May 19, 1953 F. W. COOK 2,639,311

FASTENING DEVICE FOR SHIELD CANS

Filed June 28, 1949

Fig. 1.

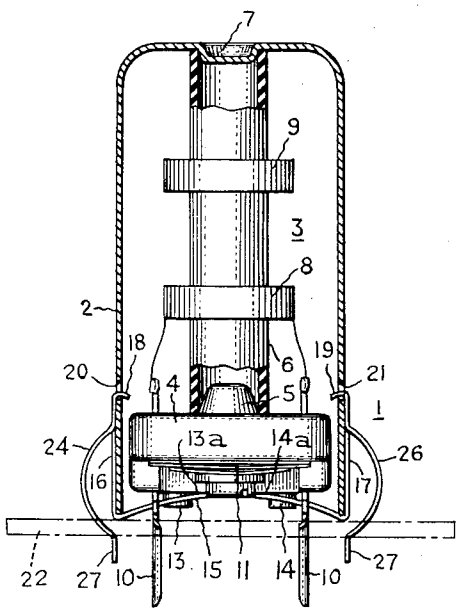


Fig. 2.

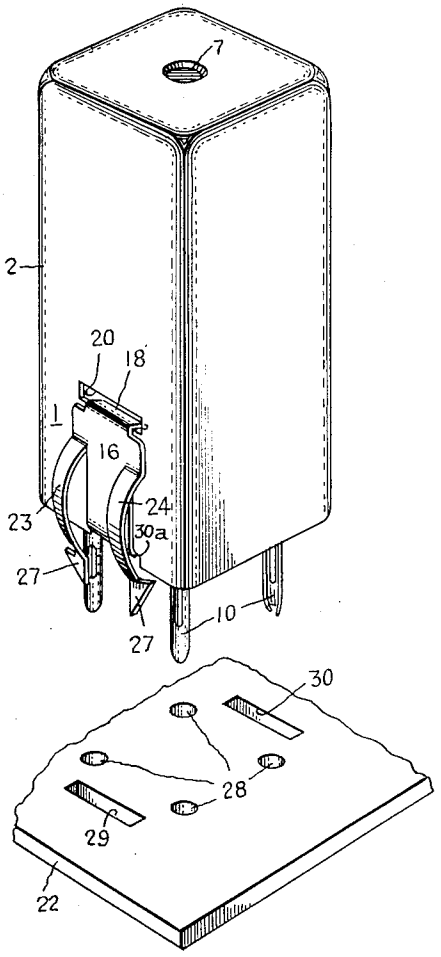
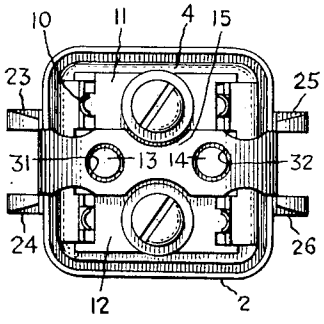


Fig. 3.



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FASTENING DEVICE FOR SHIELD CANS

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5 Claims. (Cl. 174—35)

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My invention relates to a fastening device, and, more particularly, to a fastening device which is suitable for securing the coil shield cans surrounding electrical apparatus to the chassis of a radio apparatus.

In radio apparatus it is necessary to shield certain electrical elements such as the coils and transformers thereof so as to prevent interaction between the various units. This is usually done by a metal shield in the shape of a can which is fitted over the transformer or coil and secured to the chassis of the receiver so that the electrical apparatus is completely surrounded by the metallic shield can and the deck of the chassis. It is also necessary in such radio apparatus to provide some means for holding the transformer within the shield can, such means usually comprising a deformation of the shield can to hold the transformer unit in place within the shield can or the securing of the transformer therewithin by means of screws or the like.

Certain arrangement heretofore proposed have provided mounting clips adapted to be riveted to the shield can, the mounting clips having arcuate arm portions which extend through apertures in the chassis so as to secure the shield can thereto. However, such mounting clips do not provide for mounting the transformer within the shield can and they cannot be removed once they have been riveted in place. Accordingly, it is a primary object of my invention to provide a new and improved fastening device which is suitable for use in mounting electric shielding apparatus on the chassis of a radio apparatus.

It is another object of my invention to provide a unitary mounting clip suitable for securing an electrical apparatus to the chassis of a radio apparatus and having provision for securing the electrical apparatus within the shield can.

It is a further object of my invention to provide a unitary mounting clip suitable for securing an electrical apparatus shield can to the chassis of a radio apparatus, which may be removably attached to the shield can and which secures the electrical apparatus therewithin.

Briefly, in accordance with one phase of my invention, I provide a unitary mounting clip of generally U-shaped configuration which may be slipped into place over the open end of the shield can. A flexible central portion of the clip is bowed inwardly so as to secure by spring engagement an electrical apparatus such as a transformer in position within the shield can. Each arm of the U-shaped clip is provided with a pair

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of downwardly extending arcuately-shaped arms, the free ends of which extend through apertures in the chassis so as to secure the transformer and shield can assembly to the chassis of a radio apparatus.

The features of my invention which I believe to be novel are set forth with particularity in the appended claims. My invention itself, however, both as to its organization and method of operation, together with further objects and advantages thereof, may best be understood by reference to the following description taken in connection with the accompanying drawing, in which Fig. 1 is a side elevational view, partly in cross-section, of the unitary mounting clip and transformer assembly; Fig. 2 is a perspective view of the mounting clip and shield can assembly with the unit removed from the chassis to show the method of securing the same thereto; and Fig. 3 is a bottom view of the unit of Fig. 1.

Referring now to Fig. 1 of the drawing, a unitary mounting clip constructed in accordance with the principles of my invention is therein illustrated generally at 1, the mounting clip 1 being shown in operative position around the open end of a shield can 2. A transformer assembly indicated generally at 3 is illustrated as disposed within the shield can 2.

The transformer assembly may comprise a ceramic base portion 4 which is provided with a centrally located boss 5, the boss 5 acting as a centering and locating means for a tubular coil form 6. The top of the rectangular shield can 2 is provided with a cone-shaped depression 7 which acts as a centering means for the top end of coil form 6. Coil form 6 is illustrated as having primary and secondary windings 8, 9 wound thereon at a spacing sufficient to give the desired coupling therebetween. The ceramic base portion 4 carries terminal lugs 10 which extend therethrough, and which are utilized to make connection externally with the units within the shield can. The ceramic base portion 4 also carries trimmer capacitors 11, 12, the adjusting screws of which appear below the bottom edge of the base portion 4. The base member 4 is also provided with a pair of depending lug portions 13, 14 which are utilized to center the unit in a manner to be described hereinafter. It will be apparent that connection is made internally of the base portion 4 between the trimmer capacitors 11, 12 and their associated terminal lugs so that there is connected to each pair of terminal lugs a transformer winding and associated variable capacitor which is utilized to tune the par-

ticular winding of the transformer to the desired resonant frequency.

Referring now more particularly to the unitary mounting clip 1, which is utilized to secure the transformer assembly 3 within the shield can and is also utilized to secure the shield can and transformer assembly to the chassis of a radio apparatus, it is seen that the mounting clip is of generally U-shaped configuration. The base portion 15 of the U-shaped clip 1 is bowed inwardly and fits over the lug portions 13, 14 of the transformer base member 4, the central portion of the base 15 engaging the seat portions 13a, 14a formed adjacent the lugs 13, 14 and exerting pressure thereon so as to secure the transformer unit within the shield can with the coil form engaging the centering means 7 provided in the top of the shield can. The mounting clip is provided with upstanding arms 16, 17, the free ends of which are bent inwardly to form hook portions 18, 19 which extend through openings 20, 21 provided at appropriate points in the shield can.

From the above, it is evident that the U-shaped mounting clip 1 may be conveniently secured to or removed from the shield can and transformer assembly by merely slipping the same over the open end of the shield can so that the hook portions 18, 19 thereof slip into the appropriate openings 20, 21 of the shield can. With the U-shaped mounting clip 1 in position over the open end of the shield can the entire transformer and shield can may be handled as a unit without danger of the transformer assembly shifting position within the shield can.

In order to mount the combined shield can and transformer assembly to the chassis of a radio apparatus, each of the upstanding arms 16, 17 of the U-shaped clip 1, is provided with a pair of downwardly extending arm portions 23, 24 and 25, 26. The arm portions 23, 24, and 25, 26 are integral with the arms 16, 17 and are bent outwardly from the free ends thereof so as to form arcuate intermediate portions. The free ends of the arm portions 23, 24 and 25, 26 are bent back into the plane of the upstanding arms 16, 17 and terminate in spear points which facilitate the insertion thereof through appropriate apertures in the chassis 22. The outer edges of arm portions 23, 24 and 25, 26 are notched inwardly so as to define laterally extending hook portions 27 which are adapted to engage the underside of the chassis.

The mounting clip is preferably made of resilient sheet metal, such as Phosphor bronze or the like, and the downwardly extending arm portions thereof are capable of considerable longitudinal and lateral movement, and are also capable of substantial movement in the direction away from the base portion of the clip.

Referring now to Fig. 2, there is illustrated in perspective the assembled mounting clip and shield can and a fragmentary view of the chassis on which it is to be mounted. The chassis 22 is provided with apertures 28, which accommodate the terminals 10 of the transformer assembly, and slots 29 and 30. The length of the slots 29, 30 is preferably made just slightly larger than the distance between the spear points. Thus, when the spear point portions of the arcuately-shaped arms 23, 24 and 25, 26 are inserted into the slots 29, 30 in the chassis, and pressure is exerted inwardly on the arcuate portions of the arms, the spear points will move in a direction away from the base portion of the mounting clip so as to enter into and pass through the chassis. Due to the fact that the slots 29, 30 are only of slightly greater length than the distance between spear points, the spear points will be compressed during insertion through the slots 29, 30. When the spear points are forced through the chassis apertures, they are urged outwardly so that the hook portions 27 thereof extend laterally beyond the ends of the slots 29, 30 on the underside of the chassis and act to hold the shield can securely upon the chassis deck.

In Fig. 2 it is evident that the shield can is notched at the bottom edges thereof, as is illustrated at 30a, to accommodate the arms of the U-shaped clip so that the bottom edge of the shield can rests upon the chassis for intimate shielding contact therewith.

If it is desired to remove the shield can and transformer assembly from the chassis, additional pressure is exerted inwardly on the arcuate portions of the downwardly extending arms 23, 24 and 25, 26, so as to free the hook portions thereof from the underside of the chassis, and the arms are compressed together so as to bring the hook portions 27 inside of the ends of the slots 29, 30 formed in the chassis. The unit may then be withdrawn from the chassis.

Fig. 3 also shows that the spear points formed at the free ends of the arcuate arm portions 23, 24 and 25, 26 are of substantially the same width as the upper portions of the arms so that the mounting clip may be stamped from blank stock of uniform width, the hook portions 27 being obtained by narrowing the width of the arms adjacent thereto. The base portion 15 of the mounting clip is provided with a pair of apertures 31, 32 which are adapted to register with the centering lugs 13, 14 provided on the underside of the base portion 4 of the transformer assembly. The apertures 31, 32 prevent the transformer assembly from rotating while within the shield can so that the terminals 10 register properly with the apertures 28 provided therefor in the chassis.

From the foregoing, it is evident that the invention provides a unitary mounting clip which may be slipped over the open end of a shield can so as to secure electrical apparatus therewithin. The electrical apparatus may thus be held within the shield can without the use of securing devices such as screws or the like, and the combined electrical apparatus and shield can therefor may be handled as a unit. The shield can assembly may be readily secured to the chassis of a particular radio apparatus by compressing arcuately-shaped downwardly extending arm portions of the clip so as to move the free ends thereof through the chassis, thereby hooking the free ends thereof on the underside of the chassis so that the shield can is securely held down thereupon. The particular construction disclosed does not require any permanent connections of the assembled parts thereof, and the mounting clip may be readily removed, both from the chassis, and from the shield can, so as to allow rapid replacement of the component parts of the assembly.

While the present invention has been described by reference to a particular embodiment thereof, it will be understood that numerous modifications may be made by those skilled in the art without actually departing from the invention. I, therefore, aim in the appended claims to cover all such equivalent variations as come within the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A unitary spring mounting clip of generally U-shaped configuration comprising an arcuate yieldable base portion, a pair of arms extending upwardly from said base portion, said arms having inwardly directed projections at the free ends thereof, each of said arms having a pair of downwardly extending arcuately-shaped members secured thereto near its free end, each of said members having a free end terminating below the plane of said base portion in a laterally extending hook portion.

2. In combination, a coil shield, a coil form adapted for support within said coil shield and a supporting plate having a plurality of apertures therein, means for holding said coil form within said shield and for securing said shield to said supporting plate comprising a unitary U-shaped mounting clip having a yieldable arcuate base portion, a pair of arms extending upwardly from said base portion and having hook portions at the free ends thereof for engagement with said coil shield through hook-receiving apertures in said coil shield, said base portion having an opening therein for receiving said coil form thereby to secure said coil form within said shield, each of said arms having a pair of downwardly extending arcuate members secured thereto near its free end, each of said members having a free end terminating below the plane of said base portion in a transversely extending hook portion, said hook portions being constructed to engage the underside of said plate through said apertures.

3. In a radio apparatus of the type having electrical apparatus adapted to be positioned within a shield can, means for securing the electrical apparatus within the shield can and for securing the shield can to the chassis of the radio apparatus comprising a unitary U-shaped mounting clip having a yieldable arcuate base portion adapted to enter the open end of said shield can and to secure said electrical apparatus within said shield can by resilient engagement therewith, a pair of arms extending upwardly from said base portion about the outside of said shield can and having inwardly extending hook portions at the free ends thereof for engagement with said shield can through hook-receiving apertures in said shield can, each of said arms having a pair of yieldably arcuately-shaped arm portions extending downwardly from the free end thereof, each of said arm portions having a laterally extending hook portion at the free end thereof, said hook portion lying below the plane of said base portion and being adapted releasably to engage the underside of said chassis through an aperture therein, thereby to secure said shield can to said chassis.

4. A mounting clip for securing an open-ended casing to a panel support member with its open end facing said support member, comprising a base portion adapted to span the open end of said casing, a pair of resilient, spaced arms extending upwardly from said base portion adjacent the exterior surface of said casing, each of said arms being provided at the upper end thereof with a hook portion engageable with said casing through an aperture therein, each of said arms having a pair of spaced strips secured thereto near its free end, each of said strips extending downwardly adjacent the edges of its supporting arm and terminating below the plane of said base portion, said strips being provided with lateral projections engageable with the under surface of said panel support member through apertures in said support member.

5. A spring mounting clip comprising a transverse base portion and a pair of resilient, spaced arms extending upwardly from said base portion, said arms having opposed hook-like portions at their upper ends adapted resiliently to engage an object to be mounted therebetween, and a pair of generally-parallel, resilient, anchor strips secured to each of said arms near its upper end, the strips in each pair extending downwardly adjacent the edges of their supporting arm and having free ends terminating below the plane of said base portion, the free ends of each pair of strips being provided with opposed hook-like lateral projections.

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