

Oct. 13, 1970

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3,533,141

PUSHBUTTON SAFETY BELT BUCKLE

Filed Oct. 7, 1968

2 Sheets-Sheet 1

FIG. 1

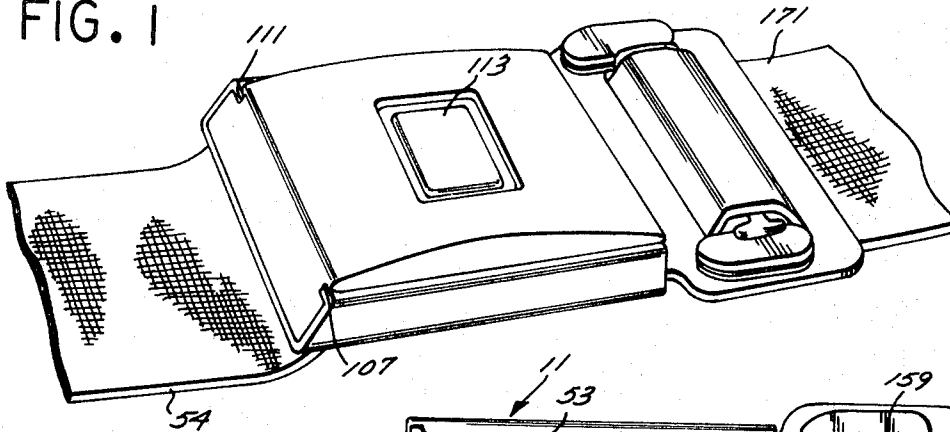


FIG. 2

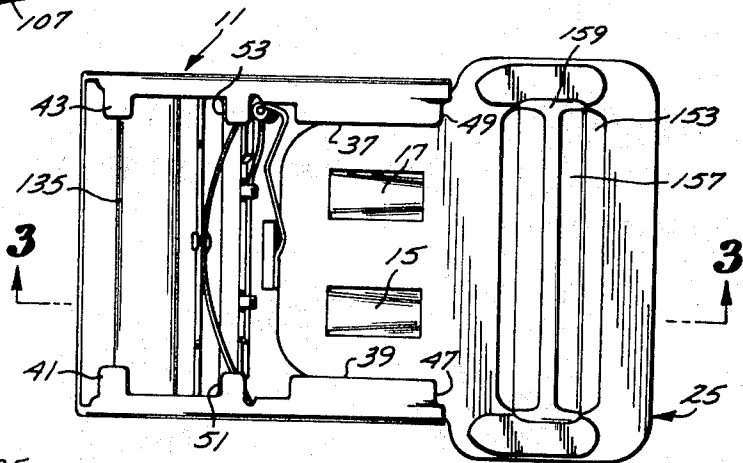


FIG. 3

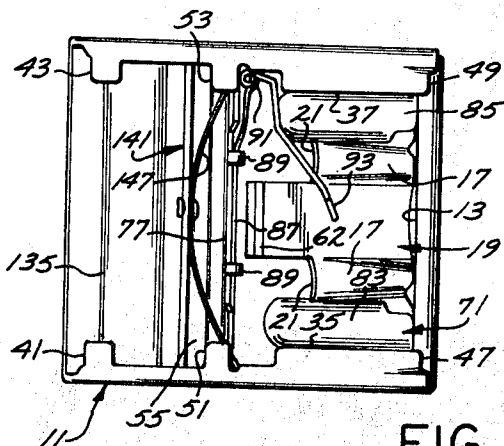
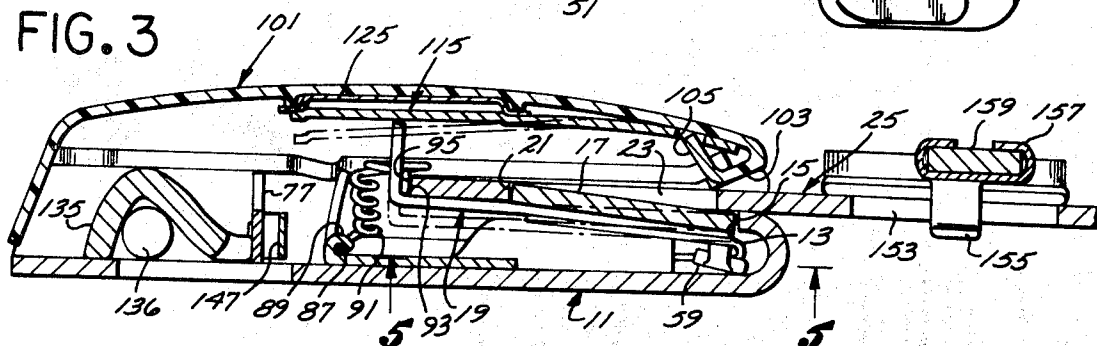


FIG. 4

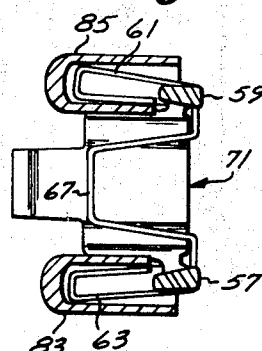


FIG. 5

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FIG. 6

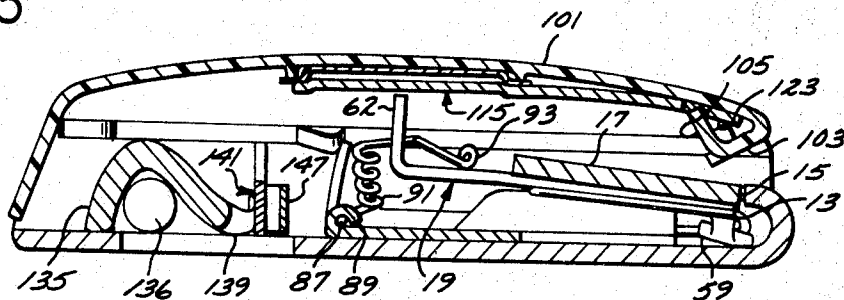


FIG. 7

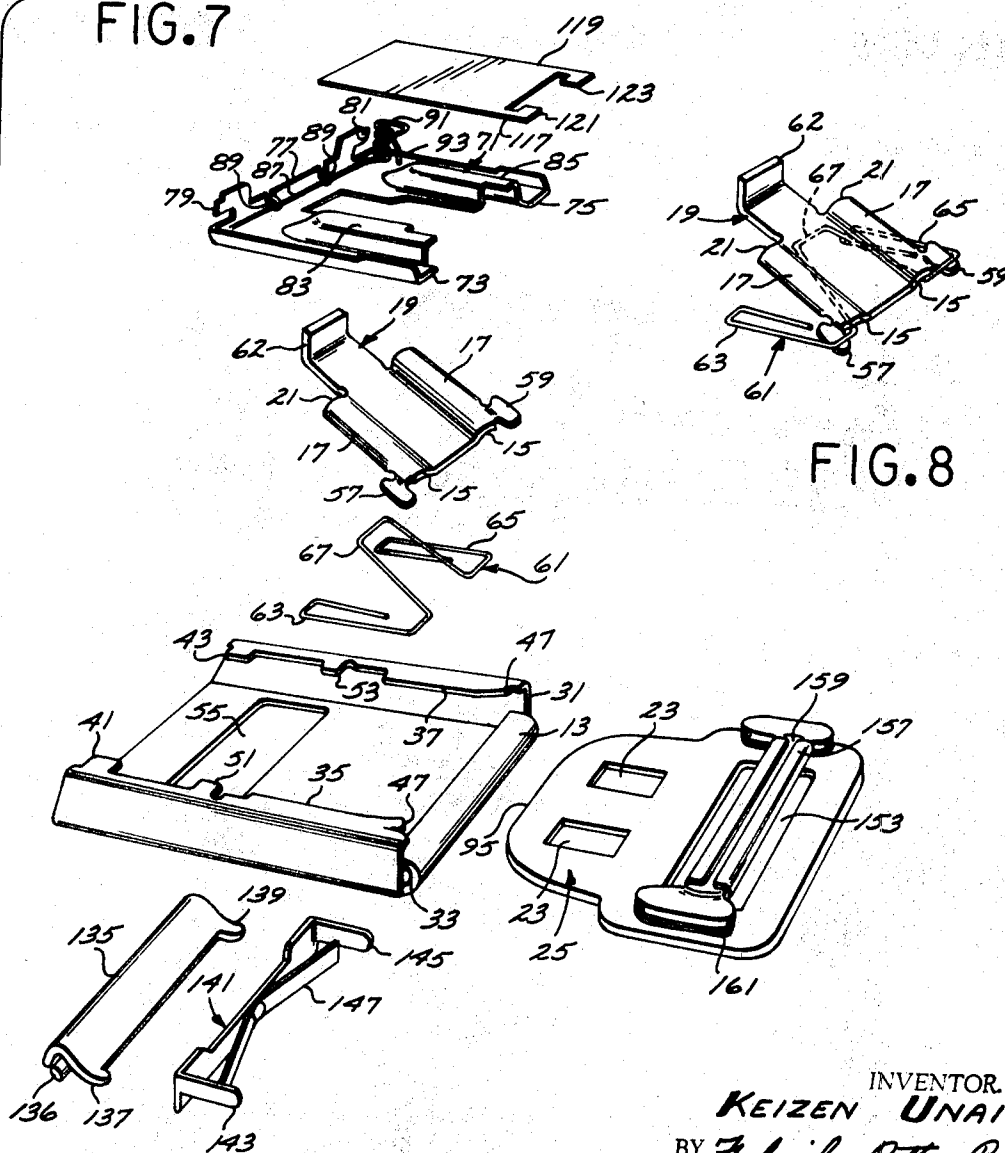


FIG. 8

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PUSHBUTTON SAFETY BELT BUCKLE
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Filed Oct. 7, 1968, Ser. No. 765,296
Int. Cl. A44b 11/26
U.S. Cl. 24—230

1 Claim

ABSTRACT OF THE DISCLOSURE

A safety belt buckle comprising a housing formed with a tongue-receiving passage having a turned back lip defining the bottom side of the entrance to said passage. An elongated clasp is disposed in the passage and is formed with a lug having its rear-end abutting the forwardly turned lip and its forward end defining a stop. The front end of the clasp is biased upwardly whereby when a tongue having a window therein is inserted in the passage registering such window with the lug, the stop will hold the tongue captive in the housing. When the tongue is so coupled to the clasp, the lug extends substantially horizontally forward from the lip whereby separation forces acting rearwardly on the tongue will have a relative short vertical moment arm to resist downward pivoting of the clasp about the turned-back lip.

BACKGROUND OF THE INVENTION

Field of the invention

The present invention relates generally to safety belt buckles which may be utilized in automobiles, aircraft and trains and more particularly to safety belt buckles including a pushbutton release.

Description of prior art

Pushbutton released safety belt buckles have been proposed which include elongated clasps that angle upwardly and inwardly from the open end of the tongue-receiving passage to register with a stop included on the connecting tongue, but such buckles suffer the disadvantage that any forces applied to the tongue act through a relatively long moment arm to resist downward pivoting of the clasp to disengage the tongue thereby making it difficult for a passenger to unfasten his belt. There are no prior art safety belt buckles known to applicant which include a pivotal clasp that lies substantially parallel to the tongue whereby separation forces acting on the tongue will act through a relatively short moment arm.

SUMMARY OF THE INVENTION

The safety belt buckle of present invention is characterized by a buckle housing formed with a tongue-receiving passage having a turned-back lip adjacent the lower side of the entrance to said passage. An elongated clasp includes a lug which abuts such lip on its rearward end and forms a stop on its forward end; the lug being maintained substantially horizontal when the tongue is inserted whereby separation forces acting on such tongue will act through a relatively short vertical moment arm to offer comparatively small resistance to downward pivoting of the forward end of the clasp during disengagement of the tongue.

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Other objects and features of the present invention will become apparent from a consideration of the following description when taken in conjunction with the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a safety belt buckle embodying the present invention;

FIG. 2 is a top view, in enlarged scale, of the safety belt buckle shown in FIG. 1 with the cover removed therefrom;

FIG. 3 is a vertical sectional view, in enlarged scale, taken along the line 3—3 of FIG. 2;

FIG. 4 is a top view similar to FIG. 2 but showing the tongue removed from the buckle housing;

FIG. 5 is a horizontal sectional view, in reduced scale, taken along the line 5—5 of FIG. 3;

FIG. 6 is a vertical sectional view similar to FIG. 3 but showing the tongue removed from the buckle housing;

FIG. 7 is an exploded perspective view of the safety belt buckle shown in FIG. 1; and

FIG. 8 is a perspective view of the buckle clasp included in the safety belt buckle shown in FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGS. 1 and 3, the preferred embodiment of the pushbutton safety belt buckle of present invention includes a buckle housing, generally designated 11, formed with a tongue-receiving passage 12 having a forwardly-turned lip 13 abutted by the rearward end 15 of a lug 17 formed by a pivotal clasp, generally designated 19. The forward end of the lug 17 defines a stop 21 which registers in a window 23 formed by a flat tongue, generally designated 25, whereby such lug, in the tongue engaging position, lies substantially horizontally to provide a relatively short vertical moment arm for forces acting rearwardly on the tongue and resisting unlatching of the clasp.

Referring to FIGS. 4 and 7, the housing 11 is formed with a pair of oppositely disposed upstanding side walls 31 and 33 which are turned inwardly on their respective upper extremities to form opposed retaining flanges 35 and 37. The flanges 35 and 37 are formed at their rearward end with a pair of inwardly projecting holding tabs 41 and 43 and are formed at their forward ends with upwardly angled holding tabs 45 and 47. Such flanges 35 and 37 are further formed with intermediate, inwardly projecting, supporting flanges 51 and 53, respectively, the purpose of which will appear herebelow. The bottom wall of the housing 11 includes a cut-out 55 for passage of the connecting belt 54 (FIG. 1). The clasp 19 is formed at its rear extremity with outwardly and rearwardly projecting feet 57 and 59 which fit underneath the retaining lip 13. The front extremity of the clasp 19 is biased upwardly by a spring, generally designated 61, and includes an upwardly turned button engaged portion 62 and is formed with a pair of transversely spaced base portions 63 and 65 and a central portion 67 which pushes upwardly on the front of the clasp 19.

A support, generally designated 71, includes rearwardly projecting flanges 73 and 75 which are received

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beneath the retaining lip 13 and has an upstanding front wall 77 including outwardly projecting tabs 79 and 81 which are engaged beneath the intermediate tabs 51 and 53, respectively, included in the housing 11. The support 71 also includes a pair of side-by-side raised stops 83 and 85 disposed outwardly of the lugs 17 to prevent downward pivoting of the tongue 25. An ejection spring 87 includes a retaining portion extending transversely across the front of the support 71 and retained by a pair of rearwardly bent tabs 89. The spring 87 also forms a coil 91 held under the flange 37, projects transversely across the passage 23, and is formed on its free extremity with a vertical loop 93 normally disposed rearwardly and centrally in the passage 12 for engagement by the front edge 95 of the tongue 25 whereby such tongue, when it is released, will be forcefully ejected from the passage 12.

A cover, generally designated 101, is formed at its rear extremity with a turned-back lip 103 which hooks beneath the holding tabs 47, such lip further including a pair of forwardly and upwardly projecting tabs 105, the purpose of which will be set forth hereinafter. The front extremity of the cover 101 is turned downwardly to cover the front of the housing 11 and includes a pair of opposed notches 109 which receive the holding tabs 41 and 43 whereby the lip 103 may be connected under the tabs 47 and 49 and the front end of the cover 101 snapped into position to register the holding tabs 41 and 43 with the respective notches 109 and 111. The center of the cover 101 is formed with a window 113 having a pushbutton, generally designated 115, disposed thereunder. Referring to FIG. 7, the rear extremity of the pushbutton 115 includes a pair of rearwardly projecting legs 117 and 119 which turn inwardly to form prongs 121 and 123, respectively, held behind the holding tabs 105 to connect such button 115 pivotally to the cover 101. The portion of the button 115 disposed beneath the window 113 includes an insignia plate 125 thereon which may bear insignia of any selection.

Referring to FIGS. 6 and 7, a formed sliding bar 135 is received in the rear end of the housing 11, is formed with a transverse cavity for receiving a rod forming a roller 136 and includes a pair of forwardly projecting feet 137 and 139 which engage a tightener, generally designated 141. The tightener 141 is formed on its opposite extremities with a pair of rearwardly projecting prongs 143 and 145 which are received in passages formed between opposite sides of the support 71 and the opposite housing walls 31 and 33. A slightly V-shaped leaf spring 147 is secured to the tightener 141 and engages with the front wall 77 of the support 71 (FIG. 3) to maintain the tightener pushed forwardly and the slide bar likewise pushed forwardly of the forward side of the cut-out 55 whereby the belt 54 projecting through such cut-out will be held tightly.

The tongue 25 is formed on its rear extremity with a transverse slot 153 which receives downwardly extending and outwardly turned cleats 155 (FIG. 3) included on opposite ends of a housing 157 which grips a slide bar 159 having a Teflon slider element 161 disposed thereunder for providing relatively free movement of the slide bar 159 across the face of the slot 153.

In operation, the belt buckle of present invention may be utilized to secure adjacent ends of two pieces of belt webbing 54 and 171 together to retain an automobile passenger in his seat in case of collision. The belt webbing 54 is threaded through the window 55 in the bottom of the housing 11 and wrapped around the slider bar 135 and fed back out the window 55. Likewise, the belt webbing 171 is extended through the window 153 in the tongue 25, wrapped around the slider bar 159 and returned back out the window 153. The tongue 25 and housing 11 are then mated by insertion of the tongue in the passage 12 sufficiently for the lugs 17 to register with the windows 23 to restrict withdrawal of such tongue. The marginal edges of the tongue 25 slide under the inwardly turned

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flanges 35 and 37 of the housing 11 to maintain such tongue horizontal and the spring 61 biases the clasp 19 and tongue upwardly to prevent relative movement and unpleasant rattling with vehicle vibrations. The clasp 19 is thus held in a substantially horizontal position whereby forces exerted on the belt webbing 171 will act rearwardly on the stop 21 formed by the front of the lug 17 tending to pivot the clasp about the rear extremity 15 of the lug 17 but since the moment arm defined by the vertical distance between the front and rear of the lug 17 is relatively short, such separation forces will offer only slight resistance to downward pivoting of the forward end of the clasp 19. Accordingly, the passenger can merely insert his finger or thumb through the window 113 to engage the button 115, pressing the forward extremity thereof down against the upwardly turned portion 62 of the clasp 19 to press such forward extremity downwardly. Downward movement of the tongue 25 is limited by the stops 83 and 85 whereby such lowering of the forward extremity of the clasp 19 will lower the forward extremity of the lugs 17 relative to the windows 23 thus freeing the tongue 25 for disengagement from the housing 11. When the tongue 25 is so freed, the projecting extremity 93 of the spring 87 will propel the tongue 25 rearwardly in the passage 12 to eject it rapidly.

From the foregoing, it will be apparent that the safety belt buckle of present invention is straight-forward in design and economical to manufacture. The clasp securely and rigidly retains the tongue latched in the housing and is pivotable to its unlatching position with relative ease irrespective of separation forces acting on the belt, thus enabling a passenger to rapidly and conveniently unlatch the buckle. This may be of particular importance where an automobile has overturned and the entire weight of the passenger is supported on the safety belt.

Various modifications and changes may be made with regard to the foregoing detailed description without departing from the spirit of the invention or the scope of the following claim.

I claim:

1. A safety belt buckle comprising:

a housing formed with an open-ended tongue-receiving passage having an upper wall portion defined by a pair of opposed lips extending along opposite sides of said passage, said lips supporting an upper wall having a window, and including a forwardly-facing lip defined by the wall forming the bottom side of the open end of said passage;

an elongated clasp in said passage and formed with a lug having its rear edge pivotally abutting said forwardly-facing lip edge and its forward end defining a stop;

first spring means urging the front extremity of said clasp upwardly;

a tongue for insertion in said passage and formed with window means for receiving said lug with the front edge of said window means abutting said stop;

a support disposed in said housing and aligned with said lug when said clasp is in its release position to limit downward movement of said tongue;

second spring means mounted in said housing to engage the front of said tongue and urge said tongue rearwardly in said passage to eject said tongue when said tongue is released from said clasp; and

a separate push button carried by said housing below said window pivotally abutting the rear end of said cover and engageable with said clasp for pushing the front end of said clasp downward to pivot said clasp about said lip edge to move the rear edge of said window means clear of said stop and free said tongue to be unfastened from said housing, whereby said tongue may be inserted in said passage to register said window with said lug and will be held downwardly against said clasp by said wall portion to maintain said clasp substantially horizontal so forces acting rearwardly of said tongue and creating a couple re-

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sisting downward pivoting of the front of said clasp
will have a relatively short vertical moment arm not
substantially greater than the height of said tongue.

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BERNARD A. GELAK, Primary Examiner

U.S. Cl. X.R.

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