

June 20, 1961

H. J. MORAN

2,989,274

DOUBLE QUICK HARNESS RELEASE

Filed Nov. 30, 1956

4 Sheets-Sheet 1

Fig. 1.

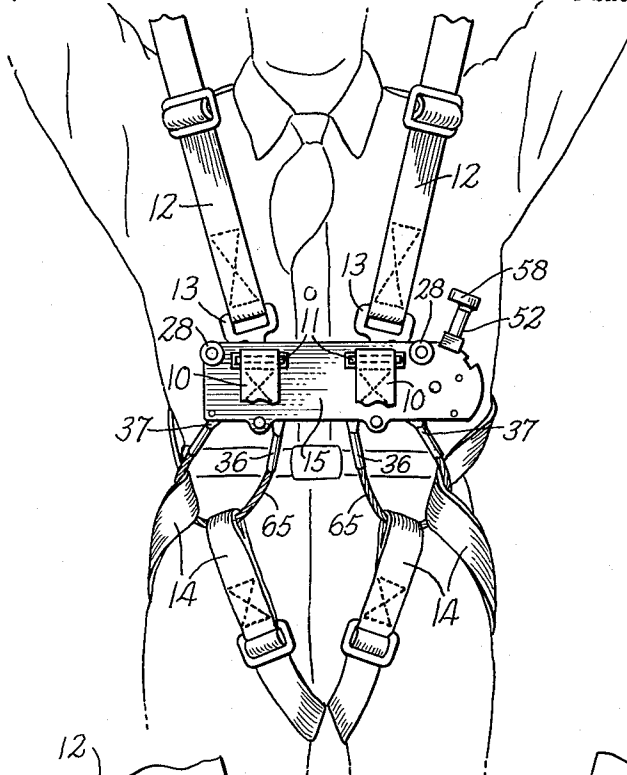
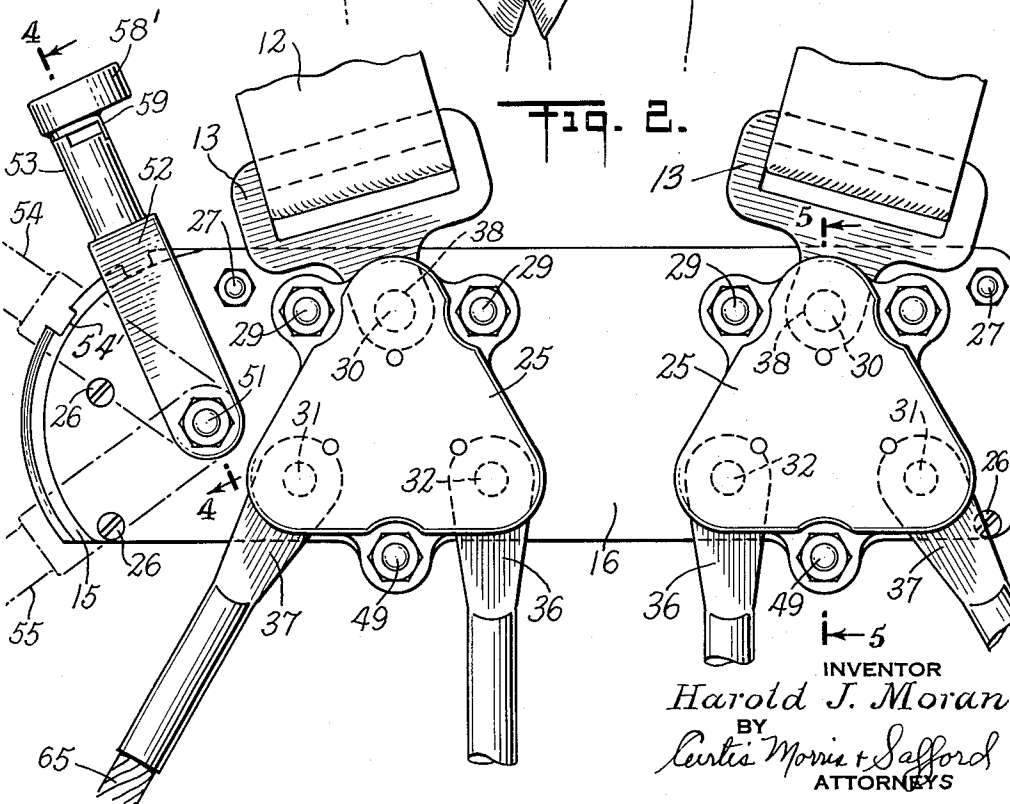


Fig. 2.



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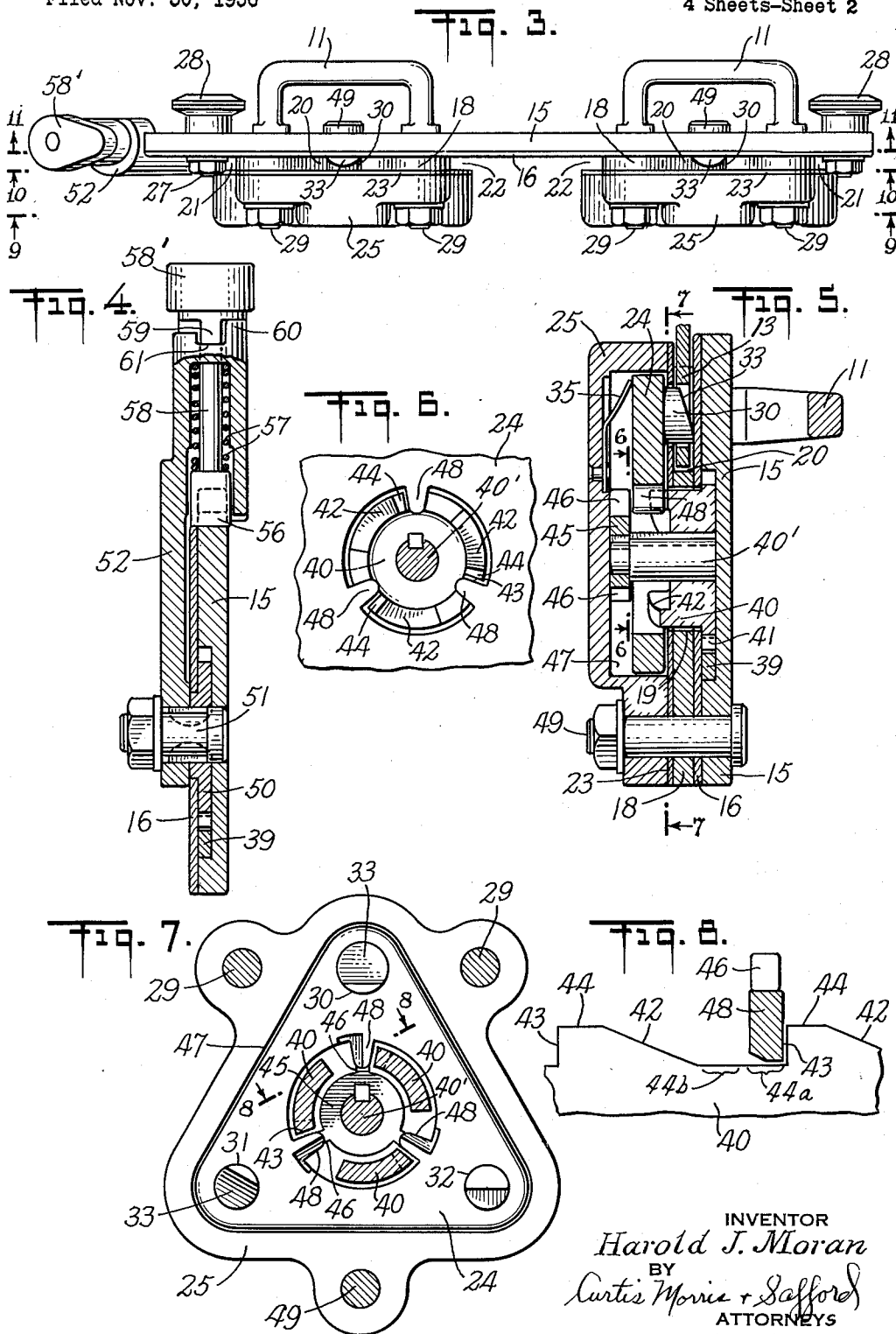
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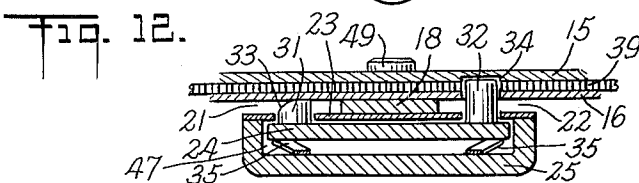
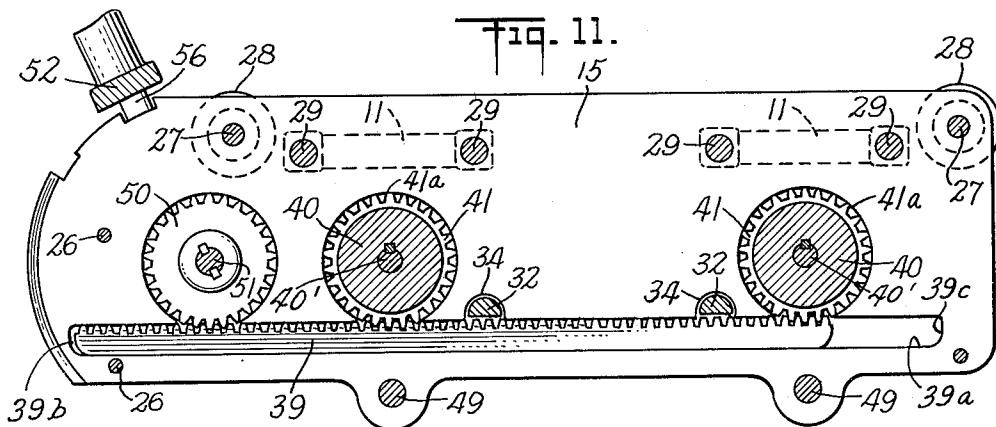
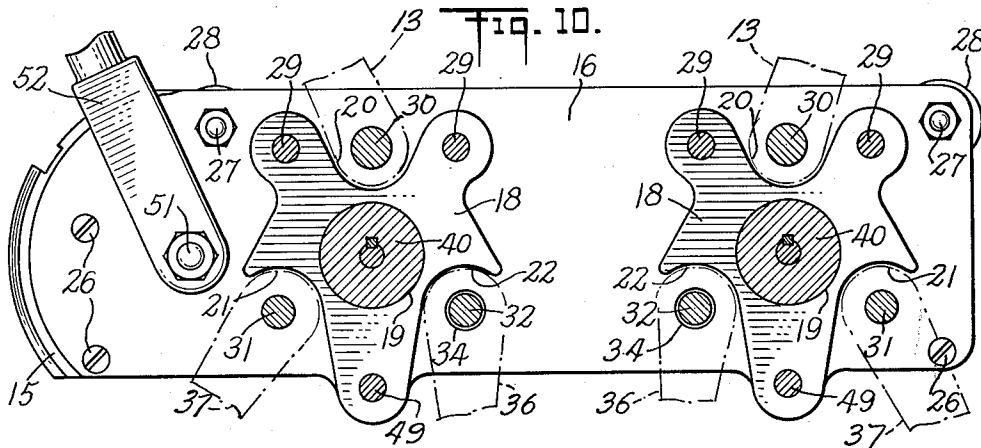
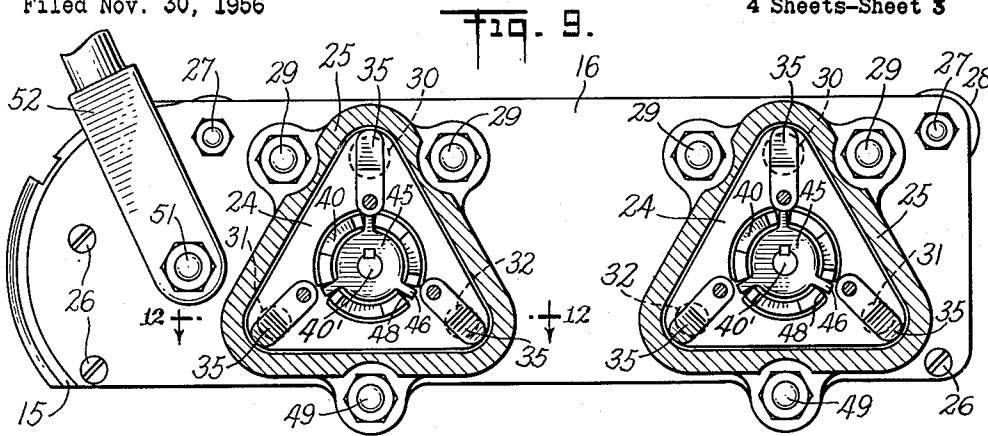
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4 Sheets-Sheet 3



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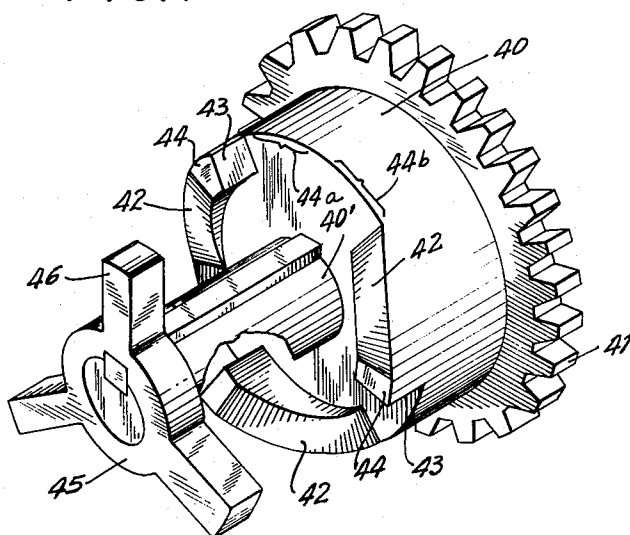
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Filed Nov. 30, 1956

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FIG. 13



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DOUBLE QUICK HARNESS RELEASE

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Filed Nov. 30, 1956, Ser. No. 625,518

9 Claims. (Cl. 244-151)

This invention relates to an aviator's divesting harness release.

It is an object of the invention to provide a quick release device by means of which the user may quickly divest himself of the parachute harness and canopy leaving himself entirely free of both.

It is a further object of the invention to provide such a release which may be operated to simultaneously release the shoulder straps and the leg straps of the harness so that the harness will completely fall away from the user.

Additionally, the invention has for an object the positive securement of the shoulder straps and leg straps upon the body of the user except when, under manual control of the user, the release device is operated to simultaneously release the leg straps and the shoulder straps.

A still further object of the invention is to provide means within the release device which makes it possible to snap into locking position the members which retain the shoulder straps and leg straps in position on the user, which means will retain said members in operative positions and which may be adjusted to positively lock said members in such positions and, at the option of the user, to release said members.

In FIGURE 1 of the drawings, I have illustrated a harness with the quick release device locked in position thereon and showing the relation of the locking or securing members and the shoulder straps and leg straps;

FIGURE 2 is an enlarged view of the release device looking at the side opposite to that shown in FIGURE 1;

FIGURE 3 is an edge view looking down on the release device as shown in FIGURE 2;

FIGURE 4 is a sectional view on line 4-4 of FIGURE 2 looking in the direction of the arrows;

FIGURE 5 is a section on line 5-5 of FIGURE 2 looking in the direction of the arrows;

FIGURE 6 is a section on line 6-6 of FIGURE 5 looking in the direction of the arrows;

FIGURE 7 is a section on line 7-7 of FIGURE 5 looking in the direction of the arrows;

FIGURE 8 is a section on line 8-8 of FIGURE 7 looking in the direction of the arrows;

FIGURE 9 is a section on line 9-9 of FIGURE 3 looking in the direction of the arrows;

FIGURE 10 is a section on line 10-10 of FIGURE 3 looking in the direction of the arrows;

FIGURE 11 is a section on line 11-11 of FIGURE 3 looking in the direction of the arrows;

FIGURE 12 is a fragmentary view in section on the line 12-12 of FIGURE 9; and

FIGURE 13 is a view in perspective of a cam and stop carrier unit adapted for co-operation with releasable web suspending locking and releasing means.

In FIGURE 1 of the drawing, the end portions 10 of the suspension webs of a check pack are shown as attached to cross bars 11 which are secured to the quick release device by means which later will be described. The shoulder or body straps 12 of the harness are attached at their front ends to the release device by connectors or terminal connector fittings 13 in a manner later to be described, rear end portions thereof being engaged with rear webs of the harness as, for example in the equipment shown in Switlik No. 2,180,182 or in Wigley et al. No. 1,899,656. The leg straps 14 are attached to the re-

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lease device by flexible connectors as loops 65 which are attached to the quick release device in a manner later to be described.

Thus when the connectors 13 and loops 65 are released from the release device, the entire harness, the quick release device and the canopy will be completely divested.

The release device comprises a gear housing or base plate 15 which is provided with a cover plate 16 and two sets of latch devices or connector locking assemblies by which the harness straps are releasably secured to said base plate 15.

As a part of each such set and mounted directly on the cover 16 is a spacer 18 (FIGURE 10) having a central opening 19 and having three sockets 20, 21 and 22, each with an outwardly flared opening.

Superimposed on the spacer 18 is a stripper plate 23 which cooperates with the cover 16 to close the opposite faces of the sockets 20, 21 and 22 leaving only their outwardly facing ends open for a purpose later to appear.

A suspension pin carrier, as plate 24 is superimposed on the stripper plate 23 and has a central opening coaxially aligned with said opening 19 in spacer 18 and with similar openings in said stripper plate 23 and cover plate 16, FIGURE 5.

A suspension plate housing 25 is superimposed on the stripper plate 23 and houses the suspension plate 24.

Said base plate 15 and the cover 16 are secured together by suitable means such as screws 26 and bolts 27 on which latter lugs 28 are formed for attachment to the chest pack.

The spacer 18, the stripper plate 23, and the suspension plate housing are all secured together and to the gear housing by bolts 29 and 49. The bolts 29 carry the cross bars 11 to which the risers or end portions 10 of the chest pack suspension webs are attached as heretofore described.

The suspension plate 24 is freely movable within the suspension plate housing 25 in the space between said stripper plate 23 and the generally flat opposed wall portion of housing 25 and is provided with suspension lugs or pins 30, 31 and 32, the pins 30, 31 and 32 extending respectively into the sockets 20, 21 and 22. Each of the pins 30 and 31 is provided with an outwardly facing cam face 33.

All three of these pins extend through adjacent openings in the stripper plate 23 and into the sockets 20, 21 and 22. The suspension pin 32 is not provided with a cam face and is somewhat longer than the pins 30 and 31 and extends into a recess 34 in the gear housing cover 16.

The suspension plate housing 25 has secured thereto a plurality of flat springs 35 which normally urge the suspension plate 24 toward the stripper plate 23 and the pins 30, 31 and 32 completely across the sockets 20, 21 and 22, which springs are capable of yielding under pressure exerted on the cam faces 33 of the pins 30 and 31.

One end of each of the flexible connector loops 65 is provided with a ferrule or terminal connector fitting 36 which has an aperture therein through which the adjacent pin 32 permanently extends but through which it is slidable. The other end of each of the connector loops 65 is provided with a ferrule or terminal connector fitting 37 which has an aperture therein adapted to align with the adjacent pin 31 and through which the pin is adapted to slide to disengage this end of the connector fitting 37.

The connectors 13 on the shoulder straps 12 are likewise provided with apertures 38 into which the adjacent suspension pin 30 extends and through which it is slidable to disengage the shoulder straps from the release device.

Thus, when the connectors 13 on the shoulder straps and both ends of each of the connectors 65 for the leg straps are attached to the pins 30, 31 and 32, the harness and the pack will be held on the body of the user, but when the connectors 13 are disengaged and the ferrules 37 on the connectors 65 are disengaged by the movement of the pins 30 and 31, respectively, against the force of the springs 35, the shoulder straps and the leg straps simultaneously will be released to completely divest the user of the harness and pack.

In order that the pins 30 and 31 having the cam faces thereon may be selectively free either to yield as spring latches upon the insertion of the connectors 13 and the ferrules 37 of the loops 65 into said sockets 20 and 21, respectively, against the resistance of said springs 35 or to be locked against movement in the sockets 20 and 21, I have provided the following latch or pin actuating mechanism. A rack 39 is movable longitudinally within a longitudinal recess 39a, FIGURE 11 in base plate 15 or the gear housing 15. Adjacent each end of the gear housing is a rotatable cam member or carrier 40 which is provided with a gear portion 41 extending into a shallow cylindrical recess 41a in base plate 15, Figs. 5 and 11, which opens into said longitudinal recess 39a and through which said gear portion 41 which meshes with the rack 39. Said carrier 40 is journaled in the opening 19 in the spacer 18 and the corresponding openings in the gear housing cover 16 and the stripper plate 23. Each of these cam carriers 40 is provided with a plurality of cam blocks presenting inclined cam faces 42, three in the present instance, and abrupt end faces 43. At the upper or higher end of each incline 42, as seen in FIGURE 8, is a short dwell face 44; and at the lower end of said incline is a longer face one portion of which, as 44a, lies adjacent the end face 43; and another portion of which, as 44b, adjoins the lower end of incline 42.

Rigid with each cam carrier 40 and keyed to the outer end of shaft 40', FIGURE 9, is a safety locking member 45 in the form of a plate spaced from said inclined faces 42 and dwell faces 44 which is provided with radially extending stop lugs 46. Each of these stop lugs 46 is in fixed angular position to come opposite a portion 44a of the normal outer or cam face of carrier 40 which lies at one side of and adjacent to the abrupt end face 43 of said cam blocks. The cam carrier 40 extends into the central opening in the suspension plate 24 and rotates therein under the action of the gear and rack; and the safety locking member 45 and its lugs 46 are normally, as when the suspension pins 30 are pressed by the springs 35 to their position as shown in FIGURE 5, located in the space 47 between the suspension plate housing and the suspension plate 24.

Each suspension plate 24 is provided with lugs 48 extending radially inward in the central opening in plate 24 and which are complementary to the lugs 46 in the sense that in one angular i.e. latch releasing position of cam carrier 40 and hence of the radial stop lugs 46 thereon, the inwardly extending radial lugs 48 on plate 24 are angularly offset therefrom sufficiently to extend between lugs 46 and thereby permit unlatching or outward movement of plate 24 and are capable of being aligned with or disaligned from the latter lugs upon the rotation of the cam carrier 40.

Adjacent one end of the gear housing 15 is a rotatable gear 50 which is keyed to a shaft 51 having its bearings in the gear housing 15 and in the gear housing cover 16. A control handle or actuating lever 52 is secured to the shaft 51 so that the rotation of the shaft and of the gear 50 may be manually accomplished.

This handle has three fundamental positions, 53, 54 and 55. It is locked in any desired one of these positions by a pawl 56 which is urged into operative position in a corresponding notch by a spring 57 but which may be locked out of operative or notch engaging position by moving the rod 58 on which the pawl is mounted against

the action of the spring and rotating the finger piece 58' until the lug 59 rests upon the shoulder 60. In operation, when it is desired to insert the connectors 13 into the sockets 20 and the ferrules or fittings 37 into the sockets 21, the control handle 52 is moved into position 54 and may be locked in this position by rotating the finger piece 58 until the lug 59 moves from its unlocking position on shoulder 60 into locking position in notch 61 at which time the spring 57 will urge the pawl 56 into the notch 54' at position 54 thereby releasably locking the parts against any movement of the rack 39 or of the cam carriers 40 but leaving the plate 24 free to yield against resistance of said springs 35.

When the handle is in this middle or connector receiving position, the pins 30 and 31 will extend completely across the sockets 20 and 21 because the suspension plate 24 is at this time urged by the springs 35 away from the suspension plate housing 25. Thus, end edge portions of the connectors 13 and the ferrules 37 may be forced against the cam faces 33 on the pins 30 and 31 and through pressure on these cam faces will move the suspension plate 24 against the action of the springs 35 until the apertures in the connectors and ferrules align with the pins 30 and 31 at which time said pins, under the influence of the springs 35, will snap back into strap retaining position in said apertures and the shoulder straps and leg straps may not thereafter be disconnected from said lugs 30 and 31 without manual movement of the handle 52.

The above described movement of the suspension plate 24 against resistance of the springs 35 is permitted, because at this time i.e. with the handle 52 in the 54 position, FIGURE 2, the lugs 46 will be out of radial alignment with lugs 48.

In order that the suspension pins 30 and 31 may be positively locked against any possible unintentional withdrawal from the sockets 20 and 21 with the consequent accidental release of the shoulder straps and leg straps, the control handle may be moved into detent locking position 53, full lines, FIGURE 2. In adjusting to this position, the cam carriers 40 will be rotated, and with them the terminal locking lugs 46, until the latter come opposite outer faces of the complementary lugs 48 on the suspension plates 24 or, in effect, overlie the lugs 48. With the parts relatively positioned as just described, the suspension plate 24 will be locked i.e. stopped by pins 46 against outward or releasing movement, and the suspension lugs or pins 30 and 31 will be locked in the sockets 20 and 21.

When, however, it is desired to release the shoulder straps and the leg straps, the handle is moved into position 55. The movement of this handle into this position will rotate the cam members 40 and the cam faces 42 will engage the lugs 48 on the suspension plate and move the suspension plate outwardly or toward the suspension plate housing 25 against the action of the springs 35 until the dwell faces 44 come under lugs 48. This movement of the suspension plate 24 will, of course, withdraw the suspension pins 30 and 31, respectively, from the sockets 20 and 21 and thereby effect rapid and automatic release of the fittings 13 on the shoulder straps 12 and the fittings 37 on the connector members 65 from said suspension lugs or keepers 30 and 31. When this release occurs, the user will be entirely divested of the harness and the pack.

During the withdrawal movement of these suspension pins 30 and 31 from their corresponding sockets, the suspension pins 32 to which the loops 65 are permanently attached will move with the suspension plate 24, but because their length is greater than that of pins 30 and 31, they will not be withdrawn from the fittings 36 on the adjacent ends of the loops 65 nor will they be completely withdrawn from the openings in the gear housing cover 16 through which they extend. This arrangement insures the permanent and secure attachment of one end of each

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of the leg harness connecting loops 65 to the harness release assembly unit.

As seen more clearly in FIGURE 11, the rack 39 is of such length in relation to its groove or channel 39a which is closed by end walls 39b and 39c at both ends, that the extent of endwise thrust of said rack in one direction, i.e. left FIGURE 11, is limited by wall 39b; and wall 39c limits the extent of endwise thrust of said rack toward the right. When the rack is in the left hand position, as shown, the carrier plate is in locked condition and when said rack is in the right hand position the carrier plate is in released condition. Thus, with the extent of endwise movement of rack 39 positively limited in both directions, there is no overrun or bind when lever 52 is moved violently into either of its end positions.

1. I claim:

1. A safety lock and quick release connector for parachute harness having body straps, leg straps and flexible leg strap retaining loops, said loops and said body straps having terminal apertured fittings, said connector comprising in combination a base plate, two suspension pin carriers each mounting a set of pins adapted to engage and to be disengaged from said apertured fittings, actuating means for simultaneously moving said carriers and said sets of pins mounted thereon including a rack slidably mounted on said base plate, a manually operable lever fulcrumed on said base plate, a rack driving gear connection between said lever and said rack, means operatively interposed between said rack and each of said pin carriers whereby fitting engaging and disengaging movements of said carriers and both sets of pins are effected simultaneously by operation of said lever, and wherein each of said sets of suspension pins includes one which is longer than the others of said set, and a terminal fitting at one end of each loop is engaged with said longer pin to retain said loop end securely in locked relation to said connector device independently of locking and releasing movements of the pin carrier.

2. In a safety lock and quick release connector for a parachute harness comprising body straps and leg straps having apertured terminal fittings, the combination of a base plate having a longitudinal groove and longitudinally spaced recesses open at one side face thereof, each of said recesses having a peripheral opening into said groove, two pin carriers each operatively mounted on said base plate opposite one of said spaced recesses and each carrying a set of suspension pins arranged and adapted to be engaged by said fittings, actuating means for simultaneously moving said pin carriers and said pins to and from different operative positions including a rack mounted to slide longitudinally in said groove, a cover plate secured against an inner face of said base plate and arranged to cover the open side of said groove and retain said rack laterally therein and having longitudinally spaced openings in register with said recesses, a manually operated lever which is gear connected to impart endwise reciprocating movement to the rack in said groove, two rotatable cam carriers journaled in said spaced openings of said cover plate and each having angularly spaced stop and cam members arranged in operative relation to said pin carriers, a gear operatively connecting each cam carrier with said rack to actuate said cams and thereby said pin carriers, a housing secured to said base plate in position to present a covering wall opposite to and spaced from each said pin carrier, and spring means operatively interposed between an inner face of said housing and an outer face of each said pin carrier normally to bias said pin carrier and the pins thereon toward operative position for retaining said terminal fittings.

3. The combination of elements recited in claim 2 and each of said cam members having a cam positioned to bear against an underside of one portion of said pin carrier to move the same outwardly past said stop member to effect retractive releasing movement of said

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pins, said stop member being in fixed spaced relation to said cam face and angularly offset therefrom and movable angularly with said cam member and said cam carrier to and from position opposite the upper side of said portion of the pin carrier and thereby to obstruct outward pin releasing movement of said suspension pin carrier to lock said terminal fittings securely to said connector device.

4. The combination of elements recited in claim 2 and wherein each of said sets of suspension pins includes one which is longer than the others of said set, and one terminal fitting is permanently engaged with said longer pin to retain said end securely in locked relation to said connector device independently of locking and releasing movement of the pin carrier.

5. The combination of elements recited in claim 2 and wherein each pin carrier has spaced radially arranged abutments extending inwardly from the perimeter toward the axis of an opening through said pin carrier, and a rotatable cam and lock carrier is mounted coaxially with said opening, cam members mounted on said rotatable cam and lock carrier at one side of said pin carrier and lock members extending radially from said rotatable cam and lock carrier at the other side of said pin carrier, said cam and lock carrier being rotatable to and from a position wherein its lock members come opposite said pin carrier abutments to lock said pin carrier against releasing movement of the pins in relation to said terminal fittings and to and from a position wherein said cam members ride against said pin carrier abutments to move said carrier outwardly and thereby to retract said pins from suspending engagement with said terminal fittings.

6. In a quick release harness strap connecting device for use with parachute harness wherein body straps each having an apertured terminal connector fitting are interconnected through said device with leg straps each of which is interengaged with a leg strap retaining loop having an apertured connector fitting at each end and wherein said terminal fittings including one on each loop may be released simultaneously from said device, the combination of a housing, two connector fitting engaging and releasing assemblies and a manually actuated device carried by said housing for simultaneously controlling the operation of said assemblies each of which includes a suspension pin for releasable engagement with a body strap terminal connector fitting, a suspension pin for releasable engagement with a loop terminal connector fitting, and a suspension pin carrier normally spring biased to retain said suspension pins yieldingly in extended connector fitting engaging position and having an opening into which spaced lugs extend from its defining edge, said manually operated control device including a rotatable cam and stop carrier provided with angularly spaced cams and angularly spaced stops and arranged coaxially with each said pin carrier, said stops being in fixed angularly offset relation to pin carrier actuating surfaces of said cams and adapted for angular adjustment therewith to different operative positions in relation to said lugs on said carrier whereby in one of said positions said lugs come between said cams and said stops whereby pin retracting movement of said carrier is prevented by the stops, in another of said positions said lugs come opposite dwell portions of said cams which are angularly offset from said stops whereby retracting movement of said carrier is effected by pressing against beveled end portions of said pins thereby permitting engagement of a connector fitting with a suspension pin thereon, and, in a third of said positions said lugs are engaged by said cams and displaced in a direction to effect, pin retracting and strap connector releasing movement of the pin carrier, and manually actuated means operatively connected with said stops and said cams to impart angular movement thereto to and from said several positions of adjustment in relation to said spaced lugs of the pin carrier,

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7. Device according to claim 6 and wherein said cam and stop carrier is journaled in the housing, an operating lever, and a rack and gear connection is effectively positioned between said lever and said cam and stop carrier to impart angular movement thereto with angular movement of said lever whereby said cams and stops are adjusted to and from said several operative positions.

8. Device according to claim 6 and wherein free end portions of some of said suspension pins are beveled to provide a camming face on each such pin in position to be pressed aside by a connector fitting applied thereto whereby with the parts in said second angular position of the cam carrier the apertured portion of said connector fitting passes to pin engaging position.

9. Device according to claim 6 and wherein the cam and stop carrier is actuated by an operating lever and a rack operatively interposed between said lever and the

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carrier, said rack being mounted for limited longitudinal sliding movement between end positions in one of which the cam and stop carrier is in locking position and in the other of which said carrier is in releasing position.

References Cited in the file of this patent

UNITED STATES PATENTS

1,177,927	Calthrop	Apr. 4, 1916
1,899,656	Wigley et al.	Feb. 28, 1933
2,180,182	Switlik	Nov. 14, 1939

FOREIGN PATENTS

151,020	Australia	Apr. 22, 1953
361,859	Great Britain	Nov. 18, 1931
389,437	Great Britain	June 8, 1931

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,989,274

June 20, 1961

Harold J. Moran

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 6, line 27, for "pen" read -- pin --; line 31, after "said" insert -- pin --.

Signed and sealed this 9th day of January 1962.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

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Commissioner of Patents