

- [54] STRAP LOCKING DEVICE WITH QUICK RELEASE
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- [52] U.S. Cl..... **24/16 PB**
- [51] Int. Cl..... **B65d 63/00**
- [58] Field of Search..... 24/16 PB, 17 AP, 73 PB, 24/206 A, 208 A, 30.5 P, 230 B, 230 F, 230 CF, 230 AT, 201 S, 201 SL, 230 SL, 260, 24

- [56] **References Cited**
- UNITED STATES PATENTS**
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| 255,620 | 3/1882 | Hale..... | 24/260 X |
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2,900,696	8/1959	Bacon.....	24/16 PB X
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3,118,200	1/1964	Bell.....	24/16 PB
3,618,173	11/1971	Schwartz.....	24/16 PB

FOREIGN PATENTS OR APPLICATIONS

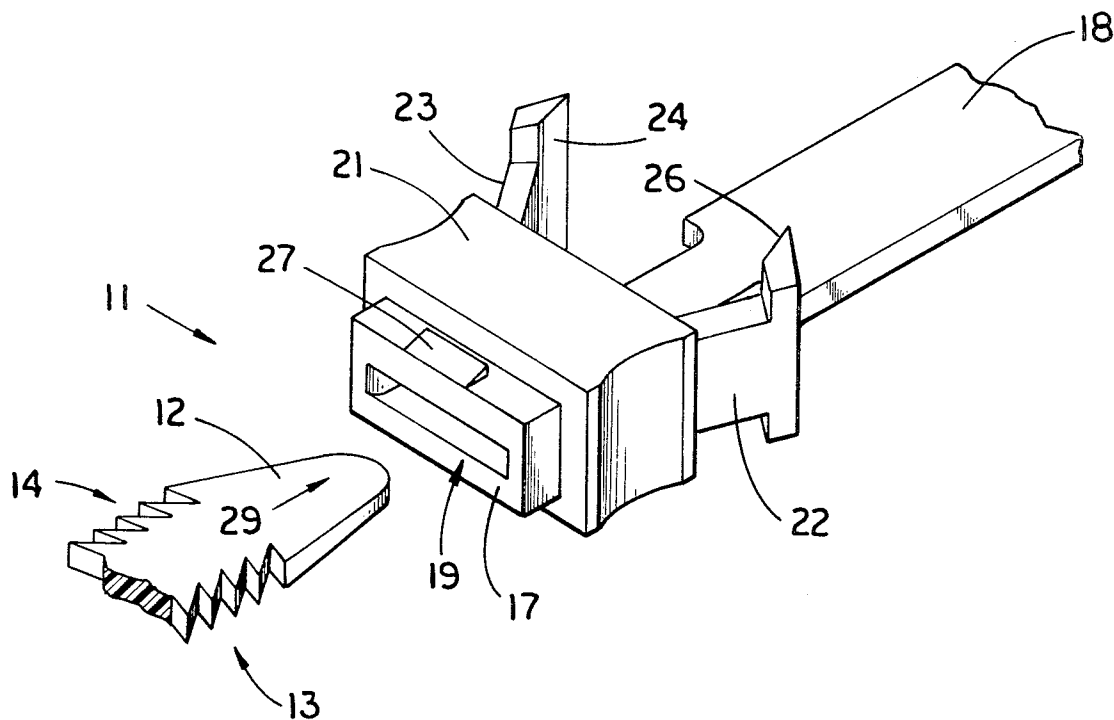
286,603	2/1953	Switzerland.....	24/230 AT
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[57] **ABSTRACT**

Apparatus for locking a notched tab within a buckle. The tab has a pair of notched sides and the buckle has a pair of resiliently attached toothed arms. The tab is locked in the buckle when the arms are moved adjacent the tab and the teeth on the arms are maintained within a pair of notches on the tab. When the arms are moved away from the tab and the teeth are disengaged from the notches, the tab may be removed from the buckle.

18 Claims, 5 Drawing Figures



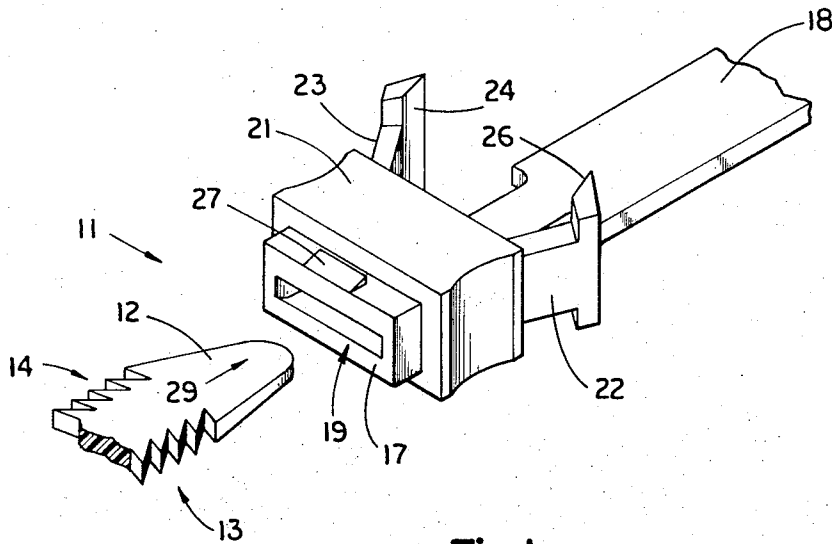


Fig. 1

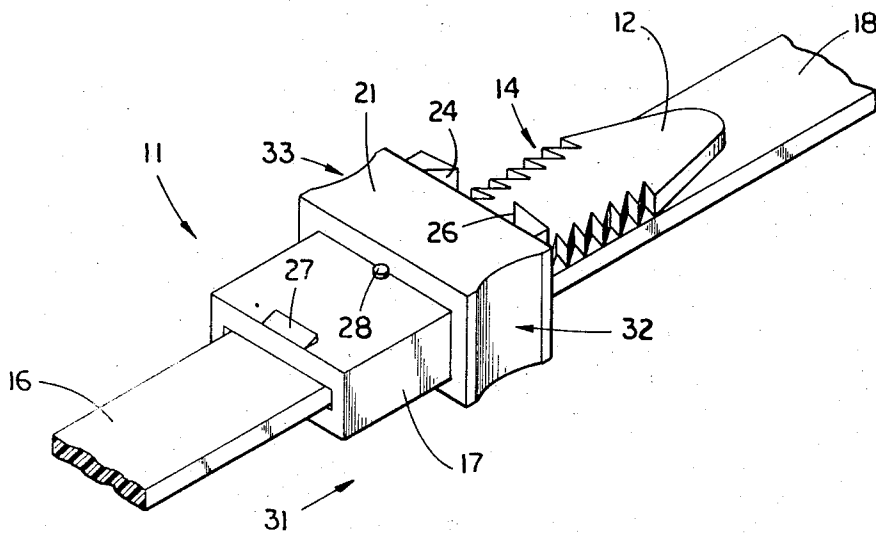


Fig. 2

STRAP LOCKING DEVICE WITH QUICK RELEASE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention is in the field of buckles, buttons and clasps.

2. Description of the Prior Art

Cable straps have been used for tying together bundles of cables wherein a notched tab is inserted into a buckle. These devices, while detachable, have not been designed for quick release of the tab from the buckle. Examples of such cable straps are disclosed in U.S. Pats. No. 3,118,200 to Bell and No. 3,300,825 to Andreasen.

Another notched tab and buckle fastening device, also not readily detachable, is shown in U.S. Pat. No. 1,619,803 to Behrman. Examples of toothed garment fasteners may be found in U.S. Pats. No. 3,214,810 to Mathison and No. 1,343,514 to Lindsay. A dog collar fastener, which also is not easily detached, is shown in U.S. Pat. No. 2,900,696 to Bacon. An essentially permanent bundling strap fastening device is shown in U.S. Pat. No. 3,618,173 to Schwartz.

SUMMARY OF THE INVENTION

An embodiment of the present invention is a quick release strap locking device comprising a tab, attachable to a first strap end, having a first side which includes a notch, a buckle, attachable to a second strap end, having a passageway and a resiliently attached arm which has a tooth, the tab being in the passageway and the arm having a first position in which the tooth is exterior to the notch, and means for moving the arm into a second position in which the tooth is in the notch and for alternatively moving the arm to assume the first position, the movement of the arm being along an arc which intersects the centerline of the tab.

It is an object of the present invention to provide a mechanically simple quick release strap locking device.

Further objects and advantages of the present invention shall be apparent from the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of an embodiment of the present invention in an unlocked position prior to the insertion of the tab.

FIG. 2 is a perspective view of the embodiment of FIG. 1 with the tab inserted and in a locked position.

FIG. 3 is a perspective view of another embodiment of the present invention shown in an unlocked position prior to the insertion of the tab.

FIG. 4 is a perspective view of the embodiment of FIG. 3 in a locked position after the insertion of the tab.

FIG. 5 is a perspective view of the embodiment of FIG. 3 in an unlocked position prior to removal of the tab.

DESCRIPTION OF THE PREFERRED EMBODIMENT

For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiment illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such al-

terations and further modifications in the illustrated device, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates.

Referring in particular to FIGS. 1 and 2, there is shown a locking device 11 according to the present invention. A tab 12, having a plurality of notches such as 13 and 14 along two opposite sides, is provided at strap end 16. Buckle 17 is provided at strap end 18. Strap ends 16 and 18 may be ends of the same strap or different straps depending upon the application in which the locking device 11 is to be used.

Buckle 17 includes passageway 19, which is of slightly larger cross-section than tab 12. Extending beyond buckle 17 are arms 22 and 23, which are resiliently attached to buckle 17. Preferably, arms 22 and 23 are integral with buckle 17. Tooth 24 at the end of arm 23 and tooth 26 at the end of arm 22 are provided for engaging notches such as 13 and 14 on tab 12 as shall be described more particularly hereinafter.

Slidably mounted on buckle 17 is sleeve 21, which is slidable over the main portion of buckle 17 which defines passageway 19 and also over arms 22 and 23. Provided on buckle 17 is stop 27 to prevent sleeve 21 from sliding off the end of buckle 17. Detent 28 is also provided on buckle 17 to maintain sleeve 21 in a locking position over arms 23 and 22, as shown in FIG. 2 and shall be more particularly described hereinafter. Sleeve 21 is prevented from sliding over the ends of arms 22 and 23 due to the thickness of the arms in the area of teeth 24 and 26.

As shown in FIG. 1, tab 12 is inserted into passageway 19 in the direction of arrow 29. Tab 12 is moved through passageway 19 and beyond the armed end of buckle 17 as shown in FIG. 2. When tab 12 is positioned as shown in FIG. 2, sleeve 21 is moved in the direction of arrow 31, away from its initial position near stop 27 and over arms 22 and 23 to a position beyond detent 28. At this time, sleeve 21 is held in position between detent 28 and the toothed ends of arms 22 and 23. Teeth 24 and 26 are held in locking engagement within a pair of oppositely disposed notches such as 13 and a corresponding notch on the other side of tab 12, the points of the teeth and the notches being inclined toward the direction of insertion of tab 12 through buckle 17 (arrow 29). With the teeth thus engaged in the notches, tab 12 is held within buckle 17 and is not removable therefrom. When it is desired to remove tab 12 from buckle 17, sleeve 21 is distorted slightly by applying pressure to grooved ends 32 and 33, which enables sleeve 21 to be moved over detent 28 and back to its position near stop 27 as shown in FIG. 1. At this time, resilient arms 22 and 23 return to their position as shown in FIG. 1, teeth 24 and 26 become disengaged from the notches in tab 12, and tab 12 may be easily removed from within buckle 17.

In FIGS. 3, 4 and 5, there is illustrated another embodiment of the present invention. Locking device 41 comprises tab 42 and buckle 47. Tab 42 has a plurality of notches such as 43 and 44 along two of its opposite sides and is attached to strap end 46 (FIG. 4). Buckle 47 contains passageway 49 and is attached to strap end 48. Strap ends 46 and 48 may be ends of the same or different straps depending upon the application in which the locking device is used. The inside dimensions

of passageway 49 are slightly larger than the cross-sectional dimensions of tab 12.

Buckle 47 includes a pair of levers having first ends 51 and 52 and second ends 53 and 54, respectively. First ends 51 and 52 include teeth 56 and 57 respectively (FIG. 3) directed toward one another.

In operation of the locking device 41, tab 42 is inserted through passageway 49 of buckle 47 in the direction of arrow 58 (FIG. 3). The notches such as 43 and 44 in tab 42, and teeth 56 and 57 on the lever ends, are inclined toward the direction of arrow 58 so that, although teeth 56 and 57 are within the path of tab 42 as tab 42 is extended beyond passageway 49 in the direction of arrow 58, they and/or the tab teeth defining notches 43 and 44 can be resiliently cammed or deformed sufficiently that tab 42 can move past teeth 56 and 57. As shown in FIG. 4, after tab 42 has been inserted through passageway 49, and teeth 56 and 57 engage notches such as 43 and a corresponding notch on the other side of tab 42, they prevent the removal of tab 42 from buckle 47.

As shown in FIG. 5, when it is desired to remove tab 42 from buckle 47, arms 53 and 54 are forced together in the direction of arrows 61 and 62, which spreads apart arms 51 and 52 and releases teeth 56 and 57 from the notches in tab 42. Tab 42 may then be easily removed from buckle 47 in the direction of arrow 59 (FIG. 5).

The material preferred for all parts of both embodiments is resilient plastic with a memory, such as nylon, for example. Therefore, both embodiments are reusable.

The invention claimed is:

1. A quick-release strap locking device comprising:
 - a tab, attachable to a first strap end, having a first side which includes a notch;
 - a buckle, attachable to a second strap end, having a passageway and a resiliently attached first arm which has a tooth, the tab being in the passageway and the first arm having a normal first position in which the tooth is exterior to the notch; and
 - sleeve means for forcing the first arm into an engaged second position in which the tooth is within the notch whereby the tab is locked in the passageway and for alternatively allowing the first arm to assume its normal first position whereby the tab may be removed from the passageway.
2. The device of claim 1 in which:
 - the tab has a second side opposite the first side which also includes a notch;
 - the buckle has a resiliently attached second arm, on the opposite side of the passageway from the first arm, which has a tooth and a normal first position in which the tooth is exterior to the notch on the second side of the tab; and
 - the sleeve means includes means for forcing the second arm into an engaged second position in which the tooth on the second arm is within the notch of the second side of the tab and for alternatively allowing the second arm to assume its normal first position.
3. The device of claim 1 in which:
 - the first side of the tab includes a plurality of notches;
 - the tooth of the first arm is exterior to each notch of the plurality of notches when the first arm is in the first position; and

the sleeve means includes means for forcing the first arm into an engaged second position in which the tooth on the first arm is within a notch of the plurality of notches and for alternatively allowing the first arm to assume its normal first position.

4. The device of claim 3 in which:

the tab has a second side opposite the first side which also includes a plurality of notches;

the buckle has a resiliently attached second arm, on the opposite side of the passageway from the first arm, which has a tooth and a normal first position in which the tooth is exterior to each notch of the plurality of notches on the second side of the tab; and

the sleeve means includes means for forcing the second arm into an engaged second position in which the tooth on the second arm is within a notch of the plurality of notches of the second side of the tab and for alternatively allowing the second arm to assume its normal first position.

5. The device of claim 4 in which the sleeve means includes a sleeve member slidably mounted over the buckle and its arms, the arms being in the first position when the sleeve member is away from the ends of the arms and in the second position when the sleeve member is adjacent the ends of the arms.

6. The device of claim 5 in which the buckle includes latch means for maintaining the sleeve member adjacent the ends of the arms and for alternatively allowing the sleeve member to be moved away from the ends of the arms.

7. The device of claim 6 in which the tab has a rectangular cross-section and the passageway has a rectangular cross-section slightly larger than that of the tab, the sides of the tab containing the notches being the narrower sides.

8. The device of claim 7 in which, when the arms are in the second position, the notches and the teeth point in a direction toward the direction of insertion of the tab into the buckle.

9. A quick-release strap locking device comprising:

- a tab, attachable to a first strap end, having a first side which includes a notch; and

a buckle made of resilient material and attachable to a second strap end, said buckle having a passageway and having an integral first lever, the tab being in the passageway and the buckle including an integral tooth near a first end of the lever, the lever having a normal first position in which the tooth is in the notch and in which a second, distal end of the lever is away from the tab, and the lever having a tooth disengaging second position in which the lever, by resiliently deforming the buckle, positions the tooth exterior to the notch when the distal end of the lever is moved toward the tab.

10. The device of claim 9 in which:

the tab has a second side opposite the first side which also includes a notch; and

the buckle has a second integral lever on the opposite side of the passageway from the first lever, the buckle including a second integral tooth near a first end of the second lever, the second lever having a normal first position in which said second tooth is in the notch on the second side of the tab and in which a second, distal, end of said second lever is away from the tab, and said second lever having a disengaged second position in which said second

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lever, by resiliently deforming the buckle, positions said second tooth exterior to the notch on the second side of the tab when the second end of the second lever is moved toward the tab.

11. The device of claim 9 in which:

the first side of the tab includes a plurality of notches; and

the lever is in the first position when its tooth is in one of the notches of the plurality of notches and its second end is away from the tab, and in a disengaged second position when its tooth is exterior to the notches and its second end is moved toward the tab.

12. The device of claim 11 in which:

the tab has a second side opposite the first side which also includes a plurality of notches; and

the buckle has a second integral lever on the opposite side of the passageway from the first lever, the buckle including a second integral tooth near a first end of said second lever, and said second lever having a normal first position in which said second tooth is in one of the notches of the plurality of notches on the second side of the tab and in which a second, distal, end of said second lever is away from the tab, and said second lever having a disengaged second position in which said second lever, by resiliently deforming the buckle, positions said second tooth exterior to the notches of the plurality of notches of the second side of the tab when the second end of the second lever is moved toward the tab.

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13. The device of claim 12 in which, when the levers are in the first position, the notches and the teeth on the levers point in a direction toward the direction of insertion of the tab into the buckle.

14. The device of claim 13 in which the tab has a rectangular cross-section and the passageway has a rectangular cross-section slightly larger than that of the tab, the sides of the tab containing the notches being the narrower sides.

15. A quick-release strap locking device comprising: a tab, attachable to a first strap end, having a first side which includes a notch;

a buckle, attachable to a second strap end, having a passageway and a resiliently attached arm which has a tooth, the tab being in the passageway and the arm having a first position in which the tooth is exterior to the notch; and

means for moving the arm into a second position in which the tooth is in the notch and for alternatively moving the arm to assume the first position, the movement of the arm being along an arc which intersects the centerline of the tab.

16. The device of claim 15 and further comprising a strap integral with the tab and with the buckle, the strap, tab and buckle being of a resilient material having a memory.

17. The device of claim 15 wherein the buckle is of a resilient material having a memory.

18. The device of claim 17 wherein the material is nylon.

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