Dec. 27, 1966 S. J. WISNIEWSKI 3,293,715

SAFETY BELT BUCKLE

Filed March 16, 1965

FIG. 1

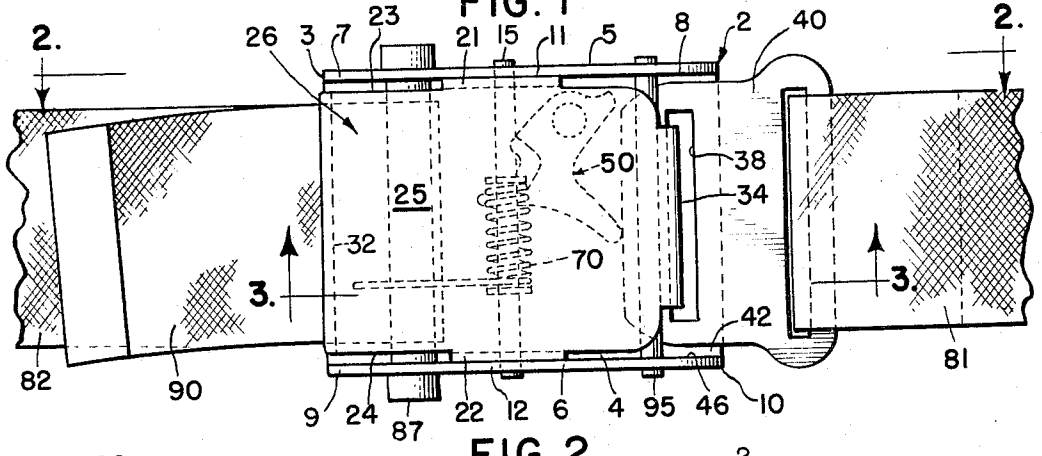


FIG. 2

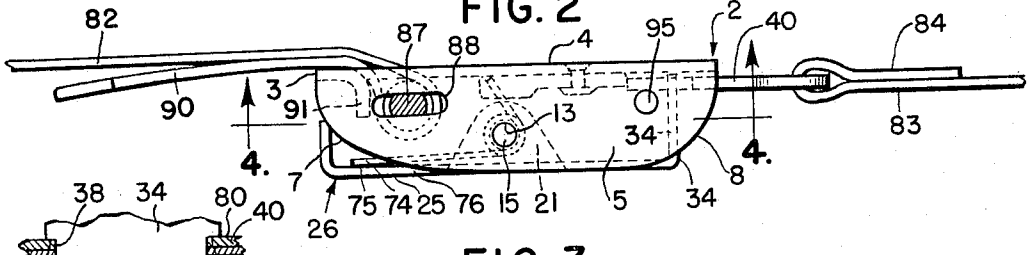


FIG. 7

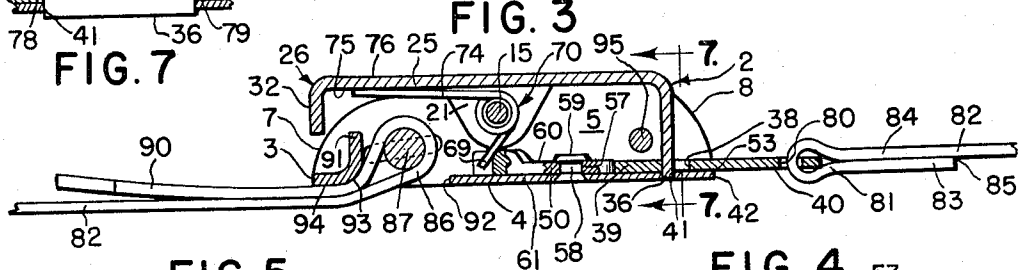


FIG. 3



FIG. 5

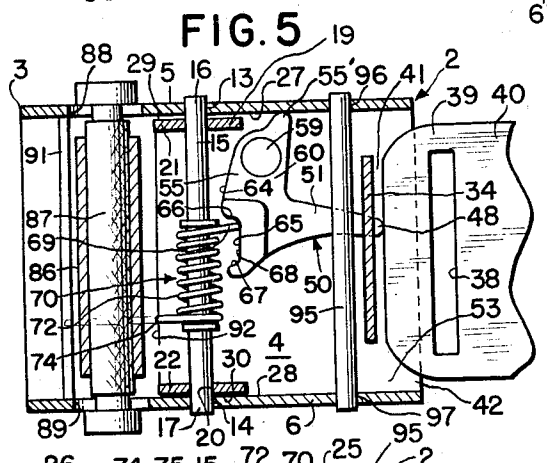


FIG. 4

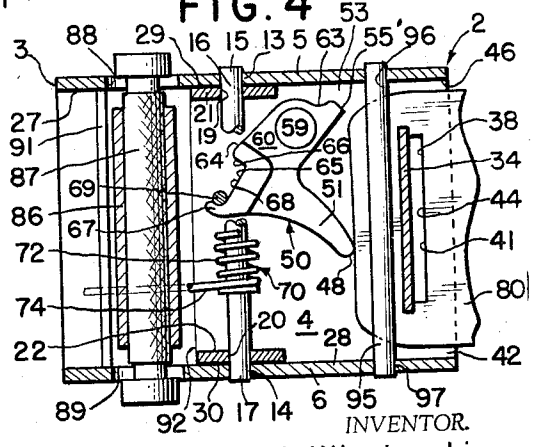
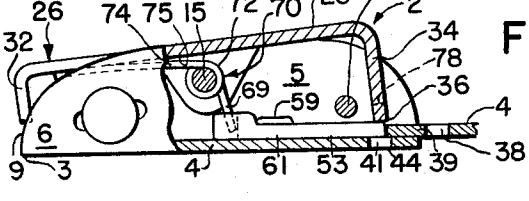


FIG. 6



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# SAFETY BELT BUCKLE

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This invention relates to belt buckles and more specifically to a novel self-locking buckle.

Buckles of the type under consideration if satisfactory in performance usually have one common fault and that is they are complicated and thus of necessity are expensive. Where parts are spring actuated, they may be difficult to operate or the spring may lose its strength so that the parts are not adequately held in locking position.

A general object of this invention is to provide a novel buckle which is of rugged, simple construction and wherein the parts cooperate in an improved manner to facilitate opening and locking of the buckle.

A further object of the invention is to provide a novel buckle in which there is utilized an ejector for releasing the buckle, the ejector functioning also to load and unload the spring mechanism which operates the locking mechanism such that when the buckle is separated from the tongue with which it cooperates, the spring mechanism is unloaded whereby facilitating opening of the buckle to enter the tongue therein whereupon the spring mechanism is loaded to hold the parts locked.

A further general object of the invention is to devise a belt buckle of improved safety whereby accidental unlocking is substantially precluded. The invention comprehends the provision of a belt buckle having an ejector mounted within a body position on which there is pivoted a latch, the latch and ejector being actuated by a common spring so oriented that upon the ejector being depressed into the body to clear a passage into the body for a belt tongue, the ejector stresses its actuating spring and the reaction is transmitted to the latch which thus is held in engagement with the tongue under additional force.

The invention also contemplates arranging a spring to actuate the ejector and the latch in such manner that the spring is not only stressed in torsion but also in tension whereby maximum output of the spring is achieved.

Another object is to provide a novel belt buckle in which the parts are so organized as to facilitate assembly for manufacture and in which the parts are of simple construction in order to reduce costs.

A further object of the invention is to provide a buckle having a latch and an ejector in which the ejector is displaced by the tongue as it enters the buckle body whereupon the latch interlocks which the tongue and wherein the withdrawal of the tongue is caused by the ejector upon the latch being moved to unlatching position whereupon the ejector underposes with respect to the latch and locates in a position whereat it is adapted to be engaged by the tongue and the ejector holds the latch out of the way while the tongue is inserted into the body to latching position.

These and other objects and advantages inherent in the invention will become more readily apparent from the specification and the drawings, wherein:

FIGURE 1 is a side elevation view of my novel belt buckle;

FIGURE 2 is a side elevational view thereof;

FIGURE 3 is a longitudinal sectional view thereof taken substantially on line 3—3 of FIGURE 1;

FIGURE 4 is a sectional view taken substantially on line 4—4 of FIG. 2 showing the buckle in locked position;



FIGURE 5 is a sectional view comparable with FIGURE 4 in which the parts are released;

FIGURE 6 is a fragmentary longitudinal sectional view similar to FIGURE 3 wherein the parts are in the position of FIGURE 5; and

FIGURE 7 is a fragmentary sectional view taken substantially on line 7—7 of FIG. 3.

*Description of the invention*

Describing the invention in detail and having particular reference to the drawings there is shown a buckle generally designated **2** which has a base or body portion **3**. The body portion **3** comprises a bottom or base wall **4** with a pair of longitudinal upright flanges **5** and **6**. The flanges **5** and **6** are designated upright only to facilitate description. More appropriately they are normal to the relatively flat base wall **4**.

The flanges **5** and **6** have radius front and edges **7**, **8** and **9**, **10** and intermediate these edges along the upper edges **11** and **12** thereof there are provided transverse coaxial pintle openings **13**, **14** which admit a pintle **15** therethrough and mount opposite end portions **16**, **17** thereof. These end portions **16**, **17** also extend through openings **19**, **20** in dependent ears **21**, **22** which are formed on the opposite lateral edges **23**, **24** of the top wall **25** of the buck latch element **26**. The ears **21**, **22** are disposed between the flanges **5** and **6** along the interior sides **27** and **28** thereof respectively whereby the latch is limited in its movement axially of the pintle **15** through abutment of the outer sides **29** and **30** of the ears **21**, **22** with the inner sides **27**, **28**.

The top wall **25** is elongated lengthwise of the buckle and at its rear edge is provided with a stiffening and spring-shielding flange **32**. The front end of wall **25** is provided with a catch **34** which is directed toward the base wall **4** and at its distal end **36** in latching position extends through a transversely elongated slot **38** in the leading end **39** of a tongue **40** and into a similarly elongated slot **41** in the forward end portion **42** of the base wall **4**.

Thus it will be noted that tongue is held against separation from the buckle by the catch **34** and the catch is reinforced against bending out due to extraordinary loading by abutment with the forward edge **44** of the slot **41** in the base, it being understood that the top or latch portion of the buckle is made of spring steel and permits slight deflection of the catch portion whereby reducing shock on a load or on the persion of the wearer of the safety belt to which the buckle may be applied.

The tongue **40** upon entering into the way or passage **46** in the buckle, as defined by the flanges **5** and **6** and base **4**, engage the node **48** on the outer end of the ejector mechanism generally designated **50**.

The ejector mechanism **50** is in the form of a bell-crank having a forwardly projecting leg **51** which is provided with the beforementioned arcuate node **48** which is on the forward end portion of leg **51**. This forward end portion **51** in the ejected position of the tongue bridges over the slot **41** in the base and enters beneath the distal end **36** as best seen in FIGURES 5 and 6. Thus the mere insertion of the tongue into the way **46** against the upper surface **53** of the base wall **4** and urging of the tongue inwardly by the user moves the forward end portion of the ejector inwardly until the end **36** of the catch aligns with the slots **38**, **41** in the tongue and the base **4**. The ejector in addition to leg **51** has an integral leg **55** which extends transversely of the flanges **5** and **6** and is provided intermediate its ends with a transverse opening **57** through which is extended a rivet pin **58** having a head **59** peened over the top side **60** of leg **55** and holding the bottom side **61** of the ejector in sliding

engagement with the top side 53 of the base wall 4. Leg 55 has an integral abutment end portion engageable with the interior side 27 of the flange 5 to limit outward movement of the leg 51 as best seen in FIG. 5. The abutment is relieved on its back edge as at 63 to prevent binding with the wall as best seen in FIG. 4.

At the juncture of the legs 51, 55, the ejector is provided on its back edge 64 with a guide notch 65 which is elongated along the leg 55. This notch is limited at opposite ends by abutment shoulders 66, 67 and between these shoulders has a slide edge 68.

The slide edge 68 is engaged by a depending end portion or leg 69 of a combination torsion and tension spring 70 which forms the biasing means for the latch and the ejector urging the former in a clockwise direction as seen in FIGURE 3 and the ejector in a counterclockwise direction as seen in FIGURES 4 and 5. The spring 70 has a helical or coil portion 72 which is sleeved over the pintle 15 intermediate the ends of the latter and the end of the coil opposite that having leg 69 is provided with an integral generally horizontal rearwardly extending end portion or leg 74 which engages the underside 75 of the top wall 25 in an area 76 behind the pintle 15. Thus the spring, being wound about pintle 15 is stressed to urge the latch into locking position and the ejector into ejecting condition.

In viewing FIGURES 4 and 5 of the drawings it will be noted that the spring has its leg 69 slidable along edge 68 and that the leg 69 of the spring is moved rearwardly as the ejector is swung clockwise pursuant to the tongue being entered into the way 46. This causes the helical portion 72 to wind up whereby increasing the reaction of the leg 74 against the rear portion 76 causing the catch to be held under greater than normal load within the slots 38, 41. Upon the tongue being fully entered into the way 46 the shoulder 67 engages the leg 69 of the spring and deflects it axially of the pintle 15 further stressing the spring by putting it in tension, that is slightly stretching it. It will be realized that the spring is so proportioned that the frictional engagement of leg 74 is sufficient to prevent the leg 74 from shifting axially of pintle 15. If desired suitable abutment may be provided on the underside of top wall 25 to positively prevent axial shifting of the spring assembly.

In order to limit inward movement of the catch it is provided at its distal end 36 with oppositely extending shoulders 78, 79 as seen in FIG. 7 which engage the top side 30 of the tongue as seen in FIG. 7.

Thus it will be seen that the parts are so organized that in the latched position of the tongue and buckle the spring is inordinately stressed to maintain the parts in latched position under more than normal force. The latch is harder to depress in order to unlock the parts, that is by pressing inwardly or downwardly on the rear area of the latch to pivot it in a counterclockwise direction from the position of FIG. 3 to the position of FIG. 4.

It will also be noted that in the released position as seen in FIG. 5, the spring is relaxed so that the latch may be more readily depressed at its rear area to raise the catch and it is easier to initially insert the tongue.

The tongue has a slot 80 which admits a loop 81 of a belt 82 therethrough, the lap 83 of loop 81 being secured to the overlap portion 84 as by sewing at 85. The opposite end of the belt is looped at 86 about a wedge pin 87 which extends through wedge openings 88, 89 in the rear portions of flanges 5 and 6, the free end portion 90 of the belt locking between the knurled wedge pin 87 and an opposing abutment wall or flange 91 formed by upturning a portion of the bottom wall rearwardly of pin 87 to form the belt loop admitting opening 92 in the bottom wall. The belt end 91 is wedged against the corner 93 formed by flange 91 and the remaining portion 94 of the bottom wall. The wedge lock for the belt forms a quick adjusting means. It will be understood, however, that the belt may be sewn together at this end to the wedge pin.

The tongue is prevented from further traveling up the catch by a stop bar 95 which is positioned slightly above the tongue as seen in FIGS. 3 and 4 and connected to the flanges 5 and 6 in tight fitting openings 96, 97 in the forward portions of the flanges 5 and 6.

It will be realized that a preferred from of the invention has been described and that in view of this disclosure various inherent modifications are possible which are intended to be covered by the appended claims.

I claim:

1. A belt buckle comprising a body portion having a base wall and a pair of upstanding flanges, a latch element having a top wall and a pair of ears extending between the flanges, a pintle extending through coaxial openings in the flanges and ears, said latch having a catch portion extending from one end of the top wall toward said bottom wall, said bottom wall having a catch-receiving slot, an ejector pivoted to the bottom wall, said ejector having a portion positionable beneath the catch in bridging relation to said slot in the released position of the buckle, and spring means reactively disposed between the latch element in a position biasing said catch portion toward the bottom wall and said ejector to a position beneath the catch, said spring means oriented to become more highly stressed pursuant to movement of said ejector into said body portion out of the path of movement of the catch portion whereby to increase the force exerted by said catch portion to locking position including entry into said slot.

2. A belt buckle having a body portion with front and rear ends and including a bottom wall with upstanding flanges defining a tongue passage, a latch having a top spaced from and opposing said bottom wall, pintle means pivotally interconnecting the latch with the flanges of said body portion, a torsion spring having a coil wound about said pintle means and having a first portion extending from the coil and reacting upwardly against said top of the latch urging it at one end adjacent to the rear end of the body portions away therefrom and thereby biasing said latch at its opposite end toward said bottom wall, said spring having a second portion extending from the coil toward said bottom wall, an ejector pivoted to said bottom wall and having a portion biased by said second portion of the spring toward said front end of the body portion, said latch having at said opposite end of the top a catch extending toward said bottom wall, and in the open position of the buckle seating upon said portion of the ejector, and a tongue with a catch-receiving slot and insertable into said front end of the body portion and entering beneath said catch while displacing said ejector portion into the body portion to align the catch portion with said slot to admit the latter therein, said ejector winding said torsion spring.

3. A belt buckle comprising a body portion to be used with a tongue insertable and withdrawable with respect to said body, locking means on said body portion for interlocking the same with the tongue upon insertion of the tongue into the buckle, ejector means on said body portion adapted to abut the tongue for ejecting the tongue from the body portion upon release of said locking means, and separate means reactively disposed between said locking means biasing said locking means toward locking position and said ejector means toward ejecting position and ejector means, said ejector means operative to load said biasing means attendant to insertion of said tongue into the body portion and to unload said biasing means upon withdrawal of the tongue from said body portion.

4. A belt buckle having a body including a base wall, a latch element pivoted to said body on an axis accommodating pivotal movement of the element transversely of the base wall, said element having a catch portion at one side of said axis extending transversely of said wall and movable upon pivotal movement of the element

toward and away with respect to said wall, an ejector movably mounted on said body and movable to a position between said catch portion and said wall, and biasing means including a resilient element stressed between said ejector and said latch element in an area on the side of said axis of pivot of said element remote from said catch portion whereby movement of the ejector away from the catch portion toward said area urges said catch portion under increased pressure toward said wall.

5. A belt buckle having a body with a base wall, a latch pivoted to the body intermediate its ends on an axis generally parallel to said wall, an ejector pivoted to said wall on an axis transverse to said axis of pivot of the latch, a catch portion on one end of said latch movable transversely of said base wall attendant to pivoting of the latch, said ejector movable to a position betwen said catch and said wall and to another position into said body from between the catch and wall accommodating movement of the catch toward said wall, and a torsion spring having a coil portion about said axis of pivot of the latch and having a leg reacting against the latch at one side of said axis of pivot thereof and having another leg extending transversely of said wall and reacting against the ejector at one side of the axis of pivot thereof.

6. A belt buckle having a body with a base wall having a slot at one end, a pair of laterally spaced flanges on said base wall, a latch element having a portion opposing said base wall and having a catch portion directed from one end of said portion thereof toward said base wall and positioned to enter into said slot, means pivoting said element intermediate the ends of its first mentioned portion from said flanges on an axis generally parallel to the base wall, an ejector having a pair of angularly related legs one of which extends transversely of said flanges and the other is directed generally lengthwise of the flanges, means pivoting said ejector to the base wall for swinging movement generally parallel to the base wall for positioning said other leg betwen said catch portion and base wall in covering position to the slot in released position of the buckle, and spring means having a coil portion about said axis of pivot of the latch and having a portion reacting against said one leg of the ejector and having another portion reacting against an end of said first-mentioned portion of the latch element opposite said one end thereof.

7. The invention according to claim 6 and abutment means on said one leg engageable with said portion of said spring means reacting against said one leg for moving said portion of the spring means axially with respect to the coil portion of the spring means.

8. In a fastener assembly, a buckle and a tongue, said buckle having a body, a latch pivoted to the body and having a catch portion movable toward and away with respect to the body attendant to pivoting of the latch, an ejector having a pair of legs arranged as a bell-crank, one of the legs extending transversely of the body and the other leg extending generally lengthwise of the body, said ejector pivoted to the body on an axis, transverse to the axis of pivot of the latch and swingable to a position underposing the other leg of the ejector beneath the



catch portion and projecting beyond the catch portion toward one end of the body, spring means reactively stressed betwen the one leg of the ejector and said latch in an area of the latch biasing the same to pivot in a direction urging the catch toward said body, said tongue engageable with said other leg of the ejector and adapted to be urged into the body from said one end thereof attendant to displacement of said other leg of the ejector by the tongue to a position beneath the catch and entry of the other leg of the ejector into the body, said tongue and body having apertures therein alignable with said catch portion for entry thereinto in the locked position of the fastener.

9. In a fastener a buckle having a body with a base wall, a latch pivoted intermediate its ends to the body on an axis generally parallel to the wall, said latch having a catch at one end directed toward the wall, an ejector pivoted to the body for swinging movement between a position between the catch and base wall and a position within the body, spring means having a coil portion coaxial with said axis of pivot of the latch and having a leg extending from the coil portion directed toward and engaging the other end portion of the latch and having another leg extending from the coil portion and engaging said ejector and biasing the ejector to said first-mentioned position thereof.

10. The invention according to claim 9 and means on said ejector providing a changing lever arm reaction against said leg of the spring means engaging the ejector.

11. The invention according to claim 9 and said ejector having a slide surface extending transversely of the leg of the spring means and engaging the same, and the axis of pivot of said ejector being disposed eccentrically with respect to the points of engagement between said surface and the engaging leg of the spring means.

12. In a device of the class described, a buckle and a tongue, said buckle having ejector means and latch means for respectively ejecting the tongue from the buckle and for securing the tongue to the buckle, and separate spring means reactively stressed between said ejector means and said latch means and biasing said ejector means to ejecting position and the latching means to latching position, said ejector means engageable by the tongue in the securing position of the latch means and urging the ejector means in a direction loading said spring means whereby said latch means is caused to hold the tongue in secured position under greater than normal force.

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