

Dec. 15, 1931.

W. T. LEWIS

1,836,260

RADIO APPARATUS

Filed April 26, 1929

Fig. 1.

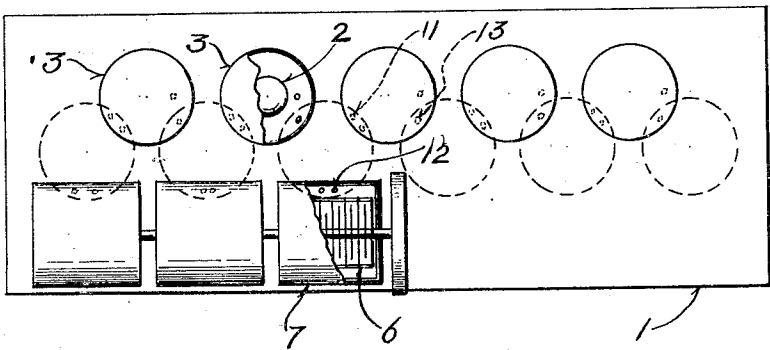


Fig. 2.

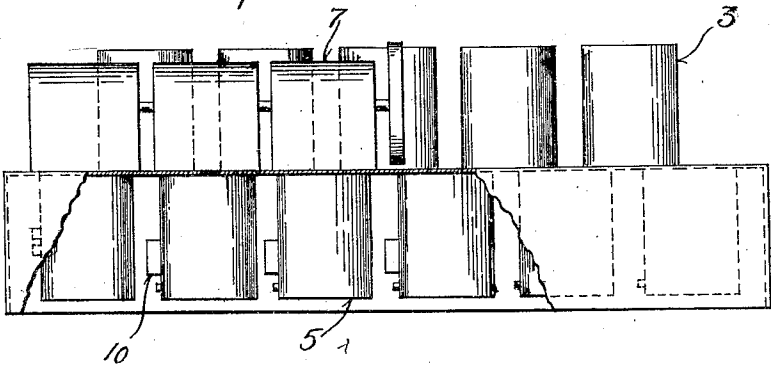


Fig. 3.

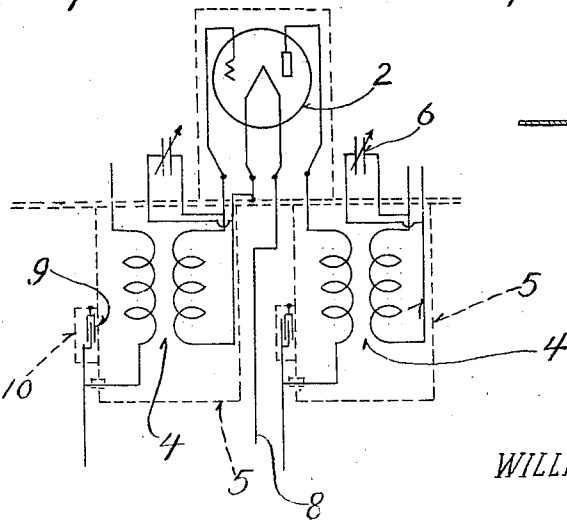
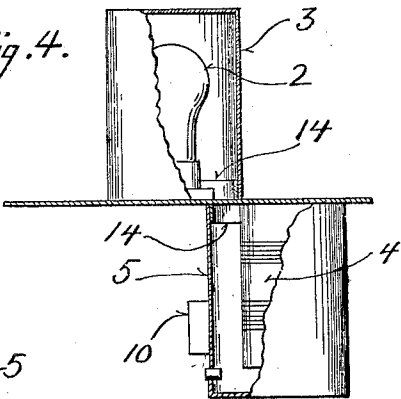


Fig. 4.



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RADIO APPARATUS

Application filed April 26, 1929. Serial No. 358,230.

This invention relates to radio apparatus.

Objects of this invention are to provide a novel manner of shielding the several parts of the radio apparatus, which also allows freedom for assembly and removal of the shielded parts, which permits the individual shielding of the tubes, the coupling devices, the condensers, and other apparatus, and which shields the connecting wires joining the several parts of the receiving apparatus.

More specifically, objects of this invention are to provide a radio receiving apparatus in which a main box or body portion carries the tubes, coupling devices, and tuning devices, in which the devices are mounted upon opposite sides of the body portion, in which shielding cans for the tubes, coupling devices, and tuning devices are carried on opposite sides of the body portion and are arranged in overlapping relation, and in which the connecting leads from successive devices pass from one shielding can directly through the body portion into another shielding can without having any portion of the leads exposed.

An embodiment of the invention is shown in the accompanying drawings, in which:—
Figure 1 is a plan view of the apparatus with parts broken away.

Figure 2 is a side elevation of the structure shown in Figure 1 with a part broken away.

Figure 3 is a diagrammatic view showing the manner in which a tube may be connected to successive coupling devices and showing the connection for the associated tuning devices.

Figure 4 is a side elevation of two of the shielding cans with the cans broken away and with the cans and adjacent portion of the body part of the apparatus in section.

In Figures 1, 2, and 4 the connecting leads have been omitted for the sake of clearness. The connections for one of the tubes are shown in detail in Figure 3.

Referring to the drawings, it will be seen that a box-like body portion 1 is used to carry the entire receiving apparatus. This box-like portion 1 is formed of metal, and may have an open bottom through which the apparatus attached to the lower portion may be inserted during assembly. The box-like body por-

tion thus constitutes the chassis or main body of the apparatus.

The several tubes 2 are located above the top of the body portion and are carried thereby, and are each surrounded or covered by a metal shield or can 3 which contacts with the body portion and thus forms a complete shield for each individual tube, so that no disturbing influence can reach the tube. The various coupling devices 4 are attached to the lower side of the box-like body portion, and are each surrounded or covered by a shield or can 5 which contacts at its upper edge with the under side of the body portion. These coupling devices may be of the usual types, such as radio frequency transformers, audio transformers, choke coils, and condensers or any other type of device. Each is completely shielded by the can 5 associated therewith, and no influence can be exerted by a coupling device upon any other part of the apparatus. The tuning instrumentalities, such as the condensers 6, may also be enclosed by appropriately shaped shields or cans 7, as shown, so that no detrimental effect can be produced by them or upon them.

The construction thus provides a complete shielding for each individual device, and each of these shields are separate and distinct from all other shields, thus permitting the removal of one of the shields for inspection or repair of the enclosed instrumentality without disturbing any other of the devices or shields.

Another and important feature of this invention is the relative positioning or arrangement of the several shields or cans so that there are practically no exposed leads or connecting wires. This is accomplished by allowing one can to overlap the next can, so that the device enclosed by the first can or shield can be connected or associated electrically with the device enclosed by the second can without having any exposed wires or connecting members.

Consider Figure 3, for instance: It will be seen that the wires from the tube pass downwardly into the can 5 and connect to the coupling devices 4 without at any portion of their extent being exposed. The wires are always located in one or the other of the cans and do

not require any other shielding than that provided for the tube and the device to which it is connected.

The tuning devices or condensers 6 are similarly connected to the appropriate coils or coupling devices by means of connecting wires which do not at any portion of their extent pass from the shields. Thus the tuning condensers are completely shielded, and their connecting wires are also completely shielded.

The shielding for the entire receiving set is thus substantially perfect and complete, and this shielding is accomplished without the use of any auxiliary shielding except that used for the instrumentalities of the set.

A further feature of this invention is that the chassis or body portion is used for one of the filament bus bars or conductors, or, in other words, one end of each filament is grounded on the body portion. This construction is shown in Figure 3. The other side of the filament is provided with a conductor 8, which extends to a common filament bus bar not shown. This conductor 8 does not have to be shielded, for no disturbing radio frequency or audio frequency currents flow in it.

It is preferable, as shown in Figure 3, to provide a condenser 9 between the lower side of the primary of each coupling device for the radio frequency tubes, and the body portion or box to thus act as a by-pass. These condensers may be carried in small metal boxes 10 attached to the corresponding cans, as shown in Figures 2, 3, and 4.

Referring in greater detail to the drawings, particularly Figure 1, it will be seen that two small holes 11 lead from a lower can into an upper can for the passage of the conductors leading to the grid and filament, and similarly, two small holes 12 lead from the lower can through the body portion upwardly into the can for the tuning condenser. A single small hole 13 leads downwardly from a tube can through the body portion into a lower can and accommodates the wire from the plate of the tube.

Any suitable means may be provided for attaching the cans to the body portion. For instance, as shown in Figure 4, the body portion may have small flanges 14 rigidly attached thereto for the reception of the cans. This construction permits the ready removal or replacement of the cans without requiring any fasteners such as bolts or screws. Other means, of course, could be provided.

For the sake of clearness and simplicity, the drawings and detailed description have been directed to a battery operated set merely as an illustration of one form that the invention may take. It is to be distinctly understood that the invention also contemplates the use of alternating current tubes. When alternating current tubes are used, the cathode

replaces the filament and is connected to the grounded body portion of the apparatus. In the case of alternating current sets, the filament leads extend through the body portion and are free from connection thereto.

In addition to the protection against electrical disturbances, the cans protect the parts against damage, as they completely enclose the several parts.

The construction is neat and attractive, and is easy to make and assemble, and aids in securing a very compact arrangement of the parts of the set.

It will be seen, therefore, that a novel wireless receiving set has been provided by this invention which is free from any undesirable coupling or interference of one part with another part; which is simple and compact; which is cheap to produce; in which provision is made for the complete shielding of the leads from one device to a succeeding device; and which may be most easily assembled.

Although the invention has been described in considerable detail, such description is intended as illustrative rather than limiting, as the invention may be variously embodied and is to be interpreted as claimed.

I claim:

1. In a radio receiving system: The combination of a metal body portion; signal responsive devices, coupling devices, and tuning devices carried by said body portion; shielding cans enclosing said devices, said shielding cans having overlapping portions; and conductors joining said devices and passing from one can into another can at said overlapping portions, whereby said conductors are shielded by said cans.

2. In a radio receiving system: The combination of a metal body portion; vacuum tubes and tuning devices carried by said body portion and located on one side thereof; coupling devices carried by said body portion and located on the other side thereof; shielding cans for said tubes and tuning devices; and shielding cans for said coupling devices, the outlines of said last mentioned shielding cans overlapping the outlines of said first mentioned shielding cans.

3. In a radio receiving system: The combination of a metal body portion; three groups of devices carried by said body portion, one group including vacuum tubes, a second group including coupling devices, a third group including tuning devices; two of said groups being located on one side of said body portion, and the remaining group being located on the opposite side of said body portion; and shielding cans enclosing the elements of each group; the shielding cans enclosing said last mentioned group overlapping the shielding cans enclosing the other two of said groups.

4. In a radio receiving apparatus, the combination of a body portion having a sheet

metal wall, a vacuum tube, a tuning device, a coupling device, shielding cans for said tube, said tuning device, and said coupling device, one of said shield cans being located
 5 on the opposite side of said wall from the other cans and having its outline overlapping the outline of the other two cans, and conductors passing through said wall from one can into another can, whereby said conductors
 10 are shielded by said cans.

5. In a radio receiving apparatus, the combination of a body portion having a sheet metal wall, a vacuum tube, a tuning device, a coupling device, shielding cans for said
 15 tube, said tuning device, and said coupling device, one of said shielding cans being located on the opposite side of said wall from the other cans and having its outline overlapping the outline of the other two cans, and
 20 conductors passing through said wall from one can into another can, whereby said conductors are shielded by said cans, each of said cans being individually removably attached to said wall and said wall forming a
 25 portion of each compartment.

6. In a radio receiving system, the combination of a box-like metal body portion, a plurality of vacuum tubes mounted on one side of said body portion, tuning condensers
 30 mounted on the same side of said body portion, a shielding can for each of said tubes and each of said condensers, coupling devices mounted upon the opposite side of said body portion, and shielding cans for said coupling
 35 devices, the outline of said last mentioned shielding cans overlapping the outline of said first mentioned shielding cans.

7. In a radio receiving system; the combination of a body portion having a metal wall;
 40 a plurality of vacuum tubes mounted upon one side of said wall, said tubes each having a cathode, a grid, and a plate; a plurality of tuning condensers mounted upon the same side of said wall as said tubes; coupling de-
 45 vices mounted on the opposite side of said wall, and each having a primary and a secondary; the primary of certain of said coupling devices being connected at one end to the plate of a tube, and at the other end being
 50 grounded through a condenser to the body portion; the secondary of certain of said coupling devices being connected to the cathode and grid of a tube, and to a tuning condenser; the cathode of each of said tubes being
 55 grounded to said wall; a shielding can for each tube; a shielding can for each tuning condenser; and a shielding can for each coupling device; said last mentioned shielding cans overlapping said first mentioned shield-
 60 ing cans.

8. In a radio receiving system, the combination of a sheet metal body portion, a plurality of metal cans located upon opposite
 65 sides of said body portion and removably held in electrical engagement with the body por-

tion and each can forming with the body portion a closed shielding means, electrical instrumentalities located singly in said cans, a can on one side of the sheet metal body portion overlapping in outline at least two cans
 70 on the other side of said sheet metal body portion, and conductors extending through said body portion from one electrical instrumentality located in a can on one side directly to an electrical instrumentality located in a
 75 can on the other side of said body portion.

In testimony whereof, the signature of the inventor is affixed hereto.

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