

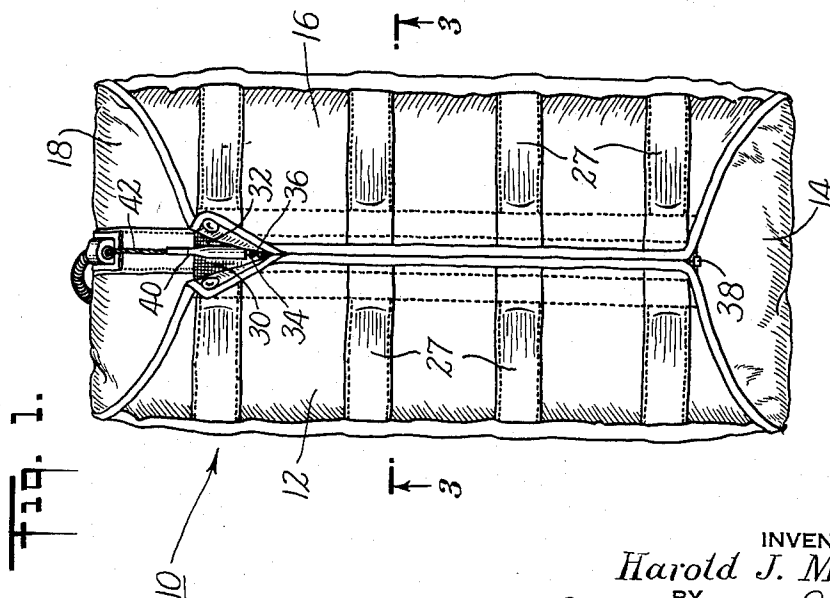
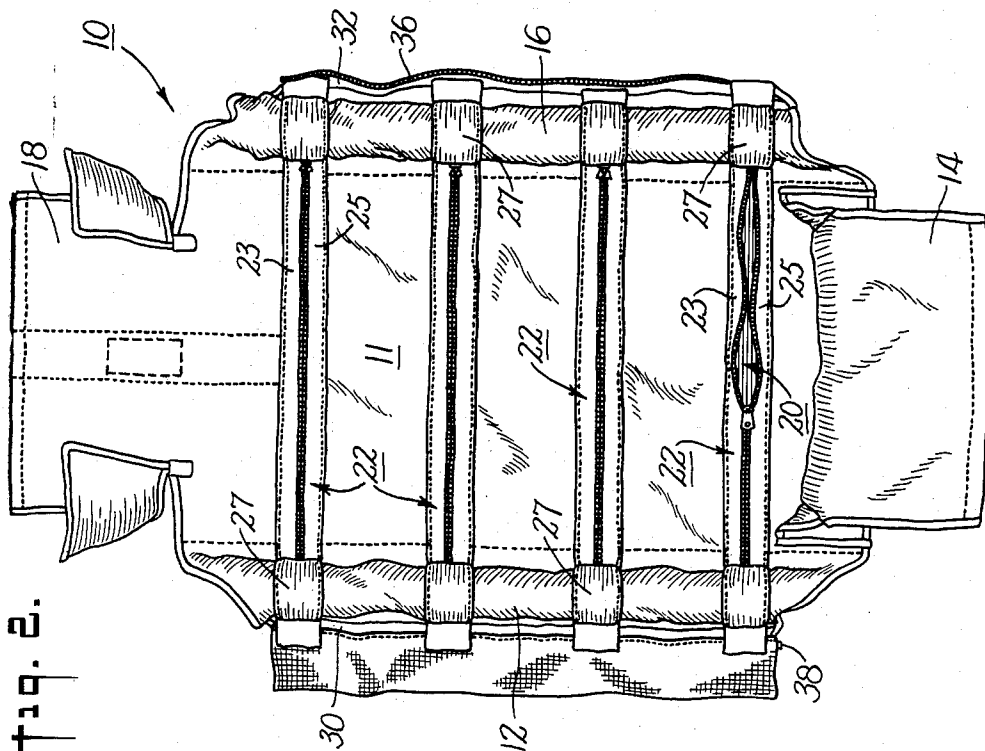
Jan. 3, 1956

H. J. MORAN
PARACHUTE PACK

2,729,410

Filed Feb. 19, 1952

2 Sheets-Sheet 1



INVENTOR
Harold J. Moran
BY
Curtis, Morris & Safford
ATTORNEYS

Jan. 3, 1956

H. J. MORAN
PARACHUTE PACK

2,729,410

Filed Feb. 19, 1952

2 Sheets-Sheet 2

Fig. 3.

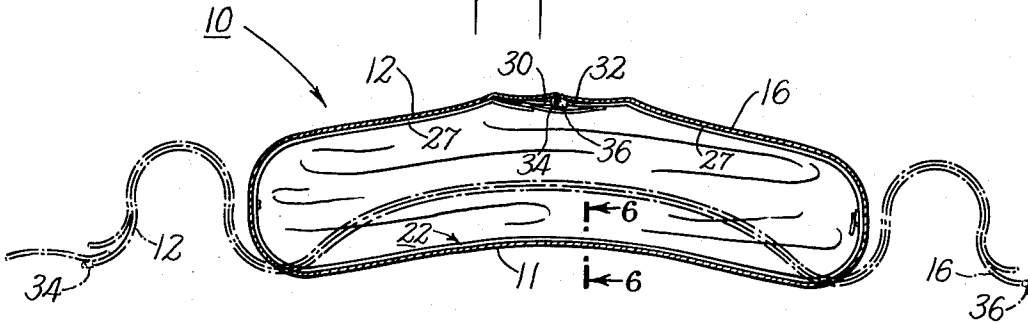


Fig. 4.

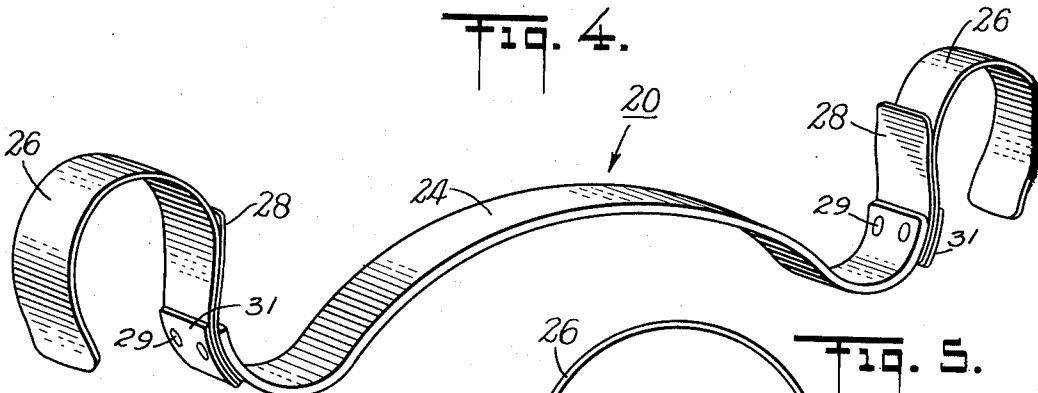


Fig. 5.

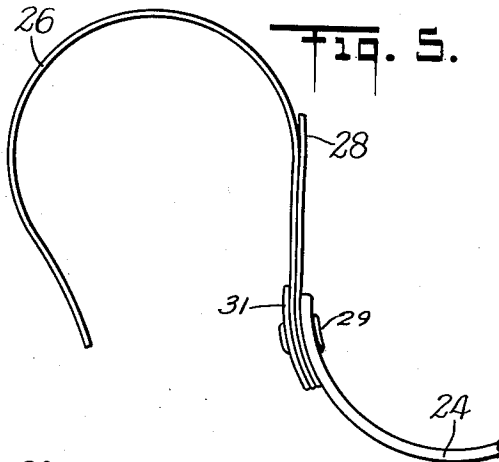


Fig. 7.

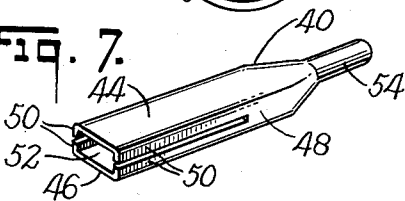


Fig. 8.

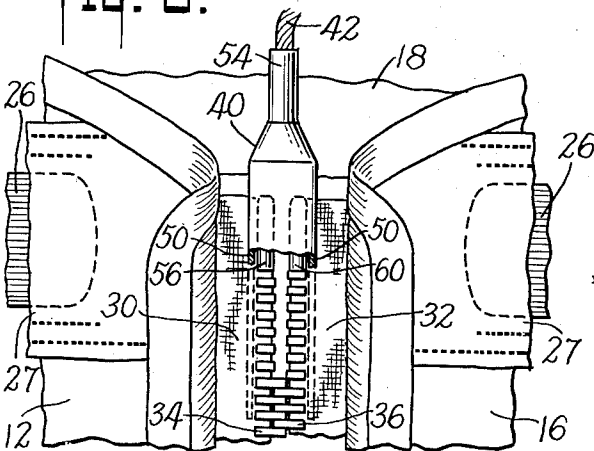
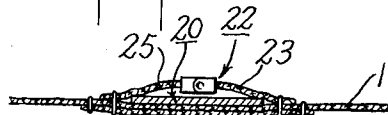


Fig. 6.



INVENTOR

Harold J. Moran

BY

Curtis, Morris & Safford
ATTORNEYS

1

2,729,410

PARACHUTE PACK

Harold J. Moran, Trenton, N. J., assignor to Switlik Parachute Company, Inc., Trenton, N. J.

Application February 19, 1952, Serial No. 272,453

12 Claims. (Cl. 244—148)

This invention relates to parachutes and more particularly to the shaping and opening of the pack.

Heretofore parachute packs have been of various forms, depending upon whether they are of the back, chest or seat types, and in connection with these the backs of the packs have been strengthened in various manners.

One of the common forms of a back pack is that wherein the cover includes a back portion and flaps, which when closed, house the parachute assembly consisting usually of the canopy, suspension lines and pilot chute.

This type of back pack in some instances has been given a body-conforming shape by spaced curved stiffeners which extend transversely of the pack in a relatively static form and overlie the side edge portions of the packed canopy.

In this type of back pack, with or without the transverse stiffeners, the flaps are usually held in closing position by interengaging cones and grommets, through the former of which extend the rip cord pins to prevent the accidental separation of the flaps. These cones and grommets are spaced along the adjacent edges of the side flaps and each pair is separately released by the pulling of the rip cord or the static line when such is used in lieu of a rip cord.

In packs of this type the flaps are opened, to permit the ejection of the pilot chute and the deploying of the canopy, by elastic members which are anchored to the pack cover and extend transversely across the pack to points adjacent the edges of the side flaps to which they are attached.

Thus the parachute assembly is positioned within the pack and held in position by pressure applied at the spaced points of the grommet and cone fasteners and of the opening elastics.

This arrangement of securement makes it necessary to apply considerable force to the rip cord in order to release the pins from the cones, since the pressure created by the packed canopy is depended upon to hold the pins in their securing positions by the force applied thereto through the grommets.

This, of course, is disadvantageous in respect of a pack wherein the release of the means which secures the flaps together is accomplished entirely by release at the location of such means, and wherein the force developed by the tendency of the folded canopy to expand automatically, disengages the flaps' securing means.

Moreover, the use of elastics, as above described, is disadvantageous, additionally because of the deterioration of the rubber, when rubber is used, and the deleterious effect of sub-zero conditions on its elasticity.

According to the present invention, a number of spaced transverse frame members are provided to shape the pack to the desired configuration and to open the flaps. The ends of each of these frame members is provided with partially coiled flexible spring sections, whether formed integrally therewith or attached thereto and which are operatively connected to the closing flaps. These spring sections are adapted to be uncoiled upon closing of the

2

flaps to extend approximately half way across the back of the pack to the edge of the respective flaps to provide a positive opening pressure, result in the opening of the pack and the removal of the spring sections from the path of the canopy in its deploying movement.

In addition, a separable slide fastener of the detachable type is provided along the edges of said flaps, together with a special holding clamp which maintains the zipper in closed position but when removed permits the zipper to open rapidly in the usual manner under the influence of the lateral forces of the special spring devices provided according to this invention. With this special closure, only the scoops adjacent the end of the zipper need be restrained against accidental lateral movement, as practically all of the lateral pressure is distributed uniformly over the full length of the zipper which, because of its inherent construction, resists lateral movement. Consequently the force required to restrain the end of the zipper to maintain the pack in closed position and which has to be overcome in opening it, is substantially less than that required with the older fastening devices.

It is accordingly a primary object of this invention to provide a pack closure that will give a tight, uniform closing seam that can be opened rapidly and positively under the influence of the flap openers and of the canopy and pilot chute when the latter is used.

Another object of this invention is to provide a pack closure to which the forces that tend to open the pack are applied evenly throughout the length of the closure portion of the pack and which closure will be maintained in the closed position by a single removable retaining member positioned at one end of said closure.

It is a further object of this invention to provide flap opening means as an integral part of the pack forming members.

It is a still further object of this invention to provide pack opening means that will insure opening of the pack to allow a free deploying of the canopy.

It is a still further object of the present invention to provide pockets for the proper positioning of the pack frame forming and spring sections which permit at the same time easy insertion and removal of said frame members.

These and other and further objects of the invention will be in part apparent and in part pointed out as the specification proceeds.

The principles of the invention will be more readily understood by reference to a specific illustrative embodiment and the following drawings in which:

Figure 1 is a plan view of the flap side of the pack of a closed parachute pack, according to the present invention;

Figure 2 is a plan view similar to Figure 1 showing the pack in the opened position with the chute removed;

Figure 3 is a section taken on line 3—3 of Figure 1;

Figure 4 is a perspective view of a pack frame member and the opening springs attached to the ends thereof;

Figure 5 is an enlarged detailed sectional view of one end of the member of Figure 4;

Figure 6 is a section taken on line 6—6 of Figure 3;

Figure 7 is a perspective view partially broken away of a retainer clip for closing the zipper;

Figure 8 is an enlarged partial plan view of one end of the zipper showing the removable retaining clip and the end opening spring section.

Referring now to Figures 1 and 2, the pack generally indicated at 10 has a rectangularly shaped back portion 11 with flaps 12, 14, 16 and 18 extending from the edges thereof and adapted to be folded in overlapping relation over said back portion to enclose the usual canopy and pilot chute assembly therein.

Spaced along this back portion are four pack forming

3

members 20 (to be described later) which are enclosed in pockets 22 which are adapted to maintain the members 20 in proper transverse position along the back. These pockets extend across the back portion 11 and a substantial distance into the flaps 12 and 16. The portion of the pockets 22 across the back is preferably but not necessarily formed by a pair of zipper carrier tapes 23 and 25 fastened to the back panel along their outer edges, the zipper elements being adapted to be engaged and disengaged in the customary manner to permit easy insertion and removal of said frame members 20 therein. The flap pocket portions 27 are formed by tapes or other material fastened along the edges thereof to the inner side of the flaps 12 and 16.

Referring now to Figure 4, each of the frame members 20 comprises a forming portion 24 of a generally convex configuration with the ends inverted and curved back on the main forming portion. At each end of the forming portion 24 there is a flap opening resilient section 26. The forming portions 24 and sections 26 are preferably made of a metal such as spring steel but may be made of any other suitable spring material. This section 26 is in a partially coiled condition extending outwardly in a convolute from the forming portion 24. The respective sections are sufficiently flexible so that on closing the pack the ends of the sections 26 may be brought substantially together in the middle of the outer portion of the pack as may be seen in Figure 3. As these sections 26, and the forming portion 24 are preferably of different resiliencies, helper springs 28 (Figure 5) may be provided at the point where spring sections 26 merge with the forming portion 24 to give added strength at the juncture points. When the sections 26 are made separate from the forming portion 24 these sections and the springs 28 are securely fastened to frame member 20 by rivets 29 and backing plate 31. Any other suitable means may of course be used.

The spring sections 26 extend into the pockets 27 in the flaps 12 and 16 to within a short distance of the edge of said flaps. Since these sections 26 are partially coiled outwardly from forming portion 24, they hold the flaps 12 and 16 curled over along the edges of the back portion 11 of the pack 10, completely out of the way of the canopy assembly when the pack is open, as may be seen in Figures 2 and 3. Sections 26 being positioned within the pockets in the flaps maintain the flaps in this withdrawn position even against the wind pressure likely to be encountered in the use of such apparatus, especially in high speed planes. In addition, the forming portion 24 is constructed in such a manner that it aids in the ejection of the canopy assembly from the pack upon the opening thereof. As may be seen from Figures 3 and 4, forming portion 24 in the unstressed condition has normally a pronounced convex configuration. When the flaps 12 and 16 are closed the sections 26 are brought together flexing forming portion 24 to the position shown in full lines in Figure 3. Thus when the flaps are released the stressed forming portion 24 returns to its normal configuration and in so doing aids in ejecting the canopy assembly from the pack. It should also be noted that when in the unstressed (dotted lines in Figure 3) condition, the forming members 20 pivot the spring sections 26 away from the mouth of the pack to prevent possible entanglement with the canopy in its employment.

To maintain the flaps in closed position against the pressure of forming portion 24 and sections 26, there is provided along the edge of flaps 12 and 16 (see Figures 1, 2 and 8) zipper carrying tapes 30 and 32 having thereon separable zipper portions 34 and 36 respectively. To interlock these zipper portions, a removable slider of the usual type may be worked along one zipper portion, as 34, from adjacent one end thereof until it contacts a fixed retainer clip or stop 38 adjacent the other end thereof. The other zipper portion 36 is then inserted through the slider into the retainer clip 38 and the slider

4

worked toward the other end, interlocking the zipper portions in the customary manner until the entire zipper is closed. The zipper is then held in the closed position by outside pressure and the slider removed and replaced by a removable retaining clip 40 which embraces both zipper portions and which is fastened to a conventional rip cord cable and handle assembly 42 or to a static line.

Referring to Figure 7 the clip 40 is formed by a pair of spaced plates 44 and 46 which are secured together integrally or otherwise at 48. The plates 44 and 46 are provided with side flanges 50 spaced from each other to form an open-ended receiving chamber 52. At the end 54 the retainer clip may be provided with an opening for receiving an operating member to which may be attached a finger piece, cord, or the like.

In operation the clip 40 is placed over the end of zipper so that the "pinned" edges 56 and 60 together with the end two or three scoops, lie within chamber 52 which confines them against lateral movement under the influence of resilient sections 26. (See Figure 8).

In operation the resilient sections 26 together with frame member 20 exert a constant pressure tending to open the flaps 12 and 16 of the pack around the side edges of the pack as axes. This pressure is distributed substantially uniformly over the entire length of the zipper portions 34 and 36, each pair of scoops of the zipper carrying its proportional load. With the forces thus distributed over the entire length of the closure, the removable retainer clip 40 need only restrain the end two or three scoops against separation and consequently need exert only a very small force to maintain the pack in closed relationship. Therefore only a very small pull is needed to release the clip 40 when it is desired to open the pack. In addition this uniform distribution of closing forces maintains the chute in its original folded condition and tends to prevent bunching of the canopy assembly in the pack.

When the retainer clip 40 is removed from the end of the separable slide fastener by a pull on the rip cord or static line, the lateral pressure of the forming members together with the expansive tendency of the canopy assembly pulls the zipper sections apart progressively from the released end toward the fastened end.

This action is accomplished by the special construction and orientation of the zipper in relation to the spring sections. Referring to Figure 8, it will be seen that the end forming member 20 is positioned beyond the interengaged scoops of the zipper and extends just beyond the end of the zipper portions themselves.

In the particular embodiment shown, the end few scoops are cut off so they do not interengage so that together with the usual pin a substantial portion of the lateral pressure of the end spring section is applied to an unengaged portion of the zipper. In the closed position the only restraining force on this unengaged zipper portion is that applied by the retaining clip 40. Consequently when the clip is removed, the end spring section pulls the end portions of the zippers into the diverging attitude necessary to properly open a zipper in the usual manner. It is thus apparent that upon removal of clip 40 the zipper is immediately conditioned for opening and the continuing pressure of the end forming member as it draws the flaps over the edges of the pack, together with the pressure of the remaining members as they are each in turn reached, cooperate to open the pack. This action is extremely rapid and positive and the spring sections 26 in addition to pulling the flaps open, maintain them in curled-over position along the edges of the back portion 11 and out of the path of movement of the deploying canopy. In addition, the action of the canopy assembly in attempting to expand out of the pack as it is released aids this opening and ensures that it is completed.

There is thus obtained a closure requiring a minimum of force to open the flaps and to maintain them in closed relationship while at the same time requiring a minimum of opening time and providing a uniform distribution of

the forces on the pack so that the canopy assembly is compressed uniformly over its folded length within the pack and held in proper position at all times.

While there is given above a certain specific example of this invention and its application in practical use, it should be understood that this is not intended to limit the invention. On the contrary, this illustration and the explanation herein is given in order to acquaint others skilled in the art with this invention and the principles thereof and a suitable manner of its application in practical use, so that others skilled in the art may be enabled to use the invention and to adapt it and apply it in numerous forms, each as may be best suited to the requirement of a particular use.

I claim:

1. In a parachute pack including a fabric cover having a back and side closing flaps adapted to fold over the back of the pack with their longitudinal edges adjacent each other, the improvement which includes a zipper detachably securing said edges together substantially from end to end, the elements of the zipper being disengageable from each other throughout the length of the zipper, means at the ends of the zipper to temporarily prevent such disengagement, a plurality of spring members extending transversely across said back portion secured thereto and having curved ends, leaf springs rigid with the ends of said first mentioned springs and having a pre-tensioned, curved set of coiled form away from said upturned ends, said leaf springs being attached to said flaps and adapted to be bent over the back portion of the cover with the flaps against their pre-tension whereby when the retaining means for the zipper at one end is released, said leaf springs will disengage the members of said zipper, move the flaps transversely from over the back portion to the sides thereof and retain said flaps in said position.

2. In a parachute pack including a fabric cover having a back and side closing flaps adapted to fold over the pack with their edges adjacent each other and end flaps adapted to be tucked in under said side closing flaps, the combination comprising, a completely releasable zipper for joining said adjacent edges together; means for releasably maintaining said zipper in engaged position comprising, retainer clips at each end of said zipper, at least one of said clips being removable to permit rapid disengagement of said zipper, and means for moving the flaps from over the back of the pack and for maintaining the flaps in such removed positions comprising, a plurality of spring members having a pre-tensioned set of coiled form attached to said flaps and having the base ends thereof secured to the back of said pack.

3. In a parachute pack comprising, a fabric cover having a back and a side closing flap adapted to fold over the back thereof with their longitudinal edges adjacent each other, that improvement which comprises, a stiffly flexible frame member in said back; a completely releasable zipper detachably securing said longitudinal edges together substantially from end to end; retainer clip means at each end of said zipper for maintaining said zipper in engaged position, at least one of said clips being removable; and means for disengaging said zipper and moving and maintaining the flaps from over the back of the pack to the sides thereof comprising a plurality of coiled leaf springs attached to said side closing flaps and having one end thereof fixed to said frame portion in the back of said pack.

4. In a parachute pack having a back and side closing flaps adapted to fold over the back thereof with their edges adjacent each other and end flaps adapted to tuck under said side closing flaps, the combination of a plurality of stiffly flexible frame members spaced longitudinally of and extending transversely along the back of said fabric cover, a plurality of leaf springs rigid with and extending from the ends of said frame members in pre-tensioned loop form, said leaf springs being attached to said side closing flaps and adapted to be bent out of said coiled

form against said pre-tension over the back portion of the cover; and completely disengageable zipper means joining the edges of said side closing flaps and means for releasably engaging said zipper, comprising removable retainer clips at each end thereof.

5. In a parachute pack comprising a fabric cover having a back and side closing flaps adapted to fold over the back with their edges adjacent each other, a completely releasable zipper joining said edges together and means for disengaging the elements of the zipper from each other, for moving the flaps from over the back to the sides thereof and for maintaining the flaps in such positions.

6. In a parachute pack including a fabric cover having a back and side closing flaps adapted to fold over the back until the edges substantially abut, stiffly flexible frame members positioned in said back to form a frame therefor, zipper means for releasably joining the edges of said side closing flaps together and means for disengaging said zipper means and for moving the flaps from over the back to the sides of said pack, comprising, a plurality of springs based on said frame portion and adapted to extend from the back to engage said side closing flaps.

7. A parachute pack including a fabric cover having a back and side closing flaps adapted to fold over the back until the edges substantially meet in adjacent relationship, zipper fastening means for releasably securing said edges together, a frame portion positioned in the back of said pack, a plurality of springs attached to said side closing flaps and fixed at one end to said frame portion to move the flaps from over the back of said pack to the side thereof and to maintain them in such positions upon the release of said zipper fastening means.

8. A parachute pack as described in claim 7 wherein said plurality of springs are positioned on said frame to apply lateral opening forces to said zipper fastening means whereby when said zipper fastening means is released, said zipper is opened progressively from one end to the other.

9. Apparatus as described in claim 7 further characterized by auxiliary stiffener springs positioned at the junctions of each of said flap opening springs and said frame portion.

10. In a parachute pack comprising a back, a flap secured to said back having a free edge and adapted to fold over said back to cooperate therewith to form a housing for a parachute, a series of zipper elements arranged and secured longitudinally along said free edge of said flap, a series of complementary zipper elements arranged longitudinally of and attached to said back and adapted to interengage with the complementary zipper elements on said flap, securing means for releasably maintaining said complementary zipper elements in interengaged relation with each other, means for rendering said securing means inoperative so as to free said complementary zipper elements for successive disengagement from each other from one end toward the other end of said series by forces applied to said zipper elements of at least one series of said elements at an acute angle to the longitudinal line of said series and a series of resilient members extending transversely across said flap and said back and normally under stress when said zipper elements are interengaged with each other for automatically and successively applying said angular zipper disengaging forces to said zipper elements of at least one series thereof upon the removal of said securing means.

11. In a parachute pack comprising a back, a flap secured to said back having a free edge and adapted to fold over said back to cooperate therewith to form a housing for a parachute, a series of zipper elements arranged and secured longitudinally along said free edge of said flap, a series of complementary zipper elements arranged longitudinally of and attached to said back and adapted to interengage with the complementary zipper ele-

7

ments on said flap, securing means for releasably maintaining said complementary zipper elements in interengaged relation with each other, means for rendering said securing means inoperative so as to free said complementary zipper elements for successive disengagement from each other from one end toward the other end of said series by forces applied to said zipper elements of both of said series of said elements at acute angles to the longitudinal line of said series and a series of resilient members extending transversely across said flap and said back and normally under stress when said zipper elements are interengaged with each other for automatically and successively applying said angular zipper disengaging forces to said zipper elements of both of said series.

12. In a pack adapted to house an expansible member and comprising a back and a closing flap adapted to fold over the back to cooperate therewith to form a housing for said expansible member, a releasable zipper joining

8

the edge of said flap to said back and means for disengaging the elements of the zipper from each other, for moving the flap from over the back toward the side thereof and for maintaining it in such position until the releasable member of the pack has been discharged comprising resilient members normally under stress and extending transversely across said flap and said back.

References Cited in the file of this patent

UNITED STATES PATENTS

2,316,896	Smith	Apr. 20, 1943
2,519,923	Noelcke	Aug. 22, 1950

FOREIGN PATENTS

368,234	Great Britain	Aug. 27, 1930
458,281	Great Britain	Dec. 16, 1936
580,029	Great Britain	Aug. 23, 1946