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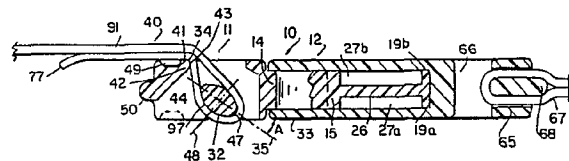
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⑤④ **Buckle.**

⑤⑦ A molded plastic buckle is formed with a male member having two opposed flexible arms which are self-guiding upon insertion into sized channels formed in the female member, whereupon insertion, the self-guided arms lock into the female member. A novel elliptical web adjustment and securing bar is provided on the male member. The present buckle construction eliminates the guide bar of the prior art construction, improves web holding, and reduces the overall weight of the buckle, while maintaining desired strength characteristics.



This invention relates to buckles. Specifically this invention relates to molded plastic buckles with improved guiding and locking action and adjustable web securing features.

BACKGROUND AND DISCUSSION OF THE PRIOR ART

In U. S. Patent No. 4,150,464, granted April 24, 1979 to Tracy, there is disclosed a molded plastic buckle having cooperative male and female members, where the male member was formed with a central rigid guide arm disposed between flexible side arms, which flexible side arms were pressed against the central arm prior to insertion and the central arm engages a central channel so as to guide the male member into the female member.

Such central guide arm added substantial weight to the buckle and the requisite pressing of the side arms against the central arm was unwieldy in actual use, particularly so where the buckle would be employed under adverse conditions such as conjunction with a life jacket or back pack.

Now there is provided by the present invention, a buckle in which flexible side arms are self-guiding and do not require manual pinching, and which eliminates the need for a central guide arm or bar.

In U. S. Patent No. 4,171,555 granted October 23, 1979, to Bakker, et al., there is disclosed a buckle with a web securing feature in which a pair of opposed bars provide opposing sharp angles to hold the web while permitting release of the web upon lifting of a tab.

The prior art desired a simplified and lightweight design.

It is therefore a principal object of the present invention to provide a molded plastic buckle with a self-guiding action of the male member in the female member.

It is another principal object of the present invention to provide a molded plastic buckle with an improved web securing feature.

It is another object of the present invention to provide a buckle as aforesaid in which the weight of the buckle is substantially reduced without sacrifice of the load bearing capacity of the buckle.

SUMMARY OF THE INVENTION

A molded plastic buckle is provided with male and female interlocking members wherein the male member is formed with self-guiding flanged resilient arms, and wherein the flanged portion of the arm is shaped so as to be self-guiding and slidably fitting into specifically sized channels formed in the female member.

The molded plastic buckle is formed with an elliptical cross bar for adjustably holding a web to one of the members.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a bottom plan partial fragmentary view of the buckle of the present invention in the unassembled mode;

FIG. 2 is a bottom plan partial fragmentary view of the buckle of FIG. 1 in the assembled mode;

FIG. 3 is a detailed bottom plan partial fragmentary view of the buckle of FIG. 1 upon insertion to provide the assembled mode of FIG. 2;

FIG. 4 is a side view taken along line 4-4 of FIG. 1;

FIG. 5 is a sectional view taken along line 5-5 of FIG. 2; and

FIG. 6 is a sectional partial fragmentary view taken along line 6-6 of FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIEMENTS

Referring to the FIGURES there is shown the buckle of the present invention generally referred to as 10. Buckle 10 is formed of a molded plastic male member 11 and a molded plastic female member 12.

Male member 11 is formed with a body portion 13 from which extends a cross-member 14. A pair of opposed similar arms 15 are integrally molded with cross-member 14, and flex about junctures 14a inwardly towards each other to a limited degree, but do not touch each other on flexing, for purposes hereinafter appearing.

Arm 15 is formed with stem 16 terminating at its foreward end with flange 17. Stem 15 is of generally rectilinear cross-section. Flange 17 is formed with upper and lower peripheral rims 19a and 19b, respectively, in turn forming an inner rounded portion 20, an inner straight portion 21, a rounded foreward leading portion 22, an outer oblique portion

trapezoidal connecting member 26 is formed with flange 17 and provides recesses 27a and 27b for rims 19a and 19b, respectively.

Body portion 13 is formed with H-shaped portion 28 having opposed legs 30 and 31. An elliptical cross bar 32 is transversely disposed between and integrally formed with legs 30 and 31. Elliptical bar 32 is angularly disposed with respect to top and bottom surfaces 33 and 34 so that the major axis 35 of the ellipse cross-section 36 is at an angle A of about 57° with respect to surfaces 33 and 34 (FIG. 5). This angular disposition of an elliptical cross bar was found to be important in retaining a web 40, as will be more fully explained hereinafter.

The cross-member 41 of portion 28 forms a second transversely disposed cross-bar 42, which is formed from bottom surface 34, surface 43 at 90° with respect to surface 34, and surface 44 at 45° degrees with respect to surface 34 (FIG. 5). It is to be noted that these angled surfaces 34, 43, and 44 are juxtaposed nearest to one end portion 46 of the ellipse on the major axis 35, and is most remote to the other end portion 47 of the ellipse on the major axis 35. Minor axis 48 is slightly less than parallel to surface 44.

Portion 28 is also formed with a plurality of parallel grooves 49 formed in bottom surface 34. A tab portion 50 extends outwardly from the male body portion.

Female member 12 is formed with a body portion 51 having opposed cut away portions 52. End 53 of portion 51 is formed with tapered side walls 54, which extends from edge 55 to edge 71 of cut-away portion 52. Opposed upper and lower walls 56 and 57 are formed with side walls 54 so as to form

insert opening 58. Opposed pairs of upper and lower ribs or guide rods 59 and 60 depend from walls 56 and 57 respectively, so as to form flange-guide channels 61. Ribs 59 and 60 have rounded opposed edges 62a and 62b, and parallel side walls 63 and 64, respectively.

Female body portion 13 is also formed with end portion 65 which is formed with transversely disposed rectangular slots for fixedly holding the closed looped end 67 of web 40 around tab bar 68. End tab 68 extends outwardly from end portion 65.

By the aforesaid manner of construction, the user grips the sides 92 of body portion 13 at the H-shaped member with one hand and grips the sides of 69 of female body end portion 65 with the other hand. The user then advances the male member 11 towards the female member 12 so that rounded leading foreward edges 22 enter the respective guide channels 61. With continued insertion, surfaces 17 and, in turn, 24 slidably contact walls 54 so as to cause arms 15 to flex towards each other to a limited degree (FIG. 3). This arm flexure continues until inner surfaces 21 slidably contact rib walls 63 and 64 whereby the arm flanges are self-guided into the channels. This insertion continues until flanges 17, particularly surface 24 passes edge 71, at which point the arms snap flex away from each other and reside substantially but not entirely with the cut-away portions. The buckle is then in the locked mode (FIGS. 2, 5, and 6).

It is to be noted that each guide channel 61 is composed of two portions, namely, a flange receiving portion 79, comprising opposed walls 80 and 81, which are sized to receive the flange in a close tolerance fit, and a flange

guiding portion 82 formed of rib walls 63, 64, and opposed walls 93 and 94, for guiding the flange into the flange receiving portion 79 (FIG. 6). It is also noted that rims 19a and 19b at inner surfaces 21 reside within the female body as at portion 75 (FIG. 2). This close fitting of the flange and stem prevents twisting of the flanges 17 and stems 16, in the locked position.

Web 40 has a fixed end 67 and free end 77. The free end 77 overlies surfaces 96, 47, and 97 of the elliptical bar 42, and passes downwardly and over the 90° angle of the second bar 42, and across the grooves 49, and underlies portion 91 of the web 40. In this manner, free end 77 is secured to the male member. To adjust the length of webbing the tab 50 or body 13 is lifted so as to relieve the stress exerted between the elliptical bar and the angled second bar, and the web free end pulled to the desired length, and the tab or male body is then released.

The presence and orientation of the elliptical bar in relation to 90° angled bar provides a secured holding of the web at the desired web length.

There has thus been shown a molded plastic buckle having self-guiding and flexing arms which securely positively lock in place without the need for physically pressing the arms, and particularly eliminating the need to press the arms against a guide bar. There has also been shown a buckle with a novel elliptical web adjustment and securing bar.

Although specific embodiments of the invention have been described, modifications and changes may be made therein without departing from the scope of the invention as defined in the appended claims.

WHAT IS CLAIMED IS:

1. A buckle comprising;
a molded plastic male member being formed with a body, and having arm means, said arm means consisting of a pair of opposed flexible arms connected to said body; and a molded plastic female member comprising a body formed with a pair of channels to slidably receive said arms, and means to lock said arms into said female body after sliding said arms in said channels.
2. The buckle of claim 1, said arms being sufficiently flexible so as to be self-flexing upon insertion in the channels, and wherein said arms cannot be flexed so as to touch each other prior to insertion.
3. The buckle of claim 2, each of said arms being formed with a rounded forward edge to be received in said channel.
4. The buckle of claim 3, each of said arms being formed with a flange adjacent said forward edge, said flange being formed with a recess of a size so as to provide a molded plastic rim.
5. The buckle of claim 4, said means to lock said arms comprising a female body portion being formed with a pair of oppositely disposed cut away portions for receiving the flanges, which flanges flex outwardly into the cut away portions so as to be a locked portion.
6. The buckle of claim 5, wherein at least a portion of each flange rim is disposed in the female body with the arms in the locked position.

7. The buckle of claim 1, each of said arms being formed with a flange portion for inserting into said channels, said flange portion having a flat edge and a contiguous rounded leading edge, and said flange portions and the channels being sized so that each of the flat edges slidably engages one side wall forming one of said channels and the rounded edge slidably engages an opposed side wall forming of said one channel.

8. The buckle of claim 4, said recess being trapezoidal in shape.

9. The buckle of claim 1, further comprising a cross member interconnecting said arms. so that said arms are in facing opposition and flex to each other to a limited degree so as not to touch each other.

10. A buckle comprising;

a body having means to adjustably secure the end of a length of a web including first and second parallel bars transversely disposed in said body, said first bar having an angled surface for engaging the web and said second bar having a cross section in the shape of an ellipse, and wherein the web overlies a portion of the surface forming the ellipse, said bars being spaced from each other, whereby the web extends from the overlying portion of the first bar to the overlying portion of the second bar.

11. The buckle of claim 10, wherein the web overlies portion of the second bar most adjacent to the first bar lies on the major axis of the ellipse.

12. The buckle of claim 11, said body having top and bottom surfaces and wherein the major axis of the

ellipse is at an angle of about 57° with said top and bottom surfaces.

13. The buckle of claim 10, wherein the first bar angled surface forms an angle of about 90° .

14. The buckle of claim 10, wherein the web overlies portion of the second bar most adjacent to the first bar lies on the major axis of the ellipse, wherein the web overlies portions of the second bar most remote from the first bar lies on the major axis of the ellipse.

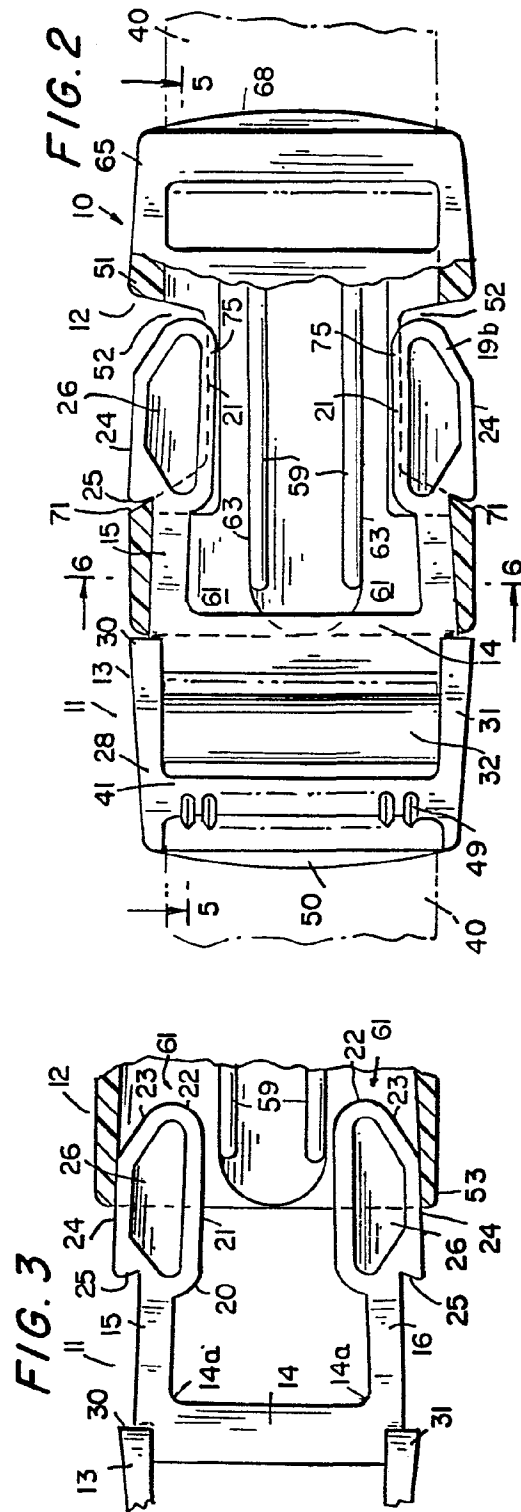
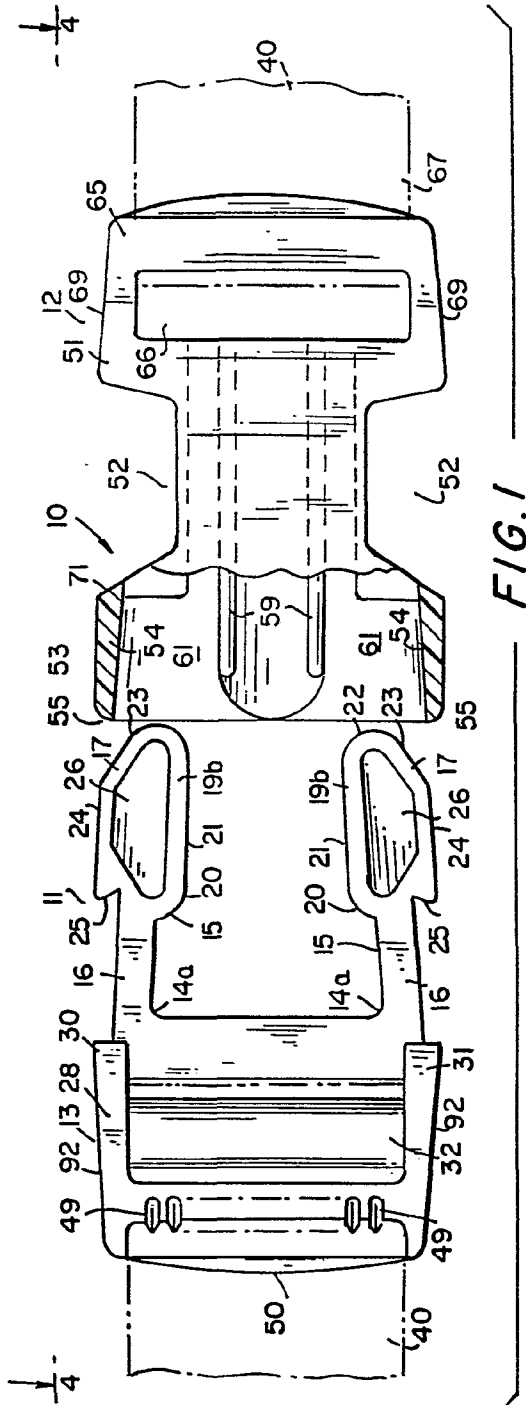
15. A buckle comprising:

a molded plastic male member being formed with a body, and having arm means, said arm means consisting of a pair of opposed flexible arms connected to said body; and a molded plastic female member comprising a body formed with a pair of channels to slidably receive said arms, and means to lock said arms into said female body after sliding said arms in said channels, one of said bodies having means to adjustably secure the end of a length of a web including first and second parallel bars transversely disposed in said body, said first bar having angled surfaces forming for the web to overlie, and said second bar having a cross section in the shape of an ellipse, and wherein the web overlies a portion of the surface forming the ellipse, and said bars being spaced from each other, whereby the web extends from the overlying portion of the first bar to the overlying portion of the second bar.

16. The buckle of claim 15, said one of said bodies being the male member body.

17. The buckle of claim 15, wherein the web overlies portion of the second bar most adjacent to the first bar lies on the major axis of the ellipse, wherein the web overlies portions of the second bar most remote from the first bar lies on the major axis of the ellipse.

18. The buckle of claim 17, wherein the first bar angled surface forms an angle of about 90° , and wherein the major axis of the ellipse is at angle of about 57° to one of said angled surfaces.



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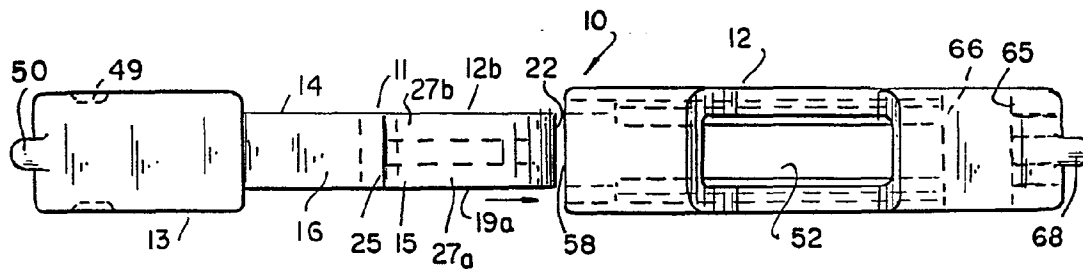


FIG. 4

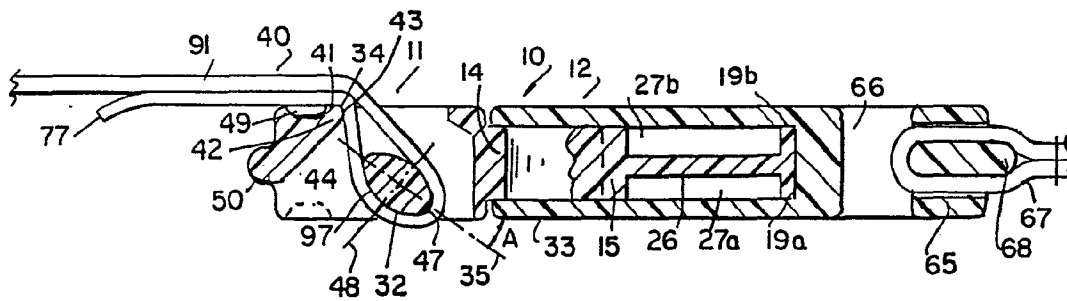


FIG. 5

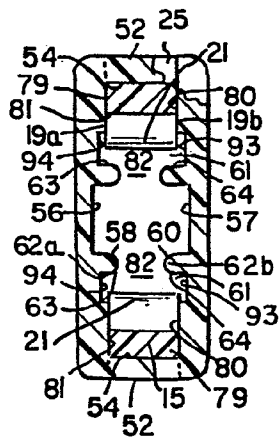


FIG. 6