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BUCKLES

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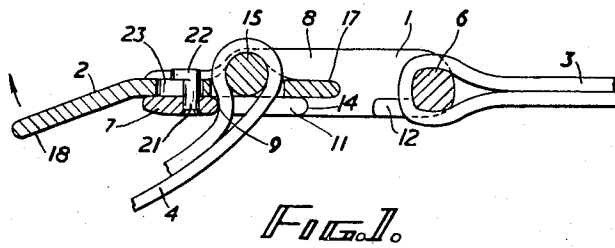


FIG. 1.

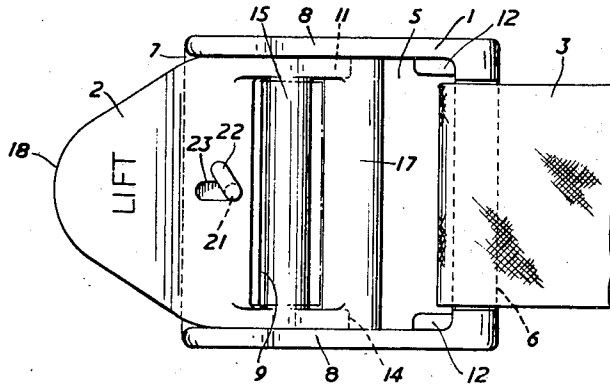


FIG. 2.

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BUCKLES

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2 Claims. (Cl. 24—171)

This invention relates to buckles for joining two strap ends, for example the two ends of a single strap or one end of each of two straps secured to a passenger seat in a car or aircraft for holding a passenger securely in the seat, and one object of the invention is to provide a simply manufactured and simply engaged and released form of buckle.

According to one aspect of the present invention a buckle for connecting two strap ends includes a frame for connection to one strap end and affording a transverse stop, and a transverse bar for connection to the other strap end by passing the strap under both stop and bar, around the bar, and back under the stop and in the absence of tension in the strap the bar is free for complete removal from the frame while it can be held against tension in the straps by the stop.

According to another aspect of the invention, a buckle for connecting two strap ends includes a frame for connection to one strap end and affording a transverse stop, and a transverse bar for connection to the other strap end by passing the strap under the stop and bar round the bar and back under the stop, in which a part of the frame spaced from the stop is wide enough to allow the length of the bar to pass through it but a part nearer to the stop is not, so that the buckle can be released and the bar completely removed from the frame by moving it against the strap tension away from the stop and allowing it to pass through the frame.

The frame may include guides providing a passage for the bar between the position in which it is held against tension in the straps by the stop and a position in which it is free to pass through the frame, or to be pulled through by tension in the straps.

The buckle may include a handle in the form of a lever integral with the bar and arranged to be levered about a fulcrum formed on the frame into the position in which strap and bar together with the lever can be pulled through the frame.

Thus the frame may have a pair of shelves restricting the width of the frame at the part nearer the strap, and the fulcrum may be constituted by the ends of the shelves remote from the stop.

In one form of the invention, in the buckled position, one strap passes through the frame, around the bar and back through the aperture in the frame, and tension on the free end of the strap tends to move the stop and the bar apart to allow the strap to be tightened, whereas tension on the standing end of the strap tends to pull the bar towards the stop to grip the strap between bar and stop so that the strap cannot be loosened.

In an intermediate position the bar may be just sufficiently far from the stop on the frame to enable the strap to be loosened or eased without allowing complete release, so that by slightly levering the tongue the strap can be loosened slightly without completely releasing the buckle.

Preferably the tongue is arranged to be mounted on one of the straps to be capable of ready manual ad-

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justment along the strap but with sufficient friction to prevent movement of the bar along the strap merely due to gravity.

Preferably, in the buckled position when the straps are in tension, the straps can be tightened, but not loosened, merely by pulling on a loose end of one strap. This enables the passenger to secure himself in his seat without danger of the straps becoming loose inadvertently.

Both buckle members may be of simple form and according to another feature of the invention either, or both has been formed merely by a stamping and/or a pressing operation together with deflashing and plating operations if required.

The buckle may include a safety catch having a latched position in which the buckle cannot be released so that the buckle can be suitable for strapping a baby in a pram with little chance of the baby's being able to release himself, but without employing sharp prongs and grips.

According to another aspect of the invention, a passenger-seat in a vehicle is provided with two straps for holding a passenger in position, and a buckle as defined above, consisting of two parts, one attached to each strap.

The invention may be carried into practice in different ways but one preferred embodiment for holding a passenger secured in the seat of an airplane or a car will be described by way of example with reference to the accompanying drawings, of which:

Figure 1 shows a cross-section through an assembled buckle, and

Figure 2 shows a plan view of the buckle shown in Figure 1 with one of the straps removed for clarity.

The buckle consists of two members, a frame 1 and a tongue 2, each of which is attached to the free end of one of two straps 3 and 4 secured to opposite sides of the car seat (not shown).

The frame 1 is generally in the form of a flat rectangular plate with a central rectangular aperture 5. The opposite ends of the frame 1 constitute respectively a bar 6, to which the free end of the strap 3 is secured, and a transverse stop 7 for the tongue 2, while the two sides constitute arms 8 holding the bar 6 and the stop 7 spaced apart in the direction of tension in the straps.

The stop 7 is flat with a curved edge 9 facing the bar 6, while at each of its two sides where it is joined to the arms 8, it is formed with a narrow guide 11 projecting towards the bar 6. Similar but shorter guides or shelves 12 are formed at the end constituting the bar 6, and they project towards the stop 7. The upper surfaces as seen in Figure 1 of the stop 7 and guides 11 and 12 lie below the upper edges of the arms 8 to provide a channel or passage for the tongue 2. At the ends facing the bar 6, the guides 11 have curved shoulders 14 forming a fulcrum for the tongue 2 at about the middle of the frame 1.

The tongue 2 is also a generally flat plate-like member and is formed with a central bar 15 with a slot on either side of it through which the free end of the strap 4 is threaded to pass into one slot around the bar 15 and back through the other slot between the edge 9 of the stop 7 and the standing end of the strap. The slots are so dimensioned in relation to the strap that although the tongue 2 can readily be moved manually along the strap there is sufficient friction to prevent it from sliding along the strap by gravity.

The tongue 2 is just narrow enough to be passed through the widest part of the rectangular aperture in the frame 1 but is not narrow enough to pass between the guides 11 so that once the tongue has been inserted in the wide part of the aperture it can be slid forward along the passage formed by the upper surface of the stop 7 and the inside surfaces of the arms 8 to the position

shown in Figure 1 in which it is restrained from further movement by the presence of the free end of the strap 4 between the edge 9 of the stop 7 and the bar 15. Tension on the standing end of the strap 4 causes the free end to be gripped more firmly so that the strap cannot be loosened or tightened while on the other hand tension on the free end of the strap tends to straighten the strap and move the bar 15 sufficiently far from the edge 9 of the stop 7 to allow the strap to be loosened or tightened.

At the end facing the bar 6 on the frame 1, the tongue 2 projects beyond the shoulders 14 on the guides 11 to provide a tab 17 capable of being pivoted around the shoulders 14 as a fulcrum, while at the other end the tongue is formed with a finger tab 18 by means of which the tongue can be pivoted about this fulcrum.

In the position shown in Figure 1 the tension in the strap 4 acts about the fulcrum in the sense to hold the tongue in the position shown, but if the finger tab 18 is lifted through an angle of about 90° the bar 15 moves over the central position until tension in the strap 4 acts in the other sense about the fulcrum to pull the tongue clear of the frame 1 through the aperture 5.

The finger tab 18 is curved slightly towards the upper surface of the strap 4 to minimise the chances of inadvertent release.

In an intermediate position of the tongue 2 between the buckled position and the release position, the bar 15 is far enough away from the edge 9 of the stop 7 to allow the strap to be slightly loosened without allowing complete release. This enables the passenger to ease his position if he is uncomfortable, while still being strapped in his seat. The shelves 12 prevent the buckle from being completely released if the tongue 2 is slid back towards the bar 6 when a pull is applied to the strap 4 as might be caused by jerks due to bumpy air or a rough road surface.

A safety catch consists of a pin having an arm 21 pivotally mounted in the upper surface of the stop 7 and an arm 22 at right angles to the arm 21 and capable of passing through a slot 23 in the tongue 2. When the buckle is to be engaged the arm 22 is turned to be parallel with the slot 23 and after it has been passed through the slot it is turned through a right angle as shown in Figure 2 to hold the finger tab 18 against lifting. The safety catch enables the buckle to be latched, for example to prevent a baby from releasing himself by playing with the finger tab 18.

It will be noticed that both the frame 1 and the tongue 2 are substantially flat and can be formed in either a single stamping operation or in a stamping operation followed by a pressing operation to press out the holes. While it may be necessary to remove flashes subsequently, and it may be desired to plate the members, they can be manufactured simply and cheaply.

The leverage provided by the length of the finger tab 18, enables the buckle to be released in spite of considerable tension in the straps and one buckle weighing not more than 2 ozs. has been found to be readily manually releasable with a tension of 300 lbs. in the straps.

What I claim as my invention and desire to secure by Letters Patent is:

1. A buckle for connecting two strap ends including a frame for connection to one strap end and a cooperating lever separably insertable in the frame, in which the frame comprises spaced side members having upper and lower edges, a cross member for connection to the associated strap end and rigidly interconnecting the side members adjacent one end thereof, a transverse stop adjacent the other end of the side members, a pair of shelves projecting inwardly from the lower edges of the side members adjacent the stop and having upper surfaces lying in a plane below the upper edges of the side members, said shelves narrowing the space between the side members at the end adjacent the stop and forming with said side members a channel dimensioned to slidably receive said lever, the ends of the shelves being aligned with one another to afford a fulcrum for the lever, and ledge means between the side members extending from said cross member toward said shelves beyond the strap connected to said cross member but stopping short of said shelves to afford an aperture between said shelves and ledge means dimensioned to pass the lever when it is pivoted about said fulcrum, the upper surface of said ledge means lying in the same plane as the upper surfaces of said shelves to permit said lever to rest thereon while bridging said aperture and lying between said side members, said lever comprising a transverse bar positioned to press the other strap end against the stop of the frame when said other strap end is looped about said bar, said lever being longer than said frame and of a width only slightly less than the distance between said side members and greater than that between said shelves.

2. A buckle as claimed in claim 1 in which the ledge means comprise a subsidiary shelf on the inner wall of each of the side members to afford apertures between them and the end of the shelves which apertures are only slightly longer than the maximum depth of the lever.

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