Nov. 3, 1959 T. H. LEE 2,911,608

GROUND SPRING CLIP

Filed March 13, 1956

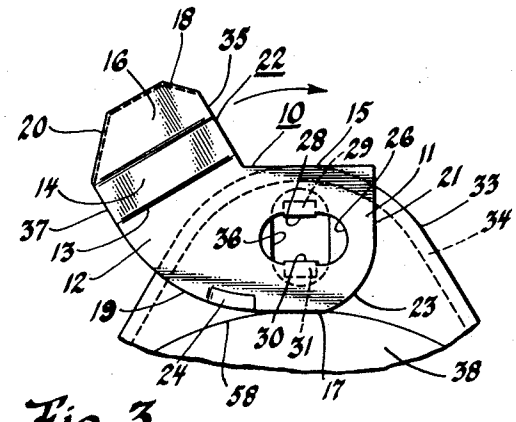


Fig. 3

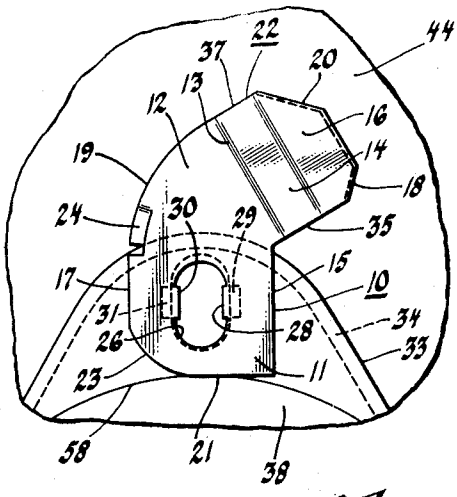


Fig. 2

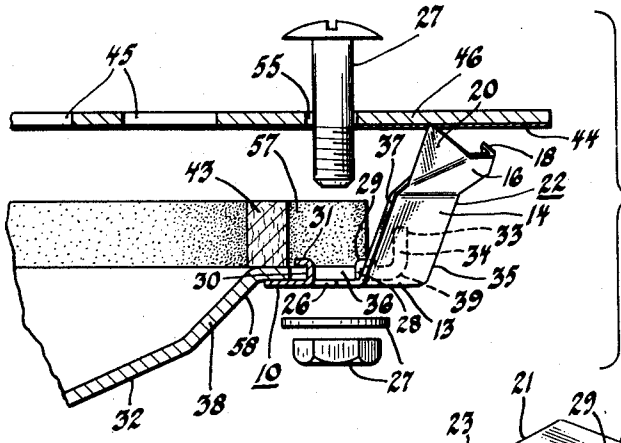


Fig. 1

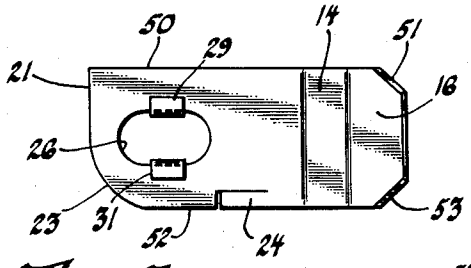


Fig. 5

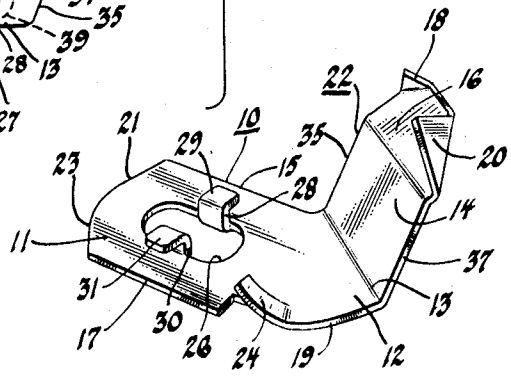


Fig. 4

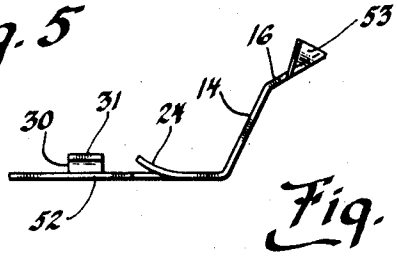


Fig. 6

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GROUND SPRING CLIP

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6 Claims. (Cl. 339—14)

This invention relates to a spring clip, and more particularly to a spring clip adapted to resiliently connect a radio speaker basket and a relatively fixed support.

An object of this invention is to provide a spring clip with means adapted to facilitate the securing of the clip to the basket or other support in order that the clip may be fixed to the basket by a simple rotation thereof.

Another object is to provide a spring clip with means adapted to bite into a support to establish a good electrical connection between the clip and support.

Other objects of the invention will be apparent from a perusal of the following description, reference being made to the accompanying drawings wherein a preferred form of the invention is shown.

In the drawings:

Figure 1 is a view partly in section illustrating a fastening assembly constructed in accordance with this invention;

Figure 2 is a view looking up at the assembly shown in Figure 1 with the spring clip in its final assembled position;

Figure 3 is a view similar to Figure 2 with the spring clip shown in a position prior to its final assembled position;

Figure 4 is a perspective view of a spring clip constructed according to this invention;

Figure 5 is a top plan view of a modified spring clip made in accordance with this invention; and

Figure 6 is a side view of the clip shown in Figure 5.

Referring now to Fig. 4, the spring clip of this invention comprises a base section generally denoted by reference numeral **10** and a spring contact section integrally formed therewith and denoted by reference numeral **22**. The spring clip may be made of spring steel or any other suitable material that is adapted to provide a resilient connection between a pair of members. The base section **10** of the spring clip includes a pair of coplanar portions **11** and **12**. Portion **11** is bounded, in part, by a pair of parallel edges **15** and **17** and an end edge or heel **21** that is at right angles to edge **15**. The edges **17** and **21** terminate in a rounded or reduced corner **23**. The other portion **12** of the base section is defined by a curvilinear edge **19** which connects edges **37** and **17**, while edges **35** and **15** intersect to form an oblique angle. Thus, it is seen that portion **12** is angularly offset from portion **11** and merges into the spring contact section **22** at a line of bend denoted by reference numeral **13**.

The spring contact section **22** is defined by a pair of reversely bent portions **14** and **16** formed as integral extensions of base section **10**. These reversely bent portions provide a resilient spring contact section for the spring clip of this invention. The corners of portion **16** are bent as shown, to provide tangs **18** and **20**. Because of the angularly offset relationship of the base and spring contact sections of the clip, it is preferable to have one of the tangs longer than the other. In this case, tang **20** is shown as being somewhat longer than tang **18**.

Base section **10** has an aperture **26** formed therein and

is provided with a pair of oppositely disposed depending lugs **28** and **30**. These lugs include gripping means or tab portions **29** and **31** that are at right angles to the parts of the lugs extending from the base section. Although these lugs might be placed anywhere on the base section **10**, they are shown in the drawings as being struck away from the edges of aperture **26**. A third lug **24** is bent away from base section **10** and as shown in the drawings, is struck away along curvilinear edge **19**. It is obvious that this lug might also be formed in different ways and need not necessarily be formed as a struck-away portion of edge **19**.

The spring clip is adapted to be connected to a supporting member such as a radio speaker basket **32**, as shown in Figs. 1, 2 and 3. The speaker basket has a flanged portion **38** having an outer wall **58** and an aperture **36** formed therein. The aperture **36** is oblong in order that the lugs of the spring clip may pass therethrough when the clip is in the position shown in Fig. 3. The outer periphery of the speaker basket is formed with a flange **34** having an outer wall **33** that may be termed the outer peripheral edge of the basket. In order to secure the spring clip to the basket, the lugs of the clip are passed through the aperture in the basket, as shown in Fig. 3, and the clip rotated to the position shown in Fig. 2. By this rotation the tabs **29** and **31** engage the walls surrounding aperture **36** to preclude movement of the spring clip away from the basket in a direction normal to the basket. When this rotation is completed, the heel or edge **21** of the spring clip abuts the outside wall **58** of the basket to prevent further rotative movement of the clip. The edge **21** and flange **38** thus coact to determine the amount the clip may rotate in one direction. The clip is not impeded in its rotative movement to its final assembled position shown in Fig. **3** because of the provision of the reduced or rounded corner **23** which freely clears wall **58** during rotation of the clip to its assembled position. When the clip reaches its final assembled position, the lug or tongue **24** struck out from the clip engages the peripheral edge **33** of the basket to prevent rotative movement of the clip in an opposite direction. This engagement takes place just above the rounded corner **39**, and tongue **24** is made long enough to positively preclude rotative movement of the clip in this opposite direction. Thus, it can be seen that the clip is attached to the basket with a minimum amount of effort, the only assembly procedure required being a rotation of the clip.

Referring now to Fig. 1, the spring clip is shown secured at one end to the speaker basket **32** and with the other end engaging a relatively fixed support **46**. In this case, the fixed support takes the form of a radio speaker plate **46** having a protective coating **44** thereon. The speaker plate has apertures **45** and a gasket material **43** is interposed between the speaker plate and basket. Plate **46** and basket **32** are secured together by suitable means such as a nut, bolt and washer assembly, denoted generally by reference numeral **27**, the bolt passing through bolt holes **55**, **26**, **57** and **36** formed in the speaker clip, gasket material and speaker basket, respectively. In assembling the speaker plate, basket and spring clip, the spring clip is attached to the basket as hereinbefore described. The parts together with the bolt are then aligned and assembled, and the nut tightened to compress the spring contact section and gasket between the speaker plate **46** and speaker basket **32**. This compression results in the tangs biting into the surface of the speaker plate and through the protective coating **44** to establish a good electrical connection between the plate and basket.

Although the clip is adapted to provide a ground connection between a speaker basket and speaker plate, it

is obvious that it may be used to electrically connect any two members.

Fig. 5 discloses a modified spring clip that is in all respects the same as the spring clip shown in Figs. 1 through 4 except that the spring contact portion is in alignment with the base section rather than being angularly disposed thereto. In this embodiment, the clip is bounded, in part, by straight parallel edges **50** and **52**. It should be noted that since the base and contact sections are in alignment, there is no need for making the tangs **51** and **53** of different length and in this case they are shown as being of the same length. This spring clip may be substituted for the spring clip shown in Fig. 4, in the assembly of Fig. 1.

The use of a spring clip having an angularly offset spring contact section has been found to have several advantages over the type where no angular offset portion is used. With an offset spring contact section it is possible to shorten the length of the clip and permits the use of a shorter spring contact section. Furthermore, it has been found that the angularly offset clip is better adapted for use with a fastener having a tongue or lug of the type denoted by reference numeral **24**.

From the foregoing, it can be seen that a simple method has been provided for resiliently connecting a speaker basket and speaker plate of a radio. For assembly, all that is needed is an application of the spring clip to the basket plus a slight rotation thereof into final assembled position. The method of assembly is not only simple but is adapted to provide an unfailing electrical connection between a speaker basket and speaker plate.

While the form of embodiment of the invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted as may come within the scope of the claims which follow.

What is claimed is as follows:

1. In combination, a speaker basket, a support, a spring clip having gripping means operative upon a predetermined relative rotation of said clip and basket and engageable with said basket for preventing relative movement of said clip away from said basket, coacting means on said clip and basket for preventing relative rotation of said clip and basket in either direction when said predetermined relative rotation is accomplished, and means on said clip for engaging said support to electrically connect said basket and support.

2. In combination, a speaker basket, a support, a spring clip attached to said speaker basket, said clip having gripping means in engagement with said basket for preventing relative movement of said clip away from said basket, a lug depending from said clip and engaging a peripheral edge of said basket for preventing relative rotation between said clip and basket in one direction, and means extending from said clip and engaging said support for establishing an electrical connection between said basket and support.

3. In combination, a speaker basket, a support, a spring clip attached to said speaker basket, said clip having gripping means coacting with said basket for preventing relative movement of said clip away from said basket, a lug depending from said clip and engaging the peripheral edge of said basket for preventing relative rotation of said clip and basket in one direction, coacting means on said clip and basket for preventing relative rotation of said clip and basket in an opposite direction, and means on said clip for engaging said support to electrically connect said basket and support.

4. In combination, a speaker basket having an aperture, a support, a spring clip having a pair of depending lugs adapted to engage the surrounding walls of said aperture when the lugs are passed through said aperture and the lugs and clip rotated through a predetermined angle of rotation to assembled position, a third lug engaging a peripheral edge of said basket when said clip is rotated, coacting stop means on said clip and basket for determining the said angle of rotation, and means extending from said clip and engaging said support for electrically connecting said basket and support.

5. In combination, a speaker basket, a support, a spring clip attached to said speaker basket, said clip having a pair of lugs in engagement with said basket for preventing relative movement of said clip away from said basket, a third lug depending from said clip and engaging a peripheral edge of said basket for preventing relative rotation between said clip and basket in one direction, said basket having a wall engaging an edge of said clip for preventing relative rotation between said basket and clip in an opposite direction, and means extending from said clip and engaging said support for establishing an electrical connection between said basket and support.

6. A unitary spring clip adapted to electrically connect two members, said clip comprising a base section having coplanar end and intermediate portions that are angularly offset relative to one another, electrical connecting means formed on said end portion to electrically engage one of said members, a spring contact arm having an intermediate portion upwardly extending from and integral with said intermediate portion of said base section, a reversely bent end portion extending at an angle from said intermediate portion of said arm, and a pair of electrical connecting tangs formed by folded corners of said end portion of said arm, the extremities of said corners being positioned upwardly away from said base to provide a resilient electrical connection with said other member.

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