



NATIONAL RADIO INSTITUTE

 *Washington D. C.* 

Radio-Trician Service Manual

Compiled solely for  Students & Graduates

ON

**SERVICING THE CROSLEY GEMBOX MODELS 608, 610;
GEMCHEST 609; JEWELBOX MODEL 704-B
and SHOWBOX (SHOWCHEST) MODELS 705 and 706
RECEIVERS**

The Gembox Model 608 A. C. set consists of a 6-tube circuit (including rectifier) with two neutrodyned radio frequency stages, regenerative detector, and two transformer-coupled audio frequency stages. The secondary radio frequency and detector stages are tuned, the first being untuned.

The schematic diagram of the Gembox is shown in Figure 1.

The volume on this receiver is controlled by a variable resistance connected across the primary of the antenna choke coil, the ground lead being taken from the rheostat slider.

Regeneration is secured by means of a small variable condenser connecting the detector plate to the plate of the second R. F. tube. The amount of regeneration may be controlled by adjusting this condenser.

A small adjustable aligning condenser shunted across the detector stage tuning condenser serves as a means of aligning the tuning condensers so that they will track together properly.

The Model 608 uses a UY-227 type detector, UX-171A type output tube, and UX-226 type tubes in all other stages. All of these tubes use A. C. for their filament supply. The necessary filament current is obtained from three separate secondary windings on the power supply transformer. The filament current for the UX-280 rectifier tube is obtained through a fourth secondary winding with a midtap supplying the 5 volts A. C. A fifth secondary winding on the power transformer furnishes 220 volts A. C. for the B and C supply. The current from this secondary

signal is loudest. A balancing wrench may be purchased from the Crosley Mfg. Company, or made from a piece of bakelite. If a metal wrench is used, adjust until the signal is loudest with wrench removed.

All circuits involving the neutrodyne method of balancing of tuned Radio frequency sets must take into account the fact that there is a variation in the characteristics of vacuum tubes. In the Crosley Showbox, Jewelbox, and Bandbox models, the method of balancing is by means of small adjustable condensers.

It is generally known that the balancing of the set has much to do with the amplification gain. Every Radio-Trician knows that it is occasionally necessary to rebalance any receiving set using the neutrodyne circuit in case the particular tubes used in that set are somewhat off of the average standard. The Crosley Gembox does not have the small variable neutralizing condensers. It utilizes what is known as the grid-to-grid method of balancing. The balance of this set depends largely upon the critical angle of the Radio frequency coils or transformers. They are occasionally adjusted in the factory for average standard tubes just as are the other Crosley models, and as a general rule, these sets will function perfectly with the average tubes with which they are equipped in the field.

However, if any set tends to oscillate with the tubes with which it is equipped, or if the set seems to lack in sensitivity, the method of adjusting the set is extremely simple to adapt it to the tubes with which it is to be used. Simply remove the lid when the set is in operation; change the coil angle by slightly raising or lowering the top of the Radio frequency coil; replace the lid; turn the dial throughout its entire range. If it oscillates at any spot, remove the lid and again change the coil slightly in the opposite direction.

A sensitivity test may then be made by tuning to a weak signal and adjusting the coil or coils until the loudest signals may be had. With the lid again replaced, again test to see if there is any point on the dial where the set oscillates. In other words, get the maximum volume without oscillation. The movement of the coil is only very slight, probably not a variation of over one-sixteenth to one-eighth of an inch.

The most critical coil in this balancing operation is the first coil in the front of the set. The second coil is far less critical and it is seldom necessary to touch the third coil. This balancing operation is required no more frequently than is required in

any other condenser balanced neutrodyne circuit. Probably the majority of sets that you receive from the factory will not require balancing, but for those comparatively rare cases where rebalancing is necessary, the above is the method of doing it.

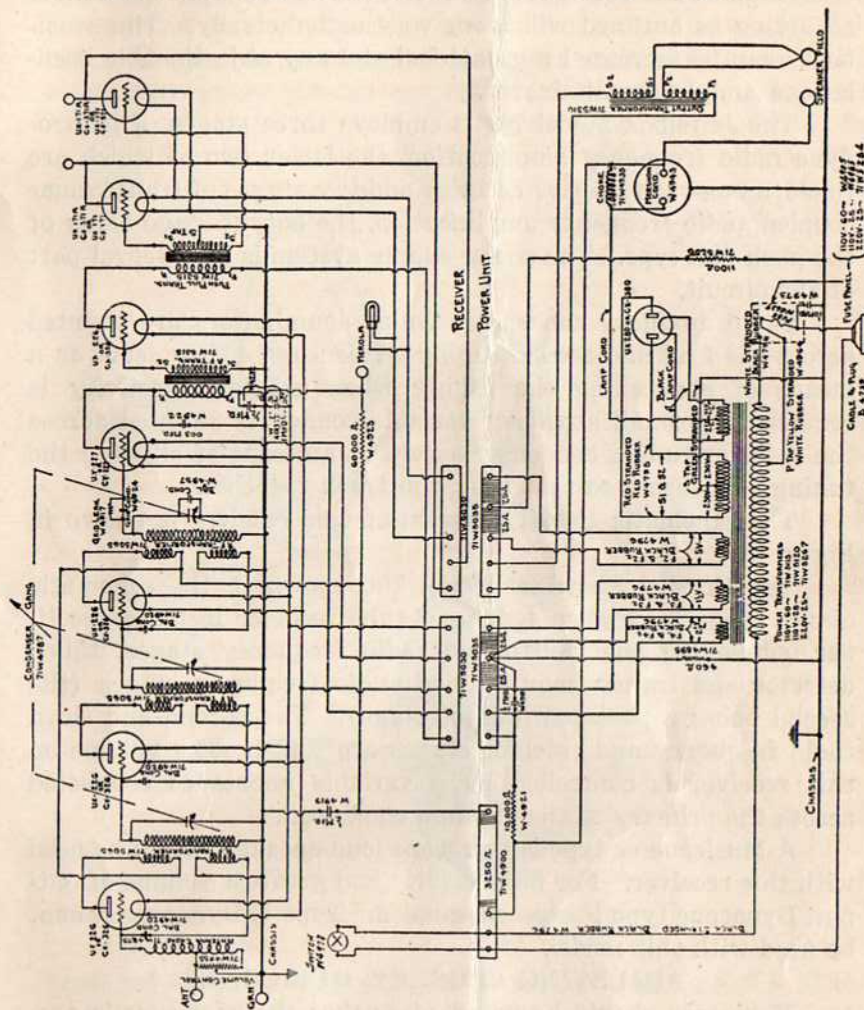


Fig. 4.—Schematic diagram of Crosley Showbox Model 700 Receiver.

This method is far more simple than the method of balancing by means of the condensers. It requires no tools, simply a slight bending of the coil angle by means of the fingers.

The same method outlined above can be used in adjusting the coils in the Gemchest, except that it is unnecessary to remove and replace the lid. Of course, it is needless to tell you that this affects only the three Radio frequency tubes. Sometimes the

same results can be obtained by shifting the tubes in the set from one socket to another.

Wherever a set is lacking in volume or sensitivity, or if an occasional set is found which oscillates, this simple method of adjusting as outlined will work very satisfactorily. The sensitivity can be increased a great deal and any objectionable oscillations completely eliminated.

The Jewelbox Model 704-B employs three stages of neutrodyne radio frequency amplification, the latter two of which are tuned, a non-regenerative detector and two stages of transformer coupled audio frequency amplification, the output stage being of the push-pull type. The power supply system is an integral part of the circuit.

Small auxiliary condensers called acuminators are shunted across the first and second tuning condensers. They serve as a means of sharpening the tuning when greater selectivity is required. A small auxiliary variable condenser shunted across the detector tuning condenser serves as a means of aligning the tuning condensers so that they will track together.

The schematic circuit diagram of this receiver is shown in Figure 2.

The Crosley Showbox Model 706 shown in the schematic circuit diagram, Figure 4, is an 8-tube receiver including rectifier, employing the neutrodyne radio frequency stages, tuned detector and transformer coupled audio frequency stages (the second being a push-pull output stage). The second and third radio frequency and detector stages are tuned. The volume on this receiver is controlled by a variable resistance connected across the primary of the antenna choke coil.

A Musicone or type F Dynacone loud-speaker should be used with this receiver. For finer quality and greatest volume of output, Dynacone type F is recommended. Type E Dynacone cannot be used with this model.

ADJUSTING CROSLEY MUSICONE

Musicones should be adjusted so that the armature is centered between the pole pieces. If adjusted properly for operation with a 201-A output tube, operating at 90 volts, the armature may chatter against one of the pole pieces if the speaker is operated with a 171 output tube at 180 volts. For proper operation with the 171 output tube, the armature should be readjusted. To reach the adjusting screws on the older models, use a long-shanked screwdriver inserted behind the cone. The adjusting

screws of more recent models may be reached with a short screwdriver.

Connect the speaker to the set with which it is to be operated, turn on the current, and tune to a station. Insert a screwdriver in the adjusting screw. Turn the screw until the Musicone just begins to rattle, due to chattering of the armature against one of the pole pieces. Then turn it in the other direction

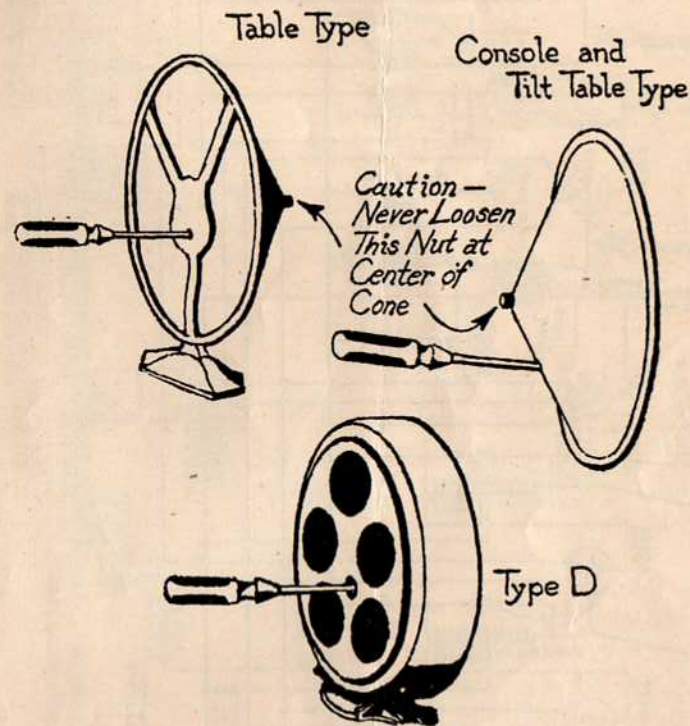


Fig. 5—How to adjust musicones.

until the Musicone again begins to rattle (this time due to the armature chattering against the other pole piece), counting the number of turns of the screwdriver as you make the adjustment. Finally turn the screwdriver about half the number of turns required to move the armature from one chopping position to the other. The Musicone will then be properly adjusted for the output tube and output plate voltage used.

