

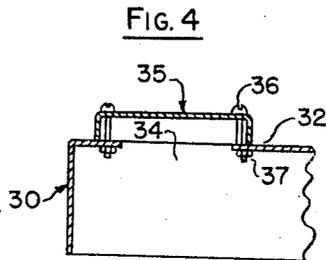
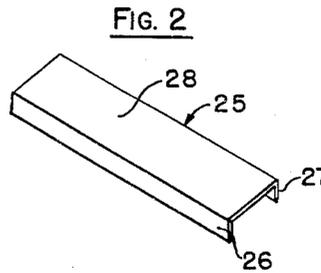
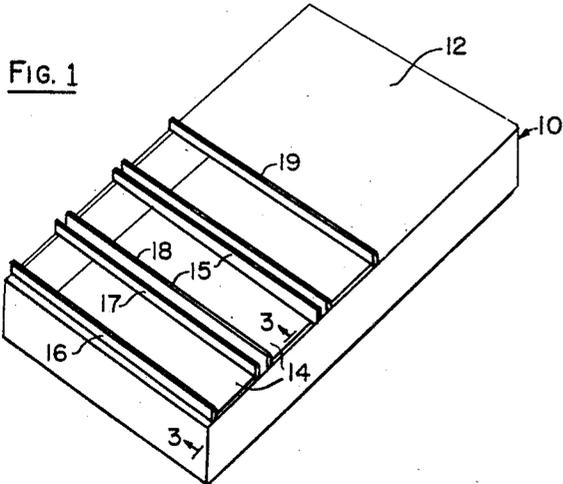
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S. H. M. DODINGTON

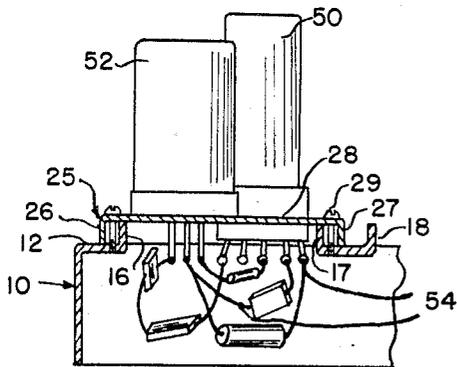
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RADIO EQUIPMENT AND METHOD OF ASSEMBLY

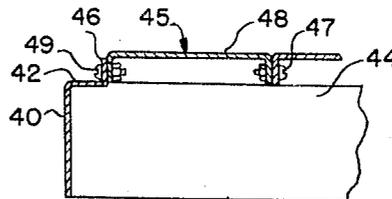
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**FIG. 3**



**FIG. 5**



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## RADIO EQUIPMENT AND METHOD OF ASSEMBLY

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10 Claims. (Cl. 250—16)

This invention relates to radio equipment and more particularly to means and a method for assembling the parts of radio transmitters, receivers, and other similar apparatus.

The present practice of manufacturing radio apparatus is to mount the radio parts and wiring onto a single chassis. For small jobs, a single chassis is usually satisfactory for manufacturing purposes. A single chassis for large assembly jobs, however, is cumbersome and time consuming to the factory workers because of the difficulty involved in assembling and wiring thereon numerous parts in compact arrangement. Besides the difficulty of assembling the parts in compact arrangement the required compactness of the job permits but one or possibly two persons to work on it at a time. Furthermore, these compact assembly jobs render it exceedingly difficult to repair and/or replace parts, since to remove a particular part for repair or replacement, other parts and wiring must usually be disturbed.

One of the objects of this invention, accordingly, is to provide improved means and a method for assembling and repairing radio equipment.

Another object of the invention is to provide a chassis construction by which radio equipment may be conveniently assembled in sub-assemblies and the sub-assemblies mounted together.

The above and other objects of the invention I accomplish by providing a main chassis in the form of a box-like structure having a wall containing one or a plurality of openings, and combining therewith one or more sub-chassis members. On these sub-chassis members, I mount radio parts and wiring as sub-assembly, each member being mountable on the box-like structure in overlying relation with respect to one of the openings in the wall thereof so that some of the parts and/or wiring mounted on the members may extend into the structure where they may be interconnected.

More particularly, the main chassis structure may be made of sheet metal by known cutting and stamping operations, the top wall of the structure being provided with a plurality of openings defined at least in part by beam-like portions, the side flanges of which extend upwardly at an angle to the plane of the wall. The sub-chassis members may be of any suitable shape and for purposes of illustration, I show them in the form of U-shaped channel structures. Circular or other shapes may also be used but I prefer to provide the members with side flanges to stiffen them and also provide

a space in which small parts and wiring may be disposed and shielded.

Radio parts and wiring may be mounted on both sides the web portion of the U-shaped channel members, the tubes, coils, and other large radio parts being preferably mounted on the top side while the smaller parts such as resistors, condensers and the wiring are disposed on the bottom side. The bottom side may be either side of the member, but as illustrated in the drawing, I refer to the portion of the member lying between the side flanges as the bottom side. These sub-assemblies may comprise certain definite stages of the radio apparatus such as a detector stage, amplifier, etc., or may comprise any radio parts that may be most readily and conveniently associated together as a unit. Each of these units or sub-assemblies may be assembled by a different workman and then the several units mounted together on the main chassis structure.

For a better understanding of the invention, reference may be had to the following detailed description to be read in connection with the accompanying drawing, in which,

Fig. 1 is a view in perspective of a main chassis structure in accordance with this invention;

Fig. 2 is a view in perspective of a sub-chassis member;

Fig. 3 is a cross-sectional view taken substantially along line 3—3 of Fig. 1 showing a sub-chassis member in section mounted thereon, the member being equipped with radio equipment as a sub-assembly; and

Figs. 4 and 5 are cross-sectional views similar to Fig. 3 showing modified forms of the chassis structure in accordance with the invention.

Referring to Fig. 1 of the drawing, a main chassis structure 10 of box-like structure is provided. The top wall 12 of the chassis has three openings 14. As hereinbefore mentioned, the box-like structure 10 may be formed by a suitable cutting and stamping operation, the openings therein being defined at least in part by a plurality of beam-like structures 15. Each beam is channel shaped, the beams having two side flanges 17 and 18. The first and third openings have as one side thereof flanges 16 and 19 respectively, similar in shape and arrangement to the flanges 17 and 18.

The openings 14 need not be provided with side flanges. Instead, the openings may be provided without side flanges substantially as illustrated in Fig. 4. The flange or U-shaped chan-

nel-like beam construction shown in Fig. 1, however, adds considerable strength to the box-like structure thereby providing a very sturdy chassis, and one which will not be warped when the sub-assemblies are secured thereto.

Each sub-chassis 25 is provided with side flanges and as shown in Figs. 2 to 5 may comprise a channel shaped structure. Referring particularly to Figs. 2 and 3, the channel member 25 has two side flanges 26 and 27 and a web portion 28. When the member is mounted on the main chassis structure 10, the flanges 26 and 27 may be disposed on either side of the flanges 16 and 17, for example, with the web portion 28 overlying the space therebetween. As shown in Fig. 3, the channel member spans across the flanges 16 and 17 and rests upon the adjacent portions of the top wall 12. To secure the member in position, bolts 29 may extend through openings formed in the channel member and be threadably received in the wall 12 as indicated.

Other arrangements and securing means may be provided for the main and sub-chassis members. In Fig. 4, for example, the main structure 30 is provided with an opening 34 cut out of the top wall 32 without the addition of reinforcing flanges along the sides of the opening. The sub-chassis member 35 is applied to the main chassis structure 30 by bolts 36 and nuts 37. This construction is quite satisfactory for the small jobs or where the width of the main chassis member is small and the beams 15 or adjacent wall portions need not be reinforced.

In Fig. 5 I have shown a main chassis structure 40 having a large opening 44 in the top wall 42, a side flange 46 being formed on the wall to define one side of the opening. It will be understood, of course, that the side of the opening opposing flange 46 may likewise be provided with a corresponding flange. In this form, one or more sub-assembly members 48 may be mounted side by side on the structure 40. The side flange of the first member may overlap the flange 46 or it may be disposed adjacent thereto and secured to the flange 46 by any suitable means such as a bolt 49. Adjacent sub-assembly members may be secured together by bolts 47 extending through openings formed in the abutting flanges thereof. At both ends of each sub-assembly, the two side flanges thereof should rest against the upper edges of the side walls of the main chassis.

I show in Fig. 3, for purposes of illustration only, one of the sub-chassis members 25 provided with a tube 50 and a coupling coil or other radio part 52 mounted on the upper side of the member. Disposed on the underside of the web portion of the member are the socket terminals or other terminals for the two parts 50 and 52. A plurality of small radio parts such as resistors and condensers are wired to these terminals. It will be understood that additional parts may be mounted along the length of the member. When the sub-assembly is completed, the parts and wiring disposed on the underside usually extend beyond the edges of the flanges 26 and 27 so that when the sub-chassis member 25 is mounted on the main chassis structure, these parts and wiring may extend through the opening into the main chassis structure. When the several sub-assemblies are completed and mounted upon the main chassis structure, they may be easily and quickly connected together by suitable interconnecting wiring 54 with soldered

connection of usual type just as if all the radio parts were directly supported from the main chassis without sub-assemblies.

It will be readily apparent from the foregoing description that my invention makes it possible to assemble and wire the numerous parts of a radio transmitter, receiver, or other radio apparatus in sub-assemblies and the sub-assemblies mounted together on the main chassis structure. By this method of assembling radio parts, a large number of operators may work on a single apparatus, one or more workers assembling the parts of each assembly. This method of assembling radio parts readily facilitates mass production of radio apparatus and insures better workmanship for compact apparatus since the cumbersomeness of numerous parts closely associated is largely avoided. Besides facilitating the manufacturing of this type of compact apparatus, my invention enables the removal of sections of the apparatus for repair and replacement purposes without disturbing the adjacent parts other than disconnecting the wiring to the sub-assembly the removal of which is desired.

While I have shown and described several embodiments of my invention, I recognize that many variations in the formation of the main and sub-chassis members are possible, as well as the use of many different means of securing the sub-assemblies to the main chassis, without departing from the invention. In place of using bolts or screws for connecting the sub-assemblies to the main chassis structure, the cooperating flanges of the two structures may be so arranged as to have a tight or clamping fit, or separate clamping means. It will be understood, therefore, that the forms herein shown and described are intended to be regarded as illustrative of the invention only and not as restricting the appended claims.

What I claim is:

1. A radio chassis comprising a main chassis structure a wall portion of which has at least one opening therein, upright flanges defining at least in part the outline of said opening, a sub-chassis member on which radio parts and wiring are mountable as a sub-assembly, said member having side flanges mountable on said structure in juxtaposed relation with said upright flanges with the body portion of said member in overlying relation with respect to said opening so that some of the wiring thereon may extend into the structure, and means to secure the sub-assembly in place on said structure.

2. A radio chassis comprising a main chassis structure a wall portion of which is of an openwork form, means to reinforce said wall portion a plurality of sub-chassis members, radio parts and wiring mounted on each member as a sub-assembly, said members each being mountable on said structure with portions thereof in cooperation with said reinforcing means in overlying relation with a part of said openwork, and means disposed in said main chassis structure for connecting together in circuit the sub-assemblies mounted thereon.

3. A radio chassis comprising a box-like structure the top side of which has a plurality of openings therein, means to reinforce the portions of said top side defining said openings, a plurality of members on which radio parts and wiring are mountable as sub-assemblies, said members each being mountable on said structure in overlying relation with respect to one of said openings and in cooperation with said reinforcing means so that some of the wiring thereon may extend

through an opening and be connected in circuit with the wiring of other associated sub-assemblies, and means to secure the members in place on said structure.

4. A radio chassis comprising a chassis structure a wall of which has at least one opening therein, the portions of said wall defining at least a part of the opening being in the form of a flange disposed at an angle to the plane of said wall, a channel member onto which radio parts and wiring are mountable as a sub-assembly, and said channel member being mountable on said structure with the side flanges of the member overlapping the flanges on said wall portion, the web portion of said channel member being thereby disposed in overlying relation with respect to the opening so that some of the wiring mounted on the underside thereof may extend into the structure.

5. A radio chassis comprising a chassis structure having a plurality of spaced apart beams, a plurality of channel members onto which radio parts and wiring are mountable as sub-assemblies, said channel members each being mountable on said structure in overlying relation with respect to a space between adjacent beams so that some of the wiring mounted on the underside thereof may extend into said structure and be connected in circuit with the wiring of other associated sub-assemblies.

6. A radio chassis comprising a chassis structure having a plurality of spaced apart channel shaped beams, said beams being disposed with the side flanges thereof extending outwardly from the body of said structure, a plurality of channel members onto which radio parts and wiring are mountable as sub-assemblies, and said channel members each being mountable on said structure with the side flanges of said members receivable in coactive supporting relation adjacent the flanges of said beams with the web portion of each member overlying a space between adjacent beams.

7. A radio chassis comprising a main box-like chassis structure a wall portion of which has at least one opening therein, a sub-chassis U-shaped channel member onto the web portion of which radio parts and wiring are mountable, the wiring and some of the parts being located on the side of

the web between the side flanges of the member, said sub-chassis being mountable on said structure with the web portion of the member overlying said opening and the side flanges resting on the adjacent portions of said wall portion, and means to secure said sub-chassis members to said structure.

8. A radio chassis comprising a main box-like chassis a wall portion of which has a plurality of openings therein, a plurality of sub-chassis U-shaped channel members onto the web portions of which radio parts and wiring are mountable, the wiring and some of the parts being located on the side of the web between the side flanges of each member, said members being mountable on said chassis structure with the web portion of each member overlying one of said openings with the wiring and parts at least partially extending into said box-like structure, and the parts and wiring of said sub-chassis members being solder connected together as if all the radio parts were directly mounted on the main chassis structure.

9. The method of assembling radio parts comprising forming a main chassis structure having parts defining a plurality of openings in a wall thereof, assembling radio parts on sub-chassis members as sub-assemblies, mounting each of the sub-chassis members onto said wall having edge portions disposable in juxtaposition with said parts to align the member in overlying relation with respect to one of said openings so that a part of the sub-assembly thereon may extend into the main chassis structure, and connecting together in circuit within said structure the sub-assemblies mounted thereon.

10. The method of assembling radio parts comprising forming a chassis structure having a plurality of openings in a wall thereof, shaping the wall portions defining the openings to provide flanges extending at an angle to the plane of the wall, assembling and wiring radio parts onto channel-shaped members as sub-assemblies, and mounting each such sub-assembly with the web portion of the channel member thereof overlying one of said openings, the side flanges of said channel members being disposed in overlapping relation with flanges on said wall.

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