Oct. 13, 1964 K. W. ROUND 3,152,374

SAFETY BELT BUCKLE

Filed Feb. 8, 1962

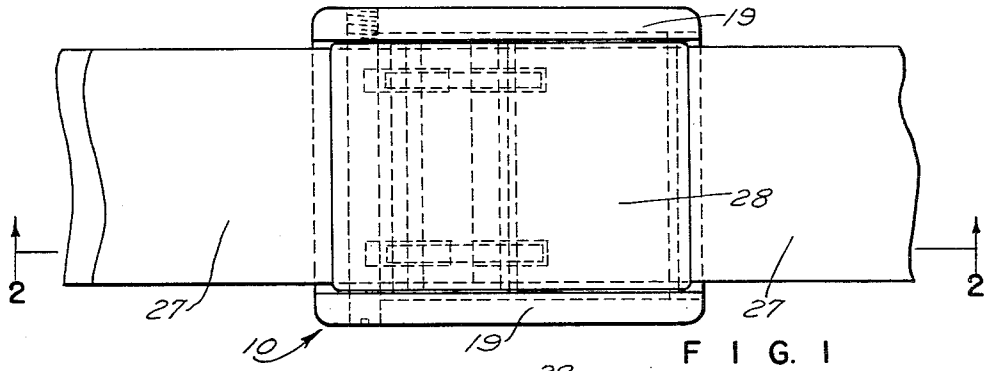


FIG. 1

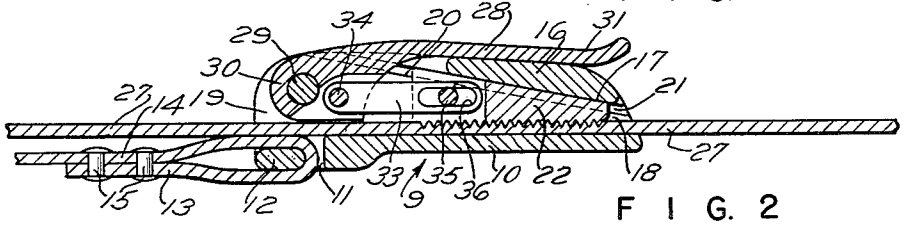


FIG. 2

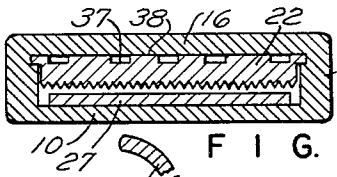


FIG. 4

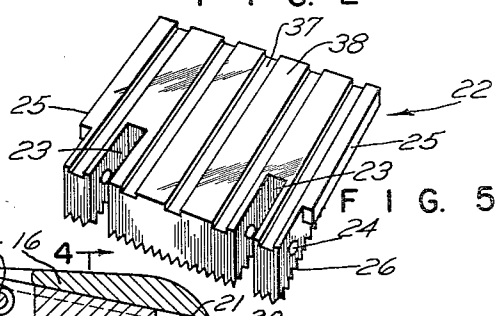


FIG. 5

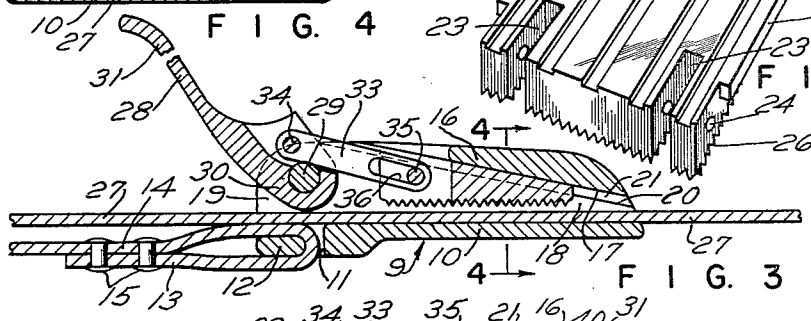


FIG. 3

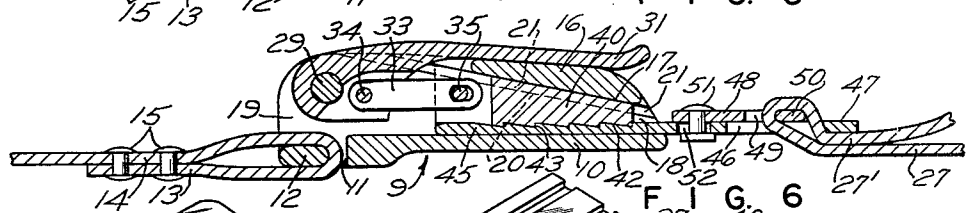


FIG. 6

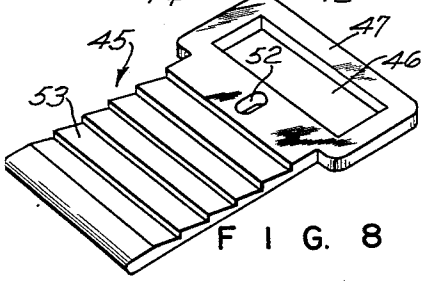


FIG. 8

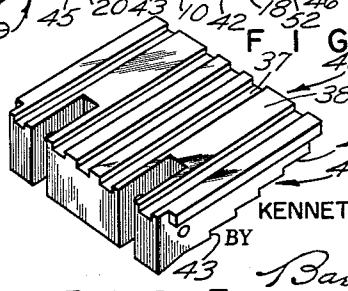


FIG. 7

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SAFETY BELT BUCKLE

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This invention relates to a buckle of the type used for safety belts which consists of a rather broad piece of textile webbing usually of a woven character and something in the neighborhood of two inches in width and one sixteenth to an eighth of an inch in thickness, although these dimensions are not to be considered restrictive.

Webbing of this character being made of textile material may be cut if a sharp metal portion is forced into it. Especially may this occur when the web is under severe strain. Other difficulties are encountered in buckles of this character, especially where varying thicknesses of web may be encountered.

One of the objects of this invention is to provide a buckle which will withstand severe strain without releasing and without so cutting the textile webbing which is being gripped as to destroy it or impair its strength.

Another object of this invention is to provide a buckle which may be repeatedly used many times and placed under severe strain many times without losing its proper functioning qualities.

Another object of the invention is to provide a buckle which will be of strong construction and yet one which may be simply made and assembled.

With these and other objects in view, the invention consists of certain novel features of construction as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawing:

FIG. 1 is a top plan view of the buckle with the belt which it is to secure therein;

FIG. 2 is a sectional view through the buckle on substantially line 2—2 of FIG. 1;

FIG. 3 is a view similar to FIG. 2 but illustrating the handle of the buckle swung to open position;

FIG. 4 is a sectional view on substantially line 4—4 of FIG. 3;

FIG. 5 is a perspective view of the gripping plate of the buckle;

FIG. 6 is a view similar to FIG. 2 but illustrating a modified form of construction;

FIG. 7 is a perspective view of the gripping plate of the modified form of FIG. 6; and

FIG. 8 is a perspective view of one part of the metal belt end member which is attached to the belt.

In proceeding with this invention, I have provided a body which presents a tapered opening in the lengthwise direction of the belt by reason of the under surface of the top wall being inclined at an acute angle to the inner surface of the bottom wall, and I have inserted a gripping plate between these two walls and guided it along the under surface of the top wall so that, as it moves lengthwise of the buckle, it will move toward the bottom wall and thus closer to the bottom wall and more tightly grip any belt or belt end member positioned between it and the bottom plate as the part so gripped tends to move in a release direction, the under surface of the gripping plate being shaped so as to provide sufficient friction on the belt or belt end member to cause the plate to move with the belt as the belt would tend to move out of the buckle. I have also provided a handle pivoted in the body with a link to connect it to the gripping plate so that movement of the handle will move the gripping plate lengthwise of the body. Thus, I may retract the gripping plate by movement of the handle to provide an opening for free

entry of the belt or belt end member and then swing the handle so that engagement is had between the gripping plate and the belt or end member.

With reference to the drawing, 9 designates generally the body of the buckle which is usually cast in the shape desired and formed of a light weight material such as aluminum or a plastic. The casting has a bottom wall 10, the inner surface of which is generally in a single plane for the major portion of the length of the body and is slotted as at 11 to provide a bar 12 about which one portion of the strap 13 may extend to be looped back on itself as at 14 and secured by sewing or rivets 15. The top wall 16 of the buckle has its inner surface 17 in substantially a single plane at an acute angle to the inner surface of the bottom wall 10. This wall 16 is substantially shorter than the bottom wall, being about half the length thereof. By reason of this arrangement there is a wedge-shaped opening 18 provided between the inner surfaces of the top and bottom walls. Side walls 19 join the top and bottom walls and extend beyond the top wall a substantial distance. These walls are each provided with a shoulder 20 extending substantially parallel to the inner surface of the top wall and providing between this shoulder and the top wall a guide groove 21 in which the gripping plate 22, as shown in FIGURES 2, 3, 4 and 5, is slidable.

This gripping plate 22 is also generally wedge shape. It is slotted at its thick end as at 23 with lateral opening 24 at either end for reception of a pivot pin. Flanges 25 are along either side edge of this plate to enter and freely slide along the groove 21. As this plate slides along this groove, it will move toward the inner or top surface of the bottom plate and there grip a belt which may be passed lengthwise through the body in the wedge-shaped space 18. This plate 22 has its under surface 26 knurled or roughened by the formation of a plurality of pyramids so as to better act as a frictional grip upon the web which is passed lengthwise through the body. This section of the web is designated 27 as shown in FIGURES 1, 2 and 3 and may be freely passed through the body when the plate 22 is in retracted position, as shown in FIG. 3.

A handle 28 is of substantially the width of the distance between the inner surfaces of the side walls 19 and is pivoted in the side walls by a pivot pin 29. The handle 28 is thickened at the pivot end as at 30 and thinned at the handle end 31. This thickened end will lie in the space between the side walls 19, while the thinned portion 31 will extend over in overlapping relation to the top wall as shown in FIGURE 2, extending beyond the top wall so that it may be easily grasped by the hand to be raised from the position shown in FIGURE 2.

A link 33 at either side of the buckle is pivoted as at 34 eccentrically to the pivot 29, and this link extends into the slots 23 and connects with either side of the gripping plate by reason of a pin 35 in openings 24 in the gripping plate and a slot 36 in the link receiving this pin therein so that there is an opportunity for relative movement of the link with reference to the gripping plate without one moving the other. The link 33 is pivoted at 34 close to the pivot 29 of the handle which will give a mechanical advantage to the force required to release the plate when locked down against the fabric belt or the belt end member which is hereinafter referred to. The slot 36 is of sufficient length so as to give some freedom of movement to the plate when in gripping position so that a pull on the belt will permit the plate to slide into tighter gripping position as the pull moves the plate toward the direction of movement of the belt without pressure on the pin 35.

The upper surface of the gripping plate 22 is grooved by a plurality of grooves 37 extending lengthwise of the

buckle. The top surface of the plate presents an area 38 somewhat reduced by the grooves so as to engage the undersurface of the top of the body and thus reduce the area of friction on the top wall.

When the buckle is in open position as shown in FIGURE 3, the portion 27 of the belt may freely enter the wedge-shaped opening 18 and extend completely through the buckle. The handle 28 is then swung from the position shown in FIGURE 3 to the closed position shown in FIGURES 1 and 2, which moves the gripping plate so that frictional engagement is established between the knurled surface 26 and the surface of the belt whereby any movement of the belt to the right as shown in FIGURES 1 and 2 will cause the gripping plate to also move to the right by reason of the friction established between the belt and the gripping plate. Thus, as the gripping plate is moving to the right, it is also moving toward the bottom wall, establishing a wedge action, tightening upon the belt to more firmly hold it against movement out of the buckle, and by reason of the broad surfaces presented to the belt on both sides, there is no tendency to cut the belt or impress into it at any one point. Thus, the belt holds throughout its width and gripped length of substantial extent to be maintained without cutting and therefore resists strains which would otherwise cut and destroy a fabric belt.

In FIGURES 6, 7 and 8 I have illustrated a modified form in which instead of the gripping plate engaging the web belt, the gripping plate now designated 40 is provided with ratchet-like teeth 41 on its under surface having a slope as shown at 42 and an abrupt step providing a rising surface as at 43 extending widthwise across the plate the full extent thereof. To cooperate with this gripping plate, there is a belt end member designated generally 45 and shown in perspective in FIGURE 8 which will have a slot 46 providing a bar 47, while an attaching slide 48 may be mounted upon this belt end member having a slot 49 providing a bar 50 so that the belt 27 may be passed through the slot 46 and through the slot 49 about the bar 50 and then beneath the bar 47 as seen in FIG. 6. This slide 48 also is provided with a pin 51 which passes through elongated opening 52 in the belt end member so that this slide 48 may move on the belt end member. Thus as a pull occurs upon the belt end 27, it will draw the slide toward the bar 47 and bind the portion 27' of the belt against the bar 47 holding it in position.

The belt end member 45 is provided with ratchet-type teeth having sloping surfaces 53 as seen in FIGURE 8 which are complemental to the ratchet-type surfaces 41 on the gripping plate so that the parts will engage substantially as shown in FIGURE 6 when the handle is swung to its gripping position and the buckle is closed as shown in FIGURE 6 which will move the gripping plate 40 down against the belt end member 45. Any tendency of the belt end member 45 to move out of the buckle will cause the tapered ratchet-like surface to

apply a wedge action of tightening the pressure of the parts against each other between the fixed top and bottom walls so that this pull will not withdraw the belt end member from the buckle. In FIGURE 6 the pin 35 on the plate is in close proximity to the end of the slot 36 in the link so that the plate cannot slide to the left as shown in FIGURE 6 or toward a position of release.

I claim:

1. A safety belt buckle comprising a body member having a pair of side walls, a bottom wall extending from one side wall to the other side wall, said side walls extending upwardly from the opposite edges of the bottom wall, and a top wall extending from one side wall to the other side wall, the inner surface of the top wall being at an acute angle to the inner surface of the bottom wall lengthwise of the body to provide a wedge-shaped opening between the two, a plate of a width substantially the distance between said side walls slidably engaging the inner surface of the top wall to move toward the bottom wall as it moves lengthwise of the buckle in one direction, a handle pivoted in said body on an axis extending transversely thereof, a link connecting said handle to said plate by a slot and pin connection for moving the plate lengthwise relative to the body in one direction or the other direction upon swinging the handle about its pivot, said handle when moved in one direction causing one end of the slot to engage the pin and move the plate lengthwise relative to the body and toward said bottom wall for gripping a part inserted into the body between the plate and bottom wall, said slot being of sufficient extent so that the plate may further move lengthwise of the body toward the bottom wall into gripping position with movement of the inserted part lengthwise relative to the body and said pin may move toward the other end of the slot to a point intermediate the ends of the slot without placing strain on the pin.

2. A safety belt buckle as in claim 1 wherein guide shoulders generally parallel to the top wall extend lengthwise of the body and said plate is provided with flanges to support and guide said plate along said shoulders as said plate slides lengthwise of the body.

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