United States Patent

Leavenworth

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[54] BUCKLE

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[52] **U.S. Cl.** **24/191**

[51] **Int. Cl.** **A44b 11/12**

[58] **Field of Search** 24/170, 191

[56] **References Cited**

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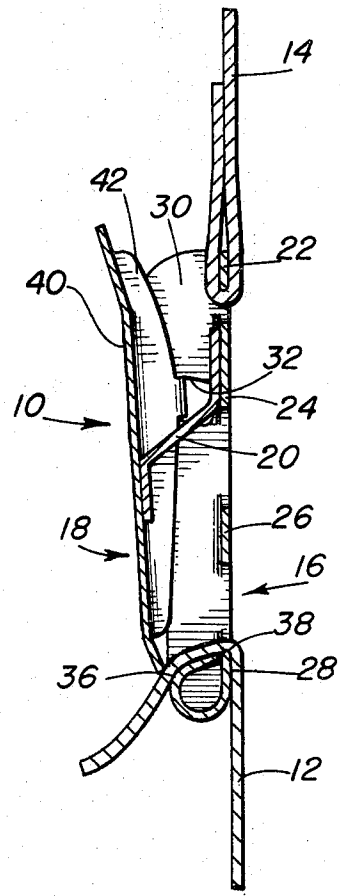
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[57] **ABSTRACT**

A buckle having frame and clamping elements including cooperating side flanges which retain the elements in operative alignment. Notches formed in the flanges of the frame element receive trunnions associated with the flanges on the clamping element to support the latter element for general pivotal movement between clamping and releasing positions relative to the frame element. The two elements are retained in assembled relation by a connecting spring which biases the clamping element toward its clamping position.

10 Claims, 4 Drawing Figures



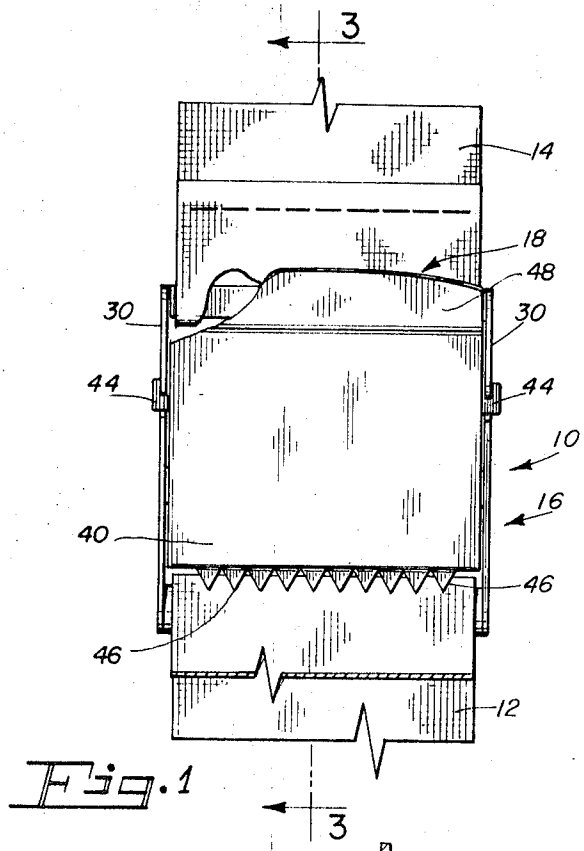


Fig. 1

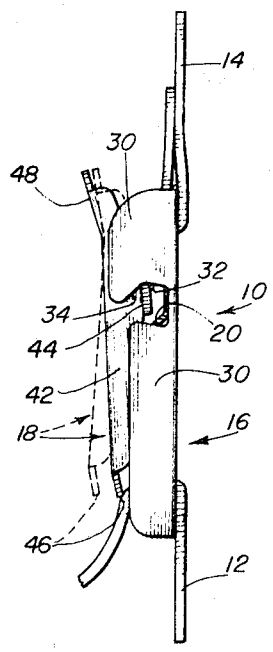


Fig. 2

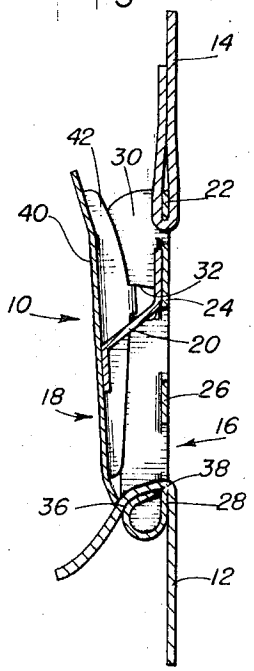


Fig. 3

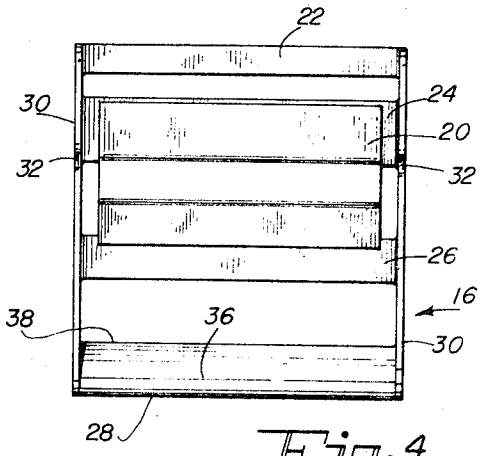


Fig. 4

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BUCKLE

BACKGROUND OF THE INVENTION

This invention relates in general to belt or strap fastening devices and deals more particularly with an improved buckle for receiving and releasably retaining a free end portion of an associated strap.

The general aim of the present invention is to provide an improved buckle of simple, durable construction for economical manufacture and for securely holding a strap while exerting relatively light clamping pressure thereon thereby preventing damage to the strap.

SUMMARY OF THE INVENTION

In accordance with the present invention, a strap fastener is provided which includes a frame element, a clamping element and a connecting member. Opposing notches formed in opposing flanges on the frame element receive trunnions associated INVENTION with the clamping element to support the clamping element for general pivotal movement between clamping and releasing positions relative to the frame element. The connecting member retains the two elements in assembled relation and also serves to bias the clamping element toward its clamping position.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a front view of a buckle embodying the present invention shown attached to one strap end portion and in clamping engagement with another strap end portion.

FIG. 2 is a side elevational view of the buckle and strap assembly of FIG. 1.

FIG. 3 is a sectional view taken along the line 3—3 of FIG. 1.

FIG. 4 is a front view of the buckle of FIG. 1 shown with the clamping member removed therefrom.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Turning now to the drawing and referring to FIGS. 1–3, a strap fastener or buckle embodying the present invention and indicated generally at **10** is particularly adapted to releasably secure the free end portion of a belt or strap **12** to another member or strap **14**. The buckle **10** comprises frame and clamping elements generally indicated at **16** and **18**, respectively. The clamping element **18** is supported on the frame element **16** for generally pivotal movement relative thereto between clamping and releasing positions respectively indicated by full and broken lines in FIG. **2**. A connecting member or spring **20** retains the elements **16** and **18** in assembled relation and also serves to bias the clamping element **18** toward its clamping position.

The frame element **16** is preferably formed from sheet metal and includes a base portion defined by a plurality of spaced-apart and transversely extending crossmembers **22**, **24**, **26** and **28** which connect a pair of transversely spaced longitudinally extending base flanges **30**, **30**. The base flanges project outwardly from opposite sides of the central portion. Each base flange **30** has an outwardly opening notch **32** formed therein and transversely aligned with a notch **32** in the other base flange **30** to facilitate assembly of the frame and clamping elements as will be hereinafter evident. Each notch **32** is partially defined by an abutment surface **34** which faces inwardly or toward the base portion of the frame element **16**, as best shown in FIG. **2**. A portion of the crossmember **28** is turned back or rolled inwardly to define a generally transversely disposed clamping surface **36** inwardly inclined toward the base portion and in the direction of the notches **32**, **32**, as best shown in FIG. **3**. The crossmember **28** also includes a transversely extending edge **38** which is spaced from the clamping surface **36** in the general direction of the notches **32**, **32**.

The clamping element **18** is preferably also formed from sheet metal and includes a central portion **40** and a pair of transversely spaced longitudinally extending side flanges **42**, **42**. which project inwardly from the central portion. The side flanges **42**, **42** are disposed between and cooperate with the flanges **30**, **30** on the frame element **16** to limit transverse movement of the clamping element relative to the frame element and thereby provides a means for retaining the two elements in operative alignment. Each of the side flanges **42**, **42** has a transversely extending trunnion **44** associated therewith and received in an associated one of notches **32**, **32**. The trunnions **44**, **44** are preferably integral to the side flanges **42**, **42** and formed by tabs bent outwardly therefrom. A generally transversely extending clamping edge **46** on the central portion **40** is adapted to cooperate with the clamping surface **36** in clamping position to releasably retain an associated portion of the strap **12** therebetween. Preferably and as shown, the clamping edge **46** has a serrated or sawtooth configuration. The central portion **40** also includes a thumb piece **48** for pivoting the clamping element **18** between its clamping and releasing positions.

The connecting member **20** which retains the two elements in assembled relation preferably comprises a transversely elongated spring which is formed from flat spring metal and has a generally Z-shaped cross section, as viewed in FIG. **3**. One end portion of the spring **20** is spotwelded or otherwise suitably attached to the crossmember **24**. The other end portion of the spring **20** is preferably attached in a like manner to the central portion **40**.

The strap **12** is threaded outwardly through the space between the crossmembers **26** and **28** so that a portion of the free end thereof passes between the clamping surface **36** and the clamping edge **46**. When the straps **12** and **14** are under tension, the edge **38** engages one portion of the strap **12** and another portion of the strap **12** is releasably retained between the clamping surface **36** and the clamping edge **46**. The clamping element **18** cooperates with the frame **16** to releasably retain the strap **12** therebetween in response to relatively light clamping pressure applied by the spring **20**. The clamping pressure exerted upon the strap **12** by the clamping element **18** tends to increase when the straps **12** and **14** are subjected to increased tension. The trunnions **44**, **44** cooperate with the notches **32**, **32** to relieve strain on the spring **20** and prevent distortion thereof under conditions of increasing belt tension. The abutment surfaces **34**, **34** prevent the trunnions from being dislodged from the notches **32**, **32** when the clamping element **18** is in its clamping position. Due to the configuration of the clamping edge **46** and its associated clamping surface **36**, it will be evident that the strap **12** may be readily released from the buckle by applying relatively light pressure to the thumb piece **48**.

I claim:

1. A buckle for releasably securing a strap to another member and comprising a frame element including a base portion and a pair of transversely spaced longitudinally extending base flanges outwardly projecting from said base portion, each of said base flanges having an outwardly opening notch therein transversely aligned with the notch in the other of said base flanges, means on said frame element defining a generally transversely disposed clamping surface longitudinally spaced from the notches in said base flanges, means for attaching said frame element to the other member, a clamping element having a central portion and including a pair of transversely spaced and longitudinally extending side flanges inwardly projecting from said central portion, each of said side flanges having a transversely extending trunnion associated therewith and received in an associated one of said notches to support said clamping element for general pivotal movement between clamping and releasing positions relative to said frame element, said clamping element having a generally transversely extending clamping edge thereon for cooperating with said clamping surface in said clamping position to releasably retain an associated portion of the strap therebetween, means for

retaining said clamping element in operative alignment with said frame element, and a connecting member for retaining said clamping element in assembled relation with said base element and for biasing said clamping element toward said clamping position.

2. A buckle as set forth in claim 1 wherein said flanges on one of said elements are disposed between and cooperate with said flanges on the other of said elements to limit transverse movement of said one element relative to said other element, said flanges comprising said means for retaining said clamping element in operative alignment with said frame element.

3. A buckle as set forth in claim 2 wherein said clamping element comprises said one element and said frame element comprises said other element.

4. A buckle as set forth in claim 1 wherein said connecting member comprises a spring.

5. A buckle as set forth in claim 4 wherein said spring is further characterized as a transversely elongated generally flat spring member having one end portion thereof attached to said base portion and the other end portion thereof attached to said central portion.

6. A buckle as set forth in claim 1 wherein said clamping edge is serrated.

7. A buckle as set forth in claim 1 wherein said clamping surface is spaced outwardly from said base portion and inclined inwardly toward said base portion and in the direction of said notches.

8. A buckle as set forth in claim 1 wherein said clamping element is formed from sheet metal and each said trunnion comprises a tab integrally connected to an associated one of said side flanges.

9. A buckle as set forth in claim 1 wherein said base portion includes a transversely extending edge spaced from said clamping surface in the direction of said notches for engaging an associated portion of the strap when said clamping element is in clamping engagement with the strap.

10. A buckle as set forth in claim 1 wherein each one of said notches is partially defined by an inwardly facing abutment surface outwardly spaced from the bottom of said one notch for engaging an associated one of the trunnions when said clamping element is in said clamping position to retain said one trunnion in said one notch.

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