Jan. 19, 1960 C. E. CUSHMAN 2,921,353

QUICK RELEASE BUCKLE

Filed April 4, 1956 2 Sheets-Sheet 1

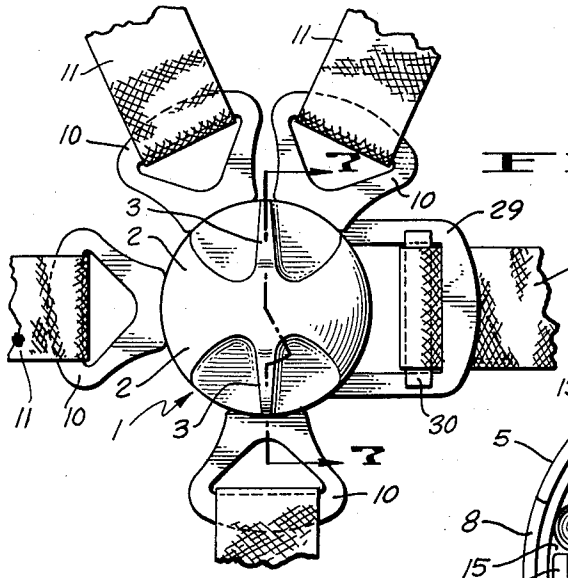


FIG_1

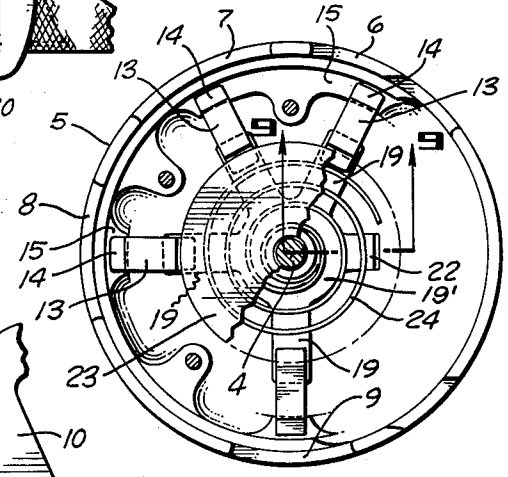


FIG_2

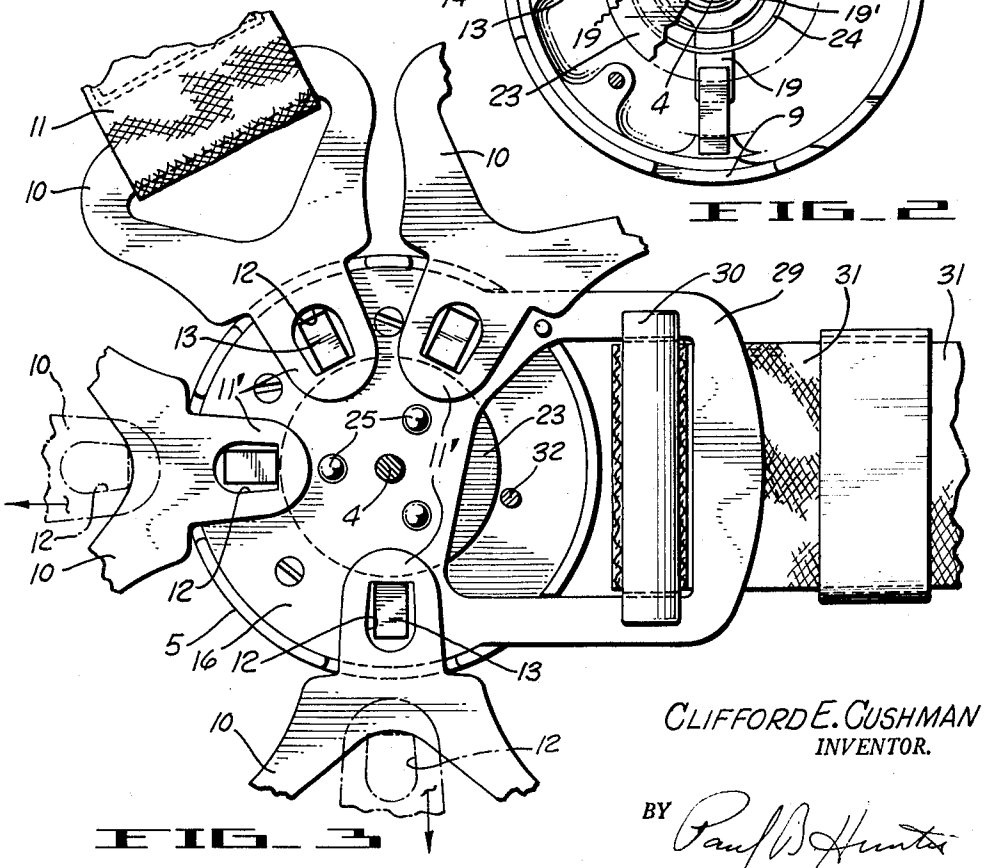


FIG_3

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QUICK RELEASE BUCKLE

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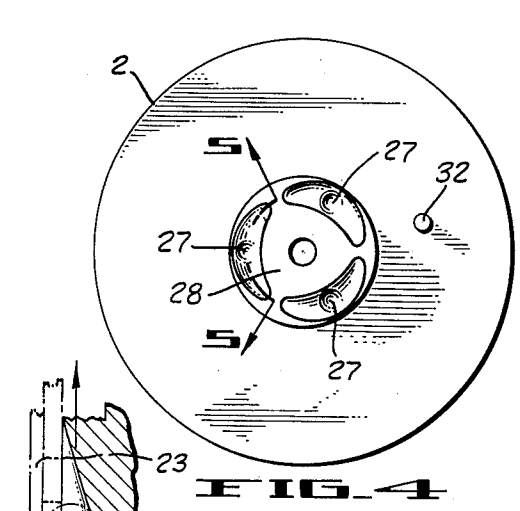


FIG_4

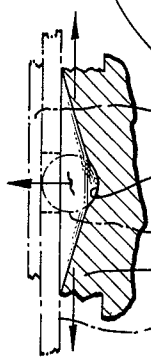


FIG_5

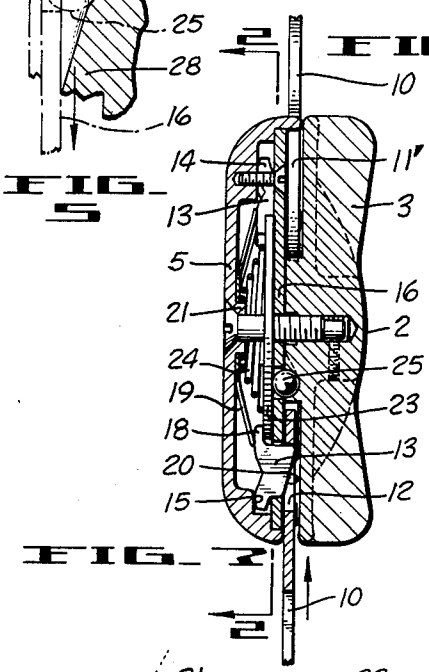


FIG_7

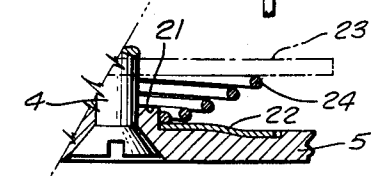


FIG_9

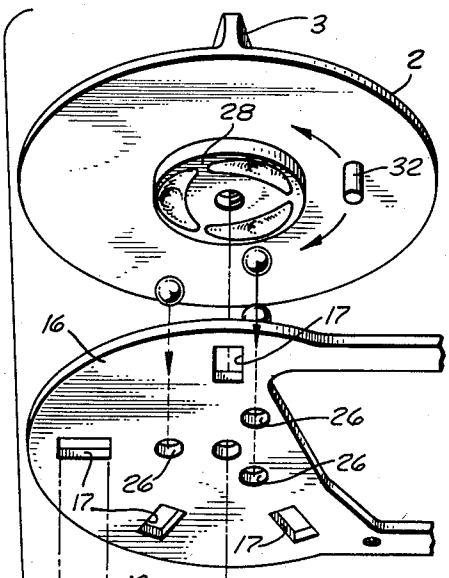
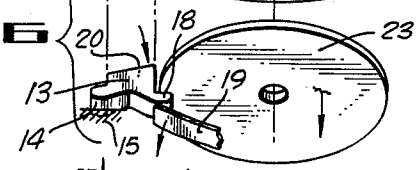


FIG_6



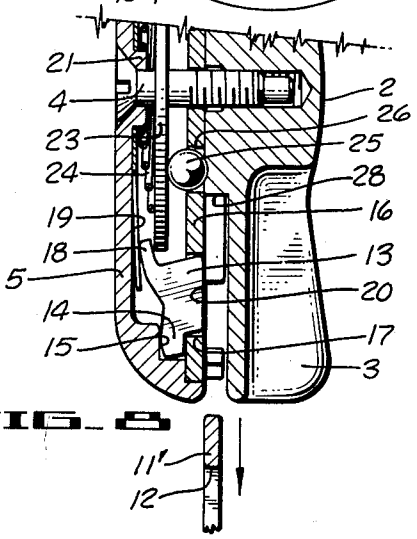


FIG_8

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QUICK RELEASE BUCKLE

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Application April 4, 1956, Serial No. 576,116

6 Claims. (Cl. 24—205.17)

This invention relates, generally, to quick releasing buckles, and the invention has reference, more particularly, to a novel buckle of this type especially suited for use with shoulder harnesses, parachute harnesses, safety belts, and the like, and which is adapted to be employed for readily receiving the harness strap terminals in locking relation to thereby secure the user, for example, in his seat, the seat buckle serving to release instantly the strap terminals by a simple rotary or turning movement of the buckle face in either direction by the user.

Quick release buckles, as heretofore constructed, have been relatively bulky and heavy, do not release instantly, and ofttimes require the exertion of appreciable pressure to release the same, and further are not always fool-proof against accidental release of the straps.

The principal object of the present invention is to provide a novel quick release buckle that is of simple, rugged and reliable construction for attaching and detaching the shoulder harness straps, seat belts, etc., the said buckle being compact and of light-weight construction and yet posssessing great strength owing to the inherent design thereof.

Another object of the present invention is to provide a novel buckle of the above character which is reliable in operation in that it is capable of withstanding high stresses without injury thereto and which may be quickly and reliably released upon the simple turning of the face of the buckle.

A feature of the invention is the use of a stress plate member, as of steel, which serves to carry all the tension loads being applied to the buckle through the use of detents or latches engaging both the strap terminals and the stress plate member in shear, thereby providing a simple direct way of carrying loads from one strap to another without creating high eccentric loads within the buckle.

Another feature of the invention is to provide a novel buckle employing spring means for urging pivoted detents into locking engagement with the harness strap terminals upon the insertion of the terminals into apertures provided therefor in the buckle, the buckle face plate having tapered grooves with balls therein for overcoming such spring means and actuating the detents to release the strap terminals instantly, when desired, by the mere turning of the buckle face plate in either direction.

These and other features and advantages of the present invention will be apparent from a perusal of the following specification taken in connection with the accompanying drawings wherein:

Fig. 1 is a view in front elevation of the novel buckle of the present invention shown with the strap terminals attached thereto;

Fig. 2 is an enlarged view of a portion of the structure shown in Fig. 1, with the buckle face plate and stress plate removed and with parts broken away;

Fig. 3 is an enlarged view of the structure of Fig. 1, but showing the buckle face plate removed;

Fig. 4 is a rear view of the buckle face plate;

Fig. 5 is an enlarged sectional view taken along the lines 5—5 of Fig. 4.

Fig. 6 is a perspective view illustrating steps in assembly of the buckle parts;

Fig. 7 is a sectional view of the buckle in locked position;

Fig. 8 is a fragmentary view showing the buckle just after actuating the same to unlocked position; and

Fig. 9 is a fragmentary view taken along the lines 9—9 of Fig. 2.

Referring now to the drawings in detail, the reference numeral 1 designates the novel quick release buckle of this invention as a whole, the said buckle having a face plate 2 provided with finger and thumb notches 3 and which is centrally threaded for turning movement upon a screw 4 that is carried by a dished back plate 5. The face plate 2 serves to close the open front of back plate 5. These members are shown of circular shape with the screw 4 positioned so as to extend along the central axis of these members, the buckle operating mechanism being enclosed by the back and face plates.

The forward peripheral edge of the dished back plate 5 is provided with notches or recesses 6, 7, 8 and 9, which, in cooperation with the face plate 2, form openings in the buckle for receiving the metal strap terminals or eyeplates 11 attached to the straps 11. The strap terminals 10 have reduced tongue-like end portions 11' for individual insertion in the openings 6 to 9, within which openings the tongues 11' are adapted to slide over beveled spring pressed detents or latches 13 (see especially Fig. 7) until these detents snap into the eyes or openings 12 to the lock the strap terminals in the buckle. As especially shown in Figs. 2, 7 and 8, the detents or latches 13 are formed with projecting lugs 14 which engage between shoulders 15 formed on the inner surface of the back plate 5 and the rear face of a stress plate 16 to provide for pivotal movement of these detents. The stress plate 16 is provided with rectangular apertures 17 for accommodating the detents 13. These detents are also formed with actuating lugs 18 at the ends remote from the lugs 14 which are engaged by leaf spring fingers 19 extending radially from the central portion of the back plate and pressing against the lugs 18 to urge the detents outwardly through openings 17 in the stress plate 16 for cooperative engagement with the terminals 10, the outer faces of the detents 13 for cooperating with the terminals 10 being beveled at 20 so to allow the ready insertion of the terminals 10 by the riding of the end portions of these terminals over the beveled surfaces 20, thus depressing the detents against the tension of spring fingers 19 and causing the detents to turn about their pivotal lugs 14, as especially illustrated in Figs. 7 and 8.

The spring fingers 19 are formed on a central substantially annular member 19' surrounding a boss 21 provided at the center of the back plate 5. The screw 4 extends through an aperture in the boss 21. The annular spring member 19' is provided with a radially extending stub portion 22 which sets into a recess provided in the inner surface of the back plate 5 so as to properly position the fingers 19 for engaging the detents 13. The forward faces of lugs 18 engage the rear peripheral surface of a tripping disc 23 which is normally pressed into abutting relation with the stress plate 16 by means of a spiral compression spring 24 with its reduced inner end surrounding the boss 21 and its outer enlarged end abutting the tripping disc 23. The forward face of the disc 23 is also engaged by three metal balls 25 spaced angularly about the central screw 4 at 120° intervals and normally positioned in circular apertures 26 provided in the stress plate 16. These balls also rest in tapered grooves or beveled notches 27 (see especially Figs. 4 and

5) provided in a central boss 28 formed on the rear surface of the face plate 2.

Thus, with the buckle in its normal position shown in Fig. 7, the strap terminals 10 may be readily attached to the buckle by merely inserting tongues 11' into the openings 6, 7, 8 and 9, with the tongue ends riding over the beveled surfaces 20 of the detents 13, pressing these detents rearwardly against the tension of springs 19, until the forward ends of the detents snap into the eye openings 12 of the tongues 11', thereby retaining the harness straps attached to the buckle. When it is desired to remove the strap terminals from the buckle, it is merely necessary to engage the user's fingers and thumb in the notches 3 and give the face plate a turn in either direction, whereupon the balls 25 are forced to ride up out of grooves or notches 27 on to the top surface of the boss 28, as shown in Fig. 8, which rearward motion of the balls forces the tripping disc 23 rearwardly against the tension of spiral spring 24 and also causes the peripheral edge of tripping disc 23 to push lugs 18 of detents 13 rearwardly, compressing spring fingers 19, and turning latches or detents 13 about their pivotal lugs 14, so that the detents are moved rearwardly and away from engagement with the tongues 11', there by allowing the strap terminals to fly out of the openings 6, 7, 8 and 9, thereby releasing the strap terminals simultaneously from the buckle.

It will be noted that, with the strap terminals attached to the buckle, the stress of the various straps is transmitted through the detents 13 directly in shear to the stress plate 16, so that this plate, generally made of steel and of great strength, carries the full load of the several straps and forms a simple, direct way of carrying the strap loads from one strap to another without creating high eccentric loads in the buckle. The stress plate is formed with an eye or bight 29 carrying a slidable pin 30 thereon, to which a belt 31 is attached, this belt being adapted to be permanently though adjustably attached to the buckle. This belt 31 together with an opposing belt having a terminal for entering opening 8 could serve as a safety belt without the use of additional belts. Merely releasing the face plate 2 after turning the same causes this face plate to turn back to its original position, owing to the action of springs 24 and 19, so that the buckle is again ready to receive the strap terminals as before in locking relation. The back of face plate 2 is provided with a stop pin 32 projecting into the bight 29 within the buckle, whereby the angular turning movement of the face plate is limited.

Thus, there is provided a mechanically simple buckle of great strength and dependability for readily receiving and locking the strap terminals, while, at the same time, allowing the quick, positive, and instant release of these terminals merely by turning the face plate 2 in either direction about the central carrying screw 4.

Since many changes could be made in the above construction of the quick release buckle and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. In a buckle of the character described, a dished back plate having a strap terminal receiving notch in the peripheral edge thereof, a face plate for closing said dished back plate and turnable thereon, a stress plate extending within said dished back plate and having a detent receiving aperture adjacent said notch, a spring pressed detent movable through said aperture for cooperatively engaging a strap terminal inserted through said notch to lock such terminal within said buckle, said stress plate having a bight formed diametrically opposite its aperture and extending outwardly of said buckle for attachment to a second strap terminal, and camming means carried by said face plate and operable upon the turning thereof with respect to said back plate to retract said detent with respect to its aperture in said stress plate, thereby releasing the strap terminal, said stress plate acting through said detent and its bight to carry directly the full load of said strap terminals, thereby eliminating objectionable eccentric loads on said buckle.

2. A quick release buckle comprising a dished back plate having a strap terminal receiving recess in the periphery thereof, a face plate overlying said back plate for closing the latter, said face plate being turnable on said back plate, a stress plate extending between said back and face plates and having a strap receiving bight projecting outwardly of said plates, said stress plate having a detent receiving aperture adjacent said terminal receiving recess and diametrically opposite said strap receiving bight, a spring pressed detent pivoted between said stress plate and said back plate and movable through said stress plate aperture for engaging and locking a strap terminal inserted into said terminal receiving recess, a tripping member engaging said detent, and camming means provided on the rear surface of said face plate engaging said tripping member and operable by the turning of said face plate to retract said detent and release the strap terminal, said stress plate acting through said detent and its bight to carry directly the full load of said strap terminals, thereby eliminating objectionable eccentric loads on said buckle.

3. In a quick release buckle, a hollow back plate having strap terminal receiving openings and a face plate for closing said back plate and turnable thereon, a stress plate extending within said hollow back plate and having detent receiving apertures therein, detents having pivotal lugs thereon pivoted within said back plate, said detents also having actuating lugs remote from said pivotal lugs, spring means within said back plate and engaging the actuating lugs of said detents for urging portions of said detents through said stress plate apertures for engaging and locking strap terminals inserted through said back plate openings, the stress of said strap terminals passing directly through said detents in shear to said stress plate without placing any stress on said pivotal lugs, whereby the load of said strap terminals is applied directly through said stress plate without the application of eccentric loads to the buckle, a tripping member also engaging said actuating lugs, and camming means provided on the back of said face plate operable by the turning of said face plate for moving said tripping member and retracting said detents, thereby releasing said strap terminals, said camming means comprising ball and socket means mounted at the back of said face plate, said stress plate having apertures for receiving the balls of said ball and socket means, said tripping member being actuated by said ball and socket means upon the turning of said face plate to move said detent actuating lugs and retract said detents.

4. A quick release buckle as defined in claim 3 wherein said tripping member comprises a spring pressed disc for normally urging the balls of said ball and socket means into the deep portions of their sockets, thereby tending to turn said face plate to its normal position with said detents positioned for locking strap terminals inserted into said buckle, the turning of said face plate against the pressure of said spring pressed disc serving to move said disc and said detents to released position.

5. A quick release buckle as defined in claim 4 wherein said detent pivotal lugs are pivoted in the space between said back plate and said stress plate, said detents having beveled active faces for enabling the strap terminals to depress temporarily said detents while inserting the strap terminals into the buckle, said pivotal lugs pivoting to allow such movement of said detents.

6. A quick release buckle comprising a dished back plate, a pivotal central securing member carried by said back plate, a face plate pivoted upon said member for turning with respect to said back plate, a stress plate attached to and spaced from said back plate and interposed therebetween and said face plate, detents having

pivotal lugs confined within the space between said back plate and said stress plate and pivoted with respect to said stress plate and projecting forwardly therethrough for engaging and locking strap terminals inserted between said face and back plates, said detents also having actuating lugs, spring means pressing on said actuating lugs for urging said detents forwardly for cooperative engagement with said strap terminals, a tripping member engaging said actuating lugs, and cooperating ball and cam means provided on the rear of said face plate for moving said tripping member and effecting the depression of said detents and the release of the strap terminals upon the turning of said face plate upon said pivotal member with respect to said back plate, said stress plate acting through

said detents in shear to carry directly the full load of said strap terminals, thereby eliminating objectionable eccentric loads on said buckle.

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