PRONG CAP FOR SNAP FASTENERS

Harold J. Reiter, Chicago, I11.

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1. The invention relates to improvements in caps for snap fasteners and more particularly to an attaching member or pronged cap for securely attaching a snap fastener element to a supporting sheet; and to the method of fabricating the same.

The present invention is concerned primarily with the structure, assembly and novel relationship and the fabrication of the component parts of an ornamental cap used to attach male and female snap fastener parts to a supporting sheet. The invention embodies improvements in the structure and method of fabricating caps of the general type disclosed and claimed, for example, in my U. S. patents, No. D. 133,348, granted August 11, 1942, and No. 2,332,167, granted October 19, 1943. Although each type of pierced cap disclosed in said prior patents embodies certain features especially adapted it for specific uses, actual use has disclosed certain limitations in general use and structural deficiencies.

By way of explanation, it should be noted that pronged caps of the kind shown in Patent No. D. 133,348, embody no means for efficient covering and concealing of the prong piercings. Also, and more important, the method practiced for piercing the prongs from the center portion of the prior art cap has limited the prong length to not greater than one-half the diameter of the circle along which they are attached to the cap body. The diameter of the prong circle, because its size is determined by the diameter of a prong receiving clinching channel in a standard socket or stud part, cannot be increased to increase the prong length. As a result of this situation, the use of such caps is limited to fastener installations on supporting sheets having a maximum thickness considerably less than the possible prong length. To use for mounting fastener parts on excessively thick sheets, or on layers of sheets, would result in improper and insecure installation of the parts and ultimate taring out of the installation.

The practical objection to prongs of limited length as taught by the design patent discussed hereinafter is overcome by the use of a cap embodying the features disclosed in my Patent No. 2,332,167, wherein the prongs are pierced out of the peripheral margin or flange of the cap. However, fabrication of that type of long prong cap necessitates the use of excessively large blanks and resulting cost increase. This alone does not render the manufacture of long prong caps impractical, but their use is limited because of their size and exposed piercings. They are not always suitable for use on dresses, gloves and other garments in instances where the use of a small or an imperforate or covered cap is indicated. Caps for such purposes have heretofore been fabricated from three pieces of material; namely, a circular pronged channel, an insert and an ornamental covering.

The cap of the present invention is structurally designed and fabricated by methods and in a manner which overcomes all of the aforesaid characteristics, deficiencies or limitations of the prior art pierced caps. The presence, in the improved structure herein disclosed, of an integral sheet material central area underlying a deformable ornamental covering is advantageous because it avoids the need for providing a separate reinforcing insert as is now practiced in the prior art. This is therefore an object of the invention to provide a novel method for the manufacture of, and novel structure for, a cap for a snap fastener installation.

Another object of the invention is to provide a prong cap with novel means for securing a covering thereover in a simple and expeditious manner.

Another object is to provide a prong cap with prongs pierced out of the center area thereof and arranged in a circle or predetermined diameter and wherein the prongs are of a length greater than the ultimate length of the piercings from which they are drawn.

Another object is to provide a prong cap with a perforate dome portion or central area surrounded by prongs pierced therefrom and of a length greater than one-half the diameter of said portion or area.

Another object is to provide a two piece prong cap in which the attaching prongs are struck out of one of the parts and both parts are securely joined and suitably domed.

Another object is to provide a prong cap of the character described and in which the outside dimensions of the cap are maintained at a minimum.

Another object of the invention is to provide a pronged covered cap with integral means to reinforce the central domed area.

Another object is to provide a novel method of fabricating a pronged cap.

Another object is to provide a novel prong cap assembly embodying but a minimum of parts, thus reducing assembly costs.

Other and further objects of the invention will become apparent as the description proceeds, having reference to the accompanying drawing which discloses several embodiments of the present invention and the method of fabrication.
In the drawing:

Fig. 1 is a longitudinal central sectional detail view of a fastener installation embodying features of the invention.

Fig. 2 is a view of a circular blank used in fabricating the fastener cap.

Fig. 3 is a central sectional detail view of the blank after partial formation, showing representations of the forming tools engaged therewith.

Fig. 4 is a view similar to Fig. 3, showing the blank after the prongs have been pierced and struck out of the body thereof.

Fig. 5 is a central sectional view of the blank partially formed and with the covering sheet in place thereover.

Fig. 6 is a central sectional view illustrating the final step in fabricating the cap shown in Fig. 1.

Fig. 7 is a plan view of the finished cap.

Fig. 8 is a central sectional view of a cap embodying modified features of construction.

Fig. 9 is a central sectional view of the partially formed body used in the cap shown in Fig. 8.

Fig. 10 is a central sectional view of a perforated pronged cap fabricated according to the teachings of the present invention.

Referring to the accompanying drawings, and particularly to the form of pronged cap shown in Figs. 1 to 7, inclusive, the cap 11 is of the kind used to secure the male and female elements of a snap fastener assembly to a sheet or strip of material. In the present disclosure, the socket part 12 is circular in outline and is formed on its peripheral edge with an inwardly opening circular channel 13 defined in part by an integral marginal flange 14. A centrally located resilient socket 15 is provided to receive the stud element when the fastener is assembled in use. The socket part 12 is attached to one face of a sheet 16 by means of the pronged cap 11 embodying the features of the present invention.

The cap 11 features a circular formed body 17 of sheet material, such as brass, steel or a combination of non-corroding covering metals, having circular central area 18 and a circular integral flange 19. The body 17 preferably is of a diameter corresponding substantially to the diameter of the socket part 12 although it should be understood that it may be larger or smaller and may be other than circular in outline. A plurality of attaching prongs 21 are struck out of the central area 18 substantially at right angles to the plane of the body 17. These prongs are integral with the body on the perimeter of the central area 18 which corresponds substantially to the circle of the socket channel 13.

To assemble a cap and socket part on the sheet material 16, the cap is placed with its prongs 21 against the side of the sheet opposite to the side carrying, and in axial alignment with, the socket part. Pressure is then applied to force the prongs through the sheet and into the channel 13 wherein they are curled outwardly to firmly clinch the parts together and to the sheet. Such clinching causes the sheet to be clamped firmly between the socket flange 14 and the peripheral area of the cap.

Installation of fasteners having pierced attaching caps on certain types of garments is objectionable from the standpoint of appearance. Obviously, a smooth surfaced ornamented cap will materially enhance the attractiveness of an installation, consequently it has long been the preferred practice in certain installations, to use caps having imperforated exposed surfaces.

The present invention contemplates the provision of a thin sheet covering for the pierced or perforated cap. The sheet covering, shown at 22, may consist of a circular blank of pliable material such as a sheet composed of felt, thin and camphor (commonly known as "celluloid") or of plastics; or it may even consist of a thin sheet of precious or semi-precious metals. The blank 22 is held in place on the cap body as by having its peripheral margin securely clamped beneath the inturnd flange 19. It might be noted at this time that sheets of "celluloid" and like pliable material have been used as covering for button-type caps but in known instances of such use the center area of the covering is not supported but is carried by a separate stiff insert held in place, with the covering sheet, by a channel ring embracing their peripheral margins. Such supporting of the central area is advisable to prevent the collapse of the thin covering downwardly under external pressure. Thus, unsupported pliable covering sheets may separate from the channel ring if flexed sufficiently to disengage only a portion of its periphery from beneath the retaining flange.

Thence, the applicant has provided a two piece pronged cap having a pliable covering sheet and integral means in the form of a perforated center area underlying said sheet to prevent collapse or separation of the covering sheet from the body.

Reinforcement of the center area of the covering sheet also affords means whereby the center area of the cap may be domed upwardly so as to provide and maintain sufficient clearance at the inner end of the socket 15 to admit the associated stud part a distance necessary to effect frictional engagement between the socket and stud. Such clearance is afforded by pressing and doming the central area of the cap body upwardly after the covering has been secured in place, although it may be effected prior to affixing the covering sheet.

The method best adapted for the fabrication of the covering and body of the two piece reinforced prong cap having the structural characteristics described hereinabove includes the prefabrication of the circular body member 17 which, as illustrated in Fig. 2, is formed from a circular blank of stiff sheet material 23. The circular blank or disc 23 then is engaged by suitable male and female dies 24—25 (Fig. 3) which clamp the disk on a circular area inwardly of the peripheral margin and turn said margin upwardly to define the circular upwardly flaring flanges 26. Simultaneously, or if desired, as a next step, the center area of the disk (within the clamped area) is deformed downwardly or dished as at 27. The dishing may be slight or it may be substantial for purposes to be more fully explained hereinafter. The next step in fabricating the body member 17 is illustrated in Fig. 4, wherein the dished area 26 has been pierced so as to provide a plurality (five shown) of circumferentially spaced pointed piercing prongs 21 which are bent out of the plane of the dished area along a circular line corresponding to the circle of the socket channel or other element with which they are to be ultimately associated.
Dishing and piercing the disk constitute important steps in the fabrication of the cap of the present invention. Dishing the center area of the disk increases its surface area proportionally to the amount of dishing. Thus, any prongs pierced out of the dished area have a length greater than the length of a prong pierced out of a flat area. As a result, the body portion of applicant's novel cap has prongs pierced out of the central area which are of a length greater than one-half of the diameter of such area. The completed cap, therefore, distinguishes over prior centrally perforated caps by the presence of longer prongs and from marginally perforated caps by the saving in material and reduction in cap size.

After the prongs have been pierced and bent out of the plane of the disk, the perforated dished area is as shown in Fig. 5, pressed upwardly into the plane of the clamped marginal area. The circular covering sheet 22 is laid over the flattened cap blank and, as shown in Fig. 5, the circular flange 18 is folded inwardly downwardly tightly over its marginal area. Doming of the central area of the covered cap then is accomplished by clamping the circular flanged edge of the cap firmly, as between circular tools 27 (Fig. 6) and deforming the central unclamped area upwardly as indicated by the arrow. Clamping of the circular flanged margin as aforesaid holds the covering sheet firmly and prevents its marginal edge from being pulled out during the doming operation.

It will be obvious that applicant has provided a smooth surfaced ornamental two piece long pronged cap, adequately reinforced within the central domed area, with a minimum of automatic machine operations. Conventional practices of automatically feeding the parts to the various tools may, of course, be employed.

The long pronged cap shown in Figs. 8 and 9 embodies a circular body member 17a fabricated in the manner and by the steps of the method previously described, except that the step of doming is eliminated. In this type of cap, the prongs 21 likewise are pierced while the central area of the body is dished, as shown in Fig. 8, whereupon the dished perforated central area 18 is returned to the plane of the circular margin. Ornamentation is provided in this cap in the form of a circular piece 21 of pearl, bone, leather, wood, metal, plastic or other suitable material which may be of such thickness as to require its circular margin to be reduced so as to receive thereover the inwardly turned retaining flange 18e without excessive overall marginal thickness. Because of the rigidity of the circular piece 21, the perforated center area 18 of the body 17a may be removed after the piercing instead of being flattened, as aforesaid.

Fig. 10 shows a piece prong cap having a perforated dome 32 and an imperforated flange 33. This cap differs from the cap shown in my prior Patent No. D. 133,348, in that the prongs are of a length greater than one-half the diameter of the domed portion. This increased length is, of course, likewise obtained by initially dishing the center area of the circular blank while its margin is held, as indicated in dotted lines in Fig. 10.

It might be observed at this time that the fabrication of a cap having long prongs as disclosed herein necessarily requires that the blank be dished on its upper face so that any burrs appearing on the edges of the piercings will be on the bottom or normally concealed face. Such burrs appearing on the top face of the cap shown in Fig. 10 would be highly objectionable and an added and objectionable step of tumbling would be required in fabrication. Likewise, burrs appearing on the top face of the body covered with the sheet of pliable material or the pearl would prevent the covering piece from lying flat. Tumbling to remove such burrs is of course objectionable not only from the standpoint of increased cost but because of the possibility of the pointed prongs scratching the ultimately exposed surfaces of other caps during the tumbling process.

Although exemplary forms of the invention have been disclosed in the accompanying drawing and described in detail in the foregoing specification, it should be understood that the invention is concerned with the fabrication of a pronged cap having long prongs pierced from an area normally of such size as to prevent the formation of such long prongs and to the novel structure and steps of the method of fabricating ornamental pronged caps from a minimum number of pieces and at low cost; and that the invention may embody modifications in detail without departing from the spirit of the invention and the scope of the appended claims.

I claim:
1. A cap for a snap fastener comprising a plate having a plurality of circumferentially spaced triangular-shaped openings arranged in a circle with their apexes terminating short of the axis of said circle, a marginal flange surrounding the perforated area, a plurality of piercing prongs extending perpendicular to and from one side of the plate, said prongs being integral with the plate, one at the base of each triangle and each being of a length greater than the height of the related triangle, and said perforated area being domed to protrude on the other side of the plate.

2. A cap for a snap fastener comprising a plate having a plurality of circumferentially spaced triangular-shaped openings arranged in a circle with their apexes terminating short of the axis of said circle, a plurality of piercing prongs extending perpendicular to and from one side of the plate, said prongs being integral with the plate, one at the base of each triangle and each being of a length greater than the height of the related triangle, and said perforated area being domed to protrude on the other side of the plate.

HAROLD J. REETER.

References Cited in the file of this patent

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>523,547</td>
<td>Ridgway</td>
<td>July 24, 1894</td>
</tr>
<tr>
<td>757,744</td>
<td>Hornich</td>
<td>Apr. 19, 1904</td>
</tr>
<tr>
<td>1,451,429</td>
<td>Lontz</td>
<td>Apr. 10, 1923</td>
</tr>
<tr>
<td>1,842,386</td>
<td>Carr</td>
<td>Jan. 26, 1932</td>
</tr>
<tr>
<td>2,080,379</td>
<td>Reeter</td>
<td>May 11, 1937</td>
</tr>
<tr>
<td>2,122,321</td>
<td>Arthur</td>
<td>Aug. 20, 1940</td>
</tr>
<tr>
<td>2,227,554</td>
<td>Purinton</td>
<td>Aug. 24, 1943</td>
</tr>
<tr>
<td>2,402,628</td>
<td>Huelster</td>
<td>June 25, 1946</td>
</tr>
</tbody>
</table>