May 30, 1961 E. A. GIMALOUSKI 2,986,362

RELEASABLE PARACHUTE HARNESS

Filed June 19, 1956 3 Sheets-Sheet 1

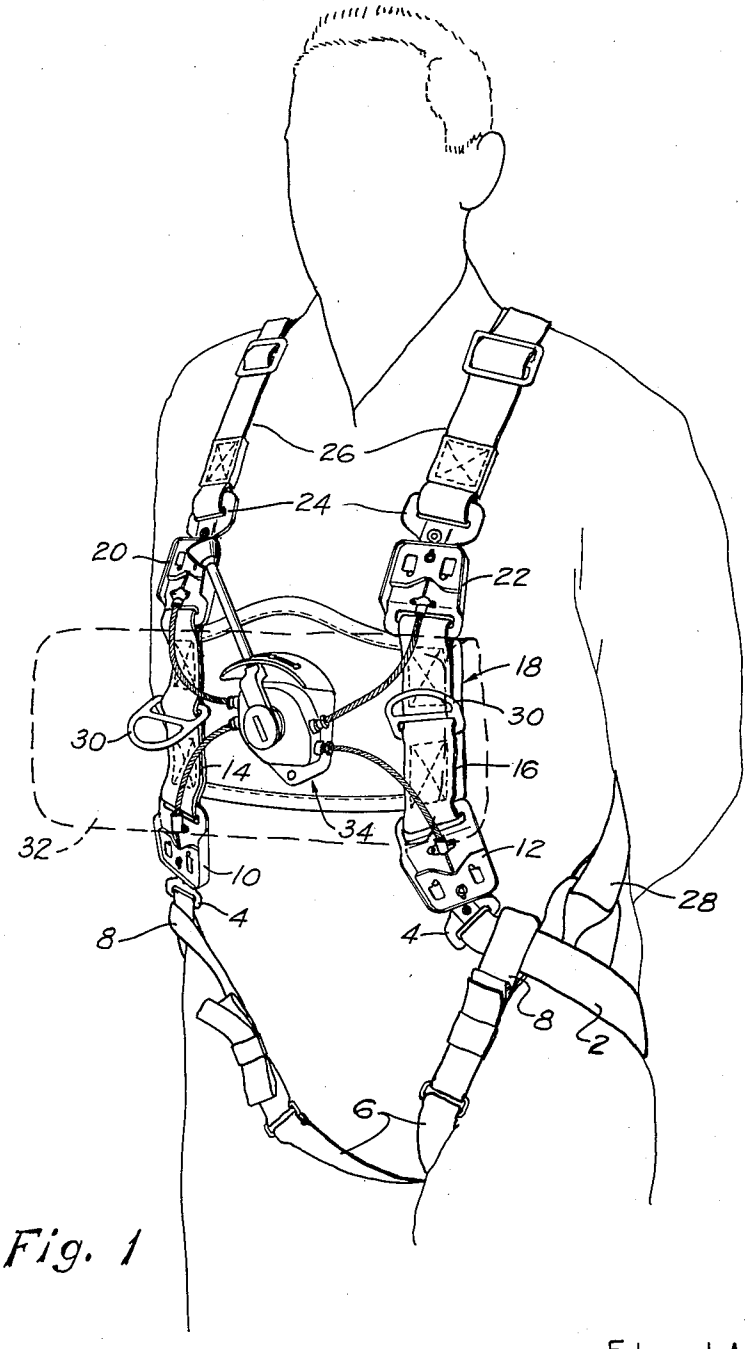


Fig. 1

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RELEASABLE PARACHUTE HARNESS

Filed June 19, 1956 3 Sheets-Sheet 2

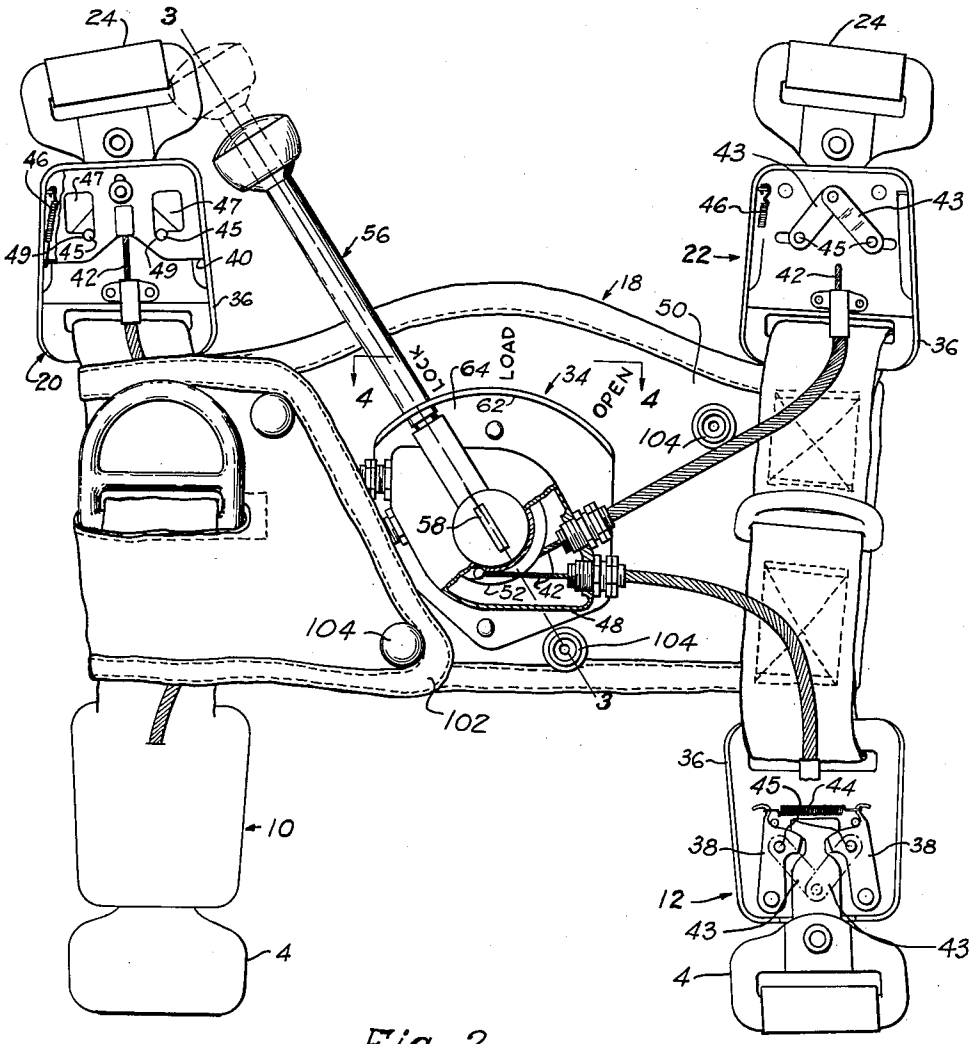


Fig. 2

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Filed June 19, 1956 3 Sheets-Sheet 3

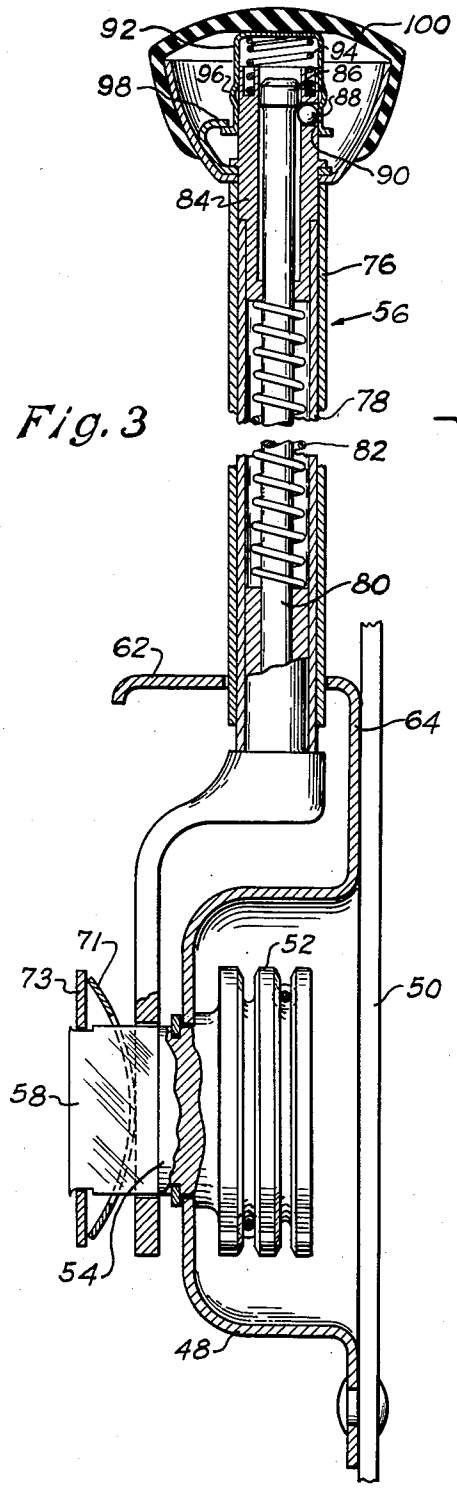


Fig. 3

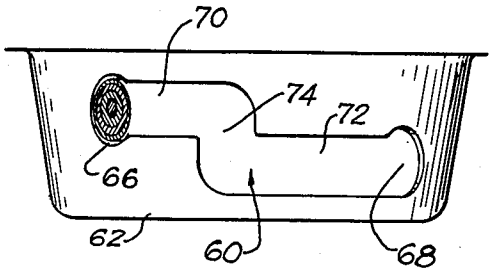


Fig. 4

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2,986,362

RELEASABLE PARACHUTE HARNESS

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4 Claims. (Cl. 244—151)

This invention relates to parachute harnesses capable of being readily released from a wearer and is directed particularly to actuating means for releasing connectors employed in such harnesses.

The parachute harness shown and described in my issued Patent No. 2,726,832 is typical of a type of harness which is releasable from a wearer so that the wearer may free himself from the harness promptly after landing and even though heavily laden with cumbersome equipment. Harnesses of this type are particularly useful for paratroopers, fire fighters and others who may have occasion to make a parachute jump while carrying arms, floats, fire extinguishers, shovels or other bulky equipment. However, because the harness can fall away from the wearer when released, it is essential that the actuating means used to effect such release shall be foolproof and incapable of accidental operation. At the same time, it must be capable of ready operation even when the user is wearing thick or heavy gloves or mittens.

In accordance wtih the present invention, a parachute harness having releasable elements is provided with actuating means which are readily operable when required, but are normally locked against movement so as to prevent accidental operation thereof. The construction preferably is such that at least two and preferably three, successive movements or operations are required in actuating the device. However, each movement is capable of being performed readily with gloved hands and by either the right or left hand as may be necessary in an emergency.

For this purpose the present invention provides harness releasing means with an actuating device having an operating handle formed with telescoping elements. The handle elements are held in collapsed and locked relation during normal usage of the harness so that the handle will not project outward to a position in which it might be accidentally actuated or catch upon clothing or articles carried by the wearer. However, when the parachutist is approaching the ground the handle may be easily manipulated to cause the elements to expand so that the handle will be prominently positioned and easily movable to release the harness from the wearer. Moreover, if the handle should be struck or otherwise accidentally caused to expand to an unlocked condition, the wearer will immediately be aware of this fact by reason of the projection of the handle and can restore it to its locked condition again. The construction also may be provided with a "loading" position for the handle in which the handle may be retained while leaving both hands free to fasten and adjust the harness and fittings. Similarly, the handle may be locked in "open" position preventing accidental return of the elements to locked relation.

One of the objects of the present invention is to provide a parachute harness with novel means for effecting release thereof from a wearer.

Another object of the invention is to provide a parachute harness with releasable means requiring successive movements to actuate the same.

A specific object of the invention is to provide actuating means for releasing a parachute harness and including a handle embodying telescoping elements movable from a collapsed and locked position to an expanded operating position.

These and other objects and features of the present invention will appear from the following description thereof in which reference is made to the figures of the accompanying drawing.

In the drawing:

Fig. 1 is a perspective illustrating a typical form of parachute harness and actuating means embodying the present invention;

Fig. 2 is a plan view of the actuating device of Fig. 1 mounted on a removable chest piece of the harness with parts thereof broken away;

Fig. 3 is a vertical sectional view taken on the line 3—3 of Fig. 2; and

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 2.

In that form of the invention chosen for purposes of illustration in the drawings the harness is of the type shown and described in Patent No. 2,726,832. The harness embodies a sling having a seat portion 2 terminating in attaching links 4 located near the wearer's hips. Leg straps 6 are secured to the seat portion and arranged to extend forward and upward between a wearer's legs, terminating in loops 8 which loosely engage the seat portion near the ends thereof. The links 4 are releasably engageable with connectors 10 and 12 secured to the lower ends of side riser portions 14 and 16, respectively, of a chest piece 18 of the harness.

The upper ends of the side riser portions 14 and 16 of the chest piece are provided with connectors 20 and 22, respectively, adapted to be releasably engaged by links 24 carried by shoulder portions 26 of the harness. The shoulder portions are arranged to pass rearwardly over a wearer's shoulders for attachment to a parachute contained in a back pack or seat pack (not shown) which may be secured to the harness. The harness also may have other straps such as the body engaging straps 28 as desired for securing the harness in place on a wearer.

The harness may, of course, be of any other suitable type embodying quick release elements operable simultaneously to permit the wearer to disengage various straps of a harness in removing the same. However, in the preferred form of the invention the harness includes a removable chest piece having separable side riser portions releasably connectable with the seat portion and shoulder portions of the harness. The attachment of the free ends of the leg straps to the seat strap may be effected by means of the loops 8 as shown, or in any other suitable way as, for example, by connectors as illustrated in my issued Patent No. 2,726,832. The side riser portions 14 and 16 of the harness preferably are provided with attaching rings 30 to which a chest pack 32 may be secured. The harness also may have other rings or means (not shown) for attachment of other types of equipment thereto as desired.

The connectors 10, 12, 20 and 22 by which the chest piece 18 and side riser portions 14 and 16 are connected to the seat portion and shoulder portions of the harness may be of any suitable or preferred type and may be actuated by cables or the like upon operation of the actuating device 34. As shown, the connectors are of the type illustrated and described in copending application Serial No. 479,566, filed January 3, 1955. Such connectors are formed with a body 36 having a pair of latching elements 38 therein engageable by one or another of the links 4 and 24 to hold them in connected relation. However, the latching elements are movable to link releasing position by means of a slide 40 operable by a cable 42. The latching elements and slide are normally urged toward their link retaining positions by springs 44 and 46, respectively, but are movable against the action of said springs by the cable 42 and pivoted arms 43 upon operation of the actuating device 34. The latching elements

have pins 45 thereon which project into openings 47 in the slide 40 and are held in the restricted part 49 of the recess when the harness is secured on the wearer whereby the latching elements are held against outward movement to release the link therefrom.

The actuating device employed for pulling on cables 42 preferably is enclosed within a housing 48 mounted near the center of a rather stiff base 50 on the chest piece 18. A drum 52 is secured to a stud 54 rotatably mounted within the housing 48 and has the ends of each of the cables 42 attached thereto. Four cables may be provided so that one cable may extend to each of the connectors 10, 12, 20 and 22 on the ends of the side riser portions of the chest piece for simultaneous operation of the connectors upon rotation of the drum 52. When rotated the cables 42 are wound upon the drum pulling the cables and moving the slide 40 and latching elements 38 of the connectors to release the links on the seat portion and shoulder portions of the harness. The slide riser portions 14 and 16 of the chest piece 18 are thereby disengaged from the harness whereby the chest piece may fall away and the harness as a whole may be discarded by the wearer without difficulty.

In order to rotate drum 52, the actuating device 34 is provided with a handle 56 which is formed at its lower end with a slot which receives the flattened or squared end 58 of the rotatable stud 54 projecting to the exterior of the housing 48. The handle is thus movable in an arc to rotate the stud 54 and drum 52 to pull on the cables 42 and actuate the connectors 10, 12, 20 and 22.

The handle 56 is arranged to extend through a slot 60 formed in an outwardly projecting flange 62 which may be formed integral with the marginal base 64 of the housing 48. The slot 60 is provided with enlarged openings 66 and 68 at the ends thereof, whereas the intermediate portion of the slot is formed with two offset portions 70 and 72 connected by a transverse channel 74. By reason of this formation of the slot 60, movement of the handle from the enlarged end 66 of the slot toward the opposite end 68 requires three successive movements—namely, movement in an arcuate direction through portion 70, lateral movement through the transverse channel 74 and further arcuate movement through the offset portion 72 of the slot. The lateral movement of the handle is permitted by reason of the spring member 71 which engages the slotted end of the handle and is held in place by a retaining plate 73 secured to the reduced end 58 of stud 54.

The handle 56 is formed of two telescoping elements which are relatively movable radially of the stud 54 so as to assume either a collapsed locking position or an extended operating position. For this purpose the outer end of the handle is formed as a telescoping sleeve 76 surrounding an inner tubular portion 78. A rod 80 extends through the tubular portion and is surrounded by a spring 82 which urges the end 76 of the handle outward to an extended operating position. When the sleeve 76 is pressed inward against the action of spring 82, it may enter the enlarged end 66 or 68 of the slot and since sleeve 76 is larger in diameter than the width of the offset portions 70 and 72 of the slot, the handle cannot be moved in an arcuate manner as long as sleeve 76 is compressed and extends into one or the other of the enlarged openings 66 or 68.

The sleeve 76 may be held in its compressed or locking position by any suitable type of releasable means. As shown, the outer sleeve 76 is provided with a collar 84 surrounding rod 80 and movable axially of the rod into and out of engagement with a stop 86 formed on the end of the rod. Locking balls or dogs 88 are located in radial bores 90 near the outer end of the collar 84 and are movable into locking position beneath the stop 86 when the sleeve 76 is compressed against the action of spring 82 so as to enter one of the enlarged openings 66 and 68 in the slot 60. A cap 92 which is slidably fitted over the

end of collar 84 serves to hold the locking balls in their inner locking position to retain the handle in its depressed and locked position in opening 66 or 68. The cap is urged outward to hold the locking balls in place by means of a spring 94. However, the cap is formed with an annular recess 96 so that when the cap is depressed against the action of spring 94, the balls can move outward from beneath the stop 86 whereupon the collar and outer end of the handle will move outward under the action of spring 82 to an extended operating position. The lower end of sleeve 76 will then be withdrawn from the enlarged opening 66 or 68 so as to release the handle for arcuate movement to actuate the harness connectors 10, 12, 20 and 22. In the preferred form of the invention illustrated, the cap 92 is limited in its outward movement by engagement with member 98 and is enclosed within a rubber or flexible cover 100 so that a water tight and dust-proof assembly is provided.

The axial or radial movement of the outer end of the handle to an extended operating position not only serves as a visual indication of the operative condition of the actuating means, but also serves to present the handle in a more prominent and convenient position wherein it projects above the chest pack 32 carried by the harness. The increased length of the handle also gives more leverage for operating the actuating means in the event any of the connectors should prove difficult to operate. On the other hand, when the handle is in its collapsed locking position, the end 100 is positioned near the upper side of the chest pack 32 where it will be out of the way and protected by the chest pack but still be located in position to be readily pressed or struck by the fist to release the handle for operation.

In using the parachute harness described, the wearer moves the handle 56 of the actuating device 34 to its central or "loading" position in which the handle is located in the transverse channel 74 of slot 60 between the offset portions 70 and 72 of the slot. Such positioning of the handle serves to pull on cables 42 sufficiently to move the slide 40 of each of the connectors 10, 12, 20 and 22 against the action of spring 44 and to an intermediate or "loading" position in which the latching elements 38 are freed to permit insertion of the links 4 and 24 into openings in the body 36 of each connector. Since the handle will normally tend to remain in the "loading" position until positively moved, the wearer may use both hands in applying and adjusting the harness.

In applying the harness to the wearer, the chest piece 18 carrying the actuating device is attached to the shoulder portions of the harness by pushing links 24 into connectors 20 and 22. Loops 8 of the leg straps are slipped over the ends of the seat portion 2 and the links 4 on the ends of the seat portion are pushed into connectors 10 and 12. The latching elements 38 of the various connectors snap into engagement with the links under the action of springs 46 affording an audible indication that they have become engaged. The connector may further be provided with transparent covers if desired so that the condition of each connector can be inspected to insure proper connection of the parts connected to the seat portion 2 by the links 4.

The handle 56 is then moved to its locking position in the enlarged opening 66 at the end of the portion 70 of slot 60 and the outer telescoping end of the handle is pushed inward against the action of spring 82 until it enters the opening 66. In pushing the end of the handle inward, cap 92 is depressed so that the annular recess 96 therein is aligned with bores 90 in collar 84. The locking balls 88 can therefore move outward into the recess 96 allowing the stop 86 on rod 80 to pass the locking balls. Thereafter upon release of the rod, the cap 92 is moved outward by spring 94 and the locking balls are pushed inward so as to project beneath the stop 86 to the position shown in Fig. 3. The outer end of the handle 56 is thus held depressed and locked within

the opening 66 in slot 60 preventing rotary or arcuate movement of the handle. Cover flaps 102 may be secured to the base 50 of chest piece 18 and are foldable inward to engage snaps 104 to protect the elements from injury or exposure.

When the wearer descends in a parachute jump, and upon approaching the ground, it is only necessary to press upon the cover 100 on the outer end of the handle or to strike it with a blow of the gloved hand, whereby the cap 92 will be depressed to bring the annular recess 96 into position to receive the locking balls 88. The balls will then move outward allowing the sleeved end 76 of the handle to move outward under the action of spring 82 withdrawing the sleeve from opening 66 of the slot 60. The outer end 76 of the handle is then free to move outward from its collapsed and protected position to a prominent exposed operating position wherein it may be readily moved to rotate the drum 52 so as to cause the cables 42 to be pulled. If desired, the handle 56 may be pushed along the offset portion 70 of slot 60 to the transverse channel 74. The actuating device is then readied for a final releasing movement upon landing.

When the parachutist lands it is only necessary to move the handle through the channel 74 of slot 60 and on through offset portion 72 of the slot to the opposite opening 68. When so moved, the cables 42 are pulled sufficiently to withdraw the latching elements 38 from engagement with the links 4 and 24 so that the chest piece is disconnected from the harness. The chest piece, leg straps, seat portion and shoulder portions of the harness are then all released and the harness will fall away from the wearer freeing him for normal activity.

The handle portion 76 may be depressed to engage opening 68 in slot 60 to lock the actuating device in releasing position when not in use so that it will not return accidentally to a locking position until positively released and moved.

The connectors employed may, of course, vary considerably in form and construction, but have here been described as being of the type shown in copending application Serial No. 479,566 since such connectors are typical of those which have been employed in such assemblies. The harness chosen for purposes of the present description is that of Patent No. 2,726,832 but it will be apparent that other types of quick release harness and other types of connector releasing means may be used if desired. It should therefore be understood that numerous changes and modifications may be made in the form, construction and arrangement of the various elements of the actuating device employed, and accordingly the particular embodiment of the invention shown in the drawings and described above is intended to be illustrative only and is not intended to limit the scope of the invention.

What I claim is:

1. In a parachute harness having a plurality of separable connectors for holding the harness in place on a wearer, an actuating device located in a position on the harness wherein it may be rendered inaccessible by paraphernalia carried by a wearer of the harness, said actuating device being rotatable to release said connectors, a handle connected to the actuating device to rotate the same from a connector retaining position to a connector releasing position, said handle having relatively movable inner and outer end portions, said outer end portion being movable from an inner relatively inaccessible position to an extended relatively accessible position, spring means normally tending to urge said outer end portion toward said extended accessible position, and means releasably holding said outer end portion in said inner relatively inaccessible position when said handle is in said connector retaining position.

2. In a parachute harness including side risers and a chest piece, separable connectors by which said chest piece is secured to at least one of said side risers, attaching rings on the side risers by which an emergency parachute pack may be secured to the harness over the chest piece, an actuating device secured to the harness in position to be rendered relatively inaccessible when an emergency parachute pack is secured to said attaching rings, said actuating device being rotatable to release said connectors, a handle connected to said actuating device to rotate the device from a connector retaining position to a connector releasing position, said handle having telescoping and relatively movable inner and outer end portions, said outer end portion being movable from an inner relatively inaccessible position to an extended relatively accessible position, spring means normally tending to urge said outer end portion toward said extended accessible position, and means releasably holding said outer end portion in said inner relatively inaccessible position when said handle is in said connector retaining position.

3. In a parachute harness having a plurality of separable connectors for holding the harness in place on a wearer, an actuating device located in a position on the harness wherein it may be rendered inaccessible by paraphernalia carried by a wearer of the harness, said actuating device being movable to release said connectors, a handle connected to the actuating device to move the same from a connector retaining position to a connector releasing position, a member fixed with respect to said device and having a slot therein through which said handle extends, said handle having telescoping inner and outer end portions and spring means urging the outer end portion of the handle from a collapsed relatively inaccessible position toward an extended relatively accessible position, said slot having an enlarged opening therein and the outer end portion of the handle being movable into and out of said enlarged opening to lock and release the handle.

4. In a parachute harness including side risers and a chest piece, separable connectors by which said chest piece is secured to at least one of said side risers, attaching rings on the side risers by which an emergency parachute pack may be secured to the harness over the chest piece, an actuating device secured to the harness in position to be rendered relatively inaccessible when an emergency parachute pack is secured to said attaching rings, said actuating device being movable to release said connectors, a handle connected to said actuating device to move the device from a connector retaining position to a connector releasing position, a member fixed with respect to said device and having a slot therein through which the handle extends, said handle having telescoping inner and outer end portions, spring means urging the outer end of the handle from a collapsed relatively inaccessible position toward an extended relatively accessible position, said slot having an enlarged opening therein and the outer end portion of the handle being movable into and out of said enlarged opening to lock and release the handle, locking means engageable with the outer end portion of the handle to hold the same in collapsed relatively inaccessible position with a portion thereof extending into the enlarged opening of said slot, and compressible means on the outer end portion of the handle operable to disengage said locking means therefrom to permit outward movement of the outer end of the handle under the action of said spring means to said extended relatively accessible operating position removed from said enlarged opening.

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