United States Patent

[11] 3,563,431

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[54] **SELF ADJUSTING PACKFRAME**
5 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **224/25**
[51] **Int. Cl.** **A45f 3/08**
[50] **Field of Search** 224/6, 25, 25.1, 8, 9, 11

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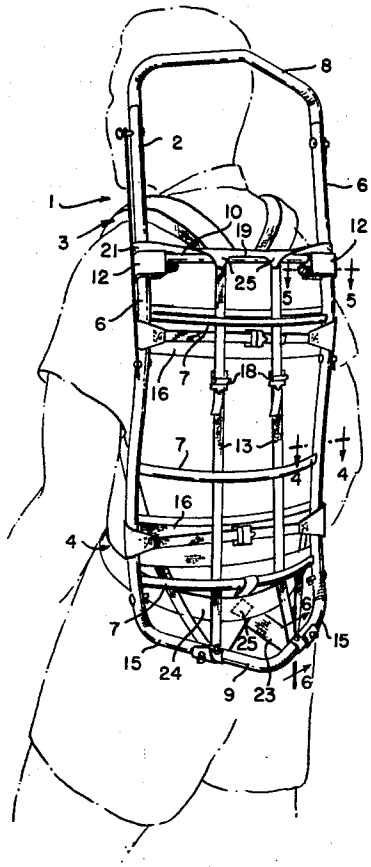
ABSTRACT: A packframe for hikers is constructed using side and cross-members rigidly held together by tension created in straps wrapped around the frame. The packframe has shoulder straps anchored at both ends to substantially a common point near the bottom and out from the general load bearing area of the packframe. A belt is coupled near the bottom of the packframe to absorb a portion of the load and to stabilize the packframe.



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SHEET 1 OF 2

FIG. 2

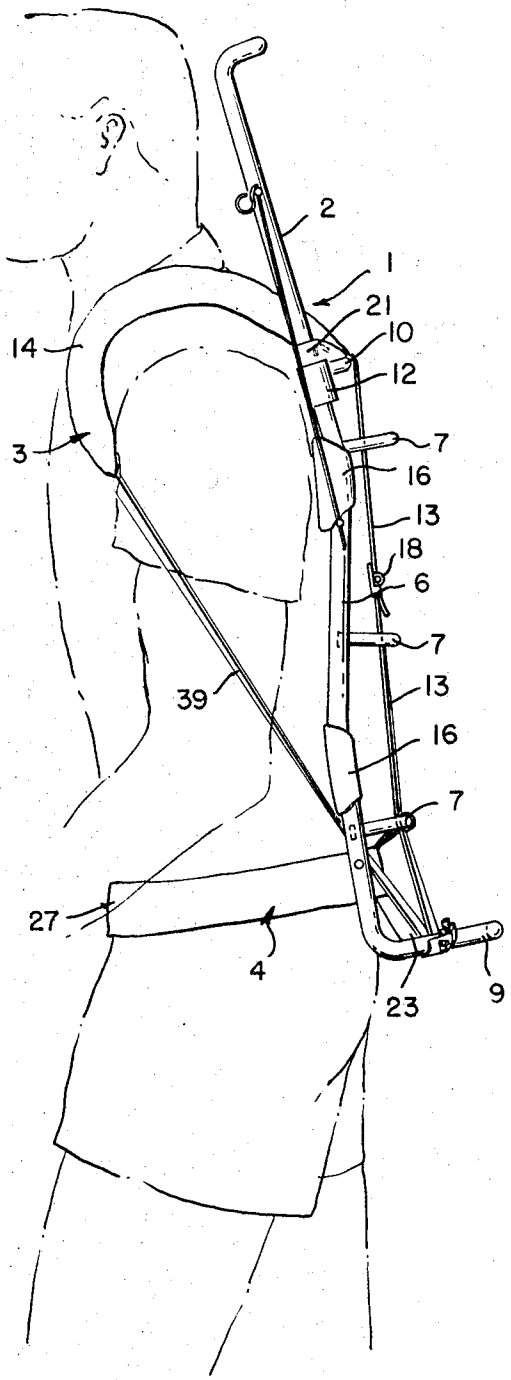
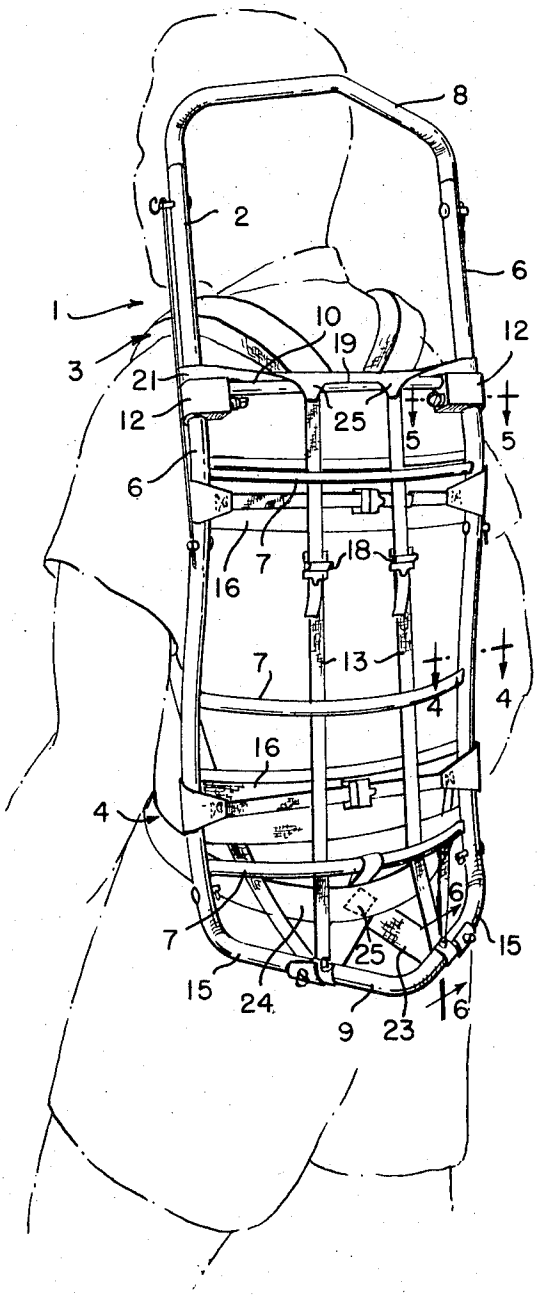


FIG. 1



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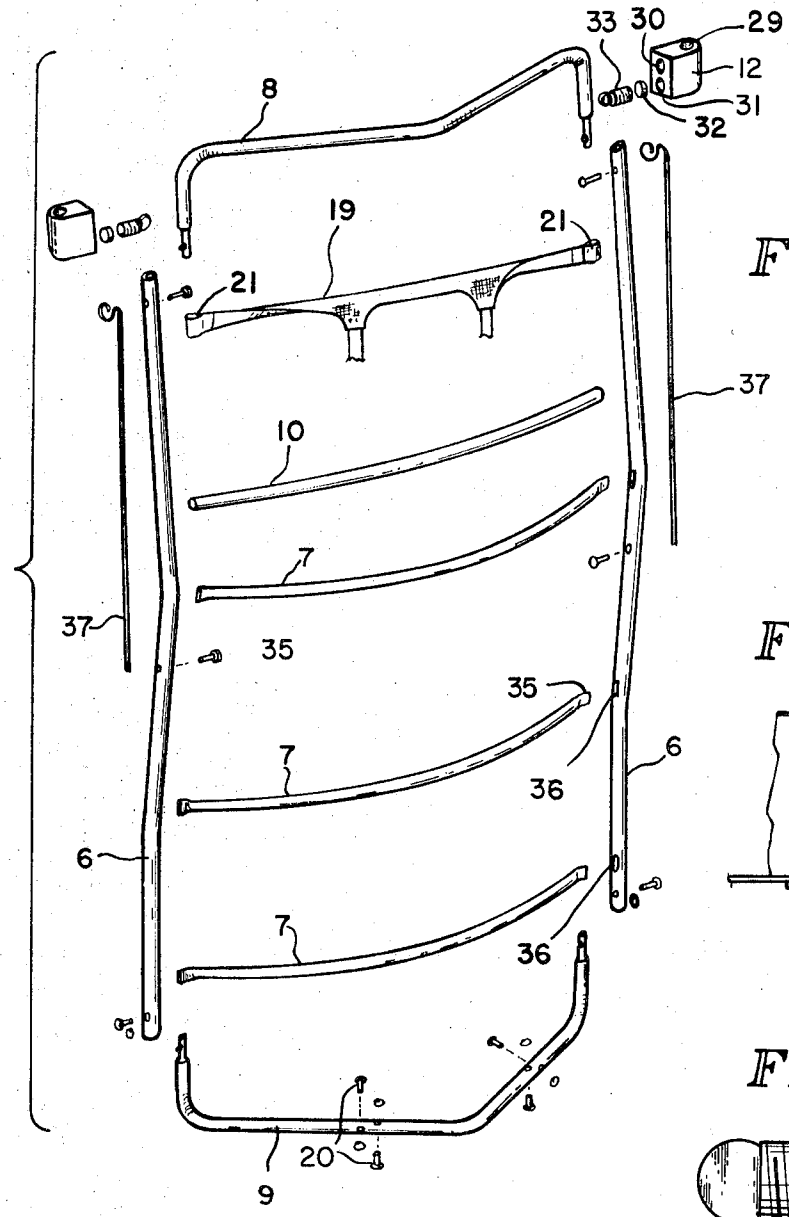

FIG. 3

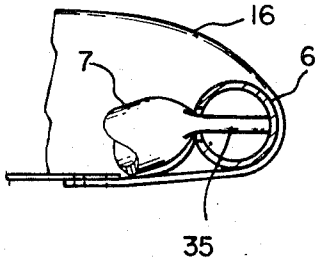

FIG. 4

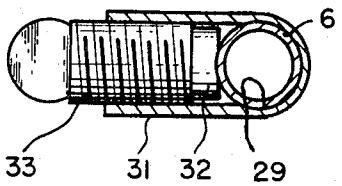

FIG. 5

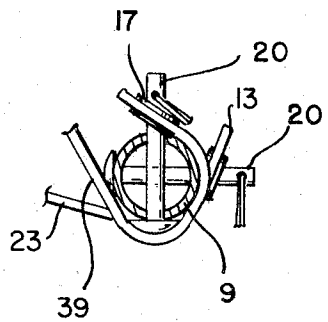

FIG. 6

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SELF ADJUSTING PACKFRAME

BACKGROUND OF THE INVENTION

The present invention relates to apparatus for transporting loads on a man's back. Specifically, the present invention relates to an improved packframe which effects optimum distribution of a load to the body utilizing simplified versatile structure.

It is commonly understood that a load is most easily endured by the human body if it is positioned above the shoulders and close in to the neck. Placement of the load in this manner directs the weight through the shoulders and torso to the hips enabling the strongest body muscles to bear the major bulk of the burden. Prior art packframes seeking to effect the foregoing load placement have employed complicated frame structures and elaborate shoulder harnesses.

Accordingly, it is an object of the present invention to construct a packframe of simple and economical structure and assembly capable of optimumly distributing the weight of a load to the body. To accomplish this objective the present invention employs a generally L-shaped frame having shoulder straps for absorbing most of the load anchored to a fixed position on the foot of the L with an adjustable takeoff point on the leg of the L. A waist belt is coupled to the frame near the foot of the L to secure the lower end of the packframe to the body and to absorb a portion of the load.

It is another object of the present invention to construct a packframe which can be readily altered in size to accommodate different types of loads and for use in different environments. It is also an object to construct the packframe so that it may be completely disassembled in the field so that the component parts can be employed for other uses. These objects are accomplished by constructing the packframe from interlocking parts held in place by the tension forces developed in the shoulder straps and other straps holding comfort pads against the back of the packbearer. Accordingly, another object is to design a packframe having a flexible frame structure capable of absorbing shock when dropped to the ground or the like while fully loaded. Even a further object is to devise a packframe which can be completely disassembled to facilitate its storage.

Yet another object of the present invention is to devise a packframe which tends to urge the load of the packframe close to the body. It is also an object to construct the packframe to enable the packframe to be properly used by different bearers.

Another object of the present invention is to provide improved means for coupling a packframe to the body including a belt which is snugly wrapped around the body and couples to the packframe via means extending from the packframe inward to the belt.

DESCRIPTION OF THE DRAWINGS

Other objects and features of the present invention will become apparent from a further reading of the description of the invention as well as from the drawings which are:

FIG. 1 is a perspective view of the packframe of the present invention mounted on the back of a hiker;

FIG. 2 is a side elevational view of the packframe and hiker shown in FIG. 1;

FIG. 3 is an exploded perspective view of the present packframe illustrating interconnection of the various components;

FIG. 4 is a cross section view of the packframe taken along line 4–4 in FIG. 2;

FIG. 5 is a cross section view of the packframe taken along line 5–5 in FIG. 2; and

FIG. 6 is a cross section view of the packframe taken along line 6–6 in FIG. 2.

DESCRIPTION OF THE INVENTION

The present packframe is versatile structure. It is designed to distribute in an optimum manner the weight of a load to the body. The packframe harness is readily adjusted for comfortably fitting the packframe to the unique body build of a user. The construction of the packframe permits complete disassembly allowing the various components to be used for as diverse purposes as an extension for a frying pan handle to a frame for a tent. Extension members are readily coupled to the packframe to expand its size. The expanded frame may be necessary for longer or peculiar loads or for positioning the load higher above the shoulders. The load normally is carried in a packsack attached to the frame but can be tied directly to the frame.

A packsack intended for use with the present frame is a tapered rucksack. A rucksack is a packsack carried without a packframe commonly used for short hikes or the last leg of a climb by a mountain climber. The present rucksack is tapered, narrower at the top than at the base, for fitting generally between the shoulder blades. A flap, having eyelets for engaging with clevis pins along the sides of the present packframe, is sewn onto each side of the rucksack to give a generally rectangular shape to the tapered rucksack. As a result the rucksack can be carried on the present packframe along with other packsacks during the early portion of a hike or climb and can be removed and carried alone on the final leg of the trip.

If the center of gravity of the load is above the height of the shoulders there is a natural tendency for the load to pivot about a point near the shoulder blades toward the neck and head. This maintains the load in the desired position close to the body. The harness of the present packframe is arranged to assist this natural tendency.

The packframe includes an L-shaped base, a waist belt and shoulder straps. The base is the structure to which the load is attached. The base is appropriately contoured to conform generally to the contours of the human back. The contoured shape as well as pads abutting the back of the pack bearer are incorporated for the comfort of the bearer.

The foot of the L-shaped base is a shelf which serves as a stand for the pack as it rests on the ground and which aids in securing the load to the packframe. Most importantly, however, the shelf provides an anchor point for both ends of the shoulder strap that is out from the general plane of the base (the leg of the L). The base also includes an adjustable crossbar which is positioned generally to the height of the user's shoulder blades. The shoulder straps are continuous loops anchored to points out on the shelf. The upper portions of these loops pass over the adjustable crossbar. The tension in the shoulder straps created by the load tends to straighten the upper portion of the straps passed over the adjustable crossbar. The straps in turn tend to rotate the bottom of the base outwardly so as to position the load at the top of the packframe closer to the body. The tendency is for the base to rotate about the crossbar and this tendency is accentuated by anchoring the straps out on the shelf away from the general plane of the base.

The belt is connected to the base near the shelf to distribute a portion of the load directly to the hips and thighs. Both the length of the shoulder straps and belt are adjustable to accommodate the physique of a particular pack bearer. The straps and belt are heavily padded not just for comfort but also for ease of coupling to the body. The heavy padding makes them relatively tangle-free permitting the user to readily engage them about his body. The straps and belt are coupled to the body by a tape locking mechanism available under the trade name "Velcro."

The present packframe is a knockdown packframe. By knockdown is meant that the packframe is capable of being readily disassembled into its component parts. The knockdown feature is obtained by interlocking the components by interfitting the components into slots and holding them in place by compression straps and cinches. The

knockdown feature of the packframe permits the various components to be freed for other uses and facilitates storage.

Packframe **1** is formed from base **2**, shoulder straps **3** and belt **4**. Base **2** includes S-shaped tubular sidemembers **6**, U-shaped tubular crossmembers **7**, tubular top member **8**, tubular shelf member **9**, adjustable crossbar **10**, blocks **12** and padded cinches **16**.

The shoulder straps include web **13**, pads **14**, eyelets **17** and buckles **18**. The shoulder straps also include crossweb **19** having loops **21** at each end thereof which is sewn to the straps at points **22**. The loops fit over the sidemembers **6**.

The belt **4** includes web **23** for coupling to the side members **6**, web **24** sewn to web **23** at points **25** and pads **27**.

FIG. **3** illustrates the interconnection of the base components. The side members **6** define the leg of the L-shaped base and the shelf member **9** defines the foot of the L-shaped base. Tubular extension rods (not shown) are coupled between sidemembers **6** and top member **8** to expand the size of the packframe. Top member **8** and shelf member **9** are turned on a lathe to reduce their outside diameters near the ends for insertion into the hollow of the sidemembers The top and shelf member telescopically coupling the components together are locked to the sidemembers by clevis pins. The shelf member, as seen in FIGS. **2** and **3**, is curved at the corners **15** in the plane of the shelf to minimize damage to a loaded packframe dropped to the ground. The curves at the corners of the shelf eliminate the lever arm presented by a sharp corner. The aluminum frame could possibly bend under the weight of the load acting through the lever arm distance of the corner.

The shelf member **9** extends generally perpendicular from a plane defined by the sidemembers **6**. The sidemembers are of a length to extend generally from the area of the user's waist to above the height of the user's shoulders.

Blocks **12** and loops **21** are slid over the sidemembers **6** prior to coupling the top and side members together. Bore **29** is provided to enable the insertion of a block over a sidemembers. Blocks **12** support the crossbar **10** which is inserted into bores in the blocks. Blocks **12** include the threaded bore **31**, plug **32** and setscrew **33**. The setscrew forces the plug against the sidemembers to lock it to a specific location. The setscrew is backed out of the threaded slot to permit the crossbar to adjust to the position on the packframe corresponding to the shoulder blade height of the user. FIG. **5** shows a block locked to a sidemember.

FIG. **4** illustrates the coupling of a crossmember **7** to the sidemembers **6**. The crossmembers include spade ends **35** which mate with slots **36** in the sidemembers. The crossmembers **7** are held in compression between the sidemembers by padded cinches **16**. The cinches **16** are looped about the sidemembers and are tightly drawn to hold the crossmembers in compression. The cinches in combination with the side and crossmembers make a rigid structure yet one capable of receiving shock without damage. Since the cross and sidemembers merely are fitted together, the frame is able to flex or give if it is dropped to the ground while a load is attached. A similar shock could sever a weld or other rigid joint as found on prior art packframes.

A packsack is attached to the frame by the clevis pins **20** positioned through bores in the sidemembers The clevis pins are locked in place by the long pin **37**.

The shoulder straps **3** are anchored at both ends by clevis pins **20** to the shelf member **9** as seen in FIG. **6**. The upper portions **38** of the straps extend from the shelf, beneath the crossmembers and over the adjustable crossbar (FIG. **2**). The pads **14** extend over the user's shoulders back to the shelf. The lower portion **39** of the straps includes buckle means for adjusting the length for a particular user. The load on the packframe is primarily absorbed by the shoulder straps and is transferred by the straps from the anchor point on the shelf to the user's shoulders. The concentration of the load at the anchor points creates a tension in the straps that tends to straighten the upper portion **38** thereby rotating the entire packframe. The packframe therefore tends to maintain the load in the desired position close in to the body.

The straps **3** include crossweb **19** which is coupled to the sidemembers **6** by loop **21**. The straps still form continuous loops tied to the shelf because the crossweb **19** does not receive the weight of the load. The crossweb maintains the two shoulder straps at fixed, spaced apart positions. In addition, it serves as means for compressing the packframe in the direction of the height of the user. Buckles **18** are provided to permit the strap web **13** to compress the packframe in an axis perpendicular to the compression generated by the padded cinches **19**. The structural strength of the packframe is thereby increased. The pads **14** form part of the shoulder straps and contribute to the user's comfort as well as being tangle proof.

The belt **4** is coupled to the packframe by clevis pins **20** fitted through bores **36** in the shelf **9** as illustrated. The eyelets in web **23** are used to attach the belt to the shelf member. Web **24** is sewn to web **23** as shown at point **25** and is in turn coupled to pads **27** which extend about the user's waist. The belt tends to stabilize the packframe on the back of the user.

It is believed that the invention will have been clearly understood from the foregoing detailed description of my now-preferred illustrated embodiment. Changes in the details of construction may be resorted to without departing from the spirit of the invention and it is accordingly my intention that no limitations be implied and that the hereto annexed claims be given the broadest interpretation to which the employed language fairly admits.

I claim:

1. A backpack for hikers comprising: a frame including laterally-spaced rigid side members for extending from the waist to above the shoulders, an adjustable upper crossbar having its ends slidably mounted on said sidemembers for locating it at about shoulder height of a given hiker, locking means on the ends of the crossbar and engaging the sidemembers for selectively fixing the crossbar relative to the sidemembers in cross-bracing relation, and a lower crossmember interconnecting the sidemembers toward their waist end; a pair of laterally spaced shoulder strap means each secured at its opposite ends to said frame near said crossmember and forming a respective shoulder loop to the front of the frame; strap positioning means mounted on said frame and connected to said shoulder strap means at the back of their loops in a location closely adjacent to said adjustable crossbar, said strap positioning means being restrained by said adjustable crossbar against downward movement relative thereto and being movable therewith along the frame when the crossbar location is adjusted, and being adapted to keep said strap loops equally spaced from the respective sidemembers and to hold the back of the loops closely adjacent the crossbar to restrict lateral or rearward shifting or twisting of the pack relative to the shoulder loops when in use; and strap length adjusting means on said shoulder strap means for varying the effective length thereof.

2. A backpack according to claim **1** in which the control portion of said lower crossmember extends rearwardly of the sidemembers as a shelf and the ends of the shoulder strap means are anchored thereto.

3. A backpack according to claim **1** in which said upper crossbar comprises a pair of slide blocks slidably mounted on said sidemembers and carrying said locking means and a bar having its ends slidably received by said slide blocks; and cushioning cinch means passing around said sidemembers and holding said bar in the slide blocks.

4. A backpack according to claim **3** in which intermediate crossmember means are socketed at their ends to the sidemembers and are held in socketed position by said cinch means.

5. A backpack according to claim **1** in which said strap positioning means comprises a cross strap secured at laterally spaced locations to said pair of shoulder strap means and sleeved at its ends on the sidemembers immediately above the upper crossbar.