June 23, 1953 H. S. VAN BUREN, JR 2,642,641

BUCKLE

Filed Dec. 8, 1951

FIG. 1.

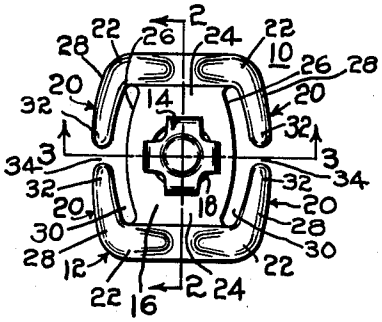


FIG. 2.

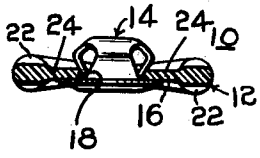


FIG. 3.

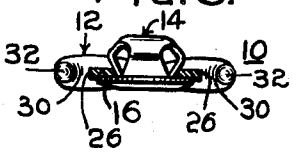


FIG. 4.

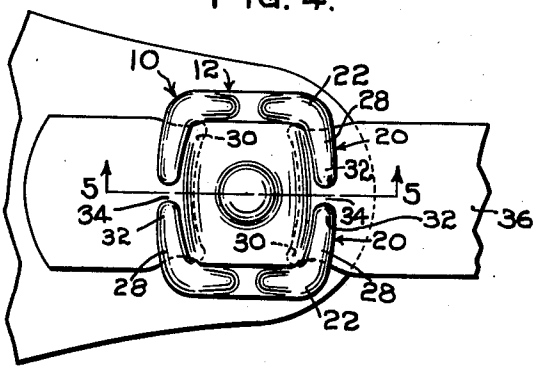


FIG. 5.

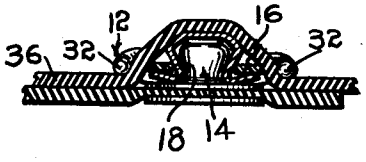
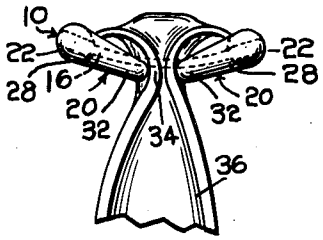


FIG. 6.



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BUCKLE

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Application December 8, 1951, Serial No. 260,662

3 Claims. (Cl. 24—198)

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This invention relates generally to buckles, and has particular reference to a buckle frame formed of a single piece of resilient molded plastic.

In the manufacture of buckles for use on bathing cap straps and the like where the buckle is to be subjected to the action of fresh and salt water, it has been found desirable to form such buckles of plastic, since such materials do not rust or corrode, and it is not necessary to provide them with expensive finishes to preserve their appearance as is the case with metal buckles for such applications. This advantage is particularly important, since in many cases the cost of applying a satisfactory finish to a metal buckle is the major item of expense in the manufacture thereof, and frequently costs nearly five times as much as the cost of manufacture of the metal buckle blank itself.

However, in the manufacture of plastic buckles, other difficulties have been encountered which have made plastic buckles unsatisfactory in many applications. This has been particularly true in the type of buckle in which a center portion having a snap fastener member assembled thereon is provided with a pair of arms on each side of the center member which extend toward each other in spaced relation to the center portion to form a strap-receiving slot with an entrance channel to the slot between the ends of the arms of each pair. This type of buckle is shown generally in a copending application of Walter I. Jones entitled Plastic Buckle Assembly, filed May 3, 1951, Serial No. 224,355.

The principal difficulty encountered in the manufacture of such buckles has been the problem of making the arms strong enough to resist breaking during insertion and removal of the strap, and during use when tension is applied to the assembled strap, causing bending forces to be applied to the arms. The problem has been complicated by the fact that, while the arms must be strong enough to resist bending due to tension applied to the assembled strap, they nevertheless must be capable of a certain amount of flexing to facilitate assembly and disassembly of the strap through the entrance channel into the strap slot. Hence, although merely strengthening the arms has been of some help in resisting the flexing due to strap tension, this has been detrimental to the ability of the arms to flex to receive the strap, particularly since thickening the arms increases the stress induced therein when a predetermined amount of flexing is applied to the arms during assembly of the strap.

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Consequently, thickening the arms to strengthen them against flexing due to strap tension actually decreases their resistance to fracture during strap assembly or disassembly.

The object of the invention is to provide a plastic buckle frame in which the arms forming strap slots are adapted to resist bending forces imparted by tension applied to an assembled strap, and are disposed on a relatively flexible center portion to enable said arms to move relative to each other to allow a strap to pass between the ends thereof without flexing of the arms.

A further object of the invention is to provide a plastic buckle frame in which a relatively flexible center portion is provided with relatively rigid arms on each side thereof forming a strap slot on each side of the center portion.

Another object of the invention is to provide a plastic buckle frame in which a relatively thin center portion is flexible laterally of its ends and is provided with relatively thick rounded arm members attached to the sides of the center portion and extending therefrom toward each other in spaced relation to the ends of the center portion to form a strap-receiving slot adjacent each end.

Other objects of the invention will, in part, be obvious, and will, in part, appear hereinafter.

In the drawing:

Fig. 1 is a top plan view of a molded plastic buckle frame embodying the features of the invention;

Fig. 2 is a view in section taken on line 2—2 of Fig. 1;

Fig. 3 is a view in section taken on line 3—3 of Fig. 1;

Fig. 4 is a top plan view of the buckle of Fig. 1 with a strap assembled therein;

Fig. 5 is a view in section taken on line 5—5 of Fig. 4; and

Fig. 6 is an end view of the buckle of Fig. 1, illustrating the manner in which the parts of the buckle flex during assembly of a strap therewith.

Referring to the drawing, there is illustrated a buckle assembly 10, which comprises a buckle frame 12 and a snap fastener member 14 assembled therewith. The frame 12 is preferably formed of a single piece of molded synthetic organic plastic, preferably of a thermoplastic type, since such materials generally have more resiliency than the thermoset type. Plastics of the cellulose acetate type have been found suitable, particularly cellulose acetate butyrate; how-

ever, other types having the required strength and resiliency are also suitable such as polystyrene, nylon, and vinyl type resins.

The buckle frame 12 comprises generally a strap supporting center portion 16, having a central opening 18 to receive the fastener 14, and a pair of strap-retaining arms 20 disposed at each end 26 of the center portion 16. The arms 20 of each pair are identical, being generally rounded in cross-section, each arm being integral with a connecting portion 22 which extends along the sides 24 of the central portion 16 in marginal side portions. The arms 20 extend from the connecting portions 22 substantially parallel to the ends 26 of the center portion 16 in spaced relation thereto to form strap-receiving slots 30, the portions 28 of the arms 20 retaining the strap within the strap-receiving slots. The arms of each pair terminate in free ends 32 which are disposed in opposing spaced relation to each other to provide an entrance slot 34 communicating with the strap-receiving slot 30.

The center portion 16 is preferably flat and relatively thin so that it is capable of a substantial amount of flexing laterally of the strap-receiving slots. The arms 20 are substantially thicker than the central portion 16 so that they are rigid for a purpose to appear hereinafter. The connecting portions 22 integrally formed with the arms and the marginal side portions are also substantially thicker than the thin central portion, as are also the marginal side portions. Thus, in the buckle frame, by virtue of the central portion 16 being thin, and the arms 20 along with the marginal side portions and the connecting portions with which they are integral being substantially thicker than the central portion, the arms 20 and the side portions are rigid, and all of the flexing of the buckle frame, as described hereinafter, will take place in the central portion only, as illustrated in Figure 6.

The usual method of assembly of a strap 36 into one of the strap-receiving slots 30 is illustrated in Fig. 6. The strap, which is usually formed of rubber, is folded longitudinally and inserted into the entrance slot 34 between the ends 32 of the arms. At this time, the buckle is usually held between the fingers by grasping it at opposite sides of the center member. As the folded portion of the strap is pushed downwardly into the entrance slot, the fingers necessarily squeeze together to retain the buckle in the proper position, and said squeezing in combination with the downward force of the strap causes the center portion 16 to flex laterally of the strap-receiving slots as shown in Fig. 6. It will be noted that although the ends of the arms move downwardly, thereby slightly enlarging the entrance slot and inclining the ends to allow the strap to pass therethrough, such downward movement does not result from any flexing of the arms themselves, but rather from the angular rotation of the marginal side portions and the connecting portions 22, caused by the flexing of the center portion 16.

This method of flexing can be further shown by supporting the buckle at opposite sides of the center member, and hanging weights on the ends of the arms. In such a test, it has been found that there is no flexing of the arms, but the arms turn downwardly through a considerable angle, depending on the weight applied, and cause downward bowing of the center portion.

After assembly of the strap, when tension is applied thereto, the arms are sufficiently rigid to resist the forces resulting from the tendency of the strap to straighten, and such forces cause only slight bending of the center portion, since a large portion of such force is applied thereto relatively close to the sides of the center portion, resulting in a direct shear force rather than a bending force.

Although the arms, in the illustrated embodiment, are rounded to provide a pleasing appearance, they may have other shapes, provided they are rigid in relation to the flexible central portion.

Since certain obvious modifications may be made in the device without departing from the scope of the invention, it is intended that all matter contained herein be interpreted in an illustrative and not in a limiting sense.

I claim:

1. A molded plastic buckle frame comprising, a thin flexible central portion having opposite strap engaging ends, marginal side portions integral with opposite sides of said central portion and strap receiving slots formed one adjacent each of said ends by pairs of arms extending towards each other substantially parallel to the strap engaging ends in spaced relation thereto, the adjoining ends of the arms in each pair being spaced from each other to provide entrance slots for entry of a strap into the strap receiving slots, said arms each being integrally connected with the marginal side portions, said arms and said marginal side portions being substantially thicker than the flexible central portion, the arms of each pair being tiltable away from each other through bending of the flexible central portion laterally of the strap receiving slots to increase the width of the entrance slots upon insertion of a strap therein to facilitate entry of a strap into the strap receiving slots.

2. A molded plastic buckle frame comprising, a thin flexible central portion having opposite strap engaging ends, marginal side portions integral with opposite sides of said central portion and strap receiving slots formed one adjacent each of said ends by pairs of arms extending towards each other substantially parallel to the strap engaging ends in spaced relation thereto, the adjoining ends of the arms in each pair being spaced from each other to provide entrance slots for entry of a strap into the strap receiving slots, said arms being of substantially greater thickness than the flexible central portion, said marginal portions including areas of greater thickness than the flexible central portion extending along the sides of the central portion and integrally connected with and forming angular extensions of said arms, the arms of each pair being tiltable away from each other through bending of the flexible central portion laterally of the strap receiving slots to increase the width of the entrance slots upon insertion of a strap therein to facilitate entry of a strap into the strap receiving slots.

3. A molded plastic buckle frame comprising, a thin flexible central portion having opposite strap engaging ends, marginal side portions integral with opposite sides of said central portion and strap receiving slots formed one adjacent each of said ends by pairs of arms extending towards each other substantially parallel to the strap engaging ends in spaced relation thereto, the adjoining ends of the arms in each pair being spaced from each other to provide entrance slots for entry of a strap into the strap receiving slots, said arms being of greater thickness than

the flexible central portion and tapering in thickness in the direction of their free ends, said marginal portions including areas of greater thickness than the central portion extending along the sides of the central portion and tapering in thickness in the direction of the midpoints of the opposite sides of the central portion, said thicker marginal areas integrally connecting with and forming angular extensions of said arms, the arms of each pair being tiltable away from each other through bending of the flexible central portion laterally of the strap receiving slots to increase the width of the entrance slots upon insertion of a strap therein to facilitate entry of a strap into the strap receiving slots.

HAROLD S. VAN BUREN, JR.

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