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F. G. MANSON ET AL

2,300,428

PARACHUTE PACK CONTAINER

Filed Aug. 26, 1940

3 Sheets-Sheet 1

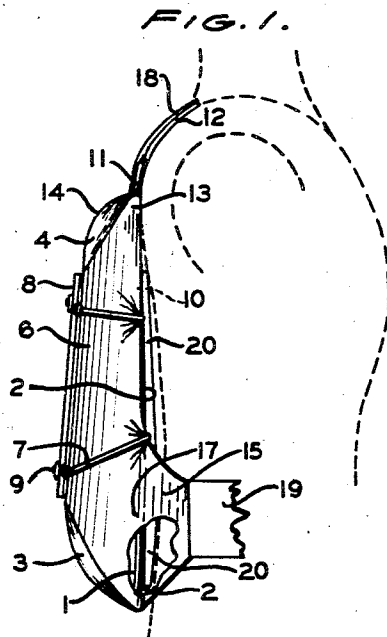
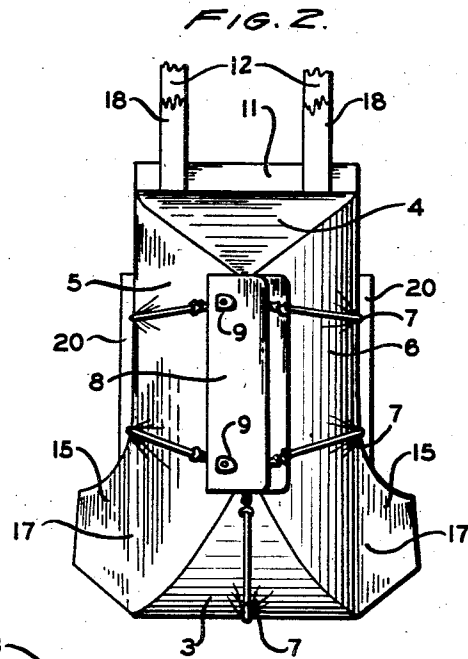
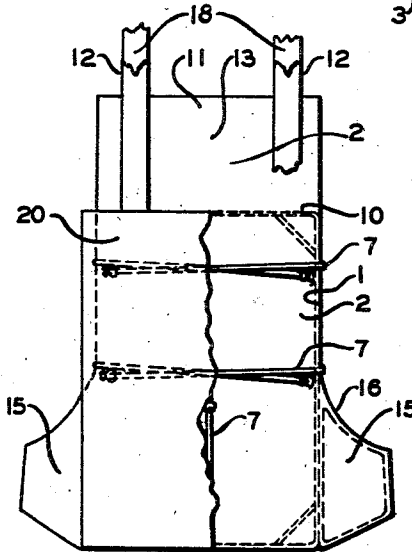


FIG. 3



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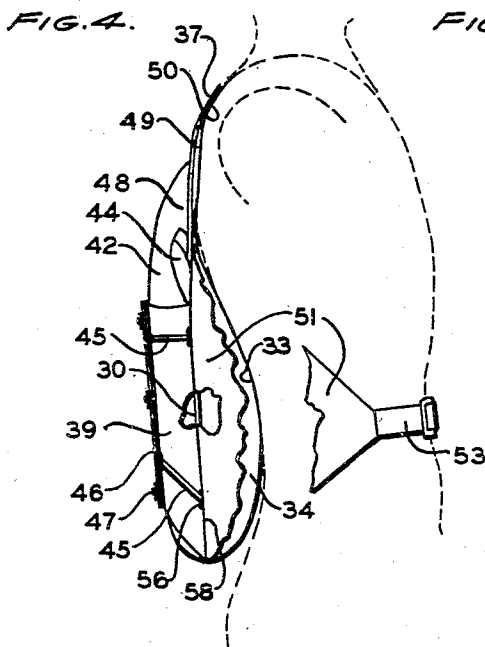
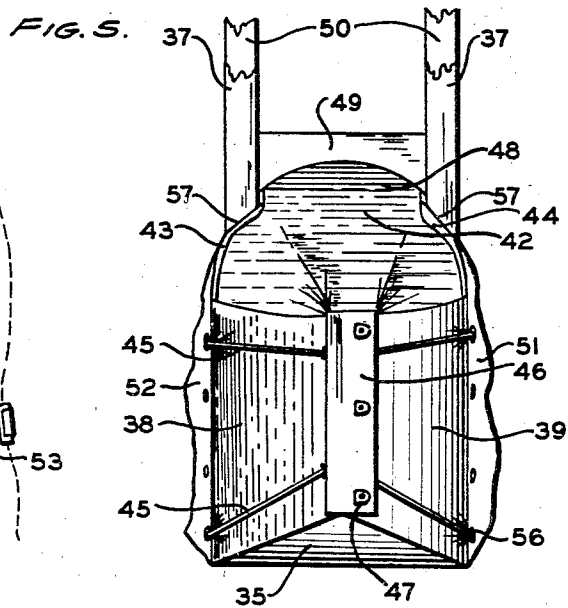
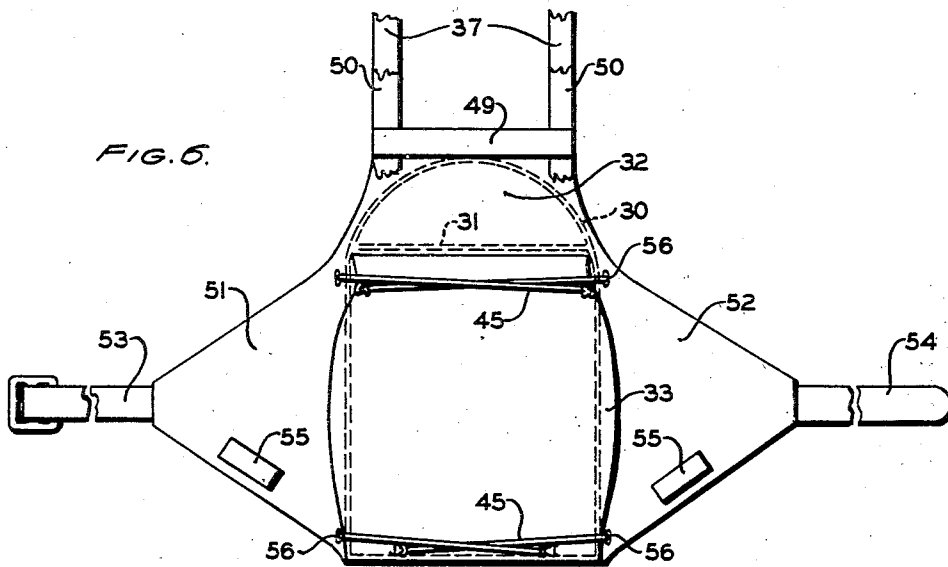
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3 Sheets-Sheet 2



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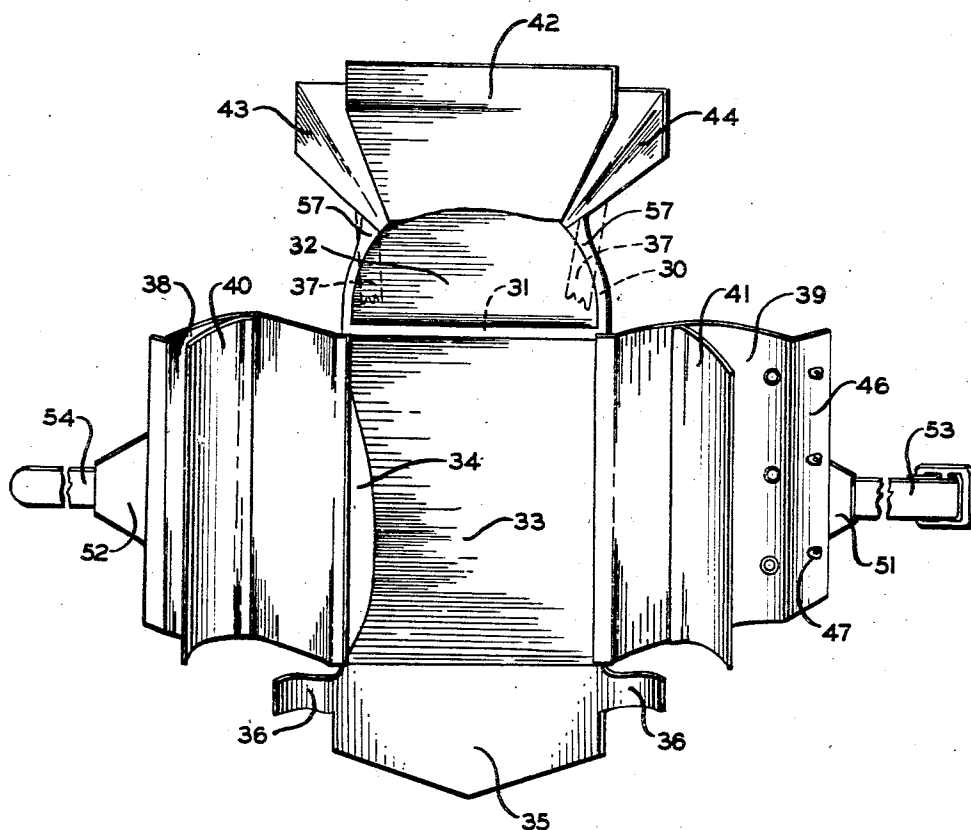
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3 Sheets-Sheet 3

FIG. 7.



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PARACHUTE PACK CONTAINER

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Application August 26, 1940, Serial No. 354,260

5 Claims. (Cl. 244—148)

(Granted under the act of March 3, 1883, as
amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to us of any royalty thereon.

The invention relates to a parachute pack container having particular reference to a form-fitting, or streamlined, back type of pack.

One disadvantage of many existing types of parachute packs is that the pack is bulky and cumbersome and restricts the freedom of movement of the wearer. This is particularly objectionable where the wearer has occasion to climb through very restricted passageways, and where he must perform duties in confined spaces. Where attempts have been made to design a form-fitting, or streamlined, pack, the results hitherto have not been completely satisfactory for a number of reasons. In the first place, it must be recognized that even though the pack be made of a shape to approximately fit the contours of the wearer, the advantages of the improved shape will largely be lost if the pack is not positively confined to snugly engage the wearer's back in any position he may assume. Thus, packs heretofore built upon rigid or even semirigid frames may be slightly curved around the back of the wearer but have not been made to satisfactorily fit the hollow of the wearer's back. Also, if the wearer bends, stoops, or twists his body, the stiffness of the frame causes the pack to protrude in various places so that it cannot be called truly form-fitting in use. This is particularly true of the top edges of existing packs when the wearer is obliged to crouch or to crawl through restricted passageways.

To facilitate such movements it is necessary first, to make the top edge, particularly, thin and wedge-shaped to assist in forcing entry of the pack into the passageway, and secondly, to confine the upper edge of the pack closely against the body of the wearer in any position the wearer may be required to assume. Further, these conditions must be fulfilled without causing some other part of the pack to buckle or bulge away from the body of the wearer so as to jam in the passageway. Thus it will readily be seen that known rigid or semirigid types of pack having relatively stiff frames for presentation directly against the back of the wearer, even if well designed, will not fulfill the above requirements, and are subject to limitations in use which tend to negative the value of the streamlined and form-fitting design. Another and very critical objection to the rigid, or so-called hard, type of packs is that they will not fit a person who does

not approximately conform to the model upon which they were built, with the result, again, that the advantages of form-fitting are lost to such persons, making the form-fitting pack more uncomfortable and fatiguing, and perhaps more bulky than a conventional thick pack. Also from the standpoint of avoiding fatigue, the form-fitting pack makes a very good back cushion if it is adapted to fit properly, and a very unsatisfactory back cushion if there is a frame against the wearer's back.

The foregoing considerations relating to restricted passageways and operation in confined quarters are particularly pertinent in military aircraft operation. Gunners and others, in certain types of military planes, for example, are required to carry out their functions in very cramped quarters which admit of only slight movement. The openings for entrance to and egress from these quarters are in many cases barely large enough for a man to crawl through. When it is remembered that the occupants of such planes are subjected to constant vertical and lateral movements even in level flight, and that such movements become extremely violent in aircraft maneuvers, it will be appreciated that the added hindrance of protruding parachute packs would seriously interfere with the functions of aircraft personnel.

The general object, therefore, of the present invention is to provide an improved form-fitting, or streamlined, parachute pack container of the back type which will overcome the objections and disadvantages pointed out above.

A particular object is to provide a flexible pack container, all parts of which will be held close to the body of the wearer in any position of the wearer's body so as to eliminate projecting parts and permit ease of movement.

A further object is to provide an elongated pack container extending a substantial part of the length of a wearer's back so as to reduce the thickness of the pack, and fitting into the hollow of the back so as to reduce the projection beyond the general outline of the wearer's figure.

A further object is to provide a pack in which the stiffening frame is separated from continuous contact with the wearer's back by a thickness of soft material whereby the pack will fit individuals of different sizes and proportions sufficiently closely to form a comfortable back cushion.

Additional objects and advantages will be apparent as the description proceeds in connection with the accompanying drawings.

The invention overcomes the disadvantages

pointed out, and accomplishes the objects stated by forming the pack so that a considerable quantity of the parachute material is carried in the hollow of the wearer's back, and so that a thickness of soft material separates at least the major part of the frame from the wearer's back. In one embodiment, a large pocket is formed in the material of the pack container on the side of the frame next to the wearer, this pocket being proportioned to fit into the hollow of the wearer's back. This pocket in itself will hold a substantial portion of all the parachute material, and will at the same time space the greater part of the frame element away from contact with the wearer. The frame element roughly defines a rectangle surrounding this pocket, with the edge portions of the material of the pocket merging into the plane of the frame element. When this pocket is filled with parachute material in packing the parachute, the remainder of the parachute disposed throughout the full length of the elongated pack container will cause only a slight bulge or convexity on the opposite side, or back side, of the plane of the frame. In this manner the frame itself is not required to fit the curve of the wearer's back, and the flexibility of the filled pocket will be sufficiently conformable to prevent chafing. Thus, instead of bulging outwardly to provide the necessary capacity, the present pack fills in the concave space in the small of the wearer's back, thereby making possible a relatively smooth and flat exterior on the filled pack, having no corners or bulges to interfere with the wearer's movements in confined places. Also, it will be seen that there results an improved back cushion to give restful support and prevent fatigue to the wearer.

In both embodiments the pack containers taper upwardly to relatively thin top edges which extend above the top margins of the respective frames, providing flexible portions for attachment to the shoulder straps of the parachute harness which lie closely against the wearer's back across the shoulders. This upper edge is somewhat wedge-shaped when viewed from the side, and insures that the pack will not snag when the wearer is required to crawl or worm his way through small openings and the like.

Side flaps are provided on the lateral edges of the pack for attachment to means to hold the main body of the pack closely against the wearer's back at all times.

The principal features are carried out in two preferred embodiments as illustrated in the accompanying drawings in which:

Figure 1 is a side view showing one form of parachute pack container constructed according to the present invention as it appears in position on the back of the wearer, a portion of the container being broken away;

Figure 2 is a back view of the pack shown in Figure 1;

Figure 3 is a front view of the pack shown in Figure 1 with a part of the back cushion broken away;

Figure 4 is a side view of another embodiment of the pack container showing it in position on the back of the wearer, parts being broken away for clearness;

Figure 5 is a back view of the pack shown in Figure 4 with the side flaps broken away;

Figure 6 is a front view of the pack shown in Figure 4; and

Figure 7 is a view looking into the pack of

Figure 4 from the back, with the various panels and flaps opened outwardly.

In the embodiment illustrated in Figure 1, the pack container is held snugly against the back of the wearer and contains enlargements in the lower portion to carry the bulk of the parachute material in the region of the hollow of the wearer's back. The pack is built upon a generally rectangular frame 1 of wire or the like which is incorporated into the front, or ventral, wall 2 of the pack container. The side of the pack herein designated as the front side, front wall or ventral wall, is understood to be the side facing forward when the pack is being worn; that is, the side which rests against the back of the wearer. Attached to the front or ventral wall 2 are the lower end panel 3, the upper end panel 4, the left side panel 5 and the right side panel 6. These panels are equipped with rip cord cones and grommets in the customary manner for retaining the rip cord pins, and elastic opening cords 7 to assist in opening the pack. A flap 8, preferably held down by snap fasteners 9, is provided to cover the rip cord cones and pins. The rip cord itself has been omitted for clearness as it forms no part of the present invention.

One of the features of novelty in the embodiment shown in Figures 1 to 3 is the extension of the front or ventral wall 2 above the upper edge of the frame 1 to provide a flexible and back-conforming upper portion on the pack. The reference numeral 10 is used to indicate the upper edge of the frame 1, it being seen from Figure 1 that that portion of the pack container extending above the upper edge 10 readily accommodates itself to the contour of the wearer's back across the shoulders.

The upper edge of the pack container terminates in a flexible band 11 of webbing material, to which may be secured the shoulder straps, or the like, 12 of a parachute harness embracing the body of the wearer. By means of this construction, the band 11 will be positively held in snug engagement with the wearer's back and will insure that the uppermost portion 13 of the pack proper will also be held in snug engagement with the wearer's back, regardless of what position the wearer may assume. The parachute material is preferably packed in the upper portion 13 so as to cause the upper end panel 4 to assume a rounded form as shown at 14. Thus, by eliminating a square corner or protruding bulge at point 14 and by restraining the upper portion 13 snugly against the wearer's back, the pack offers a minimum obstruction to the wearer in climbing or crawling through restricted openings, passageways, and the like, it being practically impossible for the upper edge of the pack to pull away from the wearer's body. Only a fragmentary portion of the harness is illustrated, as any conventional type of harness may be used.

Provision is made for a pair of lift webs 15, 16 to leave the pack between the upper end panel 4 and the front wall 2. These lift webs overlie, and are intended to be attached at some point to the shoulder straps 12, but the details of the harness form no part of the present invention.

Another feature of the present pack container in both embodiments is an enlargement of the lower portion thereof for the purpose of holding a large quantity of parachute material in the region of the hollow of the wearer's back. This enlargement in the pack container illustrated in Figures 1 to 3 takes the form of lateral extensions on opposite sides of the pack container at its

lower end. These extensions, or enlargements, are indicated generally at 15 and are formed by extensions in the width of the lower part of the front wall 2 and by the corresponding cut of the lower corner of the left and right panels 5 and 6 which are attached to the front wall 2. Auxiliary frame elements 16 are incorporated in the extensions of the front wall 2 to impart sufficient rigidity to maintain the forms of these parts. The auxiliary frame elements 16, in part, lie parallel to the side members of the frame 1, but there is no connection therebetween. The material of the side panels 5 and 6 in the region indicated at 17 is cut with sufficient fullness to allow the extensions 15 to bend or deflect forwardly so as to partially encircle the waist of the wearer. It will be understood that the canvas connection in the material of the front wall 2 between the frame 1 and the auxiliary frame 16 will act as a hinge to permit the extension 15 to be disposed at any comfortable angle, snugly engaging the waist of the wearer. In practice, it is found desirable to attach the outer end of each extension 15 to a belt or to the parachute harness to hold these parts close to the sides of the wearer and to draw them around towards the front of the wearer. The numeral 19 indicates a fragmentary portion of a belt element, which may be either an element of the harness or a separate belt attached to each extension 15.

It is, of course, understood that other means of attachment with a parachute harness may be provided on the front wall 2, the positions and forms of such means of attachment necessarily depending upon the type of parachute harness employed. To obtain the greatest advantage from the present pack container, the attachment with the parachute harness should be such as to insure snug engagement at all times with the body of the wearer by the band 11, the upper portion 13 and the extensions 15. If the parts named are held closely to the wearer, it will be impossible for any other part of the pack to swing away from the wearer so as to impede his movements.

Overlying the area outlined by the frame 1 and loosely attached to the front or ventral wall 2, is a cushion 20 of some resilient material such as sponge rubber or the like. This cushion is preferably attached loosely at only a few points so that the parachute harness and pack opening elastics may conveniently pass between the cushion 20 and the pack, with the harness attached directly to the front wall 2 in the manner previously described.

In Figure 1, a portion of the right side panel 7 is broken away in the general region indicated by the numeral 17 to show the relative positions of the frame 1, the front wall 2, and the cushion 20 against the wearer's back, as well as to show the manner in which the extension 15 on the right side curves around the waist of the wearer a short distance to increase the volumetric capacity of the pack without increasing its thickness. The practical results obtained, with a given bulk of parachute material, are to greatly reduce the thickness of the pack projecting from the outline of the wearer's body by carrying the bulk of the material where the body of the wearer is the smallest, and to eliminate protruding corners and edges by effecting rounded contours on the exposed surfaces of the pack.

In Figure 3, cushion 20 is broken away to expose the front or ventral wall 2, the disposition of the pack opening elastics 7, and to show in broken lines the relationship between the frame

1 and one of the auxiliary frame elements 16. In Figure 3, the extensions 15 have been bent back so as to extend straight out from the sides of the pack.

In the embodiment shown in Figures 4 to 7, a soft type of pack is provided which more closely conforms to the curvature of the wearer's back and thereby projects beyond the outline of the body of the wearer by even a lesser amount than the pack shown in Figure 1. A frame 30 is provided, having a generally rectangular configuration, lying in a plane, and having a curved, upper edge, slightly deflected out of said plane as best shown in Figure 6. This frame roughly outlines the pack and is provided with a cross member 31. The cross member 31, together with the curved upper end of the frame, is incorporated in what might be called a front or ventral wall 32 of the pack container. Within the rectangular part of the frame 30, the pack container material forms a large curved pocket or bulge as shown at 33, of such shape that it bulges outwardly from the general plane of the frame at the cross member 31 and returns again to the frame at the lower edge thereof. The material in the bulge 33 is preferably cut somewhat wider than the frame 30 so as to extend beyond the lateral outlines of the frame as shown in Figure 6. Solid side panels 34 close the spaces on the sides of the pack container between the frame and the bulge 33. In this manner, the front or ventral side of the pack container, that is, the side adjacent the wearer's back, is closed by the relatively flat portion 32, or front wall, adapted to lie against the shoulders of the wearer, and the long curving bulge 33, adapted to lie in the hollow of the wearer's back.

The pack container is closed by a plurality of flexible panels, which are cut with sufficient fullness to provide a convex bulge on the back or dorsal side of the container extending from the curved upper edge of the frame 30 to the bottom edge, so that the frame may be said to lie in a plane intermediate the convex ventral and dorsal sides of the container. A bottom panel 35 is attached to the container along the bottom edge of the frame and is provided with flaps 36 to tuck in the corners of the pack. Side panels 38 and 39 fold over from opposite sides, in the manner shown, and are provided with pilot parachute flap panels as shown at 40 and 41, the function of the pilot parachute flap panels being to separate the pilot parachute from the material of the main canopy when packed. An upper end panel is shown at 42 attached to the uppermost margin of the parachute container. The panel 42 carries on the side edges thereof, flaps 43 and 44 adapted to fold under each of a pair of lift webs 37, 37 and separate them from the parachute cloth where the lift webs emerge from the pack container. The lift webs emerge from the pack container between the flaps 43 and 44 and the front or ventral wall 32, so as to overlie, and be attached at some point to, the shoulder straps of the parachute harness. The positions of the lift webs 37, 37 are indicated by broken lines in Figure 7.

The side panels 38 and 39 are equipped with the customary rip cord cones and grommets for cooperating with the rip cord pins which hold the pack closed. Also, the customary elastic opening cords 45 are provided. The rip cord cones and their associated pins are covered by a flap 46 on the panel 39 which flap is adapted to be held down by snap fasteners 47 or the like.

The upper edge of the pack is somewhat wedge-shaped in side view as indicated at 48, tapering up to a thin edge 49 formed by a transverse band of webbing material. The band 49 is adapted for attachment to a pair of shoulder straps 50 of the parachute harness by stitching or other equivalent means. In this manner, the band 49, as well as the tapering upper portion of the pack container, will be held snugly against the shoulders of the wearer by means of the harness straps 50. Only a fragmentary portion of the harness is shown, as any conventional type of harness may be used.

Extending from the opposite sides of the pack are triangular shaped flaps 51 and 52 having belt means 53 and 54 attached thereto in the manner shown. By securing the belt means about the waist of the wearer, the main body of the pack is held snugly in the hollow of the wearer's back at all times regardless of the position he may assume. In the present embodiment, the flaps 51 and 52 are also provided with harness-engaging means 55 adapted to secure the pack to the lower parts of the parachute harness where the latter encircles the body of the wearer. In the present instance, the means 55 are preferably bands of webbing material stitched only at their ends to the material of the flaps 51 and 52 so that the straps of the parachute harness may be passed under these bands. Other means of attachment may be used which are found to be best suited for a particular parachute harness, and the positions of the means 55 will, of course, also be determined by the type of harness used, the prime consideration being to hold the lower part of the pack snugly against the back of the wearer in a manner similar to the snug engagement of band 49 against the back of the wearer. The flaps 51 and 52 are apertured at 56 for the passage therethrough of the elastic opening cords 45.

When the parachute is fully packed, the appearance of the filled pack container will be substantially as shown in Figures 4 and 5. In these views, certain parts have been omitted to avoid confusion. The rip cord is not shown and may be of the conventional type, passing around into the customary position in front of the wearer. Also, the lift webs emerging from the interior of the pack, and the parachute harness, are shown only in part. Provision is made for the lift webs to leave the pack at the sides of the upper end panel 42 near the upper ends of the small flaps 43 and 44, in the regions indicated at 57. The lift webs on leaving the pack lie along the shoulder straps 50, when the pack is filled. Also, in the drawings, only a fragmentary portion of the shoulder straps 50 are illustrated, the remainder of the parachute harness being omitted for clearness, since as stated any conventional harness may be used with the present pack.

The frame element 30 lies substantially in a plane with the seam 58, which is the common junction of the flap 51, the panel 39, and the panel 34, in the side edge of the pack, whereby said plane of the frame may be said to divide the volume of the pack container. Thus, it is seen that when the pack is filled as shown in Figure 4, all of the frame 30, except the very upper end, is spaced from the back of the wearer by the voluminous pocket 33 which functions as a soft and somewhat yielding cushion. Pocket 33 is shaped to give support to the wearer's back, thereby greatly reducing the fatigue in long flights. While the frame 30 has been described

as lying in a plane, the upper part of the frame above the transverse bar 31 is preferably deflected a small amount in a forward direction to follow the curvature of the wearer's shoulders. No cushion is provided for this upper, curved, part of the frame 30 inasmuch as the normal posture in an airplane seat does not force the wearer's shoulders against the frame at this point.

The side view in Figure 4 clearly illustrates the tapering shape of the pack whereby the bulk of the parachute material is contained in the space in the hollow of the wearer's back causing the thickest part of the pack to be in its lower portions. The pack then tapers progressively to a thin upper edge, snugly fitting against the wearer's back so that it will not operate as an obstruction in entering restricted passageways and when passing through small openings and the like. A portion of the pack container has been broken away in Figure 4 to show the position of the frame 30 therein, intermediate the ventral and dorsal surfaces of the container.

This type of parachute pack provides what may be termed a soft pack, eliminating the need for back cushions. The flexibility of the pack container makes for ease of packing, and tends to reduce the so-called hardening or fixation of the parachute fabric under compression. The pack is held close to the body of the retainer belt, making the pack form-fitting, and the general arrangement is such that projecting elements, as well as the thickness of the pack, have been greatly reduced. In this manner, a minimum of projections, loops and edges are presented to encounter obstructions in forward motion.

It is to be understood that the invention is capable of many modifications. Changes, therefore, in the construction and arrangement may be made which do not depart from the spirit and scope of the invention as described in the appended claims.

We claim:

1. In a form-fitting parachute back pack container having ventral and dorsal surfaces, a hollow center frame in said container spaced approximately midway between said ventral and dorsal surface, a bulging pocket in said container on the ventral side of said frame, said pocket being of a size and shape to approximately fit the hollow of the back of a wearer, said pocket when filled with parachute material serving to hold said frame away from said hollow of a wearer's back, means for holding said pocket snugly in the hollow of a wearer's back, said container having a flexible portion extending above the top edge of said frame, and means to hold said flexible portion snugly against the upper part of the back of a wearer.

2. A parachute pack container having an open frame lying approximately in a vertical plane when positioned upon a wearer's back, said frame having a top edge, a bottom edge and two lateral side edges, the dorsal side of said container comprising flexible material bulging outwardly between the bottom and top edges of said frame, and the ventral side of said container comprising flexible material bulging outwardly between the bottom edge of said frame and a horizontal line intermediate said bottom and top edges, the outline of said frame in said plane approximately defining the outline of said container in front and rear elevation, the opening in said frame providing an undivided compartment for parachute material between the ventral and dorsal sides of said container.

3. In a parachute pack container, an open frame lying approximately in a vertical plane when positioned upon a wearer's back and substantially defining the outline of said container in front and rear elevation, a horizontal cross member in said frame, the dorsal side of said container bulging outwardly from said frame between the top and bottom margins thereof, and the ventral side of said container bulging outwardly from said frame between the bottom margin and said cross member.

4. In a parachute pack container having ventral and dorsal sides, a wall of material defining the ventral side of said container, a panel attached to said wall along the top margin thereof and adapted to constitute the upper part of the dorsal side of said container, and a flap on each side edge of said panel adapted to fold under a lift web of a parachute in said pack container so as to enfold said lift web between said flap and said panel, where said lift web emerges from the top of said pack container.

5. In a form-fitting parachute back pack container, a ventral side with a convex bulge adapted to fit and provide cushioning support for the hollow of a wearer's back, a dorsal side of generally convex shape, an open frame element outlining said container along its bottom and lateral side edges, said frame lying approximately in a plane intermediate said convex ventral side and said convex dorsal side to provide an undivided space for parachute material extending through said frame, flaps of material integral with the lateral side portions of said container, belt means on said flaps for holding said container snugly against the back of a wearer in the manner described, and a flexible upper edge on said container extending above the upper edge of said frame and adapted for attachment to the shoulder straps of a parachute harness to hold said upper edge snugly against the back of a wearer.

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