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2,537,307

CLAMPING BUCKLE

Filed April 6, 1946

2 Sheets-Sheet 1

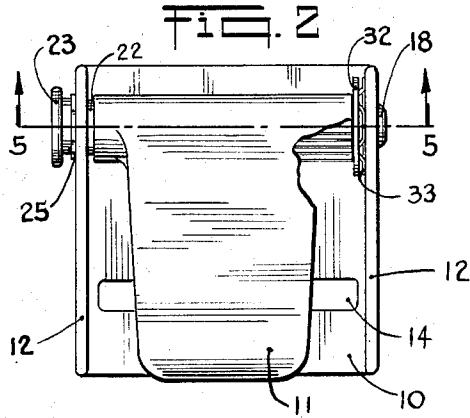
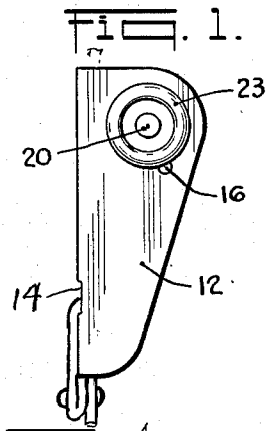


FIG. 4.

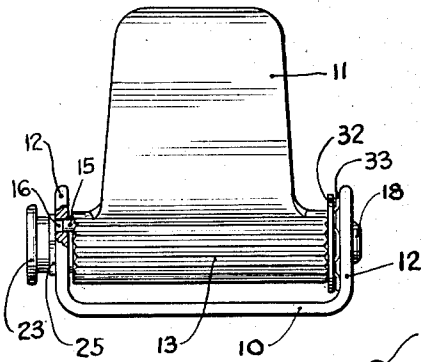


FIG. 3.

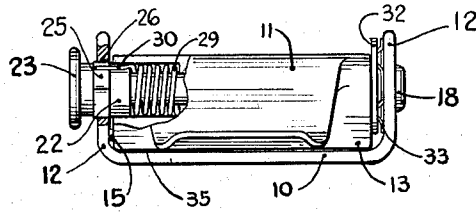
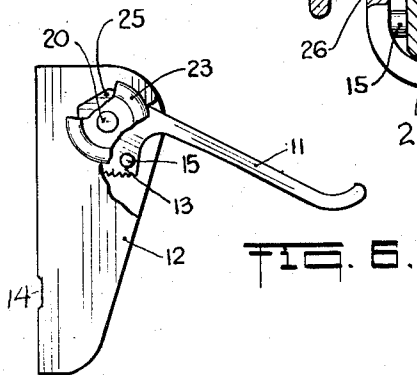
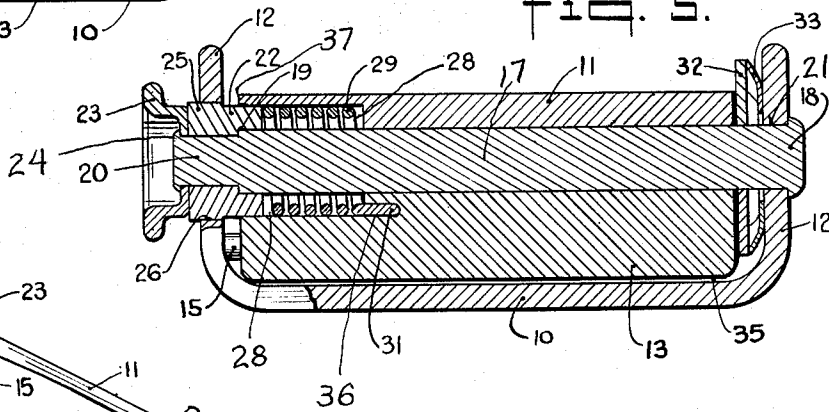


FIG. 5.



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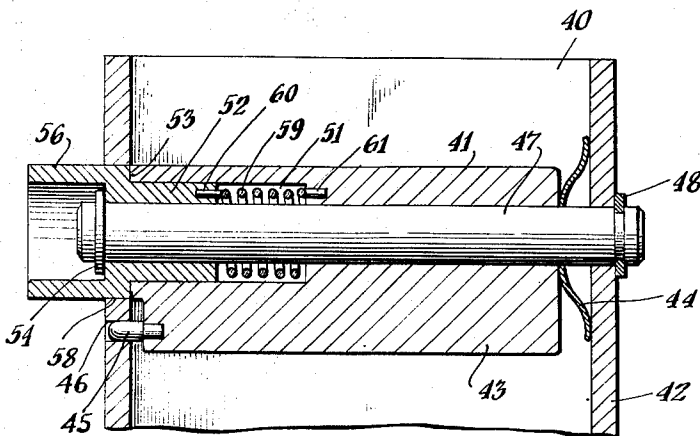
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Fig. 7



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CLAMPING BUCKLE

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5 Claims. (Cl. 24—170)

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This invention relates to buckles for straps or belts, and particularly to buckles for safety belts such as are used in airplanes to retain passengers in position in their seats.

The object of the invention is to provide a buckle which will be convenient and safe in operation and which will automatically act to give a complete and secure grip on the belt in each fastening operation.

Further objects of the invention particularly in the provision of a gripping member automatically latched in open position for insertion of the strap and subsequent release to gripping position on the strap will appear from the specification taken in connection with the accompanying drawings in which

Fig. 1 is a side view of a belt buckle illustrating the invention;

Fig. 2 is a face view of the buckle shown in Fig. 1 with a portion broken away;

Fig. 3 is an end view of the same with another part broken away to show the interior construction;

Fig. 4 is an end view of the buckle with the gripping or clamp member in latched open position;

Fig. 5 is a sectional view on enlarged scale taken on the line 5—5 of Fig. 2 and with a portion in solid lines to show the inactive position of the latching pin;

Fig. 6 is an end view similar to Fig. 1 but with parts broken away to show the structural features; and

Fig. 7 is a sectional view on enlarged scale illustrating a modified form.

In the specific embodiment of the invention shown in the drawings, a strap plate 10 having side flanges 12 carries pivoted to it a clamp member 11 having an eccentric gripping portion 13 engaging the end of the belt strap inserted between the plate 10 and the clamp. The other end of the belt strap is fastened to the strap plate 10, for instance, by looping it through the strap slot 14 as indicated in Fig. 1.

In open inactive position of the clamp member (Fig. 4) the latch pin 15 engages in the latch hole 16 to hold the clamp in open position and permit free movement of the strap between the serrated clamping eccentric 13 and the strap plate 10. In this position the user simply inserts the strap between the clamp and the plate to desired extent giving a snug fit of the belt. The buckle may be grasped in any desired manner without interfering with the free insertion of the strap end, and the clamp 11 does not have to be grasped

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to be held in released or open position, since the annular spring 33 between the flange 12 and the washer 32 holds the clamp 11, 13 to the left with the latch pin 15 in hole 16 retaining the parts in initial position for insertion of the belt end.

With the strap end in place between the eccentric clamp 13 and the plate 10, the clamp is released for automatic pivoting to gripping position by endwise movement toward the right of Figs. 2-5, shifting the latch pin 15 out of the retaining recess 16 and permitting the clamp to turn clockwise (Figs. 1 and 6) or downward in Figs. 2-5 to press the eccentric 13 tightly against the strap and bind it in place between the eccentric and the face of the plate 10. This swinging grip of the clamp is actuated by the spring 29 under initial torque in clamping position of the parts, which torque is augmented by the lifting of the clamp to latched position.

The hand of the user thus has no part in the effecting of the clamp action beyond the endwise movement of the clamp relative to the strap plate to release the latch pin. At the instant of release, the clamp freely swings or snaps to gripping position with a predetermined momentum giving a secure binding action between the parts.

As shown in the construction in the drawings, this endwise movement of the clamp is effected without any engagement of the clamp by the hand of the user, who simply presses against the end piece 23 and so shifts the pivoted parts to the right (Figs. 2-5) between the flanges 12 to disengage the latch pin 15 from the hole 16. This pivoted construction comprises a spindle or clamp pin 17 slidably mounted in recess 21 of the right flange 12 and having an integral head 18 positioned against the flange under the action of the spring 33. At the other end, the spindle 17 has a reduced end 20 on which are mounted the bushing 22 and the finger piece 23, the end 24 of reduced portion 20 being peened or riveted over to snugly hold these parts in place with the inner ledge of the bushing 22 against the shoulder 19 of the spindle. The bushing 22 is formed with the polygonal end portion 25 slidably fitting in the correspondingly shaped recess 26 of the left flange 12, the other end of the bushing being rotatably fitted within the end recess 28 of the clamp 11. The helical spring 29 is housed in cylindrical recess 28 in the end of the clamp member 11 and has one end 30 held in a peripheral slot 34 of the bushing 22, the other end 31 of spring 29 being retained in recess 36 at the inner end of the housing recess 28. This spring is assembled in position under a torque tending to

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tip the clamp member 11 into clamped position as described, the counter-torque being provided by the polygonal engagement between the head 25 and the recess 26.

The disk spring 33 through washer 32 presses the clamp 11 to the left (for instance, Figs. 2-5), in turn pressing the bushing 22 and spindle 27 toward the left through endwise thrust on the spring 29 or by engagement of the end 37 of the clamp 11 against the shoulder of the polygonal head portion 25. The bushing 22 in turn presses the spindle 17 to the left, holding its head 18 in engagement with the right flange 12 under the action of the spring 33. In the open position of the clamp 11 (Fig. 4), the pin 15 is held in recess 16 under this action of the spring 33 and this in turn retains the clamp 11 from closing under the torque of the spring 29. When the user presses the head piece 23, the bushing 22 and with it the clamp 11 are forced to the right (Figs. 2-5) sufficiently to withdraw the pin 15 from the recess 16, whereupon the clamp automatically springs to closed position (Figs. 1, 2, 3 and 5) and is retained in this clamping position under the torque of spring 29. Upon removal of the releasing pressure by the user, the spring 33 urges the clamp 11 toward the left, bringing the pin 15 against the inner surface of the left flange 12 (Figs. 3 and 5).

In the modification illustrated in Fig. 7, the strap plate or frame 40 with its flanges 42 carries the clamping member or latch 41 by spindle or pin 47, disk spring 44 being interposed as shown between one end of the eccentric 43 and the adjacent flange 42. Pin 45 carried by clamp 41 engages hole 46 to lock the clamp in open position. Recess 51 in eccentric 41 houses the inner end of bushing 52 having shoulder 53 under head 56 engaging the end of the clamp, and a spring 59 having its ends 60 and 61 in the clamp and bushing, respectively, tends to turn the clamp to closed position, the outer hexagonal end 56 of bushing 52 being slidably held against rotation in a correspondingly shaped opening 58 in the flange 42. Retaining snap rings 48 and 54 are provided at each end of the pin 47 and the hexagon end 56 is extended as a head for engagement by the finger of the user to slide the bushing 52 and clamp 41 endwise, compressing spring 44, releasing pin 45 from retaining hole 46 and permitting the clamp 41 to swing to closed position under the action of spring 59. The bushing 52 and clamp 41 being slidably mounted on pin or spindle 47, the latter is free and does not necessarily move with them and may remain in the position shown as the other parts are shifted.

In operation the user opens the clamp for insertion or release of the strap by lifting pressure under the end of the clamp 11, turning it upward to the position shown in Fig. 6. During this movement the latch pin 15 rides against the inner surface of the left flange 12 and enters into the latch hole 16 as soon as this position is reached, being automatically shifted into this latched position by the endwise movement of the clamp to the left under the action of spring 33. The parts remain in this position for proper insertion of the strap until the user releases the latching means by pressure on the finger piece 23. In the meantime, the user is entirely relieved from the necessity of holding the clamp in open strap-receiving position. He merely brings the parts together, slipping the belt end along the strap plate and into snug fitting relation to his position in the seat.

The latching operation is automatic and secure

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against accidental release, and the parts are positioned within the outer limits of the buckle in protective and unobtrusive manner.

While the invention has been described in connection with a specific embodiment, it is not limited thereto and is intended to cover such modifications thereof as fall within the scope of the appended claims.

I claim:

1. A belt buckle comprising a strap plate and a cooperating gripping member having relative rotary movement around an axis extending transversely with relation to said strap plate and relative transverse sliding movement along said axis, resilient means between said member and said plate yieldingly turning and sliding said members relatively to each other, and means between said plate and said member acting to latch the latter in open non-gripping position, said means being released by relative sliding movement between said plate and said member to permit said member to snap to gripping position under the action of the turning effort of said resilient means.

2. A belt buckle comprising a strap plate having side flanges, a relatively pivoted clamping member mounted between said flanges for combined turning and sliding movement around and along an axis transverse to said plate, resilient means tending to force said member into gripping position with relation to said plate and yieldingly holding said member against relative sliding movement, and latching means between said plate and said member automatically actuated by said resilient means to retain said member in open position as moved by the hand of the user, said latching means being released by relative lateral movement between said member and said plate to permit the parts to turn to gripping position under the action of said resilient means.

3. A buckle for a belt or the like comprising a strap plate and a cooperating gripping member pivoted on an axis transverse to said plate and having a cam face eccentric to said axis and adapted to contact the surface of said belt, a spring tending to turn said member to closed position of said cam face, latching means between said plate and said member adapted to automatically engage and hold said member in open position against the action of said spring, and a transversely movable part resiliently held outward for engagement by the hand of the user and yieldingly moving inward to detach said latching means and release said gripping member for closing movement under the action of said spring.

4. A buckle for a belt or the like comprising a strap plate having integral side flanges of generally triangular formation, a pin transversely spanning the space between said flanges adjacent the base of the triangles and consisting of a relatively small end seated in one side flange and an opposite larger flat-sided end fitting in a correspondingly flat-sided recess in the other flange, a gripping member journaled on said pin between said side flanges and having a toothed cam face eccentric to the axis of the pin and moving adjacent the surface of the plate to bind and hold a strap thereon adjacent said transverse pin, a strap slot in the plate adjacent the other end thereof, a handle on said gripping member moving between said flanges to carry its end toward said strap slot in clamping position of said member on said strap, a recess in one end of said gripping member sur-

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rounding said transverse pin adjacent said enlarged head, and a coiled spring in said recess around said pin and having one end connected to said head and the other end to said member to resiliently urge said member to bring the cam surface thereof in holding grip against the strap.

5. A belt buckle as set forth in claim 1 in which there is a center pin on which the gripping member is slidably mounted and which has its end protruding through a portion of said strap plate so that said gripping member may be independently moved to unlatching position by pressure at one end thereof without forcing the protruding end of said separate member to shift with said movement.

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6

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