

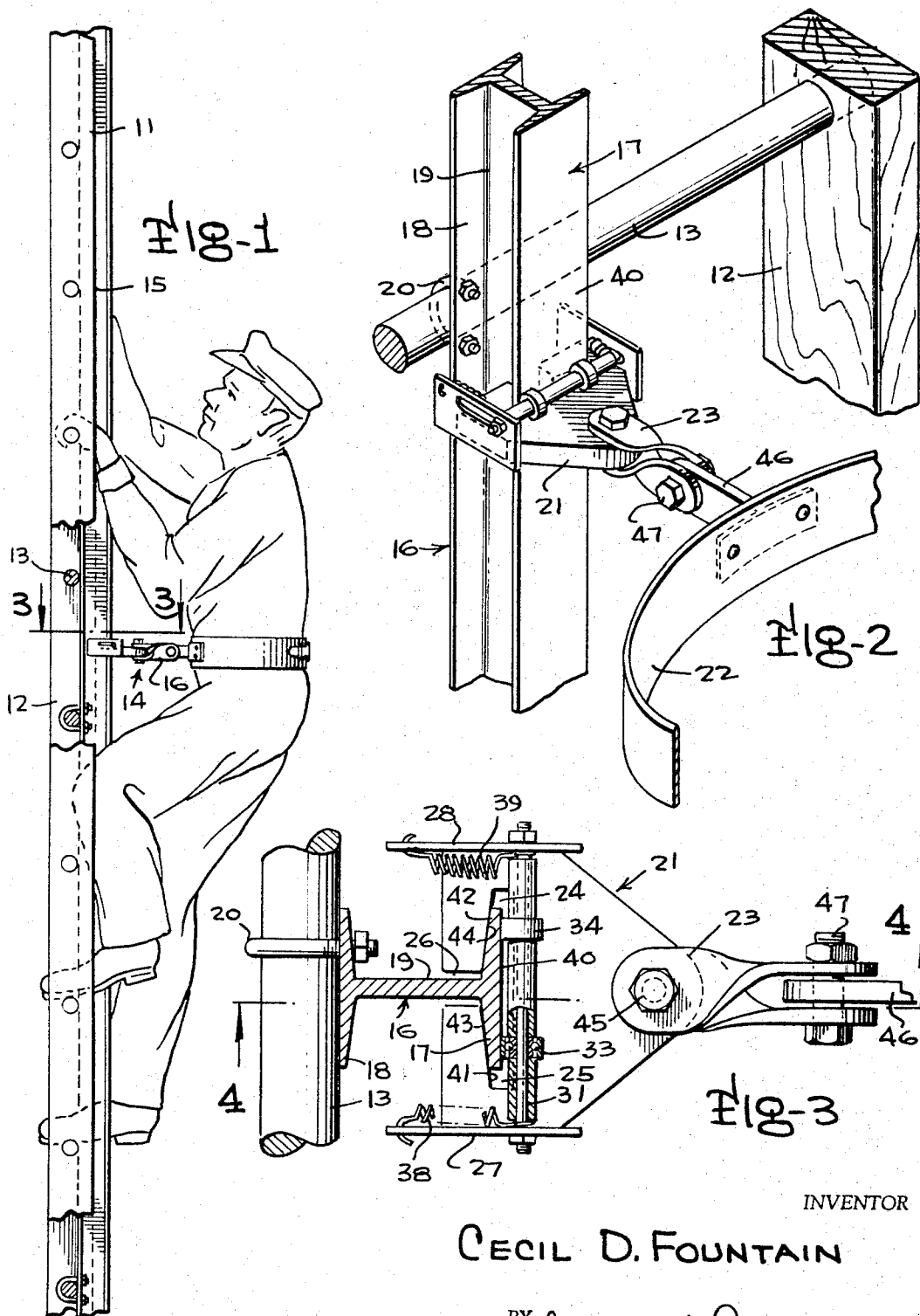
Nov. 12, 1968

C. D. FOUNTAIN  
CLIMBING SAFETY DEVICE

3,410,364

Filed April 17, 1967

2 Sheets-Sheet 1



INVENTOR

CECIL D. FOUNTAIN

BY *Mason, Fenwick & Lawrence*  
ATTORNEYS

Nov. 12, 1968

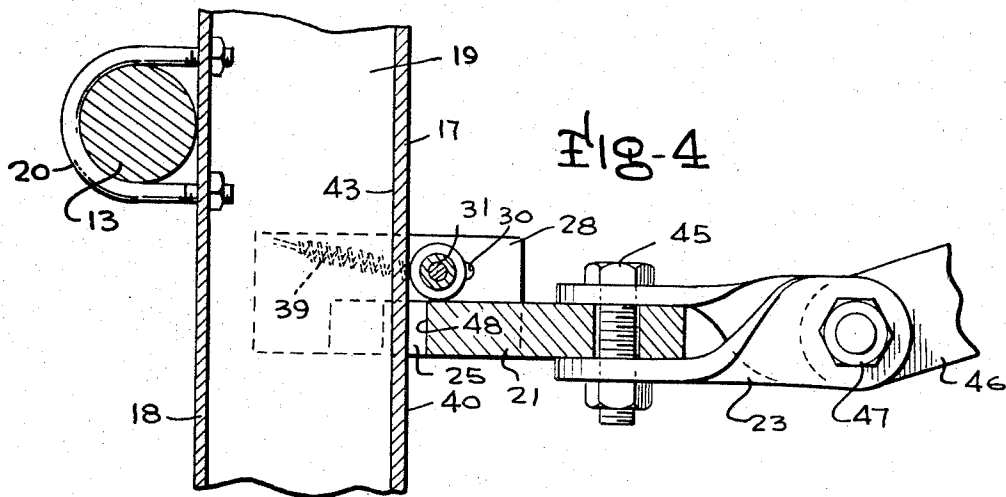
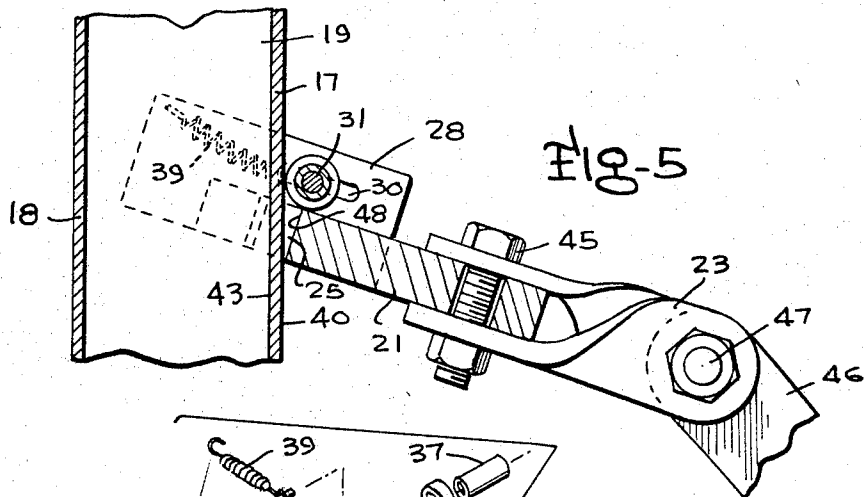
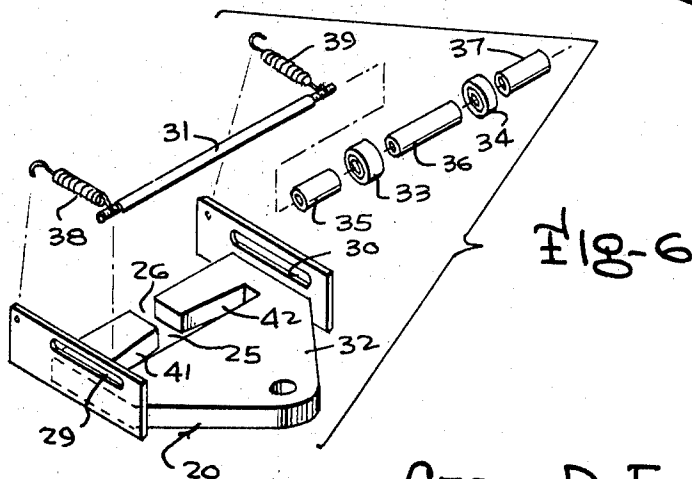
C. D. FOUNTAIN

3,410,364

CLIMBING SAFETY DEVICE

Filed April 17, 1967

2 Sheets-Sheet 2



INVENTOR

CECIL D. FOUNTAIN

BY  
Mason, Fenwick & Lawrence  
ATTORNEYS

1

3,410,364

## CLIMBING SAFETY DEVICE

Cecil D. Fountain, 1006 E. Hillsborough Ave.,  
Tampa, Fla. 33604

Filed Apr. 17, 1967, Ser. No. 631,435

14 Claims. (Cl. 182-9)

### ABSTRACT OF THE DISCLOSURE

A climbing safety device suitable for use with a vertically disposed climbing member such as a ladder for preventing the fall of the user thereof, as the user ascends or descends along the vertically disposed climbing member, including a locking member secured to the user and operatively connected for sliding movement along a vertically disposed guide means which is operative to bind and thus lock onto the guide means under certain predetermined conditions to arrest the vertical movement of the user.

### Background of the invention

In the prior art, there are various types of climbing safety devices intended for use by individuals in ascending or descending vertically disposed climbing members for preventing the fall of the individual under circumstances where the individual loses his footing or grip on the particular member being climbed, such as ladders and the like. Most of such devices have been found to be suitable to some extent in arresting the fall of the climber. However, such conventional devices also have been found to be either complicated in construction, insufficiently effective to instantaneously arrest the fall of the climber when he loses his footing or grip, or cumbersome to the extent of interfering with or impeding the motion of the climber while ascending or descending.

### Objects of the invention

The principal object of the present invention is to provide a novel climbing safety device suitable for use by individuals ascending or descending a vertically disposed climbing member.

Another object of the present invention is to provide an improved climbing safety device suitable for use by an individual climbing a vertically disposed member such as a ladder, which is effective in instantaneously arresting the fall, and supporting the weight of the individual when he has accidentally lost his footing or grip on the member being climbed.

A further object of the present invention is to provide an improved climbing safety device suitable for use by an individual for ascending or descending a vertically disposed climbing member which cooperates with a fixed guide means disposed coextensively with and adjacent to the vertically disposed climbing member and which is adapted to be connected to the body of the individual.

A still further object of this invention is to provide a novel climbing safety device suitable for use by an individual for ascending or descending along a vertically disposed climbing member which is adapted to permit normal ascent or descent of the individual but will instantaneously arrest any sudden or abrupt downward movement of the individual.

Another object of the present invention is to provide a novel climbing safety device suitable for use by an individual in ascending or descending along a vertically disposed climbing member which is simple in construction, inexpensive to manufacture, and reliable in performance.

Other objects and advantages of the invention will become more apparent to those persons skilled in the art, from the following description of a practical embodiment

2

thereof, when taken in conjunction with the accompanying drawings which form a part of this specification.

### Brief description of the drawings

FIGURE 1 is an elevational view of an embodiment of the invention, illustrated in its normal operating environment.

FIGURE 2 is an enlarged perspective view of the embodiment illustrated in FIGURE 1, having portions thereof broken away.

FIGURE 3 is an enlarged cross-sectional view taken along line 3-3 in FIGURE 1.

FIGURE 4 is a cross-sectional view taken along line 4-4 in FIGURE 3.

FIGURE 5 is a view similar to the view shown in FIGURE 4, illustrating the embodiment in the locking condition.

FIGURE 6 is a perspective view of a subassembly of the embodiment, illustrating various components thereof in exploded relation.

### Description of the preferred embodiment

Briefly described, the present invention relates to a climbing safety device suitable for use with a vertically disposed climbing member for preventing the fall of the user thereof as the user ascends or descends along the vertically disposed climbing member, generally comprising a rigid guide means disposed coextensively and adjacent the vertically disposed climbing member, and a locking member secured to the user and operatively connected to the guide means for sliding movement vertically thereon, the locking member having an opening therethrough for receiving at least a portion of the guide means therethrough, the opening being of sufficient size to permit the locking member to slide freely along the guide means when the locking member is disposed within predetermined angular limits lying in the plane of vertical movement of the locking member, and to bind with the guide means when the locking member is disposed without the predetermined angular limits, thus locking onto the guide means and arresting the vertical movement of the user relative to the guide means. In addition, yieldable means are provided on the locking means operatively engageable with the guide means for retaining the locking member within the predetermined angular limits during predetermined vertical movement of the user relative to the guide means.

Referring to the drawings, there is illustrated a specific embodiment of the invention. The embodiment illustrated in the drawings is adapted to be used with a vertically disposed climbing member such as a ladder 10, as illustrated in FIGURE 1. The ladder is of a conventional construction, including a pair of spaced side rails 11 and 12 interconnected by means of a plurality of vertically spaced rungs 13. The climbing safety device 14 consists of two major components including a guide rail 15 and a locking unit 16. The guide rail 15 illustrated in the drawings, consists of an I-beam including a pair of substantially parallel flanges 17 and 18, and a web section 19. The guide rail, as illustrated in the drawings, is adapted to be secured rigidly to the ladder 10 by means of a plurality of U-bolts 20. The guide rail is disposed coextensively against the rungs 13 of the ladder intermediate the side rails 11 and 12. Each of the U-bolts is adapted to straddle a rung of the ladder, having the threaded leg portions thereof extending through openings in the flange 18 of the guide rail. The guide rail is held rigidly against the rungs of the ladder by means of suitable nuts threaded on the legs of the U-bolts, as best illustrated in FIGURES 2, 3 and 4.

The locking device 16 includes a connecting plate member 21, a belt 22 adapted to be worn by the user,

and a linking member 23 pivotally interconnecting the plate member 21 and the belt 22. The plate member 21 is provided with a substantially T-shaped slot, which is adapted to receive the flange 17 and a portion of the web section 19 of the guide rail therethrough when the plate member 21 is mounted on the guide rail. The width of the transverse portion 25 of the slot 24 is slightly greater than the thickness of the flange 17 and the width of the longitudinal portion 26 of the slot is slightly greater than the thickness of the web section 19, as best illustrated in FIGURE 3, to permit the plate member 21 to slide freely on the guide rail 15 when the plate member 21 is disposed horizontally, substantially normal to the guide rail and within predetermined angular limits relative to the horizontal position of the plate member, as limited by the width of the transverse section 25 of the slot.

Mounted on the plate member 21 are transversely spaced upstanding brackets 27 and 28 having aligned guide slots 29 and 30. The slots 29 and 30 are adapted to receive the ends of a cross bar member 31 and guide the bar member longitudinally above the upper surface 32 of the plate member. Rotatably mounted on the cross bar 31 is a pair of roller bearings 33 and 34 which are maintained in transversely spaced relation by means of spacer sleeves 35, 36 and 37 also mounted on cross bar member 31. The cross bar member is urged in the direction of the slot 24 by means of a pair of springs 38 and 39 which interconnect the ends of cross bar member 31 and the forwardly disposed ends of upstanding brackets 27 and 28.

With the connecting plate member assembled, as illustrated in FIGURES 2 through 5, the roller bearings 33 and 34 are adapted to ride on the upper surface 32 of the plate member and engage the outer face 40 of flange 17 of the guide rail. The springs 38 and 39 are provided with sufficient tension, so that the roller bearings 33 and 34 continuously engage the outer face 40, and the forwardly disposed wall surfaces 41 and 42 of slot 24 are caused to engage the inner faces 43 and 44 of flange 17. The action of the springs 38 and 39 is effective in maintaining the forwardly disposed wall surfaces 41 and 42 of the slot 24 in constant engagement with the inner faces 43 and 44 of flange 17, so that the plate member 21 is maintained substantially horizontal or normal to the guide rail 16. Preferably, the surfaces 41 through 44 are disposed normal to the plate member 21.

The forward end of linking member 23 is pivotally connected to the rear end of plate member 21 by means of a bolt member 45. The axis of the bolt member 45 is disposed substantially normal to the upper surface 32 of the plate member, so that the linking member may be pivoted about the axis of the bolt member in a plane parallel to the upper surface 32 of the plate member. The rear end of linking member 23 is pivotally connected to a forwardly projecting bracket member 46, by means of a bolt member 47. The axis of the bolt member 47 is offset 90° relative to the axis of bolt member 45. In addition, the bracket member 46 is rigidly secured to the belt 22. It will be appreciated that the pivotal connection of the linking member to the belt and the plate member permits a user wearing the belt to move freely relative to the plate member 21, as when ascending or descending on the ladder 10.

In the use of the device as described and illustrated in the drawings, the connecting plate member 21 is mounted on the guide rail, and the belt is secured about the waist of the user, as shown in FIGURE 1. Under conditions where the climber is ascending or descending at a normal predetermined rate, the plate member 21 will remain either horizontal or within predetermined angular limits relative to the horizontal, and slide freely along the guide rail 16. The action of the springs 38 and 39 causing the roller bearings 33 and 34 mounted on the cross bar member 31 to engage the outer surface 40 of the flange 17,

will bias the plate member 21 in a position substantially horizontal, as illustrated in FIGURE 4.

Upon any sudden downward movement of the user as when he loses either his footing or grip on the ladder and falls, the plate member 21 will be pulled downwardly beyond the lower angular limit of travel of the plate member, so that the upper edge portions of wall surfaces 41 and 42 engage inner faces 43 and 44 of flange 17, and the lower edge portion of the rearwardly disposed wall surface 48 of slot 24 engages the outer face 40 of the flange 17. Under such conditions, the plate member 20 will bind and lock onto guide rail 16, as illustrated in FIGURE 5, to arrest the downward movement of the user. This would then permit the user to regain his grip and footing on the ladder. As soon as his position is secure on the ladder, the user can easily move his body unwardly to permit the plate member 21 to be positioned within the angular limits, thereby permitting the device to slide freely on the guide rail. It will be appreciated that the pivotal freedom of movement of the plate member 21 is dependent upon the thickness of the flange 40, the width of the transverse portion 25 of slot 24, the thickness of the plate member and the force of the springs 38 and 39. By adjusting these various parameters, the desired angular limits of the plate member 20 can be fixed.

It will be noted that the present invention is effective in preventing the fall of the user, yet unlikely to interfere with his climbing. With the guide rail secured to the rungs of the ladder intermediate the side rails, the user is free to step on and grip the ends of the rungs of the ladder in conventional fashion. Normal movements of the user as he is climbing are permitted by the pivotal connections of the linking member and the freedom of movement of the connecting plate member between the previously described angular limits.

The components of the locking device can be constructed of any suitable materials having sufficient strength characteristics. In addition, the components can be fabricated by any suitable method which is economical.

From the foregoing detailed description it will be evident that there are a number of changes, adaptations and modifications of the present invention which come within the province of those skilled in the art. However, it is intended that all such variations not departing from the spirit of the invention be considered as within the scope thereof as limited solely by the appended claims.

I claim:

1. A climbing safety device suitable for use with a vertically disposed member for preventing the fall of the user thereof as the user ascends or descends along said vertically disposed member comprising rigid vertical guide means disposed adjacent said vertically disposed member and a locking means including a connecting member operatively connected to said guide means for sliding movement vertically thereon, said connecting member having an opening therethrough for receiving at least a portion of said guide means therethrough, said opening being of sufficient size to permit said connecting member to slide freely along said guide means when said connecting member is disposed within predetermined angular limits lying in the plane of vertical movement of said connecting member, and to bind with said guide means when said connecting member is disposed without said predetermined angular limits, means mounted on said connecting means for urging at least a portion of the forwardly disposed wall of said opening into sliding engagement with said guide means and means for connecting said connecting means to said user.

2. A climbing safety device according to claim 1, wherein said opening in said connecting member is T-shaped and receives therethrough a T-shaped portion of said guide means.

3. A climbing safety device according to claim 1, wherein said urging means is spring biased.

4. A climbing safety device according to claim 1,

5

wherein said urging means is provided with roller means engageable with said guide means to permit said connecting means to move freely along said guide means when said user is ascending or descending and said connecting means is disposed within said predetermined angular limits.

5. A climbing safety device according to claim 1, wherein said urging means is spring biased and said urging means is provided with roller means engageable with said guide means to permit said connecting means to move freely along said guide means when said user is ascending or descending and said connecting means is disposed within said predetermined angular limits.

6. A climbing safety device according to claim 5, wherein said opening in said connecting member is T-shaped and receives therethrough a T-shaped portion of said guide means.

7. A climbing safety device suitable for use with a vertically disposed member for preventing the fall of the user thereof as the user ascends or descends along said vertically disposed member comprising an I-beam member having means for securing the same to said vertically disposed member and a locking unit including a connecting plate member operatively connected to said I-beam member for sliding movement vertically thereon, said connecting plate member having a T-shaped opening therethrough for receiving a flange section and a portion of the web section of said I-beam therethrough, said opening having a sufficient size to permit said connecting plate member to slide freely along said flange of the I-beam member received through said opening when said connecting plate member is disposed within predetermined angular limits lying in the plane of vertical movement of said connecting plate member, and to bind with said flange of the I-beam member when the connecting plate member is disposed without said predetermined angular limits, means mounted on the connecting plate member for urging at least a portion of the wall of said opening into sliding engagement with said flange of said I-beam member and means for connecting said connecting plate member to said user.

8. A climbing safety device according to claim 7, wherein said urging means is spring biased.

9. A climbing safety device according to claim 7, wherein said urging means is provided with roller means engageable with said flange of said I-beam to permit said connecting means to move freely along said flange when said user is ascending or descending and said connecting plate means is disposed within said predetermined angular limits.

10. A climbing safety device according to claim 7, wherein said urging means is spring biased and said urging means is provided with roller means engageable with said flange of said I-beam member to permit said connecting means to move freely along said flange of said I-beam member when said user is ascending or descending and said connecting plate member is disposed within said predetermined angular limits.

11. A climbing safety device according to claim 7, wherein said urging means is mounted on said connecting plate member and spring biased against the outer face of said flange of the I-beam member.

12. A climbing safety device according to claim 7, wherein said urging means is mounted on said connecting plate member and spring biased against the outer face

6

of said flange of the I-beam member, guide means are provided on said connecting plate member for said urging means and said urging means is provided with roller means engageable with said flange of the I-beam member and an upper planar surface of said connecting plate member for rolling engagement therewith.

13. A climbing safety device suitable for use with a vertically disposed member for preventing the fall of the user thereof as the user ascends or descends along said vertically disposed member comprising rigid vertical guide means having means for securing the same to said vertically disposed member and a locking unit including a connecting member operatively connected to said guide means for sliding movement vertically thereon, said connecting member having an opening therethrough for receiving at least a portion of said guide means therethrough, said opening being of sufficient size to permit said connecting member to slide freely along said guide means when said connecting member is disposed within predetermined angular limits lying in the plane of vertical movement of said connecting member, and to bind with said guide means when said connecting member is disposed without said predetermined angular limits thus arresting the vertical movement of said user relative to said guide means, yieldable means mounted on said connecting means operatively engageable with said guide means for retaining said connecting member within said predetermined angular limits during predetermined vertical movement of said user relative to said guide means and means for connecting said connecting means to said user.

14. A locking unit for a climbing safety device including rigid vertical guide means adapted to be secured coextensively on a vertically disposed climbing member, suitable for use in preventing the fall of the user thereof as the user ascends or descends along said vertically disposed member comprising a connecting member operatively connectable to said guide means for sliding movement vertically thereon, said connecting member having an opening therethrough for receiving at least a portion of said guide means therethrough when connected thereto, said opening being of sufficient size to permit said connecting member to slide freely along said guide means when said connecting member is disposed within predetermined angular limits lying in the plane of vertical movement of said connecting member, and to bind with said guide means when said connecting member is disposed without said predetermined angular limits, means mounted on said connecting means for urging at least a portion of the forwardly disposed wall of said opening into sliding engagement with said guide means and means for connecting said connecting means to said user.

#### References Cited

##### UNITED STATES PATENTS

|           |         |          |       |
|-----------|---------|----------|-------|
| 1,916,208 | 7/1933  | Diou     | 182—8 |
| 1,927,469 | 9/1933  | Plumpton | 182—8 |
| 1,955,473 | 4/1934  | Raymer   | 182—9 |
| 3,348,632 | 10/1967 | Swager   | 182—8 |

##### FOREIGN PATENTS

43,845 3/1966 Germany.

REINALDO P. MACHADO, *Primary Examiner*.