

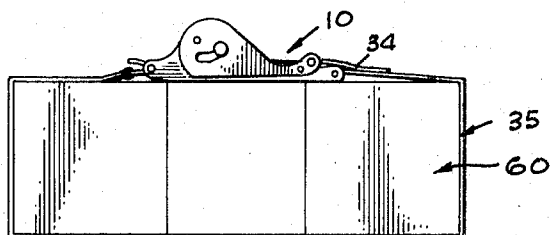
Oct. 3, 1967 LA VERE J. EVELAND 3,344,486
BUCKLE HAVING A PRESSURE MEMBER CONNECTED TO SLOTTED
PIVOTALLY RELATED FRAME MEMBERS
Filed June 15, 1965 2 Sheets-Sheet 1

67 LA VERE J. EVELAND 3,3
BUCKLE HAVING A PRESSURE MEMBER CONNECTED TO SLOTTED
PIVOTALLY RELATED FRAME MEMBERS

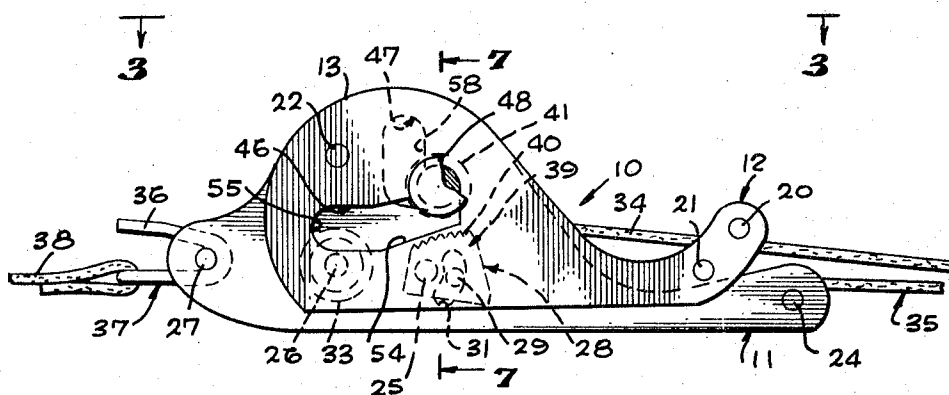
Filed June 15, 1965

2 Sheets-Sheet 1

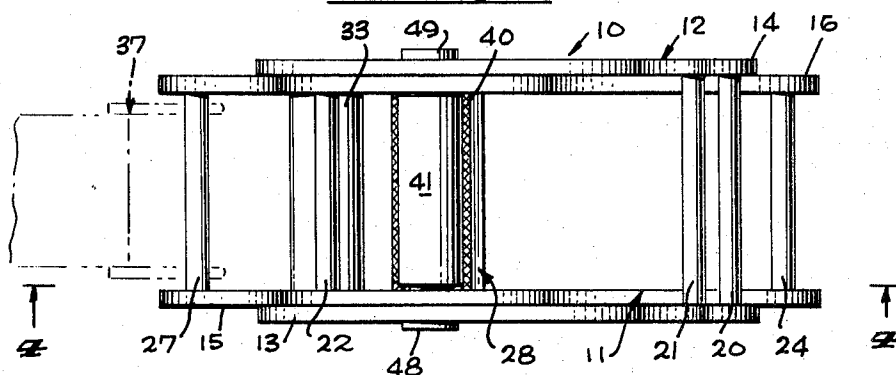
Fig. 1



Ex. 2



Ex 7.3



L A V E R E J. E V E L A N D
INVENTOR

BY R. E. Geary

ATTORNEY

Oct. 3, 1967

LA VERE J. EVELAND
BUCKLE HAVING A PRESSURE MEMBER CONNECTED TO SLOTTED
PIVOTALLY RELATED FRAME MEMBERS

3,344,486

Filed June 15, 1965

2 Sheets-Sheet 2

Fig. 4

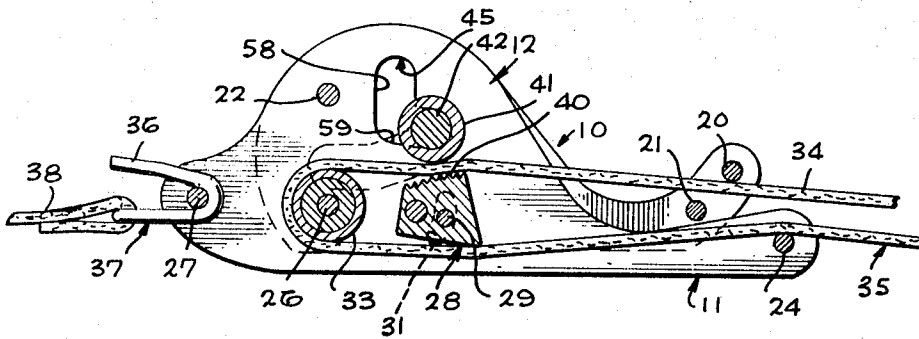


Fig. 5

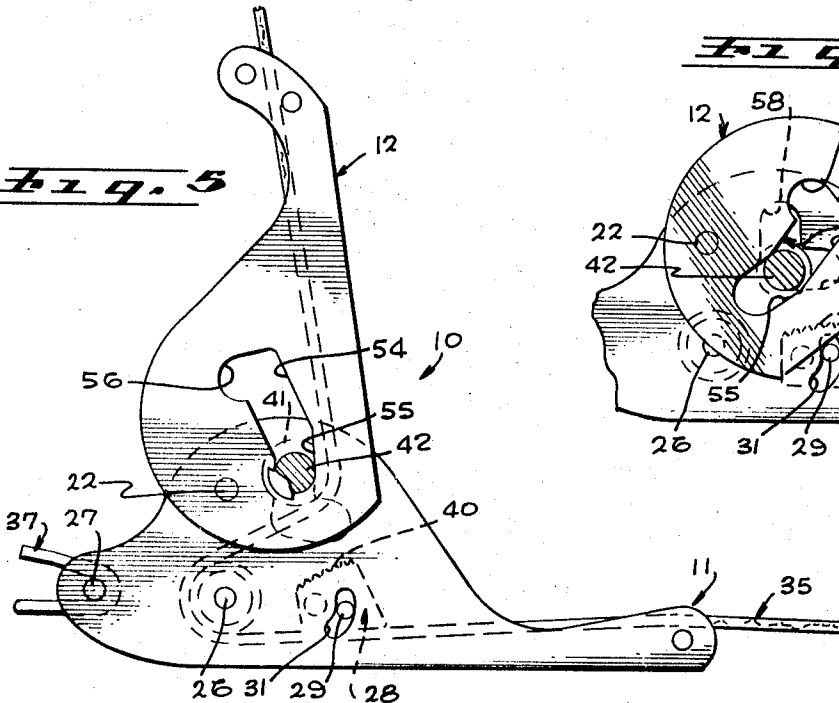


Fig. 6

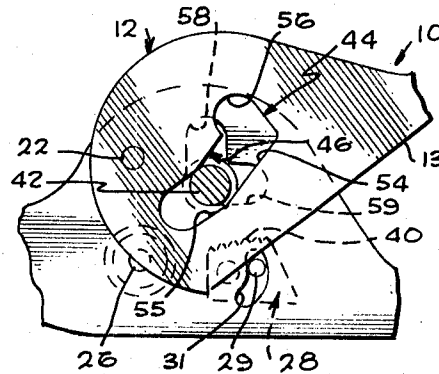


Fig. 7

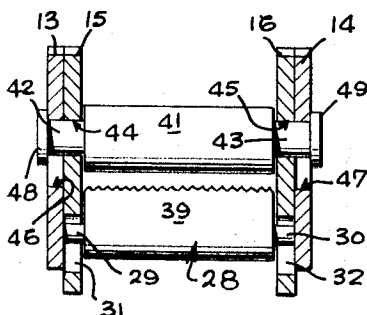
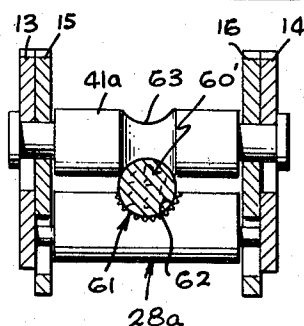


Fig. 8



LA VERE J. EVELAND
INVENTOR

By *R. E. Deane*
ATTORNEY

1

3,344,486

BUCKLE HAVING A PRESSURE MEMBER CONNECTED TO SLOTTED PIVOTALLY RELATED FRAME MEMBERS

La Vere J. Eveland, North Hollywood, Calif., assignor of one-half to Irving M. Golden, Burbank, Calif.
Filed June 15, 1965, Ser. No. 464,035
8 Claims. (Cl. 24—194)

ABSTRACT OF THE DISCLOSURE

A buckle comprising two frame members which are pivotally connected together, with each side of both frame members containing a cam slot. The pair of slots on each side receives one end of a pressure member so that relative movement between the frame members moves the pressure member toward and away from one side of the belt. The opposite side of the belt is engaged by a cam member which is pivoted to one of the frame members for limited pivotal movement and is generally opposite the pressure member. During closing of the buckle, the pressure member is moved adjacent the belt and upon opening the buckle, the pressure member is moved away from the belt and cam member in the direction of the tension on the belt.

This invention relates to a buckle and more particularly to a cargo buckle in which the strap is released by moving the pressure roller away from the strap.

A common type of cargo buckle has an eccentric gripping portion mounted on a rotatable cam member and the strap is gripped between a stationary member and the cam member. After tension is placed on the strap, the gripping portion moves in the direction of the tension to grip the strap tighter by embedding the teeth of the gripping portion further into the strap. In order to release the strap, the gripping portion must be moved in the opposite direction thereby increasing the strap tension and causing the teeth to cut into the strap, thereby damaging the strap. In some instances, the gripping portion becomes so tightly embedded in the strap that a hammer has to be used to apply enough force to the cam member to release the strap.

The buckle of the present invention also utilizes a cam member with an eccentric gripping portion and the strap is held between the cam member and a pressure roller. Also, after tension is placed on the belt, the teeth on the gripping portion moves in the direction of the tension and becomes more embedded in the strap material. However, the strap is released by upward and forward movement of the pressure roller so that the teeth on the gripping portion follow the strap out of the buckle on release and do not cut into the strap material. Thus, the strap can be easily released under any tension. The upward movement of the roller is accomplished by a cam action on the ends of the pressure roller. The cam action is produced by inserting the ends through cam slots in relatively movable frame members. The cam member is rotatively mounted in fixed location on one of the frame members and the pressure roller is suspended by both frame members. The strap can pass underneath a cross-piece on said other frame member so that the buckle can be released by pulling on the strap which in turn produces relative movement between the frame members. Since the pressure roller is movable, the same buckle can be used with straps which vary in thickness over a considerable range.

It is therefore an object of the present invention to provide a buckle which releases a strap without cutting the strap.

Another object of the invention is to provide a cargo

2

buckle in which the strap is gripped between the gripping surface portion of a cam member and a pressure roller and is released by movement of the pressure roller.

A further object of the invention is to provide a buckle in which the teeth on the gripping surface portion move in the same direction as the tension on the strap when the strap is released thereby preventing damage to the strap.

Another object of the invention is to provide a buckle for a cargo strap which can be released by lifting one end of the strap.

These and other objects of the invention not specifically set forth above will become readily apparent from the accompanying description and drawings in which:

FIGURE 1 is a side elevational view of the buckle holding a strap tightly around a cargo box;

FIGURE 2 is an enlarged side elevational view similar to FIGURE 1;

FIGURE 3 is a top plan view along line 3—3 of FIGURE 2 with the strap removed;

FIGURE 4 is a vertical section along line 4—4 of FIGURE 3 showing the strap held by the buckle;

FIGURE 5 is a side elevational view of the buckle with the parts in position to fully release the strap;

FIGURE 6 is a partial side elevational view of the buckle showing the parts in an intermediate release position;

FIGURE 7 is a transverse vertical section along line 7—7 of FIGURE 2 showing the pressure roller and cam member; and

FIGURE 8 is a view similar to FIGURE 7 of a modification of the buckle which receives a rope.

Referring to the embodiment of the invention chosen for purposes of illustration, the buckle 10 comprises a base frame member 11 and a smaller release frame member 12. The frame member 12 has sides 13 and 14 located at the outer surfaces of sides 15 and 16, respectively, of frame member 11. Sides 13 and 14 are held together by rods 20, 21 and 22 which are rigidly secured at each end to the sides. The pin 22 passes through openings in the sides 15 and 16 of the base frame member in order to pivotally connect the two frame members together.

The sides of the base frame member 11 are held together by rods 24, 25, 26 and 27 which are rigidly secured at each end to the sides. The rod 25 pivotally supports a cam member 28 which has pins 29 and 30 extending from opposite ends into curved slots 31 and 32 in sides 15 and 16, respectively (see FIGURE 7). The slots and pins position the cam member and limit the amount of its rotational movement. The rod 26 rotatably supports a guide roller 33 located next to cam member 28 so that one end 34 of the strap 35 can extend from the cam member around the roller 31 and then reverse direction. Rod 27 provides an anchor for the arms 36 of hook 37 on the other end 38 of the strap. The cam member 28 has a gripping portion 39 which is eccentric about rod 25 and has teeth 40 for gripping the strap.

A pressure roller 41 is located between sides 15 and 16 and has reduced ends 42 and 43 which extend through cam slots 44 and 45 in sides 15 and 16, respectively, and through cam slots 46 and 47 in sides 13 and 14, respectively. Enlarged caps 48 and 49 are placed on the ends of 42 and 43 to prevent these ends from moving into position to cock the roller 41 (see FIGURE 7). The slots 46, 47 each comprise a straight portion 54 having an angularly extending portion 55 at one end and a semi-circular portion 56 at the other end. Slots 44, 45 are L-shaped and comprise leg portions 58 and 59.

As illustrated in FIGURE 4, the free end 34 of the strap 35 is inserted into the buckle 10 by placing it over the rod 24, around the roller 33, over the gripping portion 39 and between rods 20 and 21. Since the other

3

free end 38 is attached to pin 27 by hook 37, the strap 35 can be pulled tightly around cargo 60 as illustrated in FIGURE 1, by pulling on the free end 34. With the frame members in the normal position shown in FIGURES 2 and 4 wherein the rod 21 of frame 12 is adjacent the upper edge of frame 11, the tightened strap 35 engages the lower surface of cam member 28 and causes the member to rotate until the gripping portion 39 engages the strap opposite the pressure roller 41. The eccentric gripping portion increases in radius about the rod 25 so that the member 28 will rotate more to engage a thin strap than to engage a thick strap. When the free end 34 is released, the gripping portion 39 will rotate slightly in the direction of tension on the strap in order to more firmly engage and hold the strap by embedding teeth 40 into the strap. Thereafter, the strap is firmly held under tension and the ends 42 and 43 are located in slot portions 56 so that the pressure roller 41 is locked in position.

When it is desired to release the strap, the frame member 12 is moved about pivot rod 22 and this can be accomplished by pulling outwardly on free strap end 34 in order to place an outward, opening force on rod 20. The first joint action of the cam slots 44, 45 and 46, 47 is to move the ends 42 and 43 of pressure roller 41 out of portion 56 and then along the leg portions 59 of slots 44, 45 by engagement of the ends with slot portion 54 of slots 46, 47 (see FIGURE 6). This action moves the pressure roller away from the gripping portion 39 in the direction of the tension on the strap. As the strap is released, the gripping portion will rotate somewhat with the strap and then it loses its grip on the strap because of the space developed by movement of the pressure roller. Further movement of the frame 12 causes the angular slot portions 55 to engage the ends 42 and 43 of the pressure roller and move the ends along the leg portion 58 of the slots 44, 45 to the ends of the leg portion 58 (see FIGURE 5). In this position of frame member 12, the pressure roller 41 is held away from the cam member 28 to provide a large strap space. The buckle is adapted for use with a wide range of strap thicknesses since very thin straps can also be held by the variable gripping action of the eccentric gripping portion 40. The pins 29 and slots 31 stop the rotation of cam member 28 toward the roller 41 just short of contact of the large radius teeth with the roller and stop the rotation of the roller in the other direction when the teeth 40 of minimum radius are opposite the roller. Within this range of movement, the strap portion below the cam member will produce a rotational force on the cam member to move it towards the strap portion adjacent the pressure roller, regardless of the thickness of the strap.

Since the relative movement of the frame members moves the pressure roller away from the teeth 40 in the direction of pull on the strap, the teeth follow the strap as it commences to move out of the buckle on release and therefore, the teeth do not cut into the strap material. Also, release can be easily accomplished for any pressure load on the strap since it is not necessary to move the cam member in a direction to increase the tension before release of the strap can commence. The movement of the pressure roller also permits the buckle to produce an effective holding action on thick, as well as thin straps. If there is danger of accidental release of the buckle by movement of strap end 40, the end can be placed over, rather than under, the rod 20 so that the frame member 12 must be moved for release directly by the fingers.

The buckle can be modified, as illustrated in FIGURE 8, to accommodate a rope 60' rather than the strap 35. The eccentric gripping portion 61 of cam member 28a comprises a curved groove having teeth 62 for engaging the rope and pressure roller 41a contains an opposite curved groove 63 for locating the rope. Otherwise, the buckle has the same construction and operation as the buckle of FIGURE 2. Also, the roller 33 could be elim-

4

inated so that the strap 34 would wrap directly around the cam member 28. This modification would be particularly suitable for a seat belt buckle. The two frame members can be formed from blanks of sheet material with the member 13 closed on the bottom and open at the top to receive a formed frame member 12. Various other modifications are contemplated by those skilled in the art without departing from the spirit and scope of the invention as hereinafter defined by the appended claims.

What is claimed is:

1. A buckle for holding a strap comprising:

a first frame member having a first pair of spaced sides;

a second frame member having a second pair of spaced sides, the sides of said second pair being adjacent the sides of said first pair;

pivot means for pivotally connecting said first and second frame members together;

cam means pivotally supported by said first pair of sides and having a gripping portion for engaging said strap;

a first pair of cam slots in said first sides and a second pair of cam slots in said second sides;

a pressure roller normally located opposite said cam member for holding said strap against said gripping portion and having opposite ends, each end passing through the cam slots in the sides of said first and second members adjacent one another; and

said slots being shaped to move said pressure roller away from said strap upon relative movement between said frame members about said pivot means.

2. A buckle as defined in claim 1 wherein said first pair of slots are L-shaped with one leg extending in the direction of tension on said strap from an end located opposite said cam means and the other leg extending from the other end of said first leg outwardly, said second pair of cams moving said ends of said pressure roller upon relative movement of said frame members from said normal position along said one leg and then along said other leg to move said roller relative to said strap in the direction of tension and then outwardly.

3. A buckle as defined in claim 2 wherein each of said second cam slots have cutaway portions at one end thereof for receiving and holding the ends of said pressure roller in said normal strap gripping position while said frame members are in their normal, strap gripping position, said cutaway portion being moved to release said ends upon initial relative movement of said members.

4. A buckle as defined in claim 1 having a guide roller spaced from said cam means along said strap in the direction of tension on the strap, said strap passing underneath said cam means, around said guide roller and between said cam means and said pressure roller, the portion of the strap underneath said cam means producing a force on said cam means for rotating said gripping portion into engagement with said strap.

5. A buckle as defined in claim 4 having a pin projecting from each end of said cam means and into an arcuate slot in a side of said first pair, said slot limiting the range of strap engaging positions of said cam means.

6. A buckle as defined in claim 1 having rods for securing said pairs of sides together, the free end of said strap emerging from said buckle between a pair of rods for said second frame member so that the buckle can be opened by an outward pull on said strap end.

7. A buckle for holding a strap comprising:

frame means having first and second frame members pivotally connected to one another;

cam means pivotally mounted on one of said frame members and having a gripping portion movable relative to said one frame member into engagement with one side of said strap;

a movable pressure member located opposite said cam means; and

5

means associated with said frame members and producing a force on said pressure member upon pivotal movement between said frame members for locating said pressure member against the other side of said strap in one relative position of said frame members and for moving said pressure member away from said other side of said strap upon relative movement of said frame members from said one position; said last mentioned means comprising slots in said frame members for slidably receiving the ends of said pressure member.

8. A buckle for holding a strap comprising: frame means having first and second frame members pivotally connected to one another; cam means pivotally mounted on one of said frame members and having a gripping portion movable relative to said one frame member into engagement with one side of said strap; a movable pressure member located opposite said cam means; means associated with said frame members and producing a force on said pressure member upon pivotal movement between said frame members for locating said pressure member against the other side of said strap in one relative position of said frame members and for moving said pressure member away from said

6

other side of said strap upon relative movement of said frame members from said one position; and guide roller means spaced from said cam means along said strap in the direction of tension on the strap, said strap passing underneath said cam means, around said guide roller and between said cam means and said pressure member, the portion of the strap underneath said cam means producing a force on said cam means for rotating said gripping portion into engagement with said strap.

References Cited

UNITED STATES PATENTS

2,551,579	6/1950	George	24—171
2,653,365	9/1953	Elsner	24—170
2,948,939	8/1960	Prete	24—171
2,964,815	12/1960	Sereno	24—194 X
2,977,655	4/1961	Peters	24—196
3,013,317	12/1961	Weber	24—75
3,013,318	12/1961	Davis	24—196
3,091,830	6/1963	Harley	24—170

WILLIAM FELDMAN, *Primary Examiner*.MILTON S. MEHR, *Examiner*.