

April 17, 1962

SHINICHIRO ASAI
SAFETY BELT BUCKLE

3,029,487

Filed Sept. 9, 1960

2 Sheets-Sheet 1

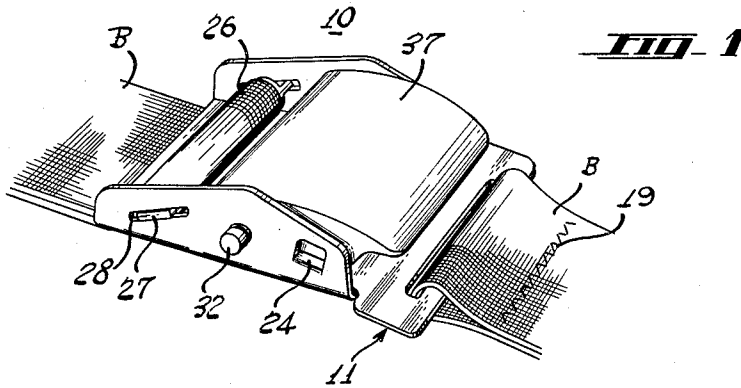
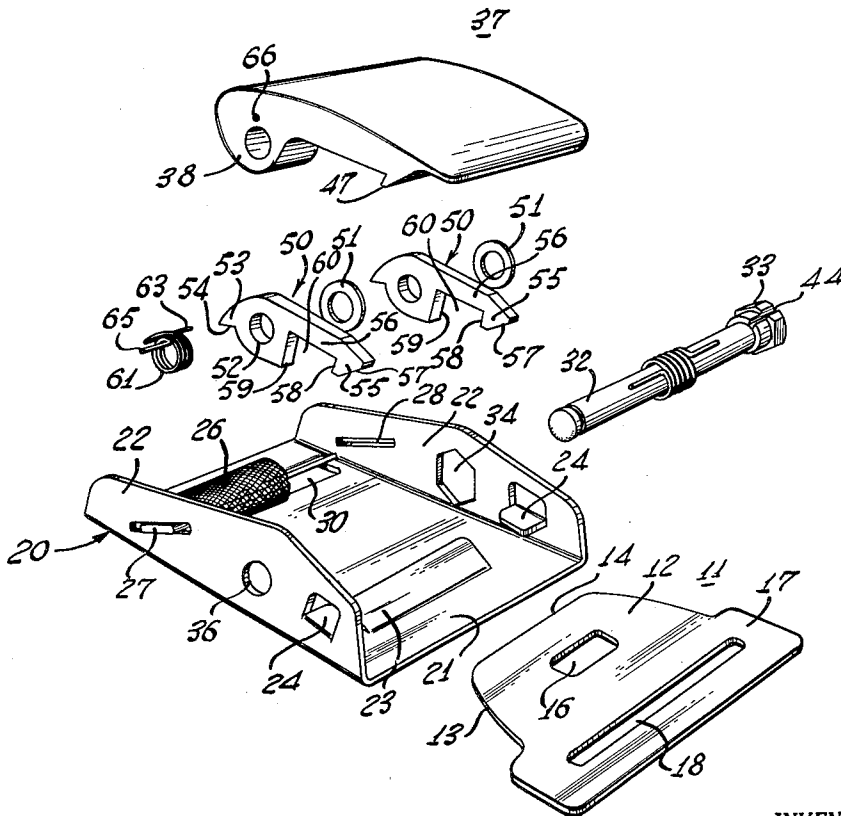


FIG. 1



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FIG. 3

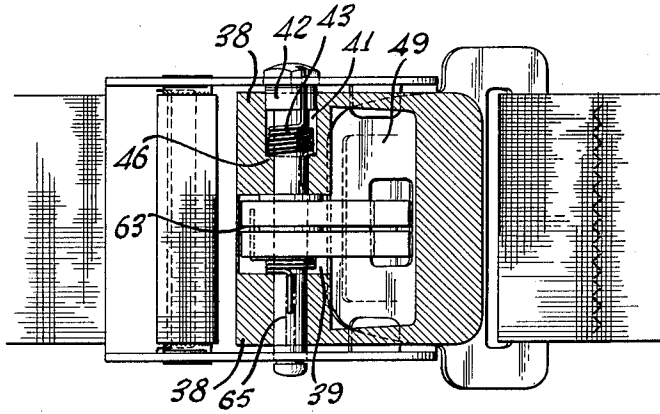


FIG. 4

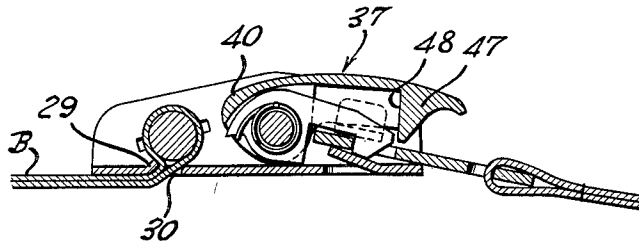
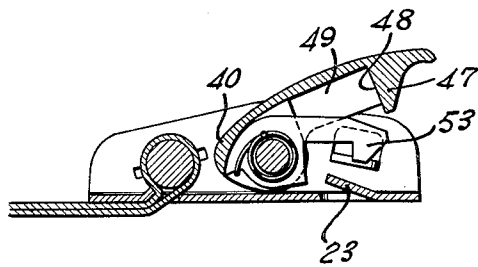


FIG. 5



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SAFETY BELT BUCKLE

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5 Claims. (Cl. 24-230)

The present invention relates generally to improvements in fastening devices and it relates more particularly to an improved buckle of the rapid engage and release type.

Buckles of the rapid release and engage type are widely employed in many applications such as with airplane, automobile, and other vehicle safety belts, parachute belts, etc. The buckles used in the above applications should permit the adjustment in the length of the belt and should effect a positive and secure attachment of the free ends of the belt in the absence of any accidental disengagement. In addition, the buckle should be so constructed that the ends of the buckle carrying belt may be rapidly and easily selectively engaged and released. While many different types of buckles have been proposed and employed in the above applications, they possessed many drawbacks and disadvantages. Many were difficult to operate and adjust, were incapable of rapid engagement and release, were frequently subject to accidental release, and otherwise left much to be desired.

It is thus a principal object of the present invention to provide an improved belt buckle in which the accidental loosening of the belt or release of the buckle is eliminated.

Another object of the present invention is to provide an improved belt buckle which may be rapidly selectively engaged and released with a minimum of alignment and manipulation.

Still another object of the present invention is to provide an improved rapid release and engage belt buckle which is simple to adjust and may be operated by persons with no experience and a minimum of aptitude.

A further object of the present invention is to provide an improved rapid engage and release belt buckle which is not subject to accidental loosening or release even under the most adverse conditions.

Still a further object of the present invention is to provide an improved buckle of the above type characterized by its simplicity, ruggedness, ease and positiveness of operation, and its low cost.

The above and other objects of the present invention will become apparent from a reading of the following description taken in conjunction with the accompanying drawings wherein:

FIGURE 1 is a perspective view of a buckle embodying the present invention and illustrated in a belt engaging locked position;

FIGURE 2 is a perspective exploded view of the buckle and tongue plate, shown partially broken away;

FIGURE 3 is a horizontal cross sectional view of the buckle and tongue plate in locked position;

FIGURE 4 is a vertical longitudinal sectional view thereof; and

FIGURE 5 is a sectional view similar to FIGURE 4, the buckle being illustrated in an unlatch position with the tongue plate removed.

In a sense, the present invention contemplates the provision in combination with a tongue plate provided with a tongue section having an aperture formed therein, of a buckle comprising a base including a bottom wall and longitudinally extending laterally spaced upstanding side walls along the side edges of said bottom wall, a rearwardly upwardly inclined ramp located on said bottom

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wall adjacent the leading end thereof, a lug mounted on and directed inwardly from at least one of said side walls and disposed above said ramp to define therewith a tongue plate guide, a handle member hinged at its trailing end to and between said side walls at a point rearwardly of said ramp and swingable between a raised unlock position and a depressed lock position, spring means urging said handle to its lock position, a first latch member pivoted adjacent its trailing end and having a depending leg at its leading end and being swingable between a raised unlatch position and a depressed latch position, said depending leg engaging said ramp when said latch member is in its depressed position, spring means urging said latch member toward its depressed latch position, elements carried by said handle and latch element effecting coupling therebetween upon raising of said handle to raise said latch member, and belt engaging means mounted on said buckle.

Another feature of the present invention is the arrangement on the buckle for engaging one end of the belt and for adjusting the length thereof and includes a laterally extending bar having axial outwardly directed non-circular projections which slidably engage forwardly upwardly inclined parallel slots formed in the buckle side walls, the bottom wall of the buckle having a lateral slot formed therein below the bar and having an upwardly forwardly directed flange along its trailing edge.

The use of the subject buckle is simple and its operation positive. One end of the belt extends through the buckle bottom wall slot about the bar and back through the slot. The length of the belt may be adjusted by merely sliding the bar forwardly and upwardly along the side wall slots, adjusting the length of the belt by drawing it around the bar in the desired direction and then releasing the bar which is pulled toward the flange to clamp the belt between the bar and the confronting flange edge to lock the belt in its adjusted position. The other end of the belt is secured to the flange plate which is brought into locking engagement with the buckle by sliding the tongue between the ramp and side wall lugs into the latch member front leg, urging the latter upwardly. As the tongue aperture reaches registry with the latch member leg, the leg is urged through the aperture into abutment with the ramp to lock the tongue plate in engaged position. The tongue plate is released by merely raising the handle.

Referring now to the drawings which illustrate a preferred embodiment of the present invention wherein, the reference numeral 10 generally designates the improved buckle, per se, which is employed with a tongue plate 11. The tongue plate 11 includes a front tongue member 12 having side edges 13 converging toward a front edge 14 and having a rectangular latch opening 16 medially formed therein. A belt engaging section 17 is located along the trailing portion of the tongue plate 11 and has formed therein an elongated slot 18 through which one end of a belt B is looped and sewn by one or more lines of stitches 19 to effect a secure attachment of the end of the belt B to the tongue plate 11.

The buckle 10 includes a base member 20 preferably stamped and integrally formed of a single piece of heavy sheet metal and consisting of a substantially rectangular bottom wall 21 and upstanding longitudinally extending parallel side walls 22 having upper inclined edges converging to medially located apices. Formed from the base member bottom wall 21 at a point rear of the leading edge thereof is an upwardly rearwardly inclined flat ramp member 23 extending laterally along the bottom wall 21. A pair of oppositely disposed inwardly directed lugs or ears 24 are formed from the side walls 22 and are located above the ramp 23. The ears 24 are substan-

tially planar and upwardly rearwardly inclined, converging slightly with respect to the plane of the ramp 23. It should be noted that the confronting faces of the ears 24 and the ramp 23 define a guide for the tongue 12.

In order to adjustably secure the opposite end of the belt B to the buckle 10 there is provided a laterally extending cylindrical bar 26 having its outer surface roughened as by knurling. Projecting outwardly from the ends of the bar 26 are a pair of rectangular stub members 27 which slidably engage oppositely disposed parallel forwardly upwardly inclined slots 28 formed in the base member side walls 22 to permit a longitudinal and concurrent vertical movement of the bar 26 while inhibiting the rotation thereof. An upwardly forwardly directed laterally extending flange 29 is formed on and from the base member bottom wall 21 below the side wall slots 28 to leave a correspondingly extending slot 30 in the bottom wall 21. The upper edge of the flange 29 is adapted to engage the surface of the bar 26 when the latter is in its rearmost depressed position. An end of the belt B passes through the slot 30 about the bar 26 and back through the slot 30. As the belt B is pulled the bar 26 is urged toward the confronting edge of the flange 29 to firmly lock the section of the belt disposed between the bar 26 and the flange 29. To adjust the length of the belt B the bar 26 is manually slid upwardly and forwardly so as to release the end of the belt B which may then be shortened or lengthened by drawing it about the rotationally stationary bar 26 to the desired extent and then releasing the bar 26 so as to lock the belt in the aforesaid manner. The belt is positively retained by reason of the locking engagement thereof between the bar 26 and the flange 29 and the frictional engagement thereof by the knurled surface of the bar 26.

The mechanism for selectively engaging and releasing the tongue plate 11 includes a laterally extending axle 32 located above the level of the base member bottom wall 21 and having a head 33 registering with the correspondingly shaped opening 34 medially formed in one of the side walls 22. The opposite end of the axle 32 registers with the circular opening 36 formed in the opposite side wall 22, the axle 32 being locked in position in any suitable manner.

A handle 37 has a pair of laterally spaced hub sections 38 separated by a medially located well 39 which is provided with a trailing depending skirt 40 having a downwardly directed undersurface. The hub sections 38 have aligned bores formed therein which rotatably engage the axle 32. The outer end of the bore adjacent the headed end of the axle 32 is enlarged as at 41 to define a cylindrical well the upper border of which engages the enlarged cylindrical section 42 of the axle 32. A coiled torsion spring 43 nests in the well 41 and engages the shaft 22. The spring 43 has a first leg which registers with a longitudinal slot 44 formed in the head 33 and the enlarged axle sections 42 and an opposite leg which registers with a radial opening 46 formed in the hub 38 to thereby normally urge the handle 37 clockwise, as seen in FIGURE 4 of the drawing, to its depressed position. Depending from the handle 37 adjacent its leading end is a laterally extending lip 47 having a vertical rear surface 48 which delineates the front face of a rectangular recess 49 formed in the under side of the handle 37 and extending rearwardly to the hubs 38 and communicating with the well 39.

Also swingably mounted on the axle 32 are a pair of similarly shaped side by side located latching members 50 which are separated by an intervening washer 51 carried by the axle 32. Each of the latching members 50 includes a hub portion 52 having a bore registering with the axle 32 and a rearwardly directed abutment element 53 having a downwardly directed shoulder 54. The hub sections 52 nest in the well 39 and are provided with arms 56 projecting forwardly from the upper portions of the hubs 52 and terminate in downwardly directed legs

55. The legs 55 have forwardly upwardly inclined cam defining lower front edges 57 and vertical rear edges 58 which are separated from the vertical front edges 59 of the hub 52 by an intervening recess 60. A second helical torsion spring 61 is located in the well 39 and encircles the axle 32, and includes a first laterally extending leg 63 which engages the hub shoulders 54 and a second laterally extending leg 65 which registers with an opening 66 formed in the handle hub section 38 to resiliently urge the latch members 50 clockwise as seen in FIGURES 4 and 5 of the drawings to their locked position. When the latch members 50 are in their depressed position as illustrated in FIGURE 4 of the drawing the flat under faces of the leg members 55 abut the upper surface of the ramp 23. It should be noted that when the handle 37 is in its depressed position the latch members 50 may be urged upwardly against the bias of the spring 61, but are normally maintained in their lowermost latch position. However upon raising of the handle 37, as seen in FIGURE 5, the apron 40 bears downwardly upon the projections 53 to rotate the latch members 50 to their raised unlatch position.

In employing the improved buckle the length of the belt is adjusted and locked by the bar 26 in the manner set forth above. To fasten the belt the tongue plate 11 is slid under the handle lip 47 between the ramp 23 and lugs 24 against the latch member cam edges 57 to raise the latch members 50. As the tongue plate reaches its fully inserted position the latch members are returned to their latch position by the spring 61, the latch member legs 55 passing through the tongue aperture 16 and bearing upon the ramp 23 to positively lock the tongue plate in its inserted position. The tongue plate may be rapidly released by raising the handle 37 which raises the latch members 50 to disengage the tongue aperture 16 and permit the separation of the tongue plate 11. It is important to note that in its inserted position the tongue plate 11 is at an angle to the buckle 10 contributing to the comfort of the fastened belt B.

While there has been described and illustrated a preferred embodiment of the present invention it is apparent that numerous alterations, additions and omissions may be made without departing from the spirit thereof.

What is claimed is:

1. In combination with a tongue plate provided with a tongue section having an aperture formed therein, a buckle comprising a base including a bottom wall and longitudinally extending laterally spaced upstanding side walls along the side edges of said bottom wall, a rearwardly upwardly inclined ramp of greater width than said tongue aperture located on said bottom wall adjacent the leading end thereof, a lug mounted on and directed inwardly from said side wall and disposed above said ramp to define therewith a tongue plate guide, a handle member hinged at its trailing end to and between said side walls at a point rearwardly of said ramp and swingable between a raised unlock position and a depressed lock position, spring means urging said handle to its lock position, a latch member pivoted adjacent its trailing end and having a depending leg at its leading end and being swingable between a raised unlatch position and a depressed latch position, said depending leg being adapted to project into said aperture to engage said ramp when said latch member is in its depressed position, spring means urging said latch member toward its depressed latch position, and elements carried by said handle and latch element effecting coupling therebetween upon raising of said handle to raise said latch member.

2. The combination in accordance with claim 1 wherein said latch member depending leg is provided with an upwardly forwardly inclined, cam defining leading edge.

3. The combination in accordance with claim 1 wherein said latch member depending leg is provided with an underface abutting said ramp when said latch member is in lock position.

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4. The combination in accordance with claim 1 including a second hinged latch of substantially the same configuration as said first latch member and laterally spaced from and parallel to said first latch member and swingable between a raised and depressed position and spring urged to a depressed position.

5. The combination according to claim 1 including a second lug mounted on and directed inwardly from the

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opposite side wall and in coplanar alignment with said other lug.

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