Dec. 13, 1955 E. A. GIMALOUSKI ET AL 2,726,832

PARACHUTE HARNESS

Filed May 8, 1953 2 Sheets-Sheet 1

Fig. 1

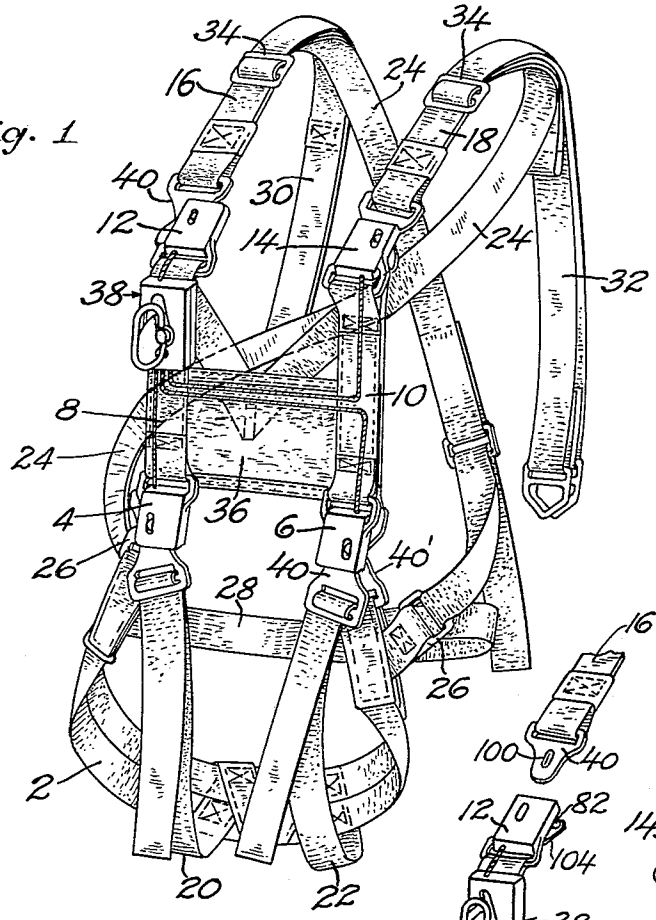


Fig. 2.

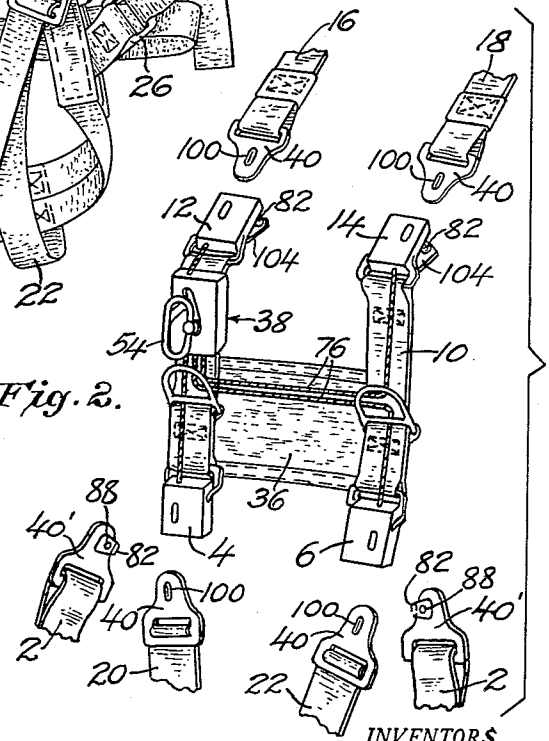
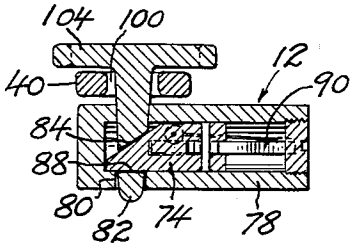


Fig. 3



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PARACHUTE HARNESS

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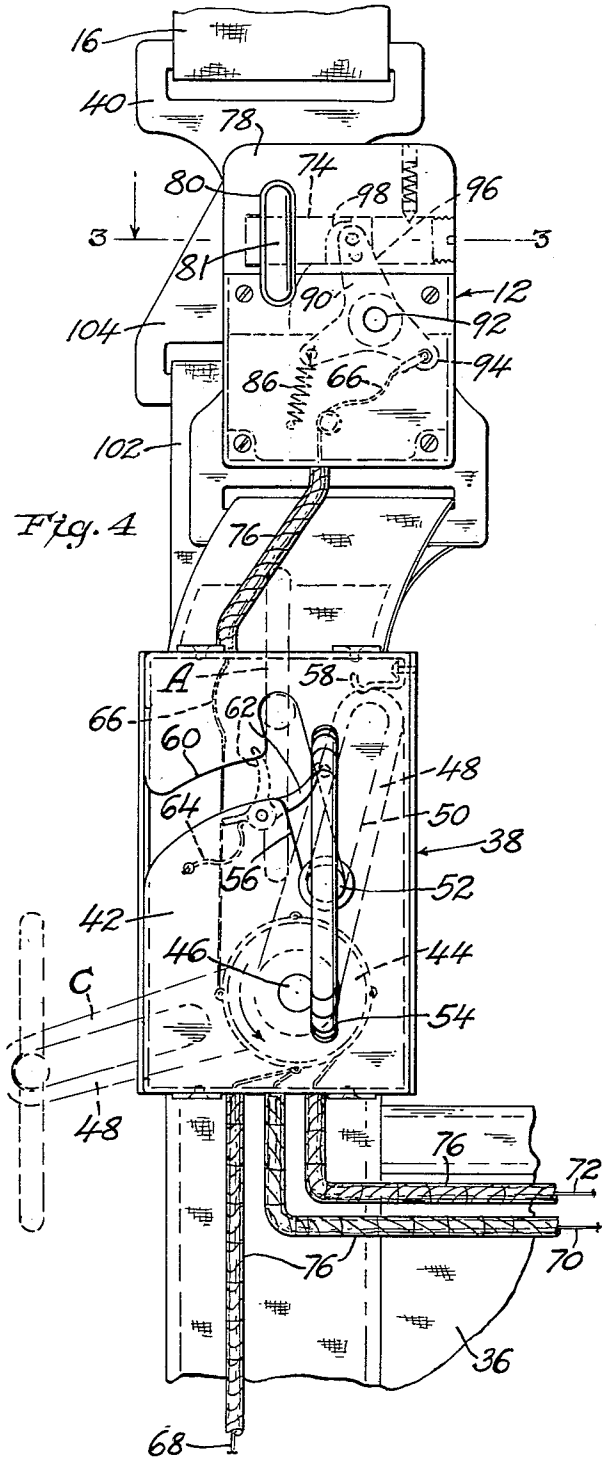


Fig. 4

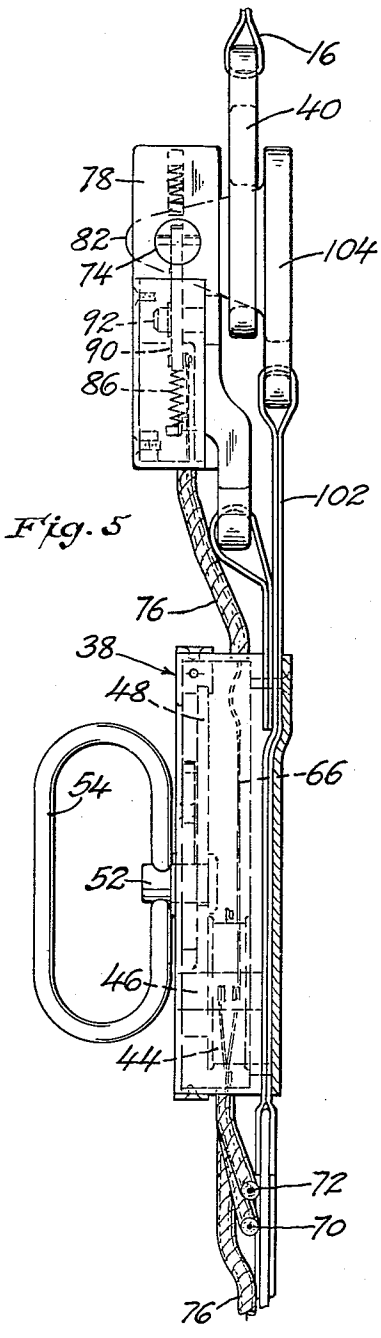


Fig. 5

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PARACHUTE HARNESS

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Application May 8, 1953, Serial No. 353,844

17 Claims. (Cl. 244—151)

This invention relates to parachute harnesses and is directed particularly to constructions that will permit the wearer to free himself quickly from the harness after a descent.

Various types of quick release harnesses have been developed heretofore as exemplified by the construction shown in the patent to Kowalski No. 2,430,773 wherein the quick release device is positioned on the wearer's chest and has shoulder and leg straps connected thereto. However, quick release harnesses of this type are not adapted for use with an emergency parachute pack located on the wearer's chest since such a pack will cover the release device. Furthermore, the leg straps in such harnesses are threaded through loops or other portions of the harnesses with the result that the harness cannot fall away freely from the wearer until the leg straps have disengaged the loops through which they pass.

An improved type of quick release harness is shown in the patent to Smith No. 2,402,264 in which the harness is provided with a removable chest piece that may or may not carry an emergency pack. When the chest piece is released it may fall away from the wearer whereupon the side risers which extend from the seat sling of the harness to the shoulders can be slipped off the wearer's shoulders very easily. However, when parachutes are used by paratroopers, medical corpsmen, forest fire fighters and others, the user is frequently loaded down with equipment which makes it difficult if not impossible for the wearer even to slip the harness straps off the shoulders. This is particularly true in the case of paratroopers who are provided with water wings or floats which are inflated before the user lands in water so that they project outward in a manner to preclude removal of the parachute harness by slipping it off the shoulders.

In these and other parachute harnesses used heretofore the seat sling and side risers to which the load is applied during shock loading of the parachute and during descent have generally included continuous, unbroken webbing members extending from the point of attachment of the parachute on one side of the harness, downward beneath the seat and upward on the other side of the wearer to the point of attachment of the parachute on the other side of the harness.

In accordance with the present invention, a parachute harness is provided in which the side risers and seat sling of the harness are not continuous but, instead, are provided with removable sections located on each side and in front of the wearer. The harness elements and side riser sections are provided with releasable connecting means whereby the lower ends of the removable riser sections may be connected to the seat sling and leg straps near the user's waist whereas the upper ends of said sections may be connected to shoulder portions of the side risers near the shoulder or elsewhere. Further means are provided which are operable simultaneously or individually to release the connecting means so that the side risers will each be broken at two points and the harness may be said to fall apart and drop away from the user without any delay or further manipulations on his part. In this way, the wearer may release himself from the harness instantly upon landing and without danger of the harness or parachute becoming entangled with the equipment carried by the wearer. Moreover, an emergency parachute pack may be secured to the removable sections of the side risers so that the emergency pack and its parachute also will fall away from the wearer on release of the removable sections from other elements of the harness.

Any suitable type of actuating means may be employed for releasing the inserts from the shoulder portions of the side risers and from the seat sling and leg straps, but as hereinafter described, the actuating means preferably is designed so that it will require two different and successive movements in order to release the inserts whereby the danger of accidental manipulation of the actuating means is reduced to a minimum.

One of the objects of the present invention is to provide a new type of parachute harness capable of release from a wearer who may be burdened with bulky equipment.

Another object of the invention is to provide a parachute harness with side risers including removable riser sections located between the seat sling and the shoulder portions of the side risers whereby these sections of the risers may be completely disconnected from the harness for releasing the harness from the wearer.

A further object of the invention is to provide a parachute harness including sections of the side risers located between the seat sling and the shoulder portions of the risers and carrying an emergency parachute pack, said sections being completely detachable from the seat sling, leg straps and shoulder portions of the risers for instant release of a wearer from the harness and emergency pack.

Another object of the invention is to provide a parachute harness with a seat sling, leg straps and side risers including portions of the side risers which are completely detachable from the seat sling and leg straps without sliding or threaded disengagement with respect to other elements of the harness.

A specific object of the present invention is to provide a parachute harness having a seat sling, leg straps and side risers which extend over the wearer's shoulders, there being a removable section included in each side riser and located between the seat sling and leg straps on the one hand, and the shoulder portions of the side risers on the other, together with a single actuating device operable to disconnect said sections of the harness at four points so as to release the seat sling and leg straps and the shoulder portions of the side risers simultaneously upon operation of the actuating means.

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 drawings for the purpose of indicating the nature of the present invention, but without intending to limit the invention thereto.

In the drawings:

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

Fig. 2 is a view showing the chest piece and terminal portions of the straps in the harness of Fig. 1 arranged in disengaged relation;

Fig. 3 is a sectional view through one of the fittings embodied in the harness of Fig. 1;

Fig. 4 is an enlarged front elevation of a fitting and actuating device embodied in the harness of Fig. 1; and

Fig. 5 is a side elevation of that portion of the harness illustrated in Fig. 4.

In that form of the invention illustrated in Fig. 1 the harness comprises a seat sling 2 which extends upward at opposite sides of the wearer's seat to points near the waist for connection by the fittings 4 and 6 to the lower ends of removable side riser sections 8 and 10 respectively. The upper ends of the side riser sections 8 and 10 are connected by the fittings 12 and 14 to the shoulder portions

16 and 18 of the side risers. Leg straps 20 and 22 are connected to the seat sling 2 for passage forward and upward between the wearer's legs for connection to the fittings 4 and 6 at the lower ends of the side riser sections 8 and 10.

The remaining portions of the harness may be constructed as desired and as shown the back straps 24 extend downward from the shoulders crossing at the back and passing through side loops 26 at the upper ends of the seat sling and being connected by the rear waist strap 28 at the small of the wearer's back.

The harness may be used with any preferred type of parachute pack such as a seat pack, back pack or chest pack. As shown the lift webs 30 and 32 are connected to the shoulder portions 16 and 18 respectively by means of the fittings 34 and extend rearwardly over the wearer's shoulders for attachment to a parachute in a back or seat pack.

The side riser sections 8 and 10 are preferably connected together by means of a chest piece 36 as shown in Fig. 1 for supporting and positioning cable housings extending from an actuating device 38 to each of the fittings 4, 6, 12 and 14. The actuating device is designed to actuate all of the fittings 4, 6, 12 and 14 simultaneously for releasing the side riser sections from the seat sling, leg straps, and shoulder portions of the harness in one operation.

The actuating device 38 and the fittings 4, 6, 12 and 14 may be of any preferred construction or type but, in general, the fittings are designed to permit the insertion of a metal connector 40 on the strap to be released and to engage the connector with a snap action to hold it in engaged relation until released by operation of the actuating means 38. The actuating means may be located in any convenient location on the assembly consisting of the removable side riser sections 8 and 10 and chest piece 36. The actuating means is preferably located adjacent the wearer's right shoulder and constructed to require two distinct and different movements for operation so that it cannot be operated accidentally by catching on any obstruction and even if the wearer should become confused he will not operate the actuating device prematurely when intending to pull the rip cord handle to release the parachute.

In the construction shown in detail in Figs. 4 and 5, the actuating device 38 embodies a housing 42 enclosing a drum member 44 rotatably mounted on a fixed stud 46 and having an arm 48 connected thereto. The arm 48 is slotted at 50 to receive a headed pin 52 on the inner end of an operating handle 54. The housing 42 is formed with a slot 56 along which the handle and pin 52 may slide from the lowered full line position of Fig. 4 in which arm 48 is held by a spring retainer 58, to the upper dotted line position A in which the arm 48 is pulled from the spring retainer and rotated through a limited arc, say 10° or so, for preparing the actuating device for subsequent operation to release of the harness from the wearer. The slot 56 is provided with a branch 60 located somewhat below the upper end of slot 56 and extending laterally so that after handle 54 has been moved upward to the upper end of slot 56 it may be pulled sideways to rotate arm 48 and drum 44 through a further angle in a final releasing movement. The branch slot 60 may terminate at the edge of housing 42 in which case the arm 48 will be rotated through a further angle of about 30° or so to the dotted line position B or the side of the housing may be slotted to permit the handle 54 and arm 48 to be swung outward from the housing through an angle of 90° or more as indicated by the dotted line position C in Fig. 4.

As a safety measure and in order to require movement of the handle 54 in two different directions and in two successive steps for preventing accidental and continuous movement in releasing the harness, a latch member 62 is pivotally mounted in the housing adjacent branch slot

60 and is movable to close off the branch slot during upward movement of the handle along slot 56. The handle therefore must be moved to the upper extremity of slot 56 and to a point where it is held against lateral movement in order to clear latch 62 and open branch slot 60. Thereafter, spring 64 returns latch 62 to the full line position of Fig. 4 in which it closes the lower portion of slot 56 and opens branch slot 60 so that the handle then may be moved only in a lateral releasing direction. Handle 54 therefore must be given two different and successive movements to rotate arm 48 and drum 44 through a large enough angle to operate the fittings at 4, 6, 12 and 14 for releasing the harness.

The initial rotation of the arm 48 and drum 44 which takes place during upward movement of the handle along slot 56 may be varied or eliminated altogether by suitable positioning of the slot 56 with respect to the arm 48 and the stud about which the arm rotates. Some limited rotation is generally desirable in order to release the arm 48 from the spring retainer 58 and to take up slack in the cables 66, 68, 70 and 72 which extend from the drum 44 of the actuating device to latch members 74 of the fittings 4, 6, 12 and 14. The cables used for this purpose preferably extend through housings 76 and the cables and housings are flexible whereas the fittings are mounted on flexible elements of the harness. It is therefore preferable to arrange the cables so that they will be loose enough to allow for relative movement of the parts as the wearer bends over or moves about without danger of tensioning the cables and accidentally actuating the latch means of the various fittings.

The fittings 4, 6, 12 and 14 may all be identical and as shown in Figs. 4 and 5 each fitting embodies a box-like housing 78 having a slot 80 therein for receiving an apertured stud 82. The latch member 74 has a bevelled end 84 that is urged into projected and latching position by a spring 86 so that the latch member will normally extend across the slot 80 in the stud 82 but is yieldable to permit insertion of the stud in securing the harness in place on a wearer. When the stud 82 has been inserted to the proper retaining position, aperture 88 in the stud registers with the latch member whereupon the latch member will be projected to its latching position to retain the connector 40 and hold it securely in place.

In order to release the connector in freeing the wearer from the harness, a bell crank member 90 is pivotally mounted at 92 in the housing 78 and is provided with one arm 94 to which one of the cables, such as cable 66, is connected, whereas the arm 96 of the bell crank extends into a slot 98 in the latch member 74. The latch member may thus be retracted from engagement with the stud 82 by a pull on the cable connected to the bell crank and in response to operation of the actuating means 38. The studs 82 associated with the lower fittings 4 and 6 are carried by the connectors 40' on the opposite ends of the seat sling of the harness and are adapted to project through openings 100 in the connectors 40 on the leg straps 20 and 22. The studs 82 associated with the fittings 12 and 14 at the upper ends of the side riser portions 8 and 10 are mounted on plates 104 carried by straps 102 secured to the chest piece 36 adjacent the fittings as shown in Fig. 5. The connectors 40 carried by the shoulder portions of the side risers are each provided with an opening 100 so that the connector may be slipped over the stud 82, after which the stud may be pushed into the slot 80 in the fitting to hold the connector in place.

In using the harness described the wearer passes the shoulder portions 16 and 18 of the harness over the shoulder and slips the connectors 40 at the forward ends thereof over the studs 82 on plates 104 carried by the straps 102 adjacent the fittings 12 and 14 on the upper ends of the side riser sections 8 and 10. The studs 82 are then pushed into the slots 80 in the fittings 12 and 14 whereby the latch members 74 thereof are pushed back against the action of springs 86. When apertures 88 in the studs are aligned with the latch members the

latter snap into latching position to secure the shoulder portions to the upper ends of the side riser sections. Thereafter apertured connectors **40** on the ends of leg straps **20** and **22** are slipped over the studs **82** of connectors **40'** secured to the opposite upper ends of the seat sling **2**. The latter studs are then inserted into the slots **80** in the fittings **4** and **6** at the lower ends of the side riser sections **8** and **10** whereupon the latch members snap into place to hold both the leg straps and the seat sling assembled as shown in Fig. 3.

The harness is thereby connected into place on the wearer and may be adjusted to fit comfortably and properly by means of quick fit buckles which preferably are of the type shown and described in Miller et al. Patents Nos. 2,542,044 and 2,475,631. The actuating device **38** is located adjacent the right shoulder or in any other convenient and predetermined position for use in releasing the harness from the wearer. A back or seat pack carrying the main parachute is connected to the lift webs **30** and **32** and may be attached to the back straps or seat sling of the harness in any suitable or conventional way. The rip cord for releasing the parachute will ordinarily be located near the left shoulder or elsewhere as in conventional harness constructions and is preferably remote from the actuating device **38** so that it will not be confused therewith. The chest piece **36** of the harness extends across the wearer's chest from one removable side riser section to the other and an emergency parachute pack may be secured directly to the chest piece or to suitable connector rings carried by the removable side riser portions themselves, as shown in Fig. 2. When an emergency pack is not used the chest piece may, if desired, be provided with suitable pockets or rings for carrying equipment which the wearer may need.

As the person wearing the harness described is descending, and upon approaching the ground, the handle **54** of the actuating device **38** is grasped and moved upward along the slot **56** in the housing and past the latch **62** to the upper end of slot **56**. The actuating device is thereby conditioned or made ready for instant releasing operation, but is still held against free movement by the sides of the upper portion of the slot. However, upon landing, the handle is free to be pulled downward and sideways along the branch slot **60** whereby the arm **48** and drum **44** are rotated through a sufficient angle to pull all of the cables **66**, **68**, **70** and **72** simultaneously. Each of the latch members **74** in the fittings **4**, **6**, **12** and **14** is then actuated whereupon the side riser sections **8** and **10** and chest piece **36** are completely disconnected from the harness. The shoulder portions **16** and **18** are released from the upper portions of the side riser sections by operation of the latch members in fittings **12** and **14** whereas the opposite ends of the seat sling **2** are released from the lower ends of the side riser sections by operation of the latch members in fittings **4** and **6**. The apertured connectors **40** on the leg straps **20** and **22** simply drop off the studs **82** of the connectors **40'** of the seat sling so that the whole harness will fall away from the wearer without any further manipulation on the user's part. In the event the harness is worn by persons landing in water and equipped with inflatable water wings or floats, the latter may be inflated before actual landing and yet the harness will disengage from any encumbrance and the wearer may swim or float away without struggling to slip the harness over the shoulders or inflated members or to disentangle the leg straps.

While the preferred form of the invention includes a single actuating device for simultaneously releasing all of the fittings at once, it will be apparent that each fitting may be provided with an independently operable actuating device or the fittings may be connected in pairs to different actuating devices or otherwise arranged for operation separately or in groups to disconnect the sections of the side risers to release the harness from the wearer. Further, it will be evident that the chest piece **36** and side riser

sections **8** and **10** may be releasable at only three points whereby the chest piece will remain attached to the harness at one point only, as to a leg strap, for example. In such a construction only three releasable fittings are required and the chest piece will not be lost and need not be replaced when the harness is recovered after use.

The construction described is thus capable of use by persons who are loaded with various equipment such as that employed by paratroopers and others and yet it is equally useful for general application with all types of life saving parachutes. The arrangement of the various straps of the harness other than the seat sling, side risers and leg straps may, of course, be varied and the types of hardware and the form of actuating means, fittings and connectors used may be constructed as desired to save in weight and cost and insure positive and consistent operation under all conditions of use.

In view thereof it should be understood that the particular form of the invention shown in the drawings and described above and the various elements thereof have been chosen for purposes of illustration only and are not intended ot limit the scope of the invention.

We claim:

1. In a parachute harness having a seat sling with side risers extending upward from the seat sling to shoulder portions of the harness, the combination of side riser sections located between the seat sling and shoulder portions and completely separable therefrom, there being separable connector elements on the upper ends of said side riser sections and on the shoulder portions of the harness and on the lower portions of said side riser sections and on the seat sling.

2. In a parachute harness having a seat sling with side risers extending upward from the seat sling to shoulder portions of the harness, the combination of side riser sections located between the seat sling and shoulder portions and completely separable therefrom, there being separable connector elements on the upper ends of said side riser sections and on the shoulder portions of the harness and on the lower portions of said side riser sections and on the seat sling, and common actuating means for releasing said separable connector elements.

3. In a parachute harness having a seat sling with side risers extending upward from the seat sling to shoulder portions of the harness, the combination of side risers sections located between the seat sling and shoulder portions and completely separable therefrom, there being separable connector elements on the upper ends of said riser sections and on the shoulder portions of the harness and on the lower portions of said side riser sections and on the seat sling, an actuating device, and means extending from said actuating device to said separable connector elements for simultaneously releasing said connector elements on operation of said actuating device.

4. In a parachute harness having a seat sling with side risers extending upward from the seat sling to shoulder portions of the harness, the combination of side riser sections located between the seat sling and shoulder portions and completely separable therefrom, there being separable connector elements on the upper ends of said side riser sections and on the shoulder portions of the harness and on the lower portions of said side riser sections and on the seat sling, and leg straps connected to said seat sling and having means thereon for securing the leg straps in connected relation with said side riser sections through the separable connector elements on the lower ends of said sections.

5. Parachute harness comprising a seat sling provided with connector elements at opposite ends thereof, leg straps attached to said seat sling and having connector elements thereon for connection with the connector elements on the seat sling to hold the leg straps in leg embracing position, side riser sections having means thereon for releasable connection with the connector elements on the seat sling and leg straps, said harness having

shoulder portions and means on the side riser sections for releasable connection with the shoulder portions of the harness.

6. A parachute harness comprising a seat sling provided with connector elements at opposite ends thereof, leg straps attached to said seat sling and having connector elements thereon for connection with the connector elements on the seat sling to hold the leg straps in leg embracing position, side riser sections having means thereon for releasable connection with the connector elements on the seat sling and leg straps, said harness having shoulder portions and means on the side riser sections for releasable connection with the shoulder portions of the harness, and common actuating means operable to release all of said releasable connections simultaneously.

7. A parachute harness comprising a seat sling provided with connector elements at opposite ends thereof, leg straps attached to said seat sling and having connector elements thereon for connection with the connector elements on the seat sling to hold the leg straps in leg embracing position, side riser sections having means thereon for releasable connection with the connector elements on the seat sling and leg straps, said harness having shoulder portions and means on the side riser sections for releasable connection with the shoulder portions of the harness, and common actuating means operable to release all of said releasable connections simultaneously including a handle and means requiring movement of the handle in two different directions for effecting operation of said actuating means to release said connector elements.

8. A parachute harness comprising a seat sling, two leg straps attached to said seat sling, a chest piece including two side riser sections one of which has the lower end thereof releasably connected to one end of the seat sling and to one of said leg straps and the other of which has its lower end releasably connected to the other end of said seat sling and to the other leg strap, said hardness having shoulder portions and releasable connections on the upper ends of said side riser sections for connection to said shoulder portions of the harness.

9. A parachute harness comprising a seat sling, two leg straps attached to said seat sling, a chest piece including two side riser sections, fittings located on the upper and lower end of each side riser section and each including a spring pressed latch member, connectors on one end of the seat sling and on the end of one leg strap releasably held in engagement by the latch member of the fitting at the lower end of one of said side riser sections, connectors on the opposite end of the seat sling and on the end of the other leg strap releasably held in engagement by the latch member on the lower end of the other side riser section, said harness having shoulder portions with connectors thereon held in engagement with the fittings at the upper ends of said side riser sections by the latch members of the latter fittings, and means for actuating said latch members to release said connectors.

10. A parachute harness comprising a seat sling, two leg straps attached to said seat sling, a chest piece including two side riser sections, fittings located on the upper and lower end of each side riser section and each including a spring pressed latch member, connectors on one end of the seat sling and on the end of one leg strap releasably held in engagement by the latch member of the fitting at the lower end of one of said side riser sections, connectors on the opposite end of the seat sling and on the end of the other leg strap releasably held in engagement by the latch member on the lower end of the other side riser section, said harness having shoulder portions with connectors thereon held in engagement with the fittings at the upper ends of said side riser sections by the latch members of the latter fittings, and actuating means mounted on said chest piece and connected to each of said latch members for operation to release all of said connectors simultaneously.

11. A parachute harness having a seat sling with side risers extending from the seat sling to the shoulder portions of the harness, said side risers each having a section thereof located between the seat sling and the shoulder portions of the harness, a chest piece extending between said sections, means releasably connecting the upper portions of said side riser sections to the shoulder portions of the harness, and other releasable means connecting the lower end of at least one of the side riser sections to the seat sling of the harness.

12. A parachute harness having a seat sling and shoulder portions, removable side riser portions extending from said seat sling to said shoulder portions, a chest piece extending between said side riser portions, and means releasably connecting said side riser portions to said seat sling and said shoulder portions at at least three points whereby said chest piece and side riser portions may be released to free the wearer from the harness without unthreading or relative slippage of the harness elements.

13. A parachute harness having a seat sling and shoulder portions, removable side riser portions extending from said seat sling to said shoulder portions, a chest piece extending between said side riser portions, and means releasably connecting said side riser portions to said seat sling and said shoulder portions at at least three points whereby said chest piece and side riser portions may be released to free the wearer from the harness without unthreading or relative slippage of the harness elements, and means for simultaneously actuating said releasing means.

14. A parachute harness comprising shoulder straps, leg straps, a removable intermediate harness portion, connector means releasably connecting said shoulder straps to said intermediate portion, additional connector means releasably connecting said leg straps to said intermediate portion, and releasing means for simultaneously releasing each of said connector means to permit said intermediate portion to fall away from the remainder of the harness to completely free the wearer from the harness.

15. A parachute harness having a seat sling and shoulder portions, side riser portions constituting the sole load supporting connection extending between said seat sling and shoulder portions in position to be located in front of the wearer when the harness is in place on a wearer, parachute attaching means carried by said side riser portions, and releasable means for connecting said side riser portions to the seat sling and shoulder portions of the harness and operable to disconnect the side riser portions and parachute attaching means from the harness for removing the harness from a wearer.

16. A parachute harness having a seat sling and shoulder portions, a chest piece having means connected thereto extending from the seat sling to the shoulder portions of the harness in load supporting relation therewith, releasable connectors securing said chest piece to said seat sling and said shoulder portions, and means carried by said chest piece for actuating said connectors to detach said chest piece from said seat sling and shoulder portions.

17. A parachute harness having a seat sling and shoulder portions, load supporting means extending from the seat sling to the shoulder portions and releasably connectable thereto for retaining the harness on the wearer's body, means for connecting a parachute to said side riser portions, and means carried by the side riser portions for disconnecting the same from the seat sling and shoulder portions to release the harness from a wearer.

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