COMBINATION STRAP AND BUCKLE

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ABSTRACT
A two ended plastic strap includes an integral buckle formed on a first end of the strap. The buckle has a longitudinal channel extending through it which is sized to receive the second end of the strap. The second strap end includes an upper surface having a plurality of serrations formed in it which may be held releasably by a serration engaging receptacle formed in the buckle. The receptacle is integrally constructed along a flexible finger and the finger is positioned so that the receptacle normally is in serration engaging position. The receptacle is designed to permit serration passage in one axial direction of the channel. Passage of the serrations in the second direction is accomplished by flexing the finger so that the receptacle disengages the serrations.

6 Claims, 5 Drawing Figures
COMBINATION STRAP AND BUCKLE

BACKGROUND OF THE INVENTION

This invention relates to strap and buckle constructions and in particular to a low cost strap and buckle design finding application in low cost roller skates for children. While the invention is described in detail with respect to roller skate applications, those skilled in the art will recognize the wider applicability of the invention disclosed hereinafter.

It is conventional to construct low cost roller skate designs from some type of plastic material. These lower cost designs in actual practice, and for the purpose of this specification, include what commonly are known as beginner roller skates. The particular beginner roller skates to which this invention has particular application are intended for use by relatively young children. In addition to a low cost design, this particular type of beginner roller skate must be simple to use so that younger children can master both the art of skating and the preliminary task of attaching the skates to their podalic extremities.

A number of skate designs are known in the art. These designs include both conventional strap and buckle attached skates and self-biasing skates similar to that disclosed, for example, in U.S. Pat. to Taylor, No. 3,781,027, issued Dec. 25, 1973, which eliminates the strap and buckle for attachment. In general, self-biasing roller skates tend to be more expensive to manufacture than skates without the self-biasing feature. Consequently, the more conventional strap and buckle arrangement retains a large portion of certain roller skate market segments. In particular, the strap and buckle combination retains that market segment dealing with beginner roller skates.

Strap and buckle designs commonly used for roller skates follow a conventional pattern in that they commonly comprise an outer skeleton frame having a central bar dividing the area enclosed by the frame into two parts. A tongue or other movable pin is pivotally mounted to the bar. The tongue is intended to be inserted in openings in the strap to secure the buckle and strap combination. The buckle commonly is metallic and must be stapled or otherwise attached to one of the strap ends. In fastening the buckle, the tongue must be positioned within the selected opening in the strap, generally by hand manipulation, before the two parts can be interconnected. As indicated above, small children generally have a difficult time making this manipulative effort without the aid of an adult. Of course, the manipulative effort required to displace the tongue from the strap opening also is a problem.

The invention disclosed hereinafter eliminates much of the manipulative effort required by strap and buckle interconnection by providing a strap and buckle in which one end of the strap is inserted through a channel in the buckle. The strap has a plurality of serrations in it and the serrations automatically engage a latch means provided in the buckle construction. The latch means/serration interaction permits one way movement of the strap but inhibits removal of the strap from the buckle. Removal is accomplished by disengaging the latch means from the serrations in a simple operation making the buckle particularly suitable for use by younger children. Since the buckle can be constructed from plastic, the entire strap/buckle combination may be an integral unit, if desired, and the conventional problems associated with attaching a metal buckle to a plastic strap are eliminated.

One of the objects of this invention is to provide a low cost strap and buckle design.

Another object of this invention is to provide a strap and buckle combination having the buckle integrally formed with the strap.

Still another object of this invention is to provide a strap and buckle combination wherein one end of the strap has a plurality of serrations in it.

Another object of this invention is to provide a strap and buckle combination particularly well suited for use on low cost roller skates.

Yet another object of this invention is to provide a strap and buckle that provides automatic engagement upon insertion of the strap end within the buckle.

Still another object of this invention is to provide a strap and buckle combination the operation of which may be mastered easily by young children.

Other objects of this invention will be apparent to those skilled in the art in the light of the following description and accompanying drawings.

SUMMARY OF THE INVENTION

In accordance with this invention, generally stated, a novel plastic strap and buckle combination is provided wherein the buckle is integrally formed along one end of a strap length. The buckle has a longitudinal channel through it and includes integrally formed latch means biased to project within the channel. A second end of the strap length or a second strap includes a relatively broad width part having a plurality of serration like projections extending outwardly from it, which may be engaged by the latch means. The latch means/serration design is such as to permit travel of the serration bearing strap in one direction along the channel but to prevent travel in a second direction along the channel. The latch means is pivotally mounted so that travel along the second channel direction is permitted by disengaging the latch means and serrations.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings, FIG. 1 is a view in perspective of one illustrative embodiment of strap and buckle of this invention;

FIG. 2 is a top plan view of the strap and buckle shown in FIG. 1;

FIG. 3 is a view in side elevation, taken along the line 3—3 of FIG. 2;

FIG. 4 is a longitudinal sectional view of the buckle shown in FIG. 1; and

FIG. 5 is a longitudinal sectional view of the strap and buckle combination shown in FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIG. 1, reference numeral 1 indicates the preferred embodiment of strap and buckle combination of this invention. The strap and buckle 1 may be a single, one piece article or it may be a two piece device. In either case, the strap or strap parts have respective ends 2 and 3 which comprise the end terminations of a portion 30 and a portion 31 of the combination 1, shown broken away in the drawings.

The end 2 has an upper surface 4, a material thickness 5 and a bottom surface 6, and is terminated in any convenient design shape. The rounded end shown is de-
sirable in that it facilitates interconnection of the portions 30 and 31, as later described. However, other end terminations are compatible with the broader aspects of this invention.

The surface 4 has a plurality of serrations 7 integrally formed with and extending upwardly from it. The serrations 7 include an arcuate wall 8 and a generally vertical wall 9, vertical being referenced to FIG. 5, which meet to define an outward end 32 of the individual serrations. Individual ones of the serrations 7 have a spacing 36 between the wall 8 of any first serration 7 and the wall 9 of the succeeding serration 7, which spacing is predeterminately selected in accordance with design considerations described below. As indicated, the end 2 may be part of an integrally constructed, single strap and buckle combination, or the strap may be severed to define two individual portions 30 and 31. Thereafter, another object may be connected between the portions 30 and 31. Both arrangements commonly are used in roller skate constructions. That is, a roller skate, for example, may have a channel through which the end 2 of a one piece strap and buckle 1 is threaded, or the strap and buckle may be severed and attached to the skate by any convenient means. Thereafter, the skate is attached to the user by operating the strap and buckle in a normal way.

The end 3 has a buckle 10 integrally formed in it. The buckle 10 includes a first pair of oppositely opposed side walls 11 and 12, a second pair of oppositely opposed side walls 13 and 14, and a top wall 15. In the embodiment illustrated, the buckle 10 is open bottomed and the side and top walls delimit a cavity 16. The side walls 13 and 14 have aligned openings 17 and 18 in them, respectively. Each of the side walls 11 and 12 have a boss 19 extending outwardly from them, on the cavity 16 defining side of those walls. Each of the bosses 19 have a first surface 33 which is parallel to an outer boundary layer 34 of the portion 31. The surface 33 and layer 34 are also aligned longitudinally with the openings 17 and 18 to define a channel 20 through the buckle 10. The channel 20 is sized to receive the end 2 of the portion 30 and pass it through the buckle 10 freely, in the absence of other considerations.

Top wall 15 has a latch means 21 integrally formed in it. The top wall 15 has an U-shaped groove 22 through it, which surrounds the latch means 21 on three sides. The latch means 21 is attached to the top wall 15 along a side 23 of the top wall 15, at the mouth of the U-shape of the groove 22. Latch means 21 includes a longitudinally extending section 24 having an outwardly extending end 25. The end 25 includes a radial part 40 and an axial part 41 which combination offsets the end 25 from the plane of the section 24 and permits easy hand engagement of the latch means 21. A rib member 26 extends between the part 40 of the end 25 and the side 23 of the top wall 15. Rib member 26 is important in that it provides structural rigidity to the latch means 21 without hindering the movement capabilities of the latch means. The buckle 10 is preferably constructed from a resilient plastic material. The attachment of latch means 21 at the side 23 in combination with the resiliency of the material from which buckle 10 is constructed enables the latch means 21 to operate hinge or spring fashion. That is, application of a relatively small force along the end 25 will enable the latch means 21 to rotate out of the plane of the top wall 15 while the natural resiliency of the material forming the buckle 10 enables the latch means 21 to spring back into its original position upon removal of that force.

A lower surface 27 of the section 24 has a serration engaging receptacle 28 integrally formed with it. The receptacle 28 extends downwardly from the section 24 so as to project into both the cavity 16 and the channel 20, in the normal position of the latch means 21. The receptacle 28 includes a pair of protruding parts 45 and 46 which are spaced from one another for a predetermined distance sufficient to permit an edge 47 of the parts 45 and 46 to engage the wall 9 of two successive serrations 7, as best seen in FIG. 5. The parts 45 and 46 also have a canted wall 48 which is important in the operation of the strap and buckle 1 of this invention. As discussed above, the application of pressure along the end 25 of the latch means 21 will raise the parts 45 and 46 upwardly for a distance sufficient to remove those parts from the channel 20. As may be observed in FIG. 5, the wall 9 of an individual serration 7 will abut the edge 47 of the latch means 21 while the arcuate wall 8 of another individual serration 7 will be in abutting relationship with the canted wall 48 whenever the end 2 is inserted for a sufficient distance in the buckle 10. While described as abutting or in abutment, those skilled in the art will recognize that manufacturing tolerances often are such as to allow a small degree of play before abutment or an abutting relationship actually is achieved. The combination of the canted wall 48 of the latch means 21, the arcuate wall 8 of the serration 7 and the natural resiliency of the latch means 21 permits the easy and continued insertion of the end 2 of the strap through the channel 20 as long as pressure is exerted in the axial direction of movement which brings the walls 8 and 48 into abutment. However, movement always will be restricted in a second axial direction through the channel 20 because the natural bias of the latch means 21 will bring the wall 9 and edge 47 into engagement. Finger pressure applied at the end 25 disengages the serrations from the receptacle 28 and the end 2 may be withdrawn easily, provided pressure is maintained on the latch means 21.

As indicated, simple operation is provided. The end piece 2 merely is inserted through the channel 20 and is drawn to any of a plurality of selectable positions. Each position automatically engages two of the walls 9 of successive serrations 7 against the edges 47 of the parts 45 and 46. Continued movement of the end piece 2 through the channel 20 in this first axial direction is accomplished easily because the receptacle 28 is designed to permit that passage. When the desired position is obtained, movement of the strap in a reverse or second axial direction is prevented by the above mentioned engagement of the serrations with the receptacle 28. There also is sufficient frictional force provided by the engagement of the latch means 21 with the serrations 7 to prevent other but intentional movement of the end 2 along the first axial direction of movement. Because the device is so easy to use, that is, mere insertion of the end 2 within the buckle 10 will automatically engage the serrations 7 in the latch means 21, and because disengagement of the serrations is accomplished by finger pressure along the end 25 of latch means 21, small children find the device particularly easy to use. In addition, since the entire strap and buckle combination may be constructed from plastic, manufacturing problems are reduced in that no inter-
connection between dissimilar materials need be made. It thus may be observed that a device meeting all the ends and objects of the invention is provided.

Numerous variations, within the scope of the appended claims, will occur to those skilled in the art in light of the foregoing description and accompanying drawings. Thus, while certain of the walls or edges comprising the latch means 21 and serrations 7 were described as vertical, for example, they may be varied from a true vertical position without affecting the operation of the device. Likewise, the position of the latch means 21 may be changed. Thus, the latch means 21 may be formed in the walls 11 and 12, if desired. When so arranged, the serrations may be formed along the thickness $S$ of the end 2. The junction of the latch means 21 and the top wall 15 may be varied. For example, that juncture may comprise a more conventional pivotal mounting as distinguished from the resilient mounting described. The design of the buckle may be varied in other embodiments. Thus, a bottom wall may be provided and the latch means may comprise a loop of material having the serrations engaging device formed in it. Disengagement is accomplished by flexing or squeezing the loop to operate the receptacle from the serrations. These variations are merely illustrative.

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:

1. A securing means, comprising:
   a first strap portion, said first strap portion having a buckle structure terminating one end of it, said buckle structure including means for defining a channel through said structure, said channel defining means being characterized by a first pair of oppositely opposed, longitudinally extending side walls, a second pair of oppositely opposed, axially extending side walls, and an upper wall, said side walls and said upper wall defining a chamber therebetween, said axially extending walls having respective openings in them, the openings in said axially extending walls and said chamber being arranged so as to define a channel through said buckle structure, latch means integrally formed with said buckle structure along said upper wall, said latch means including a longitudinally extending part having a first end and a second end, said longitudinally extending part being attached to said upper wall at said first end, the second end of said latch means including a part extending outwardly from the longitudinal axis of said buckle structure, and a part extending along the longitudinal axis of said buckle structure, a rib member extending between said first and said second ends of said latch means, and a receptacle part integrally formed with said latch means, said receptacle part including a pair of spaced, protruding parts, each of said protruding parts having a canted wall and a generally vertical wall extending outwardly from said latch means, said latch means being resiliently mounted to said buckle so as to permit movement of said receptacle part between a first position where said receptacle part extends within said channel, and a second position where said receptacle part is removed from said channel; and
   a second strap portion, said second strap portion including a terminating end having a first surface area, a second surface area, a material thickness therebetween, and a plurality of spaced serrations integrally formed near said terminating end of said second strap portion along one of said first surface area, said second surface area, and said material thickness, said serrations including an arcuate wall and a generally vertical wall extending outwardly from said second strap portion, the canted wall of said receptacle part and the arcuate wall of individual ones of said serrations being designed to meet and permit passage of said second strap portion through said channel along a first direction of movement.

2. A securing means, comprising:
   a strap having at least a first end and a second end, said second end having a relatively wide surface area and a predetermined depth dimension, said second end further having a plurality of spaced projections, said projections including an arcuate wall and a generally vertical wall extending outwardly from said wide surface area; and
   a buckle structure integrally formed with said strap along said first end, said buckle structure comprising a first pair of oppositely opposed, longitudinally extending side walls, a second pair of oppositely opposed, axially extending side walls, and an upper wall between said pairs of said side walls, said side wall pairs and said upper wall defining a cavity therebetween, said axially extending walls having respective openings in them so as to define a channel with said cavity, said cavity being sized to pass said second strap end, said upper wall having latch means integrally formed therein, said latch means being resiliently mounted to said buckle and being biased so as to project within said channel, said latch means including a receptacle part comprising a pair of spaced protrusions, each of said protrusions having a canted wall and a generally vertical wall extending within said channel, the canted wall of said protrusions and the arcuate wall of individual ones of said serrations being designed to meet and permit passage of said second strap in a first direction of movement of said second strap and through said channel.

3. A securing means, comprising:
   a strap having at least a first end and a second end, said strap having a wide, generally plane surface area and a depth, said second end further having a plurality of spaced projections along it, said projections having at least one arcuate surface and one approximately perpendicular surface extending outwardly from said plane surface of said strap; a buckle structure integrally formed with said strap along the first end thereof, said buckle structure comprising a first pair of oppositely opposed and longitudinally extending side walls, a second pair of oppositely opposed side walls, said second pair of side walls having at least one opening in respective ones of said second side wall pair, and an upper wall between said pairs of said side walls, said walls defining a cavity having a channel therethrough communicating with the respective openings in said second pair of side walls, said channel being sized to pass said second end of said strap; and latch means integrally formed with said buckle structure, said latch means including a projection engaging receptacle structure, said projection engaging receptacle structure permitting passage of said projections in a first direction through said channel
and preventing passage of said projections in a second direction through said channel, said latch means being pivotally mounted to said buckle structure between at least a first position and a second position, said projection engaging receptacle structure including a pair of spaced protrusions, each of said protrusions having a canted wall and a generally vertical wall extending within said channel in at least one of said first and second positions of said latch means, the canted wall of said protrusions and the arcuate wall of said projections being arranged to meet and permit passage of said projections as said strap is moved through said channel in said first direction.

4. The securing means of claim 3 wherein said strap comprises a first strap portion including said second strap end, and a separate second strap portion including said first strap end.

5. The securing means of claim 3 wherein said longitudinally extending side wall pair each have a boss extending outwardly from them on the cavity defining side of said last mentioned side wall pair.

6. The securing means of claim 1 wherein said first strap portion and said second strap portion are integrally formed with one another.