Jan. 26, 1971 J. J. CERVENKA ET AL 3,558,289

CHAIN FORM CLIP

Filed Feb. 12, 1968

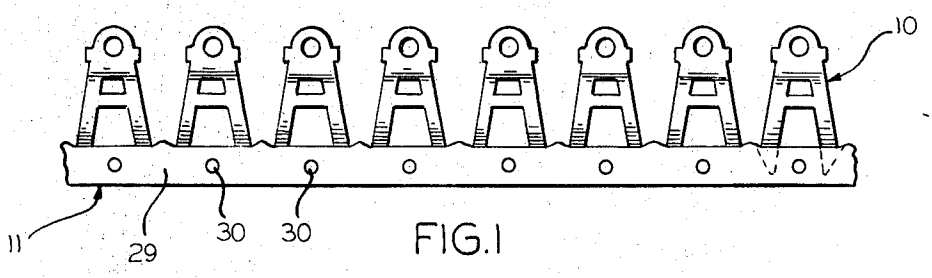


FIG.1

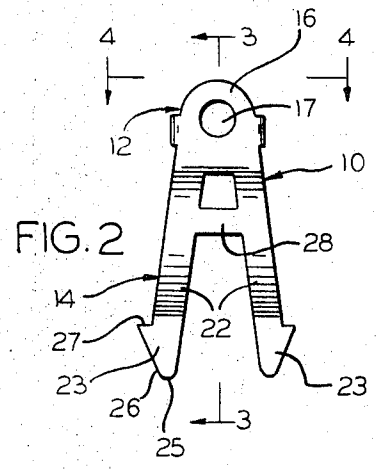


FIG.2

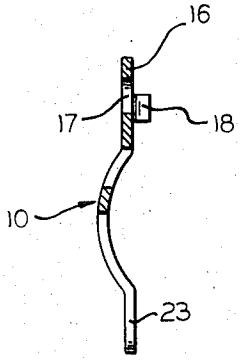


FIG.3

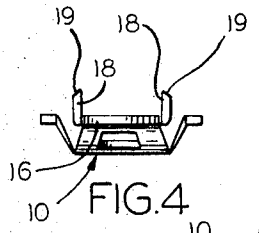


FIG.4

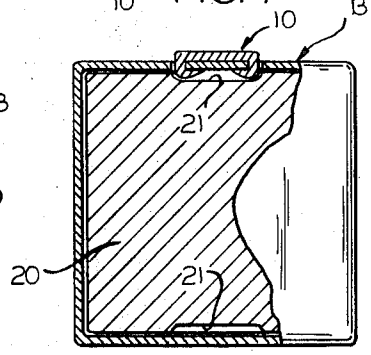


FIG.5

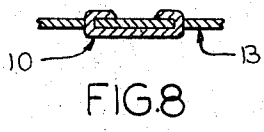


FIG.8

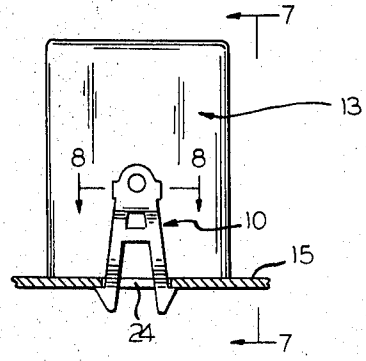


FIG.6

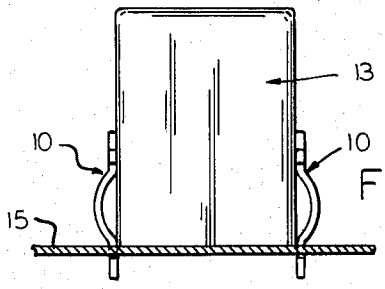


FIG.7

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CHAIN FORM CLIP

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ABSTRACT OF THE DISCLOSURE

Clip to be attached to a shield can for attaching the can to a support, where the clips may be formed in continuous chain form, and the clip includes metal piercing or tabs that pierce the can and are bent over to secure the clip to the can.

This invention relates in general to a can retaining clip adapted to be mounted on shield cans for enabling such shield cans to be easily attached to chassis plates in electronic units, and more particularly to a chain form strip of can retaining clips arranged in side-by-side relation for use in a machine that continually applies such clips to shield cans.

The present invention is an improvement over the chain form clip in U.S. Patent 3,338,689. The clip in that U.S. patent includes a sleeve portion that coacts with a flange to enable fastening to a shield can where the sleeve portion is deformed against one side of the shield can after being inserted through a hole in the can. A second hole is also needed to be provided in a shield can using a clip of the patent to receive a detent portion that prevents relative turning of the clip with the can. Thus, it is necessary to provide a pair of holes in a side of a shield can that receives a clip of the patent, and the holes must be positioned within close tolerances so that a machine can apply a clip to the can.

The present invention overcomes the difficulties of the clip in the aforesaid patent in that piercing of holes in the cans under close tolerances prior to the attachment thereto of a clip is eliminated. Where cans require a pair of clips on opposite sides as in the usual situation, the present invention eliminates the need of orienting the cans by the operator when applying them to a mandrel for having the clips attached thereto. The clips of the present invention include a pair of metal piercing ears or tabs that are driven through the metal of a can and bent over on the underside to firmly fasten the clip to a can. These clips may be employed on cans already pierced with holes where those holes are out of tolerance. Moreover, less pressure is needed for exertion on a mandrel holding a can according to the present invention when curling or bending over the ears or tabs than was needed for deforming the sleeve in the clip of the aforesaid patent. The locating tab or detent in the clip of the aforesaid patent is eliminated inasmuch as positive line up is established with the clip of the present invention by piercing the cans with the ears, and the line up is always maintained.

It is therefore an object of the present invention to provide an improved can retaining clip that may be employed on cans not having holes pierced therein.

Another object of this invention is in the provision of a can retaining clip in chain form that includes metal piercing ears or tabs for attaching the clip to a can by piercing holes in the can during application and thereafter having the ears or tabs bent over on the other side.

Still another object of this invention is in the provision of an improved can retaining clip in chain form that reduces the cost of applying clips to shield cans by

eliminating the need for prepiercing of holes in the cans, and further reducing the time needed for mounting the cans on an applicating machine since they need not be oriented.

Other objects, features and advantages of the invention will be apparent from the following detailed disclosure, taken in conjunction with the accompanying sheet of drawing, wherein like reference numerals refer to like parts, in which:

FIG. 1 is a plan view of a portion of a continuous strip of can retaining clips according to the present invention;

FIG. 2 is a front elevational view of a clip according to the present invention, removed from the carrying strip;

FIG. 3 is a vertical sectional view taken substantially along line 3—3 of FIG. 2;

FIG. 4 is a top plan view of the clip of FIG. 2 and looking along line 4—4 thereof;

FIG. 5 is an end view of a shield can mounted on a mandrel, with some parts broken away for purposes of clarity, and illustrating the manner of mounting clips to a can according to the present invention;

FIG. 6 is an elevational view of a shield can, looking at the side to which a clip has been applied, and showing the can and clip in association with a chassis plate;

FIG. 7 is a view of the can and chassis of FIG. 6 taken substantially along line 7—7 thereof; and

FIG. 8 is a detailed enlarged sectional view taken substantially along line 8—8 of FIG. 6.

Referring now to the drawings, and particularly to FIGS. 2 and 3, a clip according to the present invention, generally designated by the numeral **10**, is shown as it would appear if separated from a continuous strip of can retaining clips **11**. The clip **10** includes a fastener forming portion **12** that is adapted to be secured to a can **13**, as shown in FIGS. 6 and 7, and a chassis retaining portion **14** that is adapted to connect and retain a can to a chassis plate **15** as seen in FIGS. 6 and 7.

The fastener forming portion **12** includes a flange **16** having a registration or indexing hole **17** therein, and a pair of metal piercing ears or tabs **18** extending from one side thereof. The metal piercing ears or tabs **18**, extending from opposite edges of the flange **16**, are substantially parallel to each other, and extend substantially normal to the flange. The outer free ends of the ears or tabs **18** are coined at **19** to facilitate piercing of the can and bending over or curling on the other side of the can when engaging the mandrel. While a pair of metal piercing ears or tabs are shown, it should be appreciated that a single ear or tabs or any number of ears or tabs may be provided to obtain the desired attachment of the clip to a can. The ears or tabs are formed integral with the flange **16**, and upon being applied to the can **13** as seen in FIG. 5, pierce holes in the can of a cross section substantially the same as that of the ears or tabs. Preferably, the ears or tabs would have a rectangular cross section wherein one side would be much greater than another side, and upon being applied to a can, the ears or tabs would prevent relative rotation of the clip with the can.

As seen in FIG. 5, a can **13** is applied to a mandrel **20** that is sized so that the can will fit snugly thereon but be capable of being easily moved on or off therefrom. Longitudinally extending slots **21** are formed in the mandrel at opposite sides to define an ear or tab forming cavity. Thus, upon application of a clip to the can, the ears or tabs **18** are formed over on the inner side of the can by the slots **21** in a manner as shown in FIG. 5. While FIG. 5 only illustrates a clip as applied to one side of the can, an applicator could be provided that would apply a clip to both sides of the can at the same time, or apply a clip to one side of the can and reorient the mandrel so

that a clip may be applied to the other side of the can. In any event, it should be appreciated that no prehole punching of the cans is necessary with the present invention.

The chassis retaining portion **14** includes a pair of legs **22**, the terminal ends of which have latching portions **23** which serve to enter an opening **24** in a chassis plate and latch to the plate. Each latching portion includes a rounded nose **25**, and a camming surface **26** extending upwardly therefrom and away from the center of the clip terminating in a latching lip **27**. The legs **22** are arranged in diverging relationship and are bowed outwardly from the plane of the flange **16**. A reinforcing cross arm **28** extends between the legs **22** just below the flange **16**. As seen most clearly in FIG. 3, the latching portions **23** are substantially coplanar with the flange **16**. The clips are made of such a material that will provide some springiness to the legs **22** which must spring toward each other during application to a chassis plate. The camming edges **26** of the latching portions **23** serve to force the legs together during entry of the latching portion into a chassis hole **24**, whereupon they spring apart again when the latching lips **27** are below the undersurface of the chassis plate, thereby fastening the can to the plate as seen in FIGS. 6 and 7.

The continuous strip form of retaining clips **11**, FIG. 1, is made by repeatedly shearing, drawing and forming at equally spaced positions along a strip of sheet metal. While any type of sheet metal may be employed, it has been found that stainless steel is satisfactory to provide the proper qualities for the clip of the present invention. During the formation of the continuous strip of clips, leg portions **22** and flange **16** and ears or tabs **18** in a flat position are sheared from the metal strip, and forming operations are applied to the leg portions **22** to bend them in a shape as shown in FIG. 3. The ears or tabs **18** are coined on the ends and then bent to the positions as shown in FIG. 4. As seen in FIG. 1, the continuous strip of clips **11** includes a carrying and registering ribbon **29** having equally spaced indexing holes **30** therein. The indexing holes **30** facilitate the indexing and feeding of the strip form of clips in a clip applying machine. The latching portions **23** of each clip are formed by the clip applying machine during application of the clip to a can by a suitable shearing or stamping operation. The strip form of clips is initially quite long and therefore it is wound in coil form on spools for storage and thereafter fed into a machine from such a spool.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention, but it is understood that this application is to be limited only by the scope of the appended claims.

The invention is hereby claimed as follows:

1. A continuous metal strip of retaining clips arranged in side-by-side relation for mounting on shield cans to enable the cans to be secured to a chassis plate, said strip comprising a continuous flat strip feeding portion having the retaining clips extending from one edge thereof and adapted to have latching portions stamped therefrom for securing a can to a chassis plate, each clip including a pair of converging outwardly bowed legs extending from the flat portion and having connected to their ends a fastener forming portion, said fastener forming portion including a flange adapted to abut against one side of a can and coplanar with said flat portion and a metal piercing flat tab extending from the flange and normal thereto and adapted to pierce the can, and the free end of the tab adapted to be bent over against the other side of the can to coact with the flange and secure the clip to the can.

2. The combination as defined in claim **1**, and an indexing hole in said flat portion adjacent each clip.

3. The combination as defined in claim **1**, and the free end of said tab being coined.

4. A continuous metal strip of retaining clips arranged in side-by-side relation for mounting on shield cans to enable the cans to be secured to a chassis plate, said strip comprising a continuous flat strip feeding portion having the retaining clips extending from one edge thereof and adapted to have latching portions stamped therefrom for securing a can to a chassis plate, each clip including a pair of converging outwardly bowed legs extending from the flat portion and having connected to their ends a fastener forming portion, said fastener forming portion including a flange adapted to abut against one side of a can and coplanar with said flat portion and a plurality of metal piercing flat tabs extending from the flange and normal thereto and adapted to pierce the can, and the free ends of the tabs adapted to be deformed against the other side of the can to coact with the flange and secure the clip to the can.

5. A continuous metal strip of retaining clips arranged in side-by-side relation for mounting on shield cans to enable the cans to be secured to a chassis plate, said strip comprising a continuous flat strip feeding portion having the retaining clips extending from one edge thereof and adapted to have latching portions stamped therefrom for securing a can to a chassis plate, each clip including a pair of converging outwardly bowed legs extending from the flat portion and having connected to their ends a fastener forming portion, said fastener forming portion including a flange adapted to abut against one side of a can and coplanar with said flat portion and a pair of spaced metal piercing flat tabs extending from the flange and normal thereto and adapted to pierce the can, and the free ends of the tabs adapted to be deformed against the other side of the can to coact with the flange and secure the clip to the can.

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