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W. J. LITWIN

3,271,831

BUCKLE MEANS

Filed April 20, 1964

FIG. 1

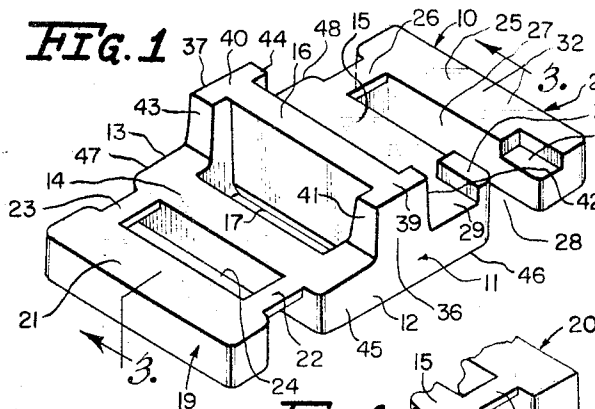


FIG. 2

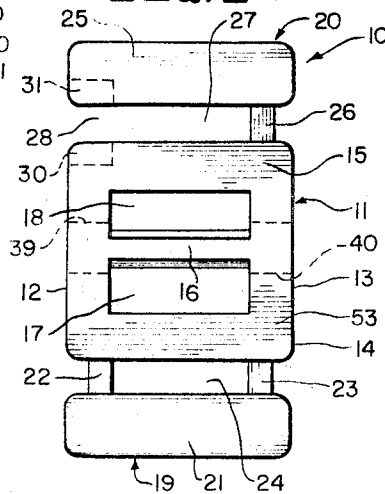


FIG. 3

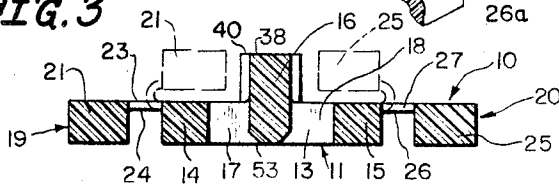


FIG. 4a

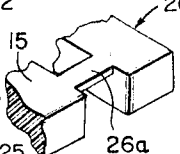


FIG. 4

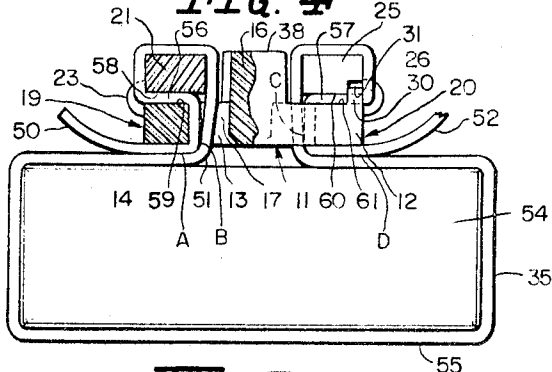


FIG. 5

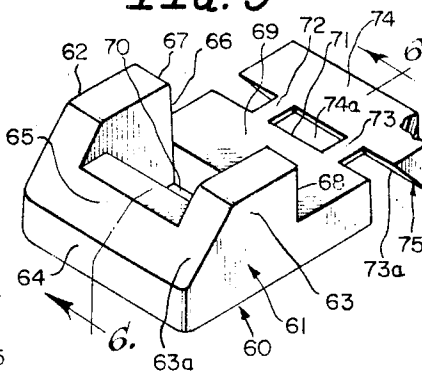


FIG. 6

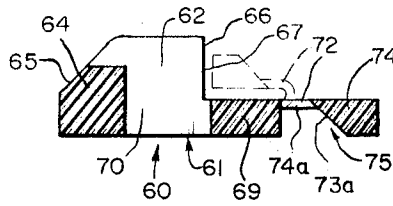


FIG. 7

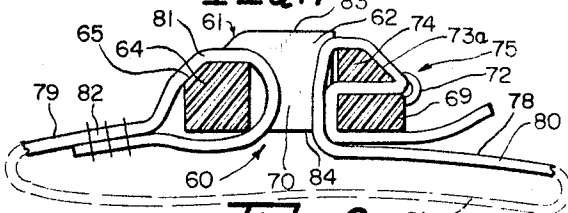
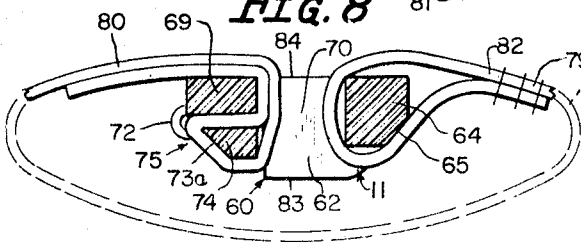


FIG. 8



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BUCKLE MEANS

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8 Claims. (Cl. 24-200)

This invention relates to buckle means and in particular to buckle means provided with anti-slip locking means for containing the end portions of a strap or cord encircling the strap or cord about an object or body.

It is therefore a general object of this invention to provide a buckle means that is provided with an anti-slip or friction locking means for tightly grasping the end portions of a strap or belt.

It is another object of this invention to provide a novel strap or belt locking means in the form of a buckle means having hinged locking elements that increase their grasp on the end portions of the strap as the pull or load is increased on the strap.

It is another object of this invention to provide a buckle means having anti-slip strap hinged jaw means provided with stress relieving or strain absorbing means in the form of a stop relieving tension in the jaw means in the direction of strap pull.

It is another object of this invention to provide a buckle means for a strap or belt in securing such things, as a package or a garment about one's waist, where the buckle means is provided with anti-slip hinging locking means for overlapping portions of the strap that are interlaced through the portions of the buckle means.

It is another object of the invention to provide anti-slip buckle means for interlacing portions of a locked strap through novel hinged jaw means disposed at opposed ends of the buckle means in providing equal buckle loading along the axis of strap pull.

These and other objects of the invention will become apparent from a reference to the following description and appended drawing wherein:

FIGURE 1 is a perspective view of the invention;

FIGURE 2 is a bottom plan view of the invention;

FIGURE 3 is a sectional view taken substantially along line 3-3 of FIGURE 1;

FIGURE 4 is a view similar to FIGURE 3 and showing the invention in operation with the strap means attached thereto;

FIGURE 4a is a view illustrating modified hinge connection arrangement from that shown in FIGURE 1;

FIGURE 5 is a perspective view of a modification of the invention;

FIGURE 6 is a sectional view taken substantially along line 6-6 of FIGURE 5;

FIGURE 7 is a view similar to FIGURE 6 and showing the invention in operation with strap means attached thereto; and

FIGURE 8 is a view similar to FIGURE 7 and illustrating a different way of interlacing strap means.

With reference now to the drawing and in particular FIGURES 1 through 4, there is shown a buckle means generally illustrated by the numeral 10 and comprising a central base or body portion 11 having a pair of parallel side walls 12 and 13 and a pair of parallel transverse walls 14 and 15 separated from one another by an intermediate wall 16, the intermediate wall 16 defining with the transverse and side walls 14 and 15 a pair of strap openings or apertures 17 and 18. A pair of hinge structures 19 and 20 are attached to the base portion 11, the left end hinge structure 19, as viewed in FIGURE 1 or 3, comprising a transverse end wall 25 and a pair of lateral or axially extending hinge walls 22 and 23 connecting end wall 21 with wall 14 in defining aperture or strap passage 24, and the right end hinge structure 20,

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as viewed in FIGURE 3, comprising a transverse end wall 25 and a lateral or axially extending hinge wall 26 connecting end wall 25 with wall 15 in defining aperture or strap passage 27 having opening 28 between wall 11 and end wall 25. The transverse base wall 15 on upper surface 29 of main buckle portion 11 is provided with a corner protuberance or projection 30 which is registerable with corner groove or recess 31 on the upper surface 32 of transverse end wall 25. In the operation of the buckle means, locking the strap 35 (see FIGURE 4), the protuberance 30 interlocks with the recess 31 in preventing lateral movement or torquing or bending of the transverse wall 25 about hinge wall 26 toward the base or main portion of the buckle 10.

The transverse central wall 16 of the base portion or main buckle 11 defines with the central portions 36 and 37 of the lateral walls 12, 13 of main buckle portion a truss element or stress relieving or strain bar 38 which is in the form of an I beam having axially extending lateral end flanges 39 and 40 rising from buckle deck or top surface 29 and presenting hinge bar or upper clamp or jaw receiving transverse faces 41, 42, 43 and 44. The end portions 45, 46, 47, 48 of the lateral buckle walls 12, 13 and the transverse buckle walls 14, 15 define U-shaped members integrally locked with the strain bar 38. Each transverse bar 14 or 15 forms an upper locking member or jaw of a strap anti-slip means or friction lock or grip structure that also comprises the transverse hinge bar or lower jaw or locking members 21 or 25. The end hinge structures 19, 20 are pivoted about the lateral, axially extending hinge walls or connectors 22, 23, 26 of the hinge structures 19, 20 for swinging of the transverse hinge walls or bars or jaw members 21, 25 over the jaw members 14, 15 of the main buckle portion 11 in the longitudinal path of the strap or axially of the buckle means 11.

A length of flexible strapping material or belt 35 which has a free end 50, an intermediate portion 51, and an end 52 attached to a roll of strap (not shown) is intertwined or woven through the buckle 11 as follows. The strap free end 50 is fed through aperture 17 from under-surface or underside 53 of main buckle portion 11, over jaw or locking bars 14 and 21, around bar 21, through aperture 24 over bar 14 through aperture 17, between bar 14 and intermediate strap portion 51 (being pulled during weaving of strap 35 in buckle 11), and out underside 53 outwardly past bars 14 and 21. Since the end 52 is attached to a roll of strap, the intermediate portion 51 is wrapped around an object such as a package 54 or a garment at the waist to form a loop 55 and the end portion 52 has a part of it that is made into a small loop that is passed first through aperture 27 over bar 15 and then around bar 25 at side where there is no hinge (that is, side opposite hinge bar 26), the path of the strap end 52 through bars 15 and 25 being the same as that path of end 50 through bars 14 and 21. The weaving of the strap or core 35 through the buckle 10 is performed while the buckle 10 is in the extended position as shown in FIGURES 1 through 3 with the hinge structures extended and lying in the axial plane of the main buckle portion 11. Upon completion of the weaving of the strap 35 through the buckle 10, the ends 50 and 52 are pulled outwardly of one another, drawing the hinge bars 21 and 25 inwardly to dispose themselves atop their respective buckle bars 14 and 15 with the strap portions 56 and 57 being held between surface 58, 59 and 60, 61 of bars 21, 14 and 25, 15 respectively (see dotted view of bars 21, 25 in FIGURE 3). The bars 21, 14 and 25, 15 are rectangular or square in cross-sectional, presenting sharp right angled corners to insure good gripping action on the belt or strap portion threaded thereabout, and the

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engagement of the strap portions of strap 35 with one another enhances the anti-slip or good locking characteristics of the buckle 10.

The buckle 10, as so constructed, provides for a pull on the hinge bars 21, 25 equally, as the bars 21, 25 and 14, 15 present a bilateral symmetry with respect to the strain or stress bar 38, each hinge structure 19 or 20 receiving its equal share of the tension loading on the hinges 23, 22 and hinge 26 and couple 30, 31. The direction of pull or tension loading on the hinge structures 19, 20 is axially of the buckle 10, i.e. along the plane of the buckle extending from one hinge structure 19 or 20 to the other and from one main buckle bar 14 or 15 to the other main buckle bar 15 or 14. Therefore, the loading on each hinge part 22, 23, or 26 is along its length and each hinge part 22, 23 or 26 is placed in tension, there being no torque or bending moment applied to the hinge 22, 23 or 26. The strain bar 16 acts as a stop for the bars 21 and 25 and also acts as a reinforcing member for the main part 11 of the buckle 10.

FIGURE 4a shows a modification of the buckle 10, only in that instead of using a protuberance or post 30 and recess 31 arrangement of FIGURES 1 through 4 there is provided a fourth hinge 26a that operates in the same manner as the other hinges 22, 23, 26 illustrated in FIGURES 1 through 4, and of course there is now no opening 28 for slipping a strap loop over the bar.

This arrangement does not work with strap or cord 35 that is attached to a roll, but only with a cut or loose strap having two free ends such as end 50. Therefore the strap 35 is fed through both hinge structures 19 and 20 in the same manner strap end is fed through hinge structure 19.

A modification of the buckle arrangement is shown in FIGURES 5 through 8, where there is shown a buckle 60 having main buckle part 61 with a pair of upright side walls 62 and 63 and defining at one end 63a with end cross bar 64 thereat and therebetween a sloping end face 65 and at the other end 66 presenting jaw or clamp receiving vertical faces 67 and 68. A flat generally rectangular base or bar 69 joins with the side walls 62 and 63 below faces 67 and 68 and defines a buckle or strap receiving opening 70. The bar or lower jaw plate 69 has at its outer end 71 axially extending hinge bars or struts 72, 73 that connect with outer bar or plate 74 that defines a lower jaw or clamp having a sloped surface 73a. The bars or jaws 69 and 74 and hinges 72, 73 define a rectangular belt aperture 74a, the hinge struts 72, 73 and bar or clamp 74 forming a hinge structure 75. As shown with FIGURES 1 through 4, the locking portions 69, 74 present square corners for good locking and strap anti-slip quality. A strap or belt 78 having end parts 79 and 80 connected with intermediate part 81 (in dotted line) is attached to the buckle 60. The end part 79 has a loop 81 held together by stitching 82 whereas the end part 80 is laced about and around the upper and lower clamp bars or jaws 69 and 74 in the same manner as the end parts 50 and 52 shown in FIGURES 1 through 4, FIGURE 6 showing operational position of jaw bar 74 in dotted line. FIGURE 7 shows buckle 60 with top surface 83 directed outwardly of the belt or strap loop 81 that goes around an object (not shown), whereas FIGURE 8 shows another position of the buckle 60, where top surface 83 is directed into loop 81 and toward the strap circumscribed object not shown, and bottom surface 84 is outwardly directed.

In feeding the strap through the portions of the buckle 10 or 60, as described, the strap portions are pulled tightly about the object in extending through the locking portions of the buckle, and the locking portions 19, 14 and 20, 15 or 69, 74, because of the axial load of strap pull, prevent strap or cord slip in the operational position of the buckle means.

It is to be further appreciated that the flexible plastic buckle 10 or 60 has a normally relaxed position shown

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in solid line (see FIGURES 1-3 or 5-6) and can only have its hinged structures 19, 20 or 75 swung into the dotted position (see FIGURE 3 or 6) or overlapping operational position shown in FIGURES 4 or 7-8 by placing and holding the hinge structures in the overlapping or operational position, as by pulling on the strap or cord.

Such terms as top, bottom or side are used herein for purposes of buckle orientation and not inventive limitation.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. A buckle comprising a planar flexible plastic structure comprising a center section, a pair of end clamp bars, and a pair of hinge means each hingedly connecting each clamp bar to a respective opposite end of the center section, said center section comprising a body portion having a pair of end bars adjacent to and generally parallel with the respective clamp bars, said body portion having an intermediate reaction bar generally parallel with the end bars and defining belt passages therewith, said clamp bars being spaced transversely from the respective end bars in the open position of the buckle and being adapted to be swung over and toward said end bars with a belt looped thereabout and drawn through the respective belt passages to hold the belt between the clamp and end bars.

2. A belt buckle comprising a plastic flexible structure having a central body portion and an end portion disposed in the open position of the buckle in a substantially common plane, said end portion being connected with the body portion by a thin flexible strap serving as a hinge between said portions, said hinge having a cross sectional thickness about its bending axis substantially less than the cross section of any portion of the center body portion or of the end portion and intersected by the bending axis of the hinge to provide for flexure only at the hinge, said end portion being in the nature of a clamp for snubbing an associated belt entered between the clamp and body portion attendant to the clamp being swung over the body portion, said belt being looped about the end portion and being passed between the body portion and clamp, said belt having overlapping portions extending through an opening in the central body portion, said belt portions extending under the body portion and frictionally interlocking with each other.

3. The invention according to claim 1 and said hinge means between one of the clamp bars and one end bar being disposed at one side of said one clamp bar and said one end bar only to define a slot and said slot being open at the other side of said one clamp bar and said one end bar laterally of the buckle to admit entry and withdrawal of the associated belt.

4. The invention according to claim 1 and said clamp bars having sharp corners for digging into portions of the belt wrapped therearound.

5. The invention according to claim 1 and said hinge means being disposed between one end of one clamp bar and one end of one end bar, and an interlocking locking means on the other end of the one end bar and a mating locking means on the other end of the one clamp bar locking the one end bar with the one clamp bar.

6. A belt buckle of flexible resilient plastic material including a body portion with a belt passage therein, clamping jaw means disposed adjacent to said body portion, and connecting means serving as hinge means interconnecting the clamping jaw means with said body portion, said connecting means being resilient and biasing said jaw means to open position disposing said jaw means substantially in the plane of the body portion, said connecting means defining with said jaw means and

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body portion a belt-admitting way, said jaw means being adapted to be folded toward said body portion against the resilient resistance of the connecting means for clamping an associated belt therebetween attendant to the belt being passed through the way and looped about the clamping means and snubbed through said belt passage.

7. The invention according to claim 1 and each clamp bar defining with an adjacent end bar and a respective hinge means a belt admitting passage.

8. The invention according to claim 1 and said reaction bar having surfaces opposing the surfaces of the clamp bars in providing a continuing belt path with each of the belt passages.

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