July 21, 1970 J. A. DUNSTER 3,521,333

RELEASABLE FASTENERS

Filed May 8, 1968

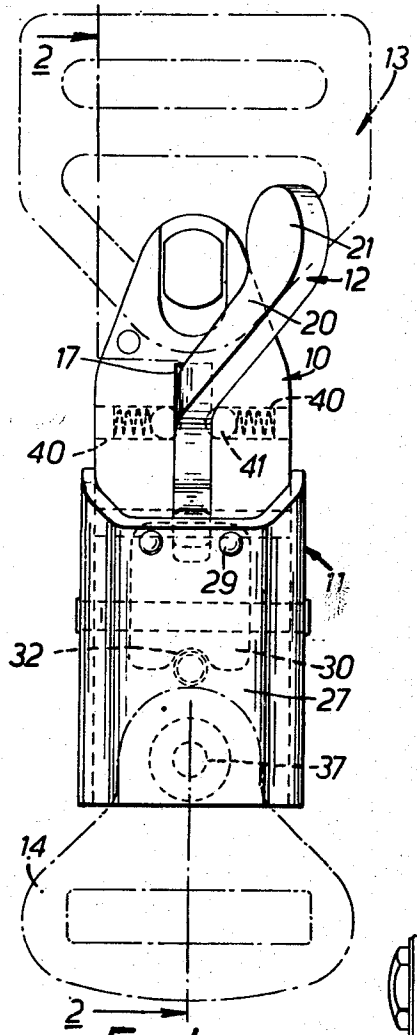


FIG. 1.

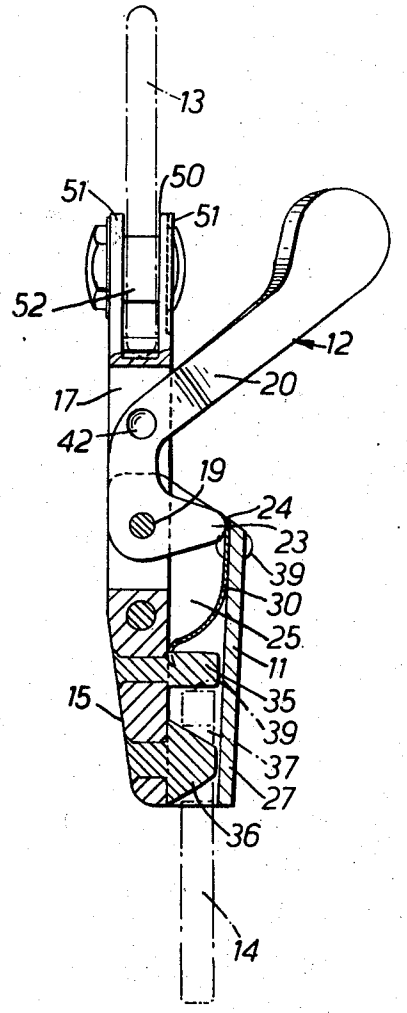


FIG. 2.

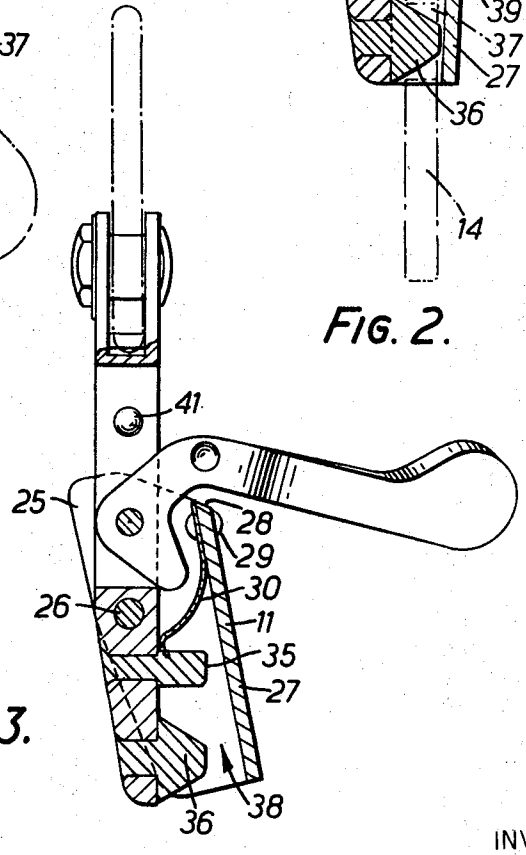


FIG. 3.

INVENTOR
JAMES ALFRED DUNSTER

BY
Watson, Cole, Grindle & Watson
ATTORNEY

United States Patent Office 3,521,333 Patented July 21, 1970

3,521,333

RELEASABLE FASTENERS

James A. Dunster, Camberley, England, assignor to Aerolex Products Limited, Surrey, England

Filed May 8, 1968, Ser. No. 727,590
Int. Cl. A44b 11/25
U.S. Cl. 24—230 10 Claims

ABSTRACT OF THE DISCLOSURE

This application discloses a releasable fastener for use particularly in parachute harness. The fastener includes a body having a frusto-conical stud to locate another part having a cooperating hole therein, a shroud being pivoted to the body to move between positions in which the plate can be retained and released, and a locking lever e.g. of bell-crank form being provided for moving the shroud to the retaining position against the action of a leaf spring.

This invention relates to releasable fasteners and in particular to a fastener which is employed to secure an arms' container to a harness of a paratrooper. It is commonplace for a paratrooper to carry below his reserve parachute, which is strapped to his chest, an arms' container which may weigh 40 lbs. or more and for this arms' container to be released by the paratrooper shortly before he reaches the ground. The arms' container is connected to one end of a lanyard, e.g. of say 20' in length, which has its other end secured to his parachute harness and as a result the arms' container contacts the ground some seconds before the paratrooper, the sudden reduction in load on the parachute slowing down the rate of descent of the paratrooper immediately before landing.

With such an arrangement it is necessary to provide at least one and usually two releasable fasteners which can readily release the arms' container manually without the incorporation of delicate mechanism.

According to the present invention a releasable fastener comprises a body having a first shoulder for engagement with a second shoulder on another part so that a load can be transmitted between the body and the said other part, in at least one linear direction, but the body and other part being relatively movable to engage or disengage the shoulders in a direction substantially at right angles to said linear direction, a shroud being pivotally mounted on the body for movement between locking and release positions in which said engagement or disengagement is respectively prevented and permitted, a locking lever mounted on the body and arranged positively to move the shroud at least to its locking position, and latching means being provided to secure the lever against inadvertent return from the position it adopts when it has moved the shroud to the locking position.

Spring means is preferably incorporated to return the shroud to the release position. This may be a leaf spring firmly secured to the shroud and having an end bearing on the body. The latching means may conveniently comprise spring biased balls mounted on the body and arranged to engage recesses formed on the lever.

A particularly simple arrangement comprises a lever of bell crank form, one arm of which is arranged to engage an abutment surface on the shroud to cause its pivotal movement to the locking position and another arm extending away from the body to provide a manual operating member. The body may comprise a substantially flat plate having a slot in which the lever pivots.

The shroud may be of U section having the arms of the U pivoted to opposite outer edges of the plate. In this case the other part may comprise a flat plate

with a hole the margin of which affords the second shoulder, the first shoulder comprising a stud projecting from the body. The abutment surface referred to above may comprise a section of the spring which is formed of a material harder than that of the shroud itself in order to accommodate sliding contact between the lever and the spring.

The body may carry a stop to limit the extent of insertion of the other part when the hole and stud are in alignment.

The stud may be of frusto-conical form in order that when the shroud is moved to the release position with a load applied to the other part in the linear direction that part will become automatically detached from the stud.

The invention may be carried into practice in a number of ways but one specific embodiment will now be described by way of example with reference to the accompanying drawings in which;

FIG. 1 is a front elevation of a releasable fastener according to the present invention;

FIG. 2 is a sectional side elevation on the line 2—2 of FIG. 1 with a shroud in the locking position, and

FIG. 3 is a view similar to FIG. 2 showing the shroud in the release position.

Referring to the drawings, the fastener comprises three main parts, namely a body **10**, a shroud **11** and a lever **12**. Connected to the upper end of the body is a plate **13** by which the fastener is secured to a paratrooper's parachute harness. The fastener is arranged to have secured to it at its lower end a generally pear shaped plate **14** to which the ammunition or arms' pack of the paratrooper is connected.

The body **10** is substantially flat with the exception of a tapered surface **15** adjacent its lower end (see FIG. 2). The body has in a central region a slot **17** in which the lever **10** is pivotally mounted to rotate about a pivot **19**. As shown in FIG. 2 the lever **10** is of generally bell crank form, one arm **20** being elongated and off-set laterally as shown in FIG. 1 and provided with an enlarged head **21** at its end to facilitate ready manual operation. The other arm of the lever **23** has a smoothly rounded end **24** which serves to move the shroud **11** between a release position of FIG. 3 and a locking position of FIG. 2.

The shroud **11** is of generally U cross-section the side arms **25** being pivoted to the outer edges of the body **10** by a pivot pin **26**. What may be termed the base **27** of the U section shroud extends across the lower end of the body **10**, the upper edge **28** of the base **27** having a leaf spring **30** riveted to it by a pair of rivets **29**. The spring **30** is of curved form with its lower end provided with a notch **32** as shown in FIG. 1. This lower end bears on the front face of the body **10** so as to bias the shroud to the position it occupies in FIG. 3 when the lever is moved to the position shown in that figure. Secured to the body **10** in line with the slot **17** are a stop pin **35** and a frusto-conical stud **36**. As indicated in FIG. 2 the generally pear shaped plate **14** has an aperture **37** which is arranged to fit around the stud **36** after the plate **14** is inserted into a space **38** situated between the shroud and the stud **36** when the parts are in the FIG. 3 position. The upper end **39** of the plate **14** is arranged to abut the stop pin **35** which thereby acts as a stop when the aperture **37** and stud **36** are in alignment. Accordingly, after the plate **14** has been inserted to the limit allowed by the stop **35**, movement of the lever **12** to the position of FIG. 2 will cause the rounded end **24** of its arm **23** to engage the under-surface of the spring **30** midway between the rivets **29** and bias the shroud **11** clockwise in order to trap the plate **14** to the fastener. By using the spring to afford the surface against which

the lever acts the shroud can be manufactured out of a relatively soft alloy without wear taking place. Mounted in a pair of lateral bores **40** in the body **10** are a pair of spring biased ball catches **41** which are arranged to engage in semi-cylindrical recesses **42** formed in the side of the lever **20**. By this means the lever **20** is latched in the position of FIG. 2 against inadvertent release but can be readily moved manually to the position of FIG. 3 as soon as release is intended. It will be appreciated that because of the frusto-conical form of the stud **36** a downward load on the plate **14** will draw the plate immediately away from the engaged position as soon as the parts are moved to the FIG. 3 position.

As indicated in FIG. 2 the plate **13** is connected to the top of the body to permit of slight rotational movement and for this purpose the plate is received in a recess **50** formed between upper projecting portions **51** of the body and having extending between them a bolt **52** about which the plate **13** pivots.

What I claim as my invention and desire to secure by Letters Patent is:

1. A releasable fastener comprising a body having a first shoulder for engagement with a second shoulder on another part so that a load can be transmitted between the body and the said other part, in at least one linear direction, but the body and other part being relatively movable to engage or disengage the shoulders in a direction substantially at right angles to said linear direction, a shroud being pivotally mounted on the body for movement between locking and release positions in which said engagement or disengagement is respectively prevented and permitted, a locking lever mounted on the body and cooperatively arranged with respect to the shroud positively to move the shroud at least to its locking position, said body comprising a substantially flat plate having a slot within which said lever is pivoted, and latching means being provided to secure the locking lever against inadvertent return from the position it adopts when it has moved the shroud to its locking position.

2. A releasable fastener as claimed in claim **1** including spring means arranged to return the shroud to the release position.

3. A releasable fastener as claimed in claim **1** in which the spring means comprises a leaf spring firmly secured to the shroud and having an end bearing on the body.

4. A releasable fastener as claimed in claim **1** in which the latching means comprises at least one spring biased ball arranged to engage a recess formed on the lever.

5. A releasable fastener as claimed in claim **1** wherein the lever is of bell-crank form, one arm of the bell-crank being arranged to engage an abutment surface on the shroud to cause pivotal movement of the shroud to its locking position and another arm of the bell-crank extending away from the body to provide a manual operating member.

6. A releasable fastener as claimed in claim **1** in which the shroud is of U section having the arms of the U pivoted to opposite outer edges of the plate.

7. A releasable fastener as claimed in claim **6** wherein the said other part comprises a flat plate having means affording a hole, the margin of which hole affords the second shoulder, the first shoulder comprising a stud projecting from the body.

8. A releasable fastener as claimed in claim **7** wherein the body carries a stop arranged to limit the extent of insertion of the other part when the hole and stud are in alignment.

9. A releasable fastener as claimed in claim **8** wherein the stud is of frusto-conical form whereby, when the shroud is moved to the release position, with a load applied to the other part in the linear direction that other part will become automatically detached from the stud.

10. A releasable fastener as claimed in claim **5** wherein the abutment surface comprises a section of the spring which is formed of a material harder than that of the shroud.

References Cited

UNITED STATES PATENTS

2,754,073	7/1956	Holm.
2,840,327	6/1958	Stanley.
2,864,361	12/1958	Johnson.
3,120,365	2/1964	Gutacker.
3,405,966	10/1968	Harley.

FOREIGN PATENTS

663	1/1890	Great Britain.
48,542	8/1909	Switzerland.

BERNARD A. GELAK, Primary Examiner

PO-1050
(5/69)

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,521,333 Dated July 21, 1970

Inventor(s) J. A. Dunster

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the heading, after"Serial No. 727,590", please insert --Claims priority Application Great Britain, May 17, 1967, No. 22996/67--.

SIGNED AND
SEALED
NOV 1 7 1970

NOV. 17,1970

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents