

Nov. 1, 1966

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3,282,483

BACK PACK

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2 Sheets-Sheet 1

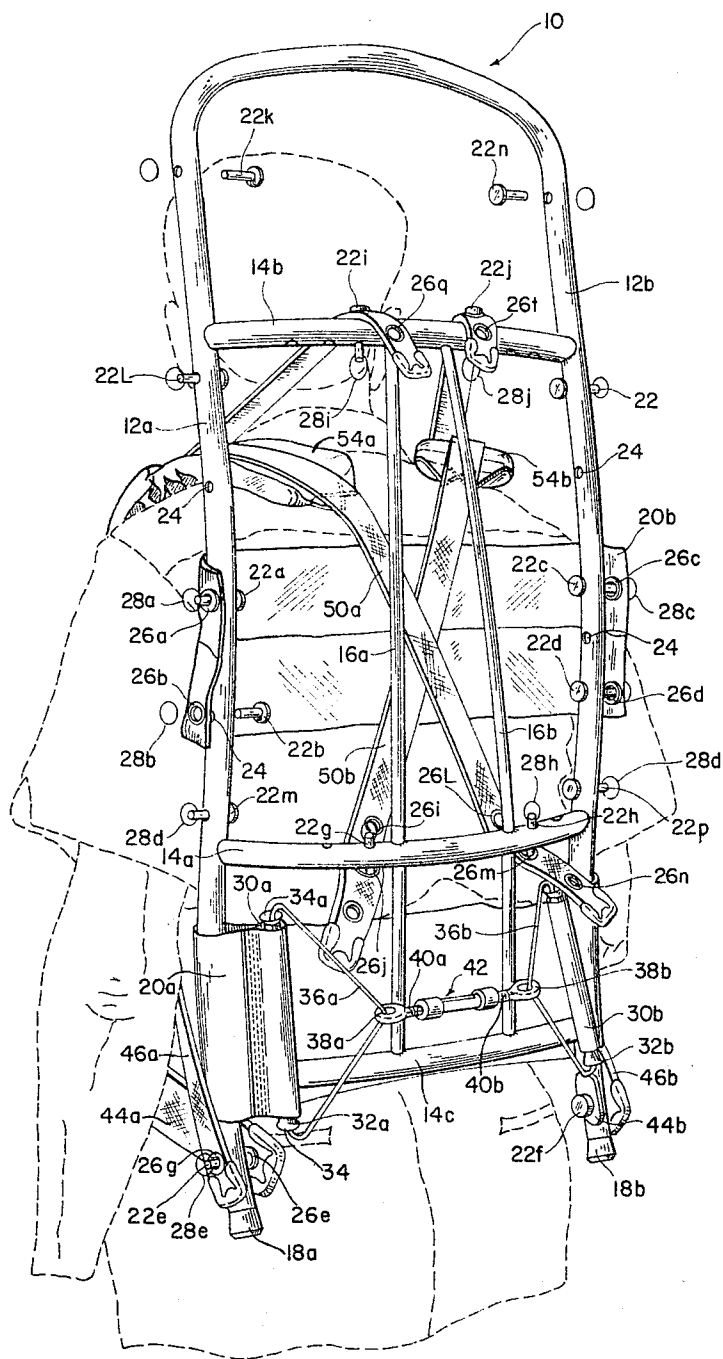


FIG. 1

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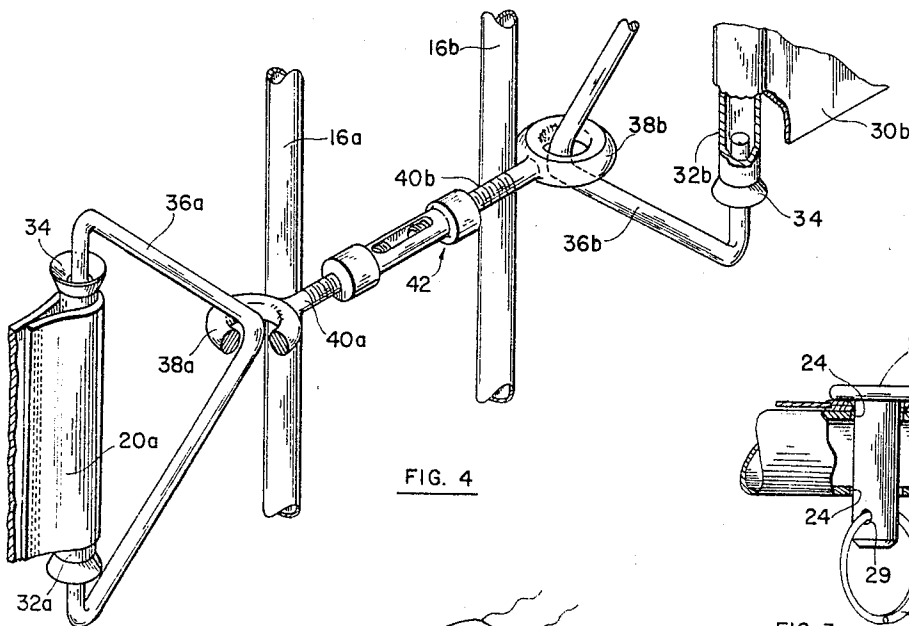
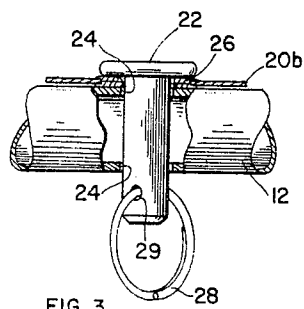
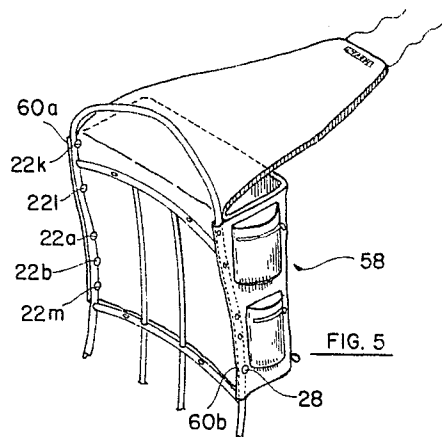
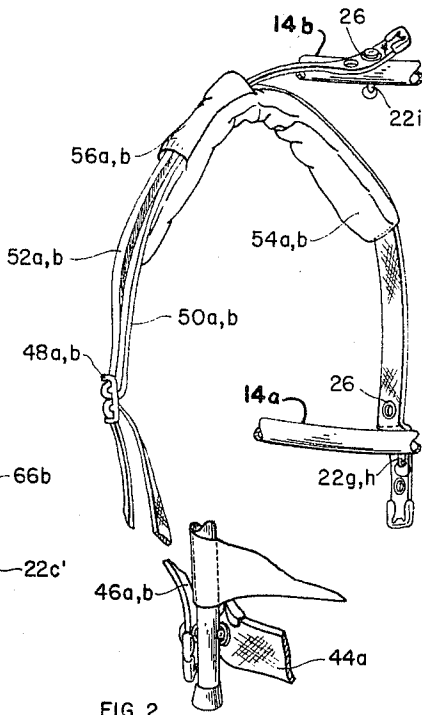
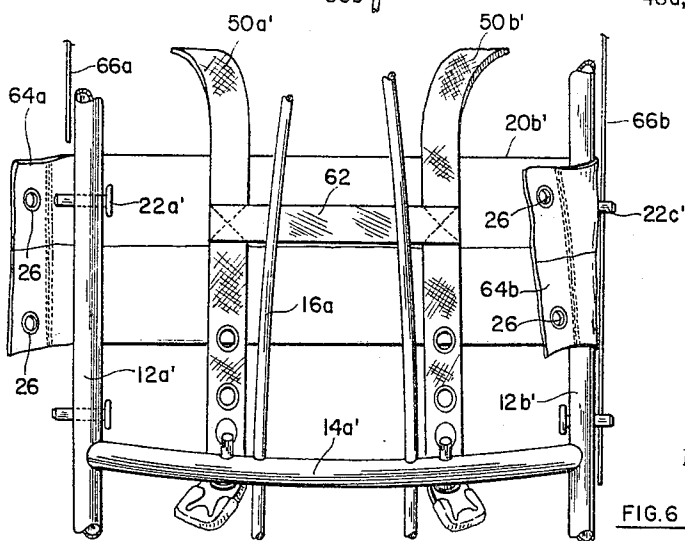
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2 Sheets-Sheet 2



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BACK PACK

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2 Claims. (Cl. 224—25)

This invention relates to an improved construction of back pack apparatus designed to carry the equipment of campers, hunters and the like, and more particularly to back pack apparatus having improved means for supporting and distributing a load carried by a human being.

For many years hikers have used back packs of the type having a rigid packframe that is held on the bearer's back by means of shoulder straps, the burden to be carried being either lashed directly to the packframe or contained in a cloth sack that is attached thereto. Frame-type back packs heretofore available have also been provided with one or more cloth back support bands mounted on the packframe at points where it is desired that laterally acting (i.e., directed substantially perpendicular to a bearer's back) forces resulting from the supported burden be distributed upon the bearer's back. While conventional frame-type back packs provide many advantages not obtained when a cloth carrier sack is supported in direct contact with a bearer's back, such back packs have not been entirely satisfactory with respect to their adaptability in fitting persons of different physical structure, their comfort and convenience in use, or their efficacy in distributing the weight of the supported burden.

It is therefore an object of this invention to provide a frame-type back pack having great adaptability with respect to fitting persons of widely different physical structure. In a preferred embodiment of the invention this object, as well as other objects hereinafter enumerated, is accomplished by means of back pack apparatus comprising: a rigid packframe formed of tubular members; an adjustable waist strap connected to the lower portion of the packframe; a pair of bifurcated shoulder straps connected to the packframe, each of which comprises three segments; means for adjusting the length of each of the three segments of each shoulder strap; a pair of back support bands made of cloth and mounted in spaced relation on the packframe; adjustable screw means interconnected with the ends of the lower back support band for adjusting and maintaining the tension thereof; and means for holding the screw means in a predetermined position with respect to the packframe to prevent shifting of the back support band interconnected with the screw means. When the back pack is in use the waist strap can be adjusted to hold the lower portion of the packframe against the bearer's lower back with a predetermined snugness. Two segments of each of the bifurcated straps are connected at their respective ends to the lower portion of the packframe. The length of one or both of these segments can be adjusted, together with the corresponding segment or segments of the other bifurcated shoulder strap, to position the packframe in a predetermined vertical position on the bearer's back according to his particular preference. The third segment of each bifurcated shoulder strap is connected to the upper portion of the packframe, and the length of these segments can be adjusted to hold the upper portion of the packframe against the bearer's back with a predetermined snugness. The screw means interconnected with the ends of the lower back support band can be conveniently adjusted in length to vary the tension placed upon the band, thus providing the particular cushioning of the load against the bearer's lower back which he finds most comfortable.

It is an additional object of this invention to provide a frame-type back pack having shoulder suspension har-

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ness and back support bands that can be conveniently adjusted by a user to provide a load distribution upon his shoulders and back according to his preference.

It is a further object of this invention to provide a frame-type back pack having bifurcated shoulder straps that can be conveniently adjusted by a user to provide the most efficient suspension of a particular load upon his shoulders and back.

It is another object of this invention to provide a frame-type back pack having screw means for conveniently adjusting and maintaining the tension placed upon the back support bands thereof.

Other objects and advantages of this invention will become apparent as the invention is disclosed in the following description, taken in conjunction with the accompanying drawings, in which:

FIGURE 1 is a pictorial view of back pack apparatus constituting a preferred embodiment of the invention, the apparatus being illustrated as it would appear when carried by a user;

FIG. 2 is a fragmentary view of segments of one bifurcated shoulder strap of the embodiment of the invention illustrated in FIG. 1, together with components of the packframe to which these segments are connected;

FIGS. 3 and 4 are partially sectional and fragmentary views of components of the embodiment of the invention illustrated in FIG. 1;

FIG. 5 is a view illustrating a cloth carrier sack attached to the packframe of the embodiment of the invention illustrated in FIG. 1;

FIG. 6 is a partially sectional and fragmentary view of components of a second embodiment of the invention.

Throughout the drawings and specification like reference numbers refer to like parts.

In FIG. 1 numeral 10 generally designates a tubular metal packframe of back pack apparatus which is constructed in accordance with the principles of this invention and which constitutes a preferred embodiment thereof. The packframe 10 comprises a U-shaped member forming oppositely disposed first side member 12a and second side member 12b. A first crossbar 14a, second crossbar 14b and third crossbar 14c are fixedly connected, preferably by welding, to side members 12a, 12b, these crossbars serving as means for holding the side members in spaced relation and, in the case of crossbars 14a, 14b, also serving as anchors for components of the shoulder suspension harness of the back pack, as will be described hereinafter. Rigidity of packframe 10 is enhanced by means of two brace members 16a, 16b which are fixedly secured in holes in the upper portion of crossbar 14c, in holes in both the upper and lower portions of crossbar 14a, and in holes in the lower portion of crossbar 14b. The lower end portion of each side member 12a, 12b extends a short distance beyond crossbar 14c to provide legs upon which the back pack can be supported when it is not being worn. Caps 18a, 18b, formed of a resilient material such as rubber or plastic, are respectively pressed on the ends of side members 12a, 12b to protect them from abrasion and keep out foreign matter. As can be seen in the drawing, each side member 12a, 12b is curved to conform with the curvature of a bearer's back, and crossbars 14a, 14b and 14c are also curved outwardly so that they will not contact the bearer's body when the packframe is being carried.

The weight of the back pack and any burden borne thereby is distributed upon a bearer's back and shoulders by means of a shoulder suspension harness, segments of which are illustrated in detail in FIG. 2 and which will be described hereinafter, and by means of a first resilient back support band 20a, mounted on packframe 10 ad-

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jacent the lower end thereof, and a second resilient back support band 20b, mounted on packframe 10 intermediate the upper and lower ends thereof. Back support band 20b is fastened to side members 12a, 12b by means of four clevis pins 22a through 22d which are removably positioned in pre-selected ones of a plurality of holes 24 (only four of which can be seen in FIG. 1) spaced linearly along each of the side members and which also pass through grommets 26a through 26d respectively set in back support band 20b adjacent the corners thereof. Each of the holes 24 in side member 12a is vertically aligned with a respective one of the holes 24 in side member 12b so that back support band 20b will be held perpendicular to the side members when fastened thereto by means of the clevis pins positioned in respective matching holes 24. As illustrated in FIG. 3, each of the clevis pins 22a through 22d is retained in a respective one of the side members 12a, 12b and grommets 26a through 26d by means of a removable locking ring 28a through 28d positioned in a hole 29 adjacent the end of the clevis pin, each clevis pin being removable from the respective side member and grommet in which it is positioned when the locking ring is taken out of the hole 29.

As can be seen in FIG. 1, the end portions of back support band 20a are lapped around side members 12a, 12b respectively and terminate in loops 30a, 30b in each of which is positioned a rigid tubular member 32a, 32b. As can be seen more clearly in FIG. 4, each of these tubular members is provided with flared end shoulders 34 which hold it in the illustrated position inside the respective loops 30a, 30b. The ends of first and second rigid connectors 36a, 36b, formed of heavy wire bent into the illustrated triangular shape, are respectively positioned within the tubular members 32a, 32b; the apex portion of each connector being positioned in the eye 38a, 38b of a respective one of the two eyebolts 40a, 40b of a turnbuckle generally designated by numeral 42. The shanks of eyebolts 40a, 40b of the turnbuckle rest upon brace members 16a, 16b respectively.

Again in reference to FIG. 1, a waist strap 44a, 44b is pivotally connected to each side member 12a, 12b at the lower portion thereof by means of a clevis pin 22e, 22f which passes through a grommet 26e, 26f (of which only 26e can be seen in the drawing) set in the waist strap adjacent the end thereof, and also through holes (not shown) formed in each side member 12a, 12b adjacent to the lower end thereof. A conventional buckle (not shown) is connected to the free end of one of the waist straps 44a, 44b.

Each of the clevis pins 22e, 22f also passes through a grommet 26g, 26h (of which only grommet 26g can be seen in the drawing) set in a strip of webbing hereinafter respectively referred to as the first segment 46a, 46b of first and second shoulder straps that comprise the suspension harness for packframe 10. The first segments 46a, 46b are retained on the clevis pins 22e, 22f by means of locking rings 28e, 28f (of which only locking ring 28e can be seen in the drawing). Thus the first segments 46a, 46b are pivotally connected to the lower portion of the packframe 10, or more specifically, to a respective one of the side members 12a, 12b adjacent to the lower end thereof. In FIG. 2 one shoulder strap is illustrated in detail, with each component thereof being designated by two numerals to indicate the identical construction of the shoulder straps. It can be seen in the drawing that each first segment 46a, 46b is connected to a conventional tabular buckle 48a, 48b having three slots therein through two of which the first segment is threaded. Thus the end of each first segment 46a, 46b can be pulled through the buckle 48a, 48b to adjust the length of the first segment (i.e., the length of webbing between the buckle 48a, 48b and grommet 26g, 26h). Each shoulder strap also includes a second strip of webbing which is threaded through two of the slots in a respective one of the buckles 46a, 46b to form two other segments

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of the shoulder strap, hereinafter referred to as second segment 50a, 50b and third segment 52a, 52b. The ends of second segments 50a, 50b are pivotally connected to the first crossbar 14a by means of clevis pins 22g, 22h which respectively pass through a pre-selected one of three grommets 26i through 26k and 26l through 26n spaced linearly along the end portion of each second segment, and which also pass through holes (not shown) extending vertically through crossbar 14a. A locking ring 28g, 28h retains each clevis pin 22g, 22h in place in crossbar 14a. A shoulder pad 54a, 54b is fixedly attached to each second segment 50a, 50b, the shoulder pad having a loop 56a, 56b attached to its upper side through which both the second and third segments of a respective shoulder strap extend. In the preferred embodiment of the invention herein described, each second segment 50a, 50b is stitched to the upper side of a respective shoulder pad 54a, 54b along the length thereof, whereas the third segment 52a, 52b is only threaded through the respective loop 56a, 56b attached to the shoulder pad. It can be seen in FIG. 1 that the second segments 50a, 50b are crossed so that second segment 50a is connected to crossbar 14a adjacent to side member 12b and second segment 50b is connected to the same crossbar adjacent to side member 12a. This crossed arrangement of the second segments of the shoulder straps keeps the shoulder pads 54a, 54b in proper position on the bearer's shoulders.

The ends of third segments 52a, 52b are pivotally connected to the second crossbar 14b by means of clevis pins 22i, 22j which respectively pass through one of three grommets 26o through 26q and 26r through 26t (only grommets 26q and 26t being shown in the drawing) spaced linearly along the end portion of each third segment and also through holes (not shown) extending vertically through crossbar 14b. A locking ring 28i, 28j retains each clevis pin 22i, 22j in place in crossbar 14b.

FIG. 5 illustrates a cloth packsack, generally designated by the numeral 58, attached to packframe 10 by means of three clevis pins 22k through 22m and 22n through 22p that pass through holes in each side member 12a, 12b and grommets set in a flap 60a, 60b attached to each side of the packsack. The clevis pins 22a through 22d also pass through grommets which are set in the flaps 60a, 60b so as to align with the grommets 26a through 26d set in back support band 20b. Locking rings 28 of the type illustrated in FIG. 3 secure the clevis pins in the grommets.

In the preferred embodiment of the invention all components of the packframe 10, including brace members 16a, 16b are formed of aluminum tubing. The tubular members 32a, 32b, locking rings 28, and all clevis pins are also formed of aluminum, while the connectors 36a, 36b, buckles 46a, 46b, and turnbuckle 42 are formed of steel. Brass grommets are used at all specified attachment points of the shoulder straps, waist straps and packsack, all of which are preferably made of synthetic fiber. The two back support bands 20a, 20b and shoulder pads 54a, 54b are also made of synthetic fiber, each of the latter including an inner sponge rubber cushion.

The construction of the above-described preferred embodiment of this invention makes possible the support of a load with maximum comfort because the shoulder suspension harness and lower back support band of the apparatus can readily be adjusted to position the packframe 10 on a bearer's back according to his preference for the particular load he is carrying and the activity in which he is engaged. It will be recognized by inspection of FIG. 2 that any change made in the length of either or both of the first segments 46a, 46b and second segments 50a, 50b of the first and second shoulder straps will vary the vertical position of the packframe 10 upon the bearer's back, the length of a segment being defined as the length of the webbing of the segment between the point of its attachment to packframe 10 and buckle 48a, 48b. If the length of either or both of the first and second segments of the

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shoulder straps is increased the packframe 10 will be positioned lower on the bearer's back than it was prior to the adjustment. Conversely, if the first and second segments are shortened the packframe will be positioned higher on the bearer's back. It will be recognized that first segments 46a, 46b can readily be pulled through the respective slots in buckles 48a, 48b to provide wide variation in their length, and that each clevis pin 22g, 22h also can be readily positioned in a pre-selected one of the three grommets 26i through 26k and 26l through 26n to provide incremental variation in the length of second segments 50a, 50b. Consequently, by selecting the length of the first and second segments of the shoulder straps a user of the back pack can conveniently move the packframe 10 to the vertical position on his back that he finds most comfortable for his particular physical structure and the type of load being carried.

After the vertical position of packframe 10 on the bearer's back has been selected by adjustment of the length of either or both of the first and second segments of the shoulder straps, the waist straps 44a, 44b can be fastened together to pull the lower back support band 20a against the bearer's back with the desired snugness. It will be recognized that any burden attached to packframe 10 will tend to pull the upper portion of the packframe away from the bearer's upper back, the packframe pivoting about the lower back support band 20a. The third segments 52a, 52b of the shoulder straps are connected to the second crossbar 14b, however, and thus hold the upper portion of the packframe either against or near the bearer's upper back, depending upon the adjustment of the length of the third segments 52a, 52b. It will be seen by inspection of FIG. 2 that clevis pins 22i, 22j can be selectively positioned in one of the three grommets 26o through 26q and 26r through 26t respectively set in each third segments 52a, 52b to vary the length of said segments, the length of each third segment being defined as the length of the webbing of the segment between the point of its attachment to packframe 10 and buckle 48a, 48b. If a user of the back pack prefers to have the upper portion of the packframe held loosely against his upper back the clevis pins 22i, 22j can be positioned in the respective grommets 26q and 26t (i.e., the grommet in each third segments 52a, 52b located closest to the end thereof). Conversely, the upper portion of the packframe can be pulled closer to the bearer's back by respectively positioning the clevis pins 22i, 22j in either of the other two grommets 26o, 26p and 26r, 26s spaced linearly along each of the third segments 52a, 52b to thereby shorten the length of said segments.

As noted above, any load attached to packframe 10 will tend to pull the upper portion of the packframe away from the bearer's upper back, the packframe pivoting about the lower back support band 20a. Consequently the laterally-acting (i.e., directed toward the bearer's back) forces upon back support band 20a will normally be considerably greater than the laterally-acting forces upon back band 20b, and therefore the lower back support band is more likely to stretch under use and require adjustment of its tension to provide proper cushioning of the pack load on the bearer's lower back. In conventional back packs the back support bands are placed under tension by lacing interconnected to the ends of the bands. It has been found, however, that it is difficult and inconvenient to maintain proper tension in a back support band by means of lacing, since the lacing is itself susceptible to stretching and also cannot easily be tied when it is wet and slippery. In the above-described preferred embodiment of the invention the tension placed upon the lower back support band 20a can readily be adjusted and maintained by adjusting the length of turnbuckle 42 to either pull the connectors 36a, 36b closer together or widen the space therebetween. As previously mentioned, the shanks of eyebolts 40a, 40b of turnbuckle 42 rest upon brace members 16a, 16b respec-

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tively. Therefore if the eyes of the eyebolts are respectively turned to a position normal to the axes of the brace members, movement of the turnbuckle, and the back support band 20a connected thereto, is restricted in the direction perpendicular to side members 12a, 12b.

FIG. 6 illustrates components of a second embodiment of the invention that differs from the above-described preferred embodiment with respect to the arrangement of the shoulder straps and upper back support band thereof, the components of this second embodiment which correspond with like components of the preferred embodiment being identified in the drawing by like numerals each having a suffixed prime mark. In the second embodiment of the invention the construction of the shoulder straps which support the packframe is identical to that of the shoulder straps of the preferred embodiment. However, instead of being crossed as in the preferred embodiment of the invention, the second segments 50a', 50b', of each shoulder strap is connected to crossbar 14a' adjacent the side members 12a', 12b', to which the first segment (not shown) of the same shoulder strap is connected. Opposite ends of a cross strap 62 are respectively connected to second segments 50a', 50b' of the shoulder strap, this cross strap holding the second segments in spaced relation so that shoulder pads (not shown) attached to the segments are maintained in proper position on the bearer's shoulders. The end portions of an upper back support band 20b' are respectively lapped around side members 12a', 12b', and the band is placed under tension by means of a cord (not shown) interlaced between grommets 26 set in its reinforced ends 64a, 64b. Shifting of back support band 20b' in a vertical direction on side members 12a', 12b' is prevented by clevis pins 22a' through 22d' (only clevis pins 22a' and 22c' being shown in the drawing) that pass through holes in the side members and slits in the back support band. A wire 66a, 66b locks clevis pins in each side member 12a', 12b'.

In both of the illustrated embodiments of the invention a plurality of holes linearly spaced along the upper two crossbars of the packframe permit the clevis pins attaching segments of the shoulder straps thereto to be selectively positioned at different distances from the side members of the packframe, thus providing the user of the back pack with additional adjustments in the arrangement of the shoulder suspension harness to suit his particular physical structure and preference in distribution of the load which he is carrying.

It will be understood that the structures illustrated in the drawings of the above-described two embodiments of the invention may be modified without departing from the spirit and scope of the invention. For example, the grommets set in the second segments 50a, 50b and third segments 52a, 52b of the shoulder straps of the preferred embodiment of the invention illustrated in FIG. 1 may be replaced by other suitable means, such as tabular buckles respectively connected to the segments and to crossbars 14a, and 14b, that permit the lengths of the segments to be varied. The ends of second segments 50a, 50b may also be connected to crossbar 14c rather than crossbar 14a, or to the lower portion of respective side members 12a, 12b. In both of the illustrated embodiments of the invention the upper back support band may, of course, be held under tension by the turnbuckle and connector arrangement provided for the lower back support band.

Although the invention has been described and illustrated in detail, it is to be clearly understood that the same is by way of illustration and example only and is not to be taken by way of limitation, the spirit and scope of this invention being limited only by the terms of the appended claims.

What is claimed is:

1. A back pack comprising:

a packframe comprising oppositely disposed side members, a first crossbar fixedly connected to said side

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- members at the lower portion thereof, and a second crossbar fixedly connected to said side members at the upper portion thereof;
- a first back support band mounted on said side members adjacent the lower ends thereof;
- a second back support band mounted on said side members intermediate the upper and lower ends thereof; and
- first and second bifurcated shoulder straps each comprising a first shoulder strap segment one end of which is connected to a respective one of said side members adjacent the lower end thereof, a buckle mounted on said first segment so that it can be fixedly positioned at different points thereon, a continuous strap connected to said buckle to form second and third shoulder strap segments, said buckle being movable to different points on said continuous strap so that the relative lengths of said second and third segments can be varied, means for fixedly connecting said second segment to said first crossbar at different points spaced along said second segment at the end thereof remote from said buckle, means for fixedly connecting said third segment to said second crossbar at different points spaced along said third segment at the end thereof remote from said buckle, and a shoulder pad fixedly mounted on said second segment intermediate the ends thereof, a portion of said second and third segments being above said shoulder pad when said back pack is supported upon a person's shoulders.
2. A back pack comprising:
- a packframe, said packframe including a U-shaped member forming oppositely disposed first and second side members, a first crossbar fixedly connected to said side members at the lower portion thereof, a second crossbar fixedly connected to said side members at the upper portion thereof, a third crossbar fixedly connected to said side members on the side of said first crossbar remote from said second crossbar, and a pair of brace members fixedly secured in holes in each of said crossbars and disposed substantially parallel to said side members, said first and second crossbars and said side members including a plurality of holes spaced linearly thereon;
- a first back support band mounted on said side members adjacent the lower end thereof, said back support band being lapped around said side members having a loop at each end thereof;
- a pair of tubular members respectively positioned in said loops of said first back support band, each of said tubular members having flared end shoulders adapted to hold it within said loop;
- a turnbuckle having the shank of each of its eyebolts in contact with a respective one of said brace members of said packframe;
- a pair of connectors each comprising a triangular-shaped rod having opposite end portions positioned within the ends of a respective one of said tubular members, the apex portion of each of said connectors being positioned in the eye of a respective one of said eyebolts of said turnbuckle;
- a second back support band mounted on said side members intermediate the upper and lower ends thereof, said second back support band including a plurality of grommets fixedly secured therein adjacent each end thereof, each end of said second back support band being connected to a respective one of said side members of said packframe by means of a plurality of clevis pins each respectively positioned within one

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- of said holes spaced linearly on said side members and within one of said grommets in said back support band;
- a pair of waist straps each having a grommet fixedly secured therein adjacent one end thereof, each of said waist straps being connected to a respective one of said side members of said packframe by means of a clevis pin positioned within said grommet and within a hole in the side member adjacent the lower end thereof, one of said waist straps having a buckle connected thereto at the end thereof remote from said packframe;
- a pair of bifurcated shoulder straps each including a first segment having a buckle connected to one end and a grommet fixedly secured therein adjacent the other end thereof, each of said grommets being positioned on a respective one of said clevis pins which connect said waist straps to said side members, thus connecting said first segments to said side members adjacent the lower end thereof, each of said shoulder straps also including second and third segments each connected intermediate its ends to a respective one of said buckles connected to said first segments thereof, said second and third segments each including a plurality of grommets fixedly secured therein and spaced linearly along the end thereof remote from said buckle, said second segments each being connected to said first crossbar and said third segments each being connected to said second crossbar by means of a clevis pin positioned within a preselected one of said grommets in said segments and within a preselected one of said holes spaced linearly on said first and second crossbars respectively;
- a pair of shoulder pads each fixedly attached to the second segment of a respective one of said shoulder straps, each said shoulder pad including a loop attached to its upper side, the third segment of the same shoulder strap being threaded through said loop; and
- a pack sack secured to the upper portion of said packframe by means of clevis pins each respectively positioned within one of said holes spaced linearly on said side members and within grommets fixedly secured in the side edge portions of said packsack.

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