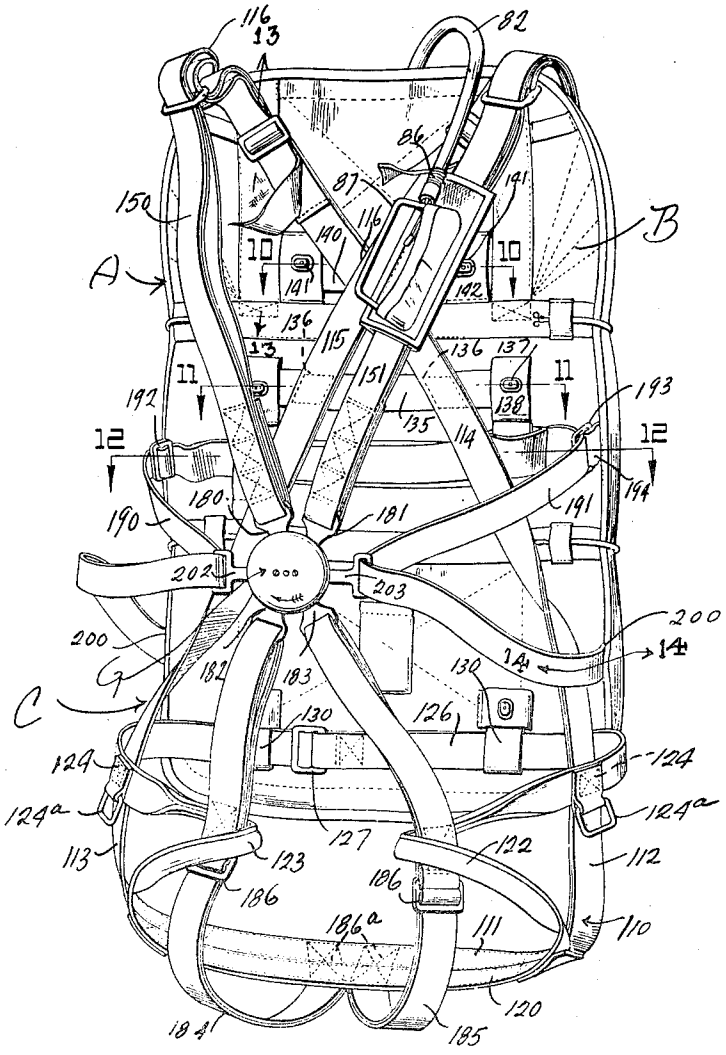
March 11, 1952 L. L. IRVIN 2,589,086

PARACHUTE PACK AND HARNESS CONSTRUCTION

Original Filed Oct. 23, 1945 5 Sheets-Sheet 1

FIG 1



INVENTOR.
Leslie L. Irvin

BY Lancaster, Allwine & Rommel
ATTORNEYS.

March 11, 1952 L. L. IRVIN 2,589,086

PARACHUTE PACK AND HARNESS CONSTRUCTION

Original Filed Oct. 23, 1945 5 Sheets-Sheet 2

FIG 2

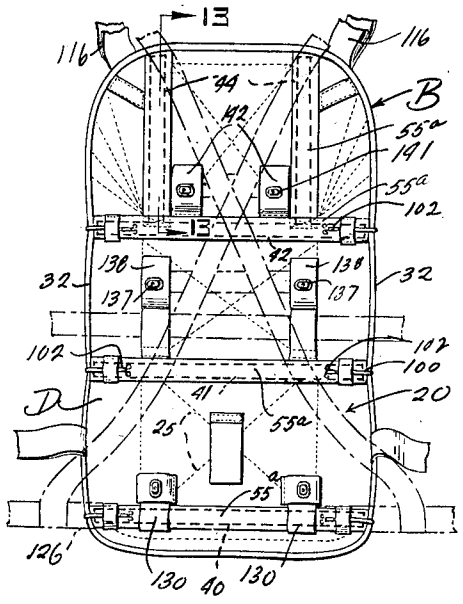
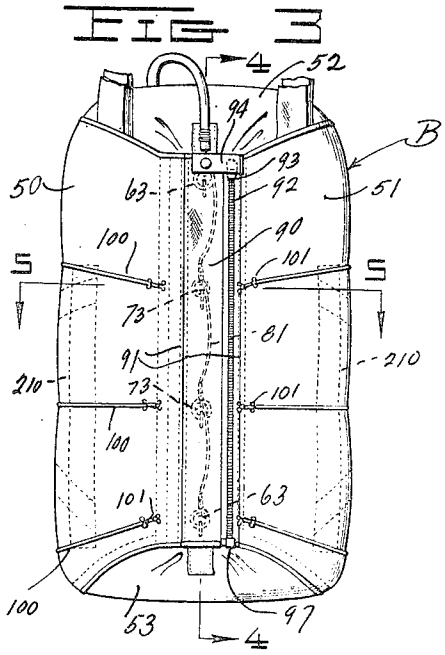


FIG 3

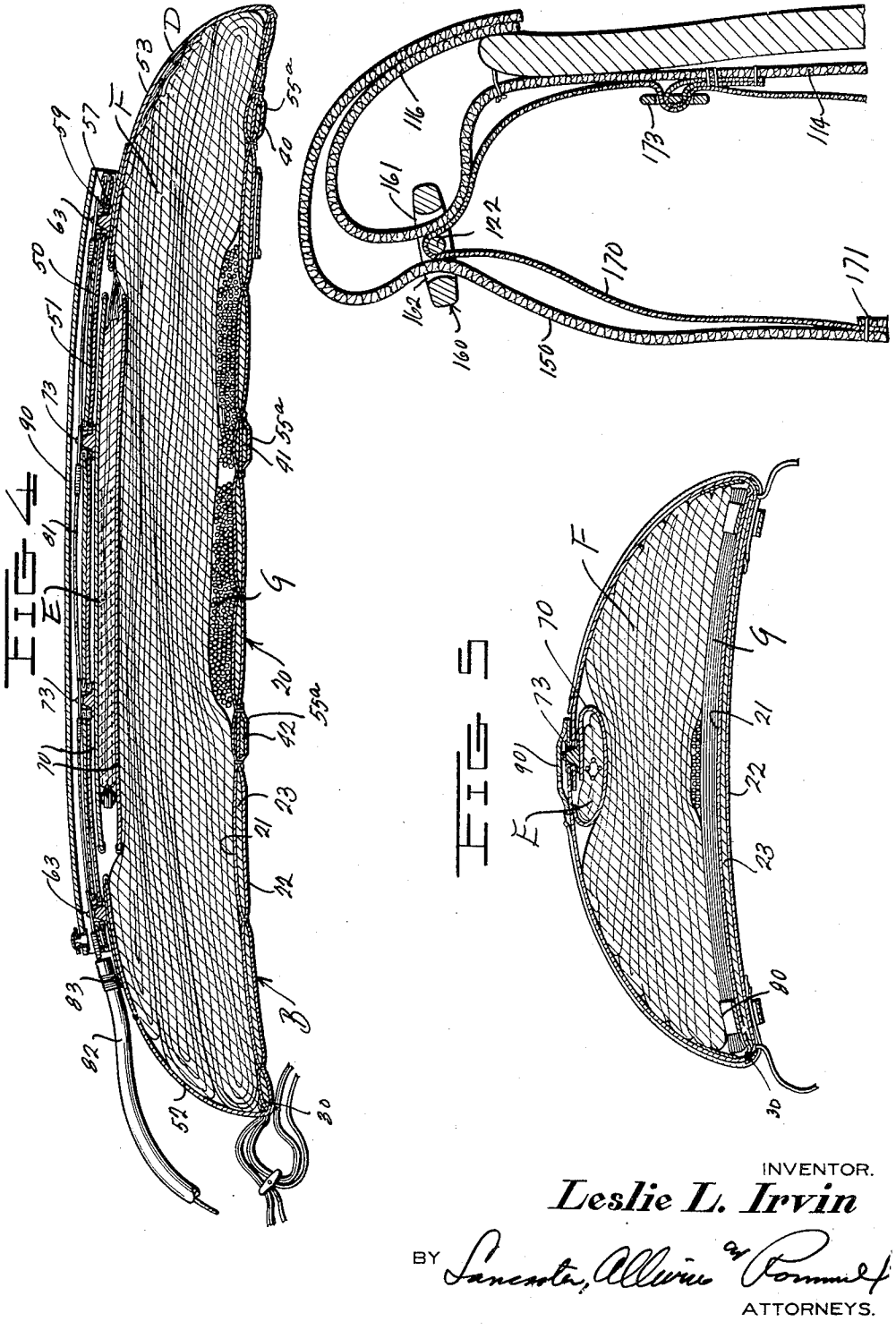


INVENTOR.
Leslie L. Irvin
BY Lancaster, Allwine & Rommel
ATTORNEYS.

March 11, 1952 L. L. IRVIN 2,589,086

PARACHUTE PACK AND HARNESS CONSTRUCTION

Original Filed Oct. 23, 1945 5 Sheets-Sheet 3



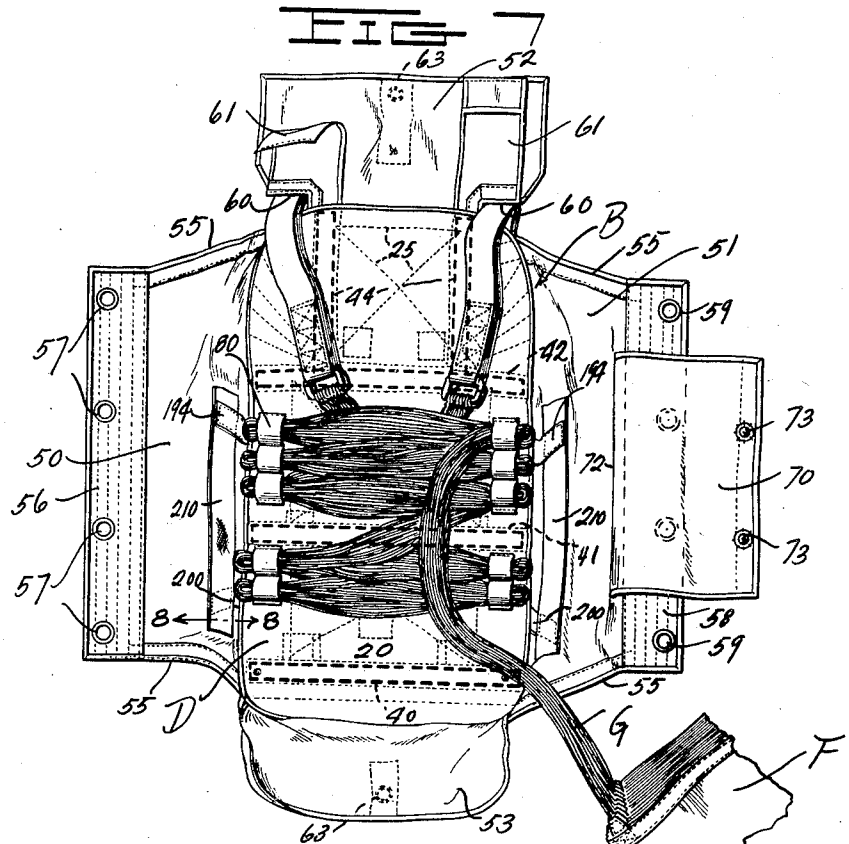
INVENTOR.
Leslie L. Irvin
BY Lancaster, Allwine & Rommel
ATTORNEYS.

March 11, 1952 L. L. IRVIN 2,589,086

PARACHUTE PACK AND HARNESS CONSTRUCTION

Original Filed Oct. 23, 1945 5 Sheets-Sheet 4

FIG 7



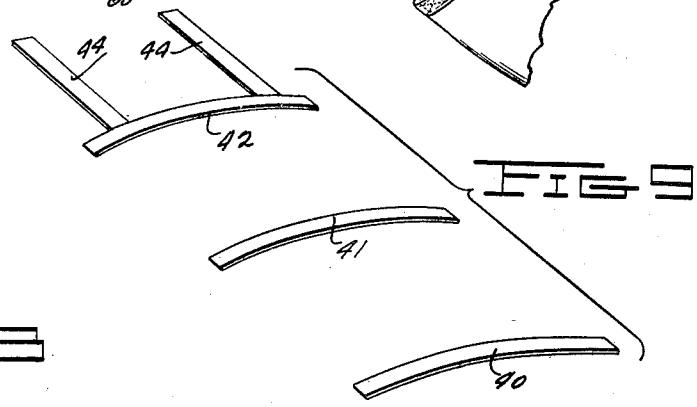
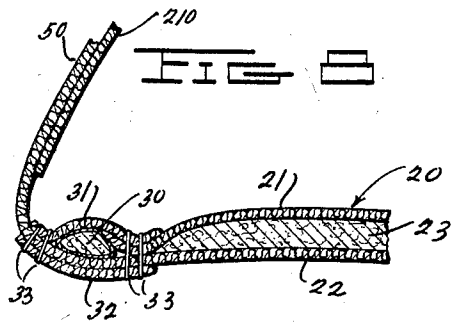


FIG 9

FIG 8



INVENTOR.
Leslie L. Irvin

BY Lancaster, Allwine & Rommel

ATTORNEYS.

March 11, 1952 L. L. IRVIN 2,589,086

PARACHUTE PACK AND HARNESS CONSTRUCTION

Original Filed Oct. 23, 1945 5 Sheets-Sheet 5

FIG 10

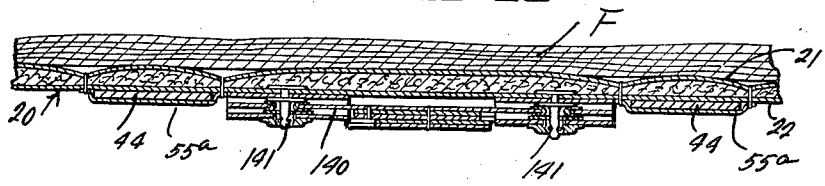


FIG 11

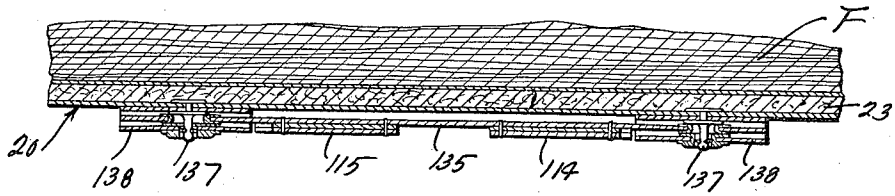


FIG 12

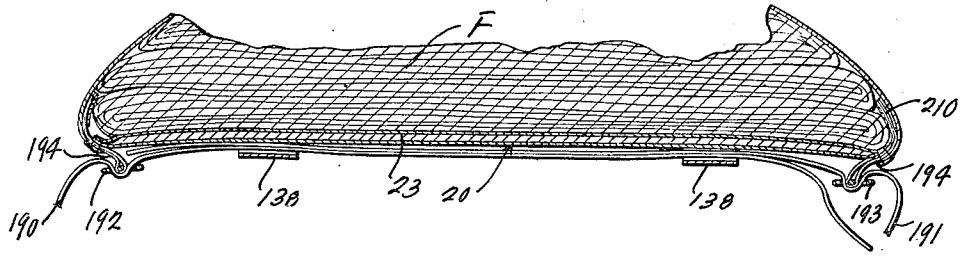


FIG 13

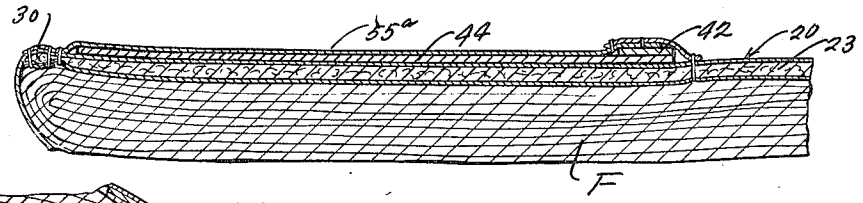
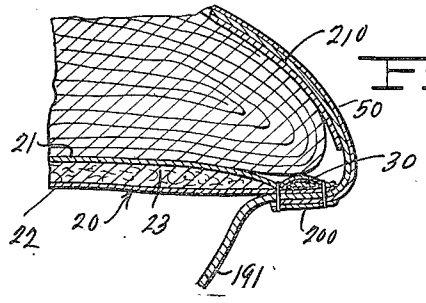


FIG 14



INVENTOR.
Leslie L. Irvin
BY Lancaster, Allen & Rommel
ATTORNEYS.

Patented Mar. 11, 1952 2,589,086

UNITED STATES PATENT OFFICE

2,589,086

PARACHUTE PACK AND HARNESS CONSTRUCTION

Leslie L. Irvin, Buffalo, N. Y., assignor to Irving Air Chute Co., Inc., Buffalo, N. Y., a corporation

Original application October 23, 1945, Serial No. 623,916, now Patent No. 2,542,925, dated February 20, 1951. Divided and this application October 7, 1949, Serial No. 120,026

5 Claims. (Cl. 244—148)

1

This invention relates to movements in parachute packs and harnesses.

The primary object of this invention is the provision of an improved combination pack and harness of the back type embodying means providing a flexible comfortable pack and a harness which embraces the wearer with safety under all circumstances of use; the same being of the single coupling release type from which the wearer may readily release himself.

A further object of this invention is the provision of an improved comfortable and efficient type of form fitting flexible back parachute pack of the type generally shown in United States Patent 1,882,086; British Patent 351,147 and Canadian Patent 306,100 but embodying improvements thereover in the specific pack and harness structure associated therewith.

Other objects and advantages of the invention will be apparent from the following detailed description.

This application is a division out of U. S. application Serial No. 623,916, filed October 23, 1945, now U. S. Patent No. 2,542,925, issued February 20, 1951.

In the accompanying drawings wherein for the purpose of illustration is shown a preferred embodiment of the invention,

Figure 1 is a perspective view of the improved parachute pack and harness with the latter in closed position.

Figure 2 is a front view of the pack container showing in dotted lines associated harness construction.

Figure 3 is a rear view of the closure side of the pack.

Figures 4 and 5 are cross sectional views thru the pack taken substantially on their respective lines shown in Figure 3 of the drawings.

Figure 6 is a cross sectional view taken thru the harness shoulder portions showing an adapter adjustment for the harness.

Figure 7 is a view of the pack with the closures open showing the interior parts of the container and its flaps and the shroud lines associated therewith.

Figure 8 is an enlarged cross sectional view taken thru a side of the pack container showing improved features thereof; the view being taken substantially on the line 8—8 of Figure 7.

Figure 9 is a developed view showing the flexible metal bar reinforcement in the foundation wall of the pack container.

Figures 10, 11 and 12 are cross sectional views

2

taken substantially on their respective lines shown in Figure 1 of the drawings.

Figure 13 is a cross sectional view taken thru one of the longitudinal reinforcing members of the pack; this view being placed horizontal.

Figure 14 is an enlarged cross sectional view taken thru a portion of the pack and harness substantially on the line 14—14 of Figure 1.

In the drawings, wherein similar reference characters designate corresponding parts thruout the several views, the letter A may generally designate the parachute equipment which may consist of a pack B and a single coupling harness C.

Referring to the pack B, the same includes a container D which, so far as the pack feature is concerned, contains essential details of novelty in that thereby the pack is relatively thin and extremely flexible both longitudinally and laterally and of a nature to receive with safety and efficiency a pilot parachute E which is attached in conventional manner to a main canopy F. The latter has shroud lines G housed within the pack in conventional manner and attached as is usual to the riser webs of the harness.

The container D includes a base or foundation wall 20 which consists of inner and outer plies 21 and 22 of flexible fabric between which is located compacted mat-like padding 23 held in position therein by horizontal vertical and diagonal stitch lines indicated variously in the drawings and referred to occasionally by the numeral 25; these stitch lines being shown best as dotted to represent stitches in Figures 1, 2 and 7 of the drawings. The base wall 20 is of rectangular shape with the corners rounded and the same is marginally reinforced and held in shape by means of reinforcing cordage 30 of approved type. It may consist of any suitable textile material, or raw hide, or even plastic; the same being extremely flexible yet sufficiently stiff to shape and reinforce the outline of the base wall and the shape of the pack. It is held in position by inner and outer binding 31 and 32 suitably stitched at 33 to the fabric inner and outer walls 21 and 22 of the wall structure, as best shown in Figure 8 of the drawings.

While under some circumstances the base wall, as above described, will be sufficient upon which to build the pack and hold the pack shape when closed, I prefer to provide upon the foundation wall lower intermediate and upper spring strips or bars 40, 41 and 42 respectively and also vertically positioned upper back shape holding spring bars 44 welded or otherwise secured upon the bar or strip 42 normal to the latter and extending

upwardly therefrom. They are housed by fabric pieces 55a attached upon the outer covering 22.

The spring member 40 is positioned upon the container so as to be located across the small of the back of the wearer; the cross bar or member 41 fits at the pit of the back of the wearer and the bar 42 at or just below the shoulder bones of the wearer; the bar portions 44 extending upwardly to hold the top of the pack in position against sagging outwardly when in position upon the wearer. These bar portions 40, 41, 42 and 44 are preferably of metal altho they may be of plastic, whale bone or any other approved material which is semi-rigid but which will flex longitudinally and spring back into position under normal body movements of the wearer. They are entirely shape holding in their nature with the exception of the transverse bars 40 to 42 which play some action in swinging the pack open upon pulling and releasing the rip cord. The ends of the bars 40 to 42 and also the bars 44 terminate short of the outer edges of the base or foundation wall.

Referring to the flap or closure arrangement for the container D, the same includes side flaps 50 and 51 and top and bottom or end flaps 52 and 53 respectively. The side flaps 50 and 51 extend the length of the base wall at the point of their attachment thereto and therefrom diverge along the marginal edges 55. These marginal edges are reinforced and the flap 50 at its free edge is fabric and stitching reinforced at 56 and provided with a plurality of grommets 57, preferably four in number, therealong. The flap 51 is also fabric reinforced along its marginal portion at 58 and likewise it is provided with complementary grommets 59, preferably four in number. These flaps 50 and 51 are contiguous with the base wall outer fabric 22 and may be an integral part thereof as shown in Figure 8 and elsewhere. The flaps 50 and 51 due to their slackness and the end curvature of the base wall to which they are connected have a box-like arrangement adjacent to the base wall. That is, the flaps 50 and 51 cannot be extended in planes entirely flush with the base wall adjacent their connections with the latter. The flap 53 is connected along the bottom margin of the base wall, as shown in Figure 7, and may be a continuous part of the outer fabric layer of the base wall. It is entirely flexible and the side marginal portions of the flap 53 may be continued in connected relation with the base wall beyond the point of attachment of the flaps 50 and 51, so as to form a complete closure when the flaps are folded together.

The top flap 52 is connected along the top margin of the base or foundation wall and is cut out at 60 adjacent the sides thereof to facilitate entrance and removal of the riser webs of the harness in the manner well known in the art. Built-up corner portions 61, which are nothing more than flaps, are provided at the sides of the closure flap 52 for the purpose of entirely enclosing the corners of the container when the parachute is packed therein.

The end flaps 52 and 53 are provided each with a single cone or stud 63 of well known nature adapted to cooperate with the end grommets of the flaps 50 and 51.

It is an object of this invention to provide means for safely enclosing the pilot parachute. In packs in practical use heretofore the pilot parachute has been separated from the main parachute by various expedients. The one most

in use is that of providing auxiliary flaps upon each of the side flaps of the container which overlie the main parachute and form a division for receiving the pilot parachute. Very often they become disarranged due to the fact that they are not interconnected and as a result the pilot parachute sometimes entangles and prevents successful deployment of the main parachute. To obviate this I have provided a single pilot parachute separation or enclosing flap 70 which is secured to the inside of the side flap 51 forming a main closure for the container; this securement is effected along the line 72 just beyond the inside edge of the main reinforcement 58 of the flap 51. The auxiliary flap 70 of course extends beyond the outer marginal edge of the flap 51 when these flaps are extended as shown in Figure 7 and on a surface thereof adjacent the margin is provided with cones or studs 73 complementary with respect to the studs 63. Studs 73 are adapted to receive the intermediate grommets of the flaps 50 and 51, as will be subsequently mentioned.

The manner of packing a parachute is well understood in the art. Usually by means of drawstrings or other expedients, after the shroud lines have been tucked in pockets 80 provided therefor on the inside of the base wall, the main parachute is folded zig-zag upon the base wall or foundation wall of the container and then the flaps are drawn into position thereover. Just before closing the flap structure the pilot parachute is tucked into position. In the assemblage it will be noted that the end flaps 52 and 53 have their studs positioned for receiving the end grommets 57 and 59 of the side flaps 50 and 51, as shown in Figure 4, and the pilot enclosing flap 70 is positioned, as shown in Figure 5, so that the studs 73 thereof extend thru the intermediate grommets 57 and 59 of the side closure flaps 50 and 51. The pin ends of the rip cord structure 81 are extended thru the transverse openings in these studs 63 and 73 in the usual manner. One end of the rip cord housing 82 may be attached at 83 to the top closure flap 52 and the other end secured to the harness at 86, as shown in Figure 1. Of course the rip cord has a handle 87 secured in a pocket or by other expedient 88 attached upon the harness within reach of the operator.

As a safeguard for the rip cord pin attachment with the studs I provide a safety flap 90 secured at 91 upon the flap 51 of the container, having a slide fastener connection at 92 longitudinally thereof. This flap 90 may be opened. The fastener handle 93 is protected by a detachable flap 94 as shown in Figure 3. The complementary parts of the slide fastener are detachable at the lower end at 97 in a manner well understood in the art, so that the flap 90 may be entirely opened.

It will be apparent from the drawings that the pilot parachute is thus secured within a safety tube or pocket provided entirely by the single flap 70. The latter furnishes also a foundation for the studs which enclose the main flaps. There will be no likelihood of entanglement of the pilot parachute with the main pilot parachute, and the pilot parachute will be thrown clear as the flaps are opened by their conventional elastics, shown at 100 in the drawings; these elastics being attached at their ends as shown at 101 and 102 to the rear and forward parts of the container; preferably in line with the frame strips 40, 41 and 42.

It will be apparent from the foregoing that the container is entirely flexible. Primarily it is intended for use as a back pack but the features of this invention will readily adapt themselves to any type of pack such as chest pack, lap pack, seat pack, etc.

Referring to the improved harness C, the same has been provided with the thought of safety in mind, and the ability of the wearer to quickly release himself from the harness. In the main it is of the single point coupling release type and includes a main sling portion 110 having a seat strap 111 within which the wearer sits as in a swing during descent and from which side riser webs 112 and 113 extend along the sides of the wearer and thence to the back where they provide back straps 114 and 115 crossing at 116. They extend upwardly to form suspension lines 116 shown best in Figure 6 of the drawings. I also provide a complementary seat web or strap 120 which lies in the same plane and may be an integral part of the strap portion 111 above described. At the ends of the seat portion 120 I provide U-shaped loops 122 and 123 just above the seat or sling of the harness; the loops being connected at 124 to the riser web portions 112 and continuing therefrom in a back strap 126 having an adjusting adapter 127; it of course being understood that the back strap consists of two straps approaching the adapter at which place the back strap may be adjusted as to length. The loop portions 122 and 123 may be rendered rather stiff by doubling the material of the webbing upon itself and stitching it in such condition as shown in Figure 1. This back strap overlies the lower bar reinforcement 40 in the container and fits across the small of the back of the wearer. It is retained in position upon the container by releasing tabs 130. The riser webs 112 and 113 extend along the sides and intermediate the ends of the base wall of the container and the same are held in properly spaced relation by a strap 135 stitched at 136 thereto; the ends of the strap 135 being detachably connected against the pack by fasteners 137 upon suitable tabs 138 located upon the outer surface of the base wall of the container, as shown in Figure 1. Also at their crossing point the straps 114 and 115 are provided with a connecting cross strap 140 having snap fastener connections 141 with suitable tabs 142 provided upon the back wall of the container, as shown in Figures 1 and 10 of the drawings.

Suspension tabs or straps 150 and 151 are provided for complementary association with the back straps 114 and 115 respectively; the same being connected thru three bar adapters 160. The suspension webbing 116 is extended thru the passageway 161 between two of the bars and the suspension webbing 150 or 151, as the case may be, is extended thru the other opening 162 of the three bar adapter. In order to hold the position of the adapter, which lies over the shoulder of the wearer, and to accomplish snug fitting or accurate fitting of the harness upon the wearer, I provide a strap 170 secured at 171 as to the front suspension strap and therebehind; the same is threaded slidably over the intermediate bar 172 of the adapter and thence extended slidably or adjustably thru an adapter connection 173 upon the inside of the complementary suspension web 116, which in reality at that point is a back strap, as shown in Figure 6. The strap 170 of course will hold the adapter 160 in proper position so that the suspension webs at the shoulders of the wearer will be retained in proper connection for fitting the harness efficiently to the stature of the wearer.

As shown in Figure 1 of the drawings I provide a fixed point quick release coupling G which is well known, as to essential characteristics, in the prior art. I believe this to be the first time that a six point coupling has been used and in the main the same enables the operator to instantly free all the fasteners from the coupling and the ends of the harness will drop loose from the wearer. The coupling G receives detachable fasteners 180 and 181 at the ends of the front suspension straps 150 and 151 of the harness and it furthermore receives fasteners 182 and 183 adjustable at the ends of leg straps 184 and 185 respectively; the latter being secured at 186 upon the seat straps 111 and 120 and being adapted to extend therefrom thru the loops 123 and 122 respectively of the harness. These leg straps are provided with suitable adapters 186 to adjust their length.

I prefer to provide side means for adjusting the harness in enclosing relation upon the wearer. It consists of a cross belt arrangement adapted to lie across the middle of the back of the wearer including side straps 190 and 191 threaded thru three bar adapters 192 and 193 respectively; these buckles or adapters are secured by tabs 194 attached upon the container by being stitched in the structure thereof at the extreme side margins of the container, as will be hereinafter described. The straps or webs 190 and 191 are threaded thru these adapters in the usual manner so that they can be adjusted but will not too easily slide, and the free ends are then overlapped and held in position upon the pack by the tabs 138 above described, and as shown in Figure 12. The straps 190 and 191 are looped therefrom downwardly and at their free ends are secured at points 200 in the fabric structure of the container. Thus, the straps 190 and 191 provide the loops shown in Figure 1, upon which are threaded fasteners 202 and 203. The latter is permanently connected to the coupling member G but the fastener 202 is releasable therefrom. The coupling may be operated to release the fasteners 180 and 183 inclusive and the fastener 202 and the wearer may drop all of the harness parts from his body and release himself from the entire parachute equipment.

Since the ends of the loops holding the fasteners 202 and 203 are connected directly to the container of the pack, these points of connection are reinforced by providing a connecting reinforcing piece 210 along the inner side of each flap 50 and 51, as shown in Figure 7, to which the tab 194 is stitched, the other end of the loop forming strap 190 and 191, as the case may be, being extended and connected as shown at 200 in Figure 7 with the other end of this connecting and reinforcing strap 210. This arrangement of connecting the harness to the extreme sides of the pack insures that the latter will be held tight or close to the wearer's body at all times.

I prefer to provide coupling parts 124a upon the side risers of the harness adjacent to the seat for connection of safety straps, a life raft or a seat pack.

From the foregoing description of this invention it is apparent that an improved pack and harness has been provided which will enable a wearer to sit with ease within the aeroplane without relinquishing any safety factors essential to successful operation of the device should an emergency arise.

Various changes in the shape, size and arrangement of parts may be made to the form of invention herein shown and described, without departing from the spirit of the invention or the scope of the following claims.

I claim:

1. A parachute harness comprising a U-shaped supporting sling including a seat and riser webs extending at the sides of the seat and thence extending in back crossing relation and terminating in suspension lines, flexible loops connected upon the riser webs immediately above the seat and having a back strap extending thereacross and connecting said loops and the riser webs, a single point release coupling, leg straps connected with said seat for releasable threading thru said loops and having fastener means for connection to said coupling, upper body attaching straps including suspension lines and front straps provided with fastener means for releasable connection with said coupling, adjustable adapter connection means connecting said upper body straps with the back crossing straps adjacent the connection of the suspension lines of the back crossing straps, V-shaped side body attaching straps including fastener means for connection with the release coupling and a back strap connection therebetween, and a longitudinally and laterally flexible pack having means for connection of the same with the back strap which connects said loops, and with the side body straps and the back connection of the side body straps and also with the crossing straps of said sling.

2. In a combination harness and pack the combination of a pack having a flexible back wall, a U-shaped sling portion including a seat and riser webs extending therefrom in relative crossed relation and having end portions terminating in parachute canopy connecting straps, front and shoulder straps having adjustable adapter connection with the crossed straps and extending in downwardly convergent relation to the front, fasteners at the lower ends of said straps last mentioned, leg strap means connected with said sling having fasteners, means connecting said sling at the lower portion thereof to the lower portion of the back wall of said pack, means connecting the aforesaid crossed straps to the said back wall of the pack at the upper portion thereof, V-shaped side straps having fasteners at the apices thereof, a length adjustable back strap connecting complementary ends of said V-shaped side straps, means connecting said back strap to the flexible wall of said pack, means connecting the other complementary ends of the V-shaped side straps to the marginal portions of said wall of the pack, and a single point release coupling for connecting said fasteners aforementioned together.

3. In a combination harness and pack the combination of a flexible back pack including a flexible foundation wall, a body encasing harness including substantially V-shaped side straps having connectable fasteners at the apices thereof, and means connecting the V-shaped side straps at complementary ends to the flexible foundation wall of said pack, including a length adjustable back strap for varying the length size of the V-shaped side straps.

4. In a combination parachute pack and harness the combination of a flexible back pack including a flexible foundation wall, and a harness for connection with said foundation wall including a substantially U-shaped supporting sling including a seat and riser webs, means connecting said riser webs to the upper portion of the flexible foundation wall of the pack, said riser webs having upper body attaching straps extending to the front of the wearer including fasteners, lower body attaching straps connected with the lower portion of the sling including fasteners and a connection with the lower portion of the flexible foundation wall, and substantially V-shaped side straps each having a pair of relatively spaced connections with the side margins of the foundation wall of the pack at the intermediate portion in the length of said pack, said V-shaped side straps having fasteners slidable thereon, and a single point release coupling for connecting all of said fasteners together.

5. In a combination harness and pack the combination of a vertically elongated flexible back pack including a flexible foundation wall, a body encasing harness including a U-shaped sling, lower body connecting straps connected with the sling including strap portions having coupling fasteners thereon, upper body attaching shoulder straps connected to the sling including front straps adapted to extend to the front of the wearer and having coupling fasteners thereon, means connecting portions of said lower body and said upper body attaching straps to the flexible foundation wall, substantially V-shaped side straps between the said upper and said lower body attaching straps, having means connecting the same to the flexible foundation wall at each of the extreme side margins of said flexible foundation wall, said V-shaped side straps having coupling fasteners at the apices thereof, and a single point release coupling having means associated therewith for detachably connecting the fasteners of said upper and lower body attaching straps and side straps thereto.

LESLIE L. IRVIN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,367,723	Smith	Feb. 8, 1821
2,430,773	Kowalski	Nov. 11, 1947

FOREIGN PATENTS

Number	Country	Date
387,388	Great Britain	Feb. 6, 1933
417,649	Great Britain	Oct. 9, 1934
771,397	France	July 23, 1934