorable position for picking-up the desired broadcast station signal and in an unfavorable position to collect local disturbing noises.

Unfortunately, it is not possible to remedy all of the disturbances at the source, but care in the installation of the pick-up usually will give a satisfactory installation for local stations and for most distant stations. The following is a list of disturbances and suggested remedies:

(a) **Interference Between Broadcasting Station Programs:** The selectivity of the No. 744 Radio receiver is ample to prevent this kind of interference, provided the station signals do not overlap.

(b) **Interference Due to Broadcasting Stations on Close Wave Lengths:** When the broadcasting stations are operating on wave lengths that are so close together that the inaudible radio-frequency carrier waves combine to cause audible beat notes, the result is a steady squeal or howl of unvarying pitch. This seldom occurs unless one or both of the broadcasting stations are operating on an incorrect wave length, or when a very distant broadcasting station has an assigned wave length the same as or close to that of a local broadcasting station.

There is no remedy in the hands of the broadcast listener to entirely overcome this kind of disturbance, other than to listen to the station that comes in with the loudest signal and reduce the amplification by turning the Volume control knob counter-clockwise or to the point where the interfering note is practically eliminated. If both stations come in with the same volume, there is no way to mitigate this type of interference, although the programs may be partially separated by careful setting of both station Selectors to "maximum response" for the station desired.

(c) **Radiation from Local Receiving Sets:** Practically all receiving sets using the "regenerative" principle, and sets not provided with means to prevent "oscillation" act as minature broadcast stations and radiate tuning and receiving noises, **when incorrectly operated.** These noises usually vary in pitch and sound like chirping of birds, howling and low pitched groans and can be picked up from a receiving set located many miles away. However, the louder noises of this character come from a neighboring receiving set. A correctly balanced "Neutrodyne" type of receiver will not radiate this kind of disturbance, regardless of how the station Selectors are tuned, so that when all of the receiving sets in use are of the "Neutrodyne" or balanced type, no disturbance of this kind will be possible. The Stromberg-Carlson radio receivers do not oscillate or radiate when installed in accordance with these instructions, **therefore, will not cause disturbance to your nearest neighboring receiving set.**

The only remedy for this kind of disturbance is to suppress it at the source. A campaign of education has been inaugurated by radio clubs and various national radio associations to minimize and eventually eliminate this receiving set radiating disturbance. You can assist in this good work by conferring with your neighbor.

(d) **Interference Due to Telegraph Code Signals:** Telegraph code signals, sounding like continuous dots and dashes, usually come from so-called "spark sets" and can be local amateur stations or local or distant commercial stations. Nearly all of the commercial stations are without the broadcast range and the amateur stations are gradually eliminating the "spark sets" or are working these sets on a schedule that avoids interference with evening broadcast programs.

The great selectivity of the Stromberg-Carlson radio receivers reduces this kind of disturbance to a minimum.

(e) **Interference Due to Static:** All Noises due to atmospheric electricity and local man-controlled electricity is commonly called

"static." This disturbance sounds like a continuous roaring noise with occasional crashes and other varying or steady superimposed noises.

The atmospheric static is greater in summer than in winter and usually is more noticeable at night than in daytime. When the volume of the "static" exceeds that of the signal from the desired broadcast station, it is impossible for any radio receiver to bring-in the programs satisfactorily. Devices for eliminating "static" also eliminate signal frequencies that are absolutely necessary for high quality audio reception. The only remedy is to be content with programs that come in with greater volume than that of the "static." Always keep the Volume Control turned down when the static level is high.

Other noises included under the heading of "Static" are caused by one or more of the following:

1—Switching-on and off of lamps and other electrical devices.
2—Electric flat irons with thermostatic heat control or loose plug.
3—Electrie heating pad with thermostatic heat control.
4—Door bells and buzzers while being operated.
5—Electric vacuum cleaners.
6—Sewing machine motors.
7—Furnace thermostat motors.
8—Oil burners that use spark ignition (some types).
9—Oil burners operating motors.
10—Refrigerator motors or electric control.
11—Violet ray machines.
12—Ozonators.
13—Motors with sparking brushes.
14—Battery chargers of vibrating type and some electrolytic types.
15—Ignition systems on private home lighting plants.
16—Electric elevators using commutators.
17—Hum caused by some types of "B" Socket-Power Units, having unsatisfactory filter system, or with magnetic coupling to audio apparatus of the receiver.
18—Bad contact in electric house lighting system switch, lamp socket, fuse or other connected device.
19—Electric sign flashers.
20—Electric street cars and electric railroads.
21—Electric smoke and dust precipitators.
22—Telephone exchange pole changers and ringing converters, if not protected by suitable shunting devices.
23—Induction from telephone and telegraph lines.
24—Some arc light systems.
25—Electric welding apparatus.
26—X-ray machines.
27—Static electricity produced by running belts.
28—Static electrical machines.
29—Stock tickers.
30—Electric furnaces of some types.
31—Motion picture projectors using arc lamps.
32—High voltage testing equipment.
33—Defective electrical power circuits and apparatus.

Fortunately practically none of the above listed disturbances (steady disturbances) are picked up by a receiving set located in a residence building, although they may be encountered to a more or less extent in steel frame apartment houses, stores and factory buildings. Thus a satisfactory demonstration of a sensitive and powerful radio receiving set is best made in the ultimate location rather than in a store or other salesroom.

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