July 18, 1939. W. C. WALKER 2,166,777

SAFETY BELT

Filed Feb. 13, 1939

Fig. 1.

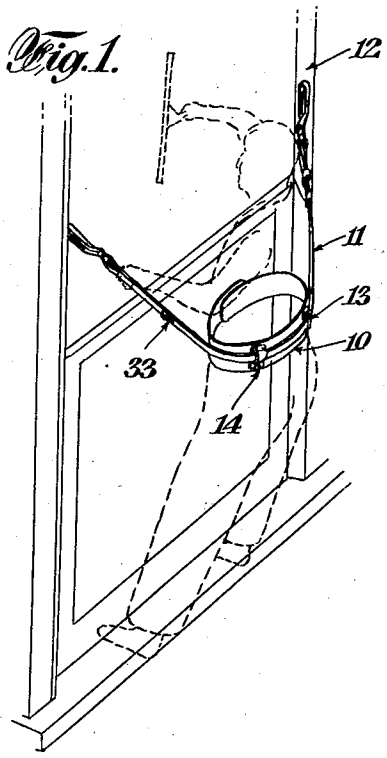


Fig. 2.

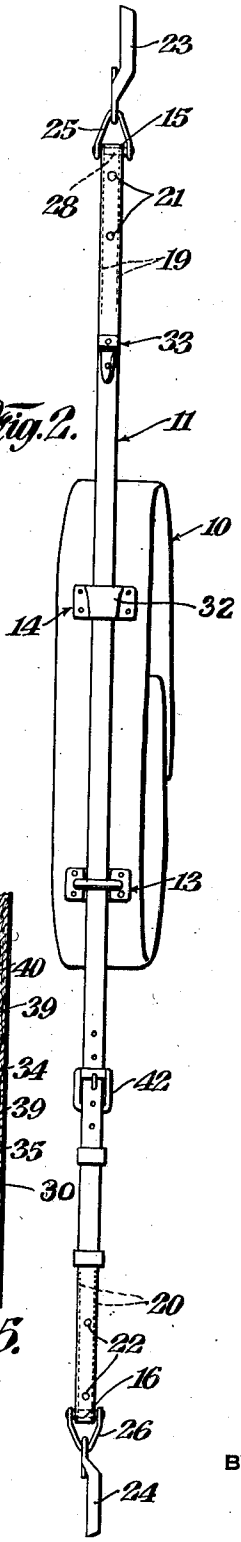


Fig. 3.

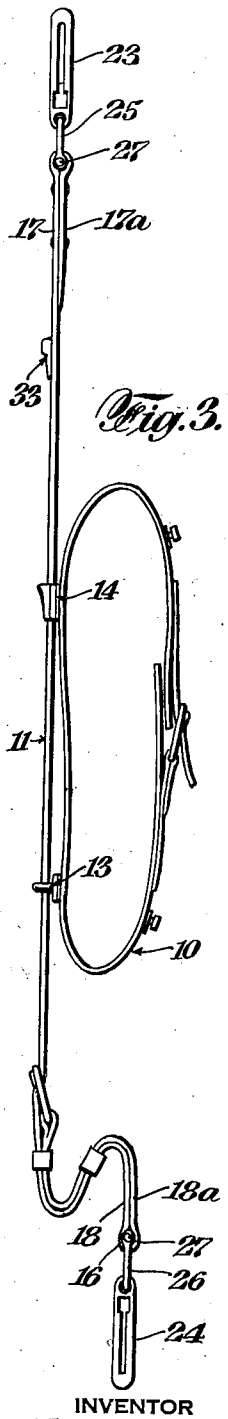


Fig. 4.

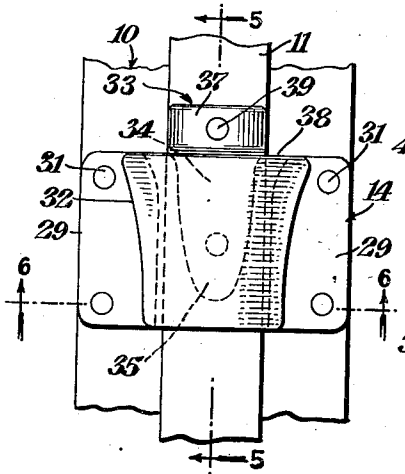


Fig. 5.

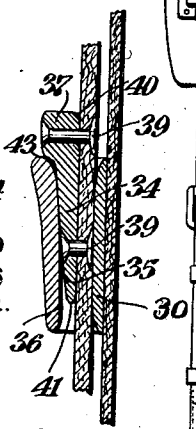
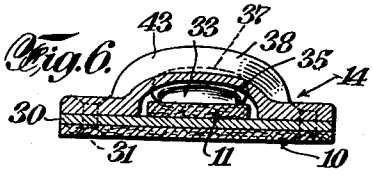


Fig. 6.



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2,166,777

SAFETY BELT

William C. Walker, New York, N. Y.

Application February 13, 1939, Serial No. 256,074

7 Claims. (Cl. 227—49)

This invention relates to safety belts, particularly of the type adapted for use by window cleaners and linesmen.

Most belts of this category comprise two main elements, one being the belt proper for encircling the waist of the wearer, and the other being the supporting strap the terminals of which are provided with conventional anchor buckles for attachment to suitable anchoring hooks on the supporting structure. In practically all conventional devices of this character, the belt portion is provided at the rear thereof with a plurality of metallic loops through which the supporting strap portion extends and with which it is in slidable engagement. It is hence apparent that should the strap tear, the anchored portion thereof will slip through the loops, causing the belt portion and the wearer to be completely detached therefrom, generally with disastrous results. It has been found that the rupture of the supporting strap usually occurs in the general region of the terminal portions thereof, either because of a drying, cracking and a consequent breaking of one of the sharply curved loops at the ends of the strap, or a wearing out of such a looped end by frictional engagement with the conventional anchoring pin or sleeve over which the loop is mounted; or, such rupture may be caused by a weakening of the stitching holding the looped folded-back terminal portion against the strap, whereby excessive strains are placed upon the rivets or other supplementary metallic fastenings to cause a shearing thereof. When such a rupture occurs at the side of the strap containing the conventional buckle, the strap will be held against slipping entirely out of the loops when the buckle comes into engagement with its nearest loop—the wearer being safely held suspended in this manner. But when the rupture occurs at the opposite extremity of the belt, where there is no buckle, the entire strap slips through the open loops to cause a detachment of the belt portion therefrom.

It is hence primarily within the contemplation of my invention to eliminate the aforesaid shortcoming of conventional belts, and reduce the danger of a detachment of the belt portion from the supporting strap due to a rupture at the most vulnerable parts thereof. This objective I accomplish by providing cooperative holding means on the strap and belt portions and so positioned as to prevent a detachment of such portions from one another should the terminal portion of the strap or the metal parts thereof become ruptured or broken.

And in connection with the above-referred to aspect of my invention, it is a further object to enable the said cooperative holding elements to coact with the least possible injury either to these elements or to the flexible portions of the belt.

It is still a further object of my invention to enable a belt of the aforementioned category to be provided with the aforesaid holding elements without interfering with the usual freedom of movement of the wearer.

And it is a further object of my invention to enable the aforesaid objectives to be accomplished by means of a relatively simple and inexpensive construction.

Other objects, features and advantages will appear from the drawing and the description hereinafter given.

Referring to the drawing,

Figure 1 is a perspective view of the safety belt embodying my invention, illustrated as applied to a window and showing its operative relation with respect to a window cleaner.

Figure 2 is a plan view of the belt of Figure 1, shown elongated to illustrate the various elements thereof.

Figure 3 is a side view of Figure 2.

Figure 4 is an enlarged fragmentary plan view of the locking elements of my invention, illustrated in operative engagement.

Figure 5 is a longitudinal section of Figure 4 taken along line 5—5, and

Figure 6 is a transverse section of Figure 4 taken along line 6—6.

In the drawing, the safety belt constituting my invention is illustrated as containing two main elements, the belt portion 10 adapted to encircle the waist of a wearer, and the supporting strap portion 11 for attachment to any suitable supporting structure such as the window frame 12. The belt portion 10 is provided with a conventional metallic loop element 13, as well as another loop member 14 of special construction to be subsequently described, the latter comprising one of the holding members constituting a part of my invention—the strap 11 being slidably movable through members 13 and 14 as in conventional structures. The terminal portions of the strap 11 are bent back upon themselves to form terminal loops 15 and 16, the adjacent plies 17 and 17a, and 18 and 18a, respectively, being each secured together by two lines of stitching 19 and 20 respectively. The said plies are also secured together by rivets 21 and 22 respectively, as supplementary reinforcing elements. Connecting the

terminals of the strap to the conventional anchoring buckles 23 and 24 are the links 25 and 26 respectively, each of these containing, in the usual and preferred arrangement, pins 27 over which are rotatably mounted sleeves 28—whereby only the sleeves 28 are intended to be subject to wear, and not the looped ends 15 and 16 which are intended to be in fixed and immovable relation with respect to the said sleeves.

The combination loop and stop member 14 consits of a bracket portion having two flanged bases 29 in abutting engagement with the base plate 30, the bases and plate being preferably of the same length and both attached, preferably by rivets, 31, to the belt portion 10. Although the bases 29 and base plate 30 are shown as two separate elements, it is of course understood that they can be combined in an integral structure, within the purport and intent of this invention. Medially disposed on member 10 is the preferably tapering stop socket 32 containing a central passageway of enlarged width and height at that portion thereof disposed towards the looped terminal 15, and being of reduced width and height at the opposite extremity thereof. Suitably attached to the strap 11 and positioned between the looped end 15 thereof and the member 14 is the wedge member 33 comprising a tapered wedge portion 34 the inclined surface 35 thereof being shaped and proportioned to substantially conform with the upper inclined wall 36 of the socket 32—the member 33 containing also the abutment 37 of a height greater than that of the inlet portion 38 of socket 32 whereby said wedge member 33 will be prevented from passing through the said central passageway of member 14. The wedge member 33 is shown to be secured to the strap by rivets 39. In the preferred form of my invention, the forward and rearward edges 40 and 41 of the wedge member are rounded so as not to present sharp or cutting edges engageable with said strap; and the wedge member 33 is so positioned that there are no metallic elements between it and member 14—the rivets 21 and the two-ply terminal portions of the strap 11 being entirely at the side of the wedge opposite member 14.

It is apparent that with the structure hereinabove described, the strap 11 is capable of free movement through the loop 13 and member 14, any such movement being limited only by the buckle 42 on one side and the wedge member 33 on the other side of the strap. Should the stitches 19 become loosened or weakened for any reason, an excessive strain might be induced, as aforesaid, in the rivets 21, which might ultimately cause them to break or snap under the constant stresses and impacts to which they are subjected during use. Should this occur, that section of the strap intersected by the rivets, being of reduced cross-sectional area, will become considerably weakened and may rupture, whereupon, under the influence of the weight of the wearer, the detached portion of strap 11 will slidably move through the loop 13 and member 14 until wedge member 33 comes into engagement with the said loop and stop member 14. Regardless of whatever the cause may be for the rupture of the strap 11 at the said terminal portion thereof, and whether it be at the region of the rivets 21 or at the loop end 15, the resulting action will be the same, and the member 33 will come into engagement with member 14 and be held against further movement therepast.

Due to the enlarged entrance 38 of the passageway within the socket portion 32, the tapered wedge portion 34 will readily enter the passageway. There will however be a cushioning of the shock of impact, due to the tapered configuration of the interior of the socket and the corresponding shape of wedge 34. When the abutment 37 engages the wall 43 of member 14, the movement of the strap 11 will be arrested as no further relative movement between the member 33 and member 14 will be possible. In this position the wearer of the device will be suspended until he can draw himself up to a position of safety.

Due to the cushioning effect above-described, it is apparent that such an action will be less likely to cause a further rupture or breaking of the strap than if the impact had been sudden and direct. A further precaution against mutilation of the flexible members of this device is the employment of the base plate 30 which presents a relatively flat surface over the length of member 14, not only presenting an elongated and reinforced bearing surface for the strap and wedge member as they enter, but also preventing a curvature of the portion of the belt 10 to which said plate is attached. It should further be noted that the rounded corners 40 and 41 of the member 33 also insure against a cutting and mutilation of the flexible strap, inasmuch as any reverse bending thereof in the direction of the wedge while the device is in use will bring the strap into engagement only with the harmless curved corners 40 and 41.

In the preferred embodiment of my invention, the combination loop and stop member 14 is substantially flat, being of no greater height than the loop 13, thereby constituting no impediment whatsoever to the freedom of movement of the wearer.

It is of course understood that the structure above-described and shown in the drawing is illustrative of my invention, inasmuch as numerous changes and modifications may be made therein within the scope of the appended claims without departing from the spirit of this invention.

What I claim is:

1. A safety belt of the class described comprising a belt portion for encircling the waist of the wearer, a plurality of spaced loop elements secured upon the outer surface of said belt portion, a supporting strap extending through and slidably engageable with said loop elements, anchoring means at the terminals of the strap, one of said loop elements constituting a stop member and comprising a base portion and a socket with a central passageway therethrough, a wedge member attached to the strap between said stop member and that terminal of the strap nearest thereto, said member comprising a wedge portion proportioned for entry and accommodation within said passageway and an abutment of greater height than the entrance to said passageway whereby it will be engageable with said stop member upon a movement of the strap therethrough to prevent a continued movement thereof, and an adjustable buckle at the opposite terminal of the strap and of greater proportions than the opening of the nearest of said loop elements whereby it will not be movable therepast.

2. A safety belt according to claim 1, the socket of said stop member being of tapered configuration, the passageway thereof being of enlarged width and height at that end thereof disposed towards the said wedge member and being of re-

duced width and height at the opposite end thereof, the said wedge member having its wedge portion shaped and proportioned to substantially conform with the walls of the said passageway whereby it will be frictionally engageable thereby to be snugly held in place.

3. A safety belt according to claim 1, the terminal portions of the strap being bent back upon themselves and secured by suitable fastening means to form terminal loops for accommodating the said anchoring means, the said wedge member being positioned between said fastening means and said stop member.

4. A safety belt according to claim 1, the socket of said stop member being of tapered configuration, the passageway thereof being of enlarged width and height at that end thereof disposed towards the said wedge member and being of reduced width and height at the opposite end thereof, the stop member being further provided with a base extending substantially along the entire width and length of said passageway, the said wedge member having its wedge portion shaped and proportioned to substantially conform with the walls of the said passageway whereby it will be frictionally engageable thereby and the contiguous strap portion will be frictionally engageable with said base, for effecting a cushioned impact between the wedge and stop members.

5. In a safety belt of the class described, a belt portion for encircling the waist of the wearer, a plurality of spaced loop elements secured upon the outer surface of said belt portion, a supporting strap extending through and slidably engageable with said loop elements, anchoring means at the terminals of the strap, and cooperative holding means on said strap and belt portion and associated with one of said loop elements for limiting the slidable movement of the strap through said loop elements, said holding means comprising a male member mounted on the strap and a female member constituting one of said loop elements and proportioned for partial accommodation of and frictional engagement with the male member, the said members being so positioned that at a predetermined position of the strap with respect to the belt portion the said members will come into operative engagement to prevent a further relative movement between said strap and said belt portions.

6. In a safety belt of the class described, a belt portion for encircling the waist of the wearer, a plurality of spaced loop elements secured upon the outersurface of said belt portion, a supporting strap extending through and slidably engageable with said loop elements, anchoring means at the terminals of the strap, and cooperative holding means on said strap and belt portion for limiting the slidable movement of the strap through said loop elements, said holding means comprising a stop member and a wedge member, the stop member containing a socket having a passageway through which said strap slidably extends and a base portion attached to the belt portion, the passageway being of enlarged proportions at one end thereof and tapering down to reduced proportions at the opposite end, the base extending across the entire width of said passageway, the wedge member containing a wedge portion extending towards the enlarged end of the said passageway and proportioned for entry within and frictional engagement with the wals of the passageway, and an abutment on the side of the wedge member remote from the stop member and engageable therewith at the entrance to said passageway to prevent a further movement of the wedge member therethrough, the corners of the wedge member adjacent the strap being rounded to present a smooth curved surface to the strap during an operative manipulation thereof.

7. In a safety belt of the class described, a belt portion for encircling the waist of the wearer, a plurality of spaced loop elements secured upon the outer surface of said belt portion, a supporting strap extending through and slidably engageable with said loop elements, anchoring means at the terminals of the strap, and cooperative holding means on said strap and belt portion for limiting the slidable movement of the strap through said loop elements, said holding means comprising a stop member and a wedge member, the stop member containing a socket having a passageway through which said strap slidably extends and a flanged base, a base plate underlying the flanged base and in engagement with the belt portion, fastening means extending through the flanged base, plate and belt portion, the passageway being of enlarged proportions at one end thereof and tapering down to reduced proportions at the opposite end, the plate extending across the entire width of said passageway, the wedge member containing a wedge portion extending towards the enlarged end of the said passageway and proportioned for entry within and frictional engagement with the walls of the passageway, and an abutment on the side of the wedge member remote from the stop member and engageable therewith at the entrance to said passageway to prevent a further movement of the wedge member therethrough, the stop member being of substantially the same height as the loop elements.

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