

[54] **PACK FRAME WITH SWIVELING
HIP-RIDERS**

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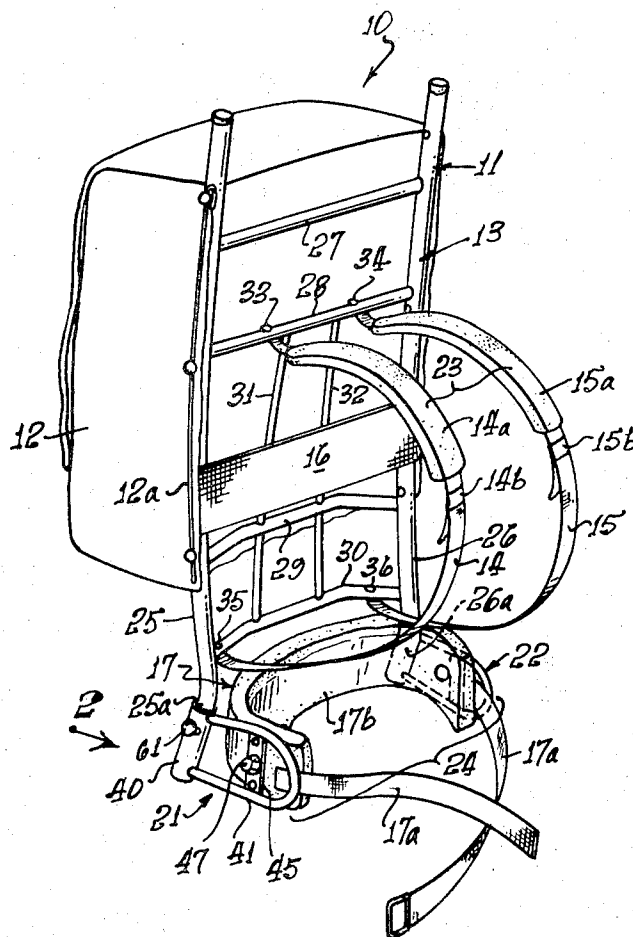
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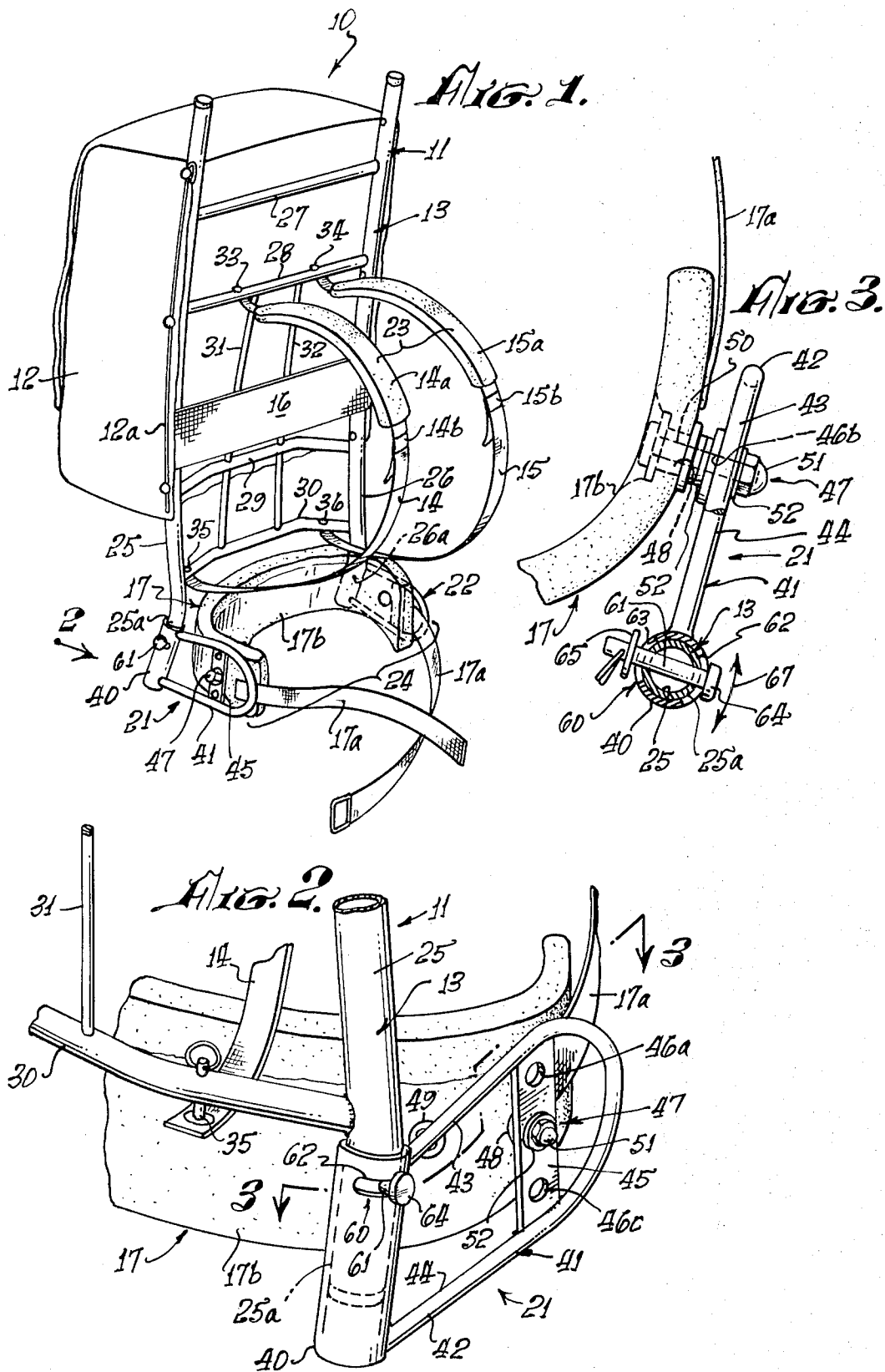
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ABSTRACT

A pack frame assembly combining a pack frame and a suspension means which permits a restricted movement of the pack frame as it is carried on the back of a walking person, which suspension means includes in combination: a pair of flexible shoulder straps attached to the pack frame; and right and left swiveling cantilever arms projecting horizontally from the lower ends of the pack frame to a hip belt, said cantilever arms being pivotally attached to the hip belt.

1 Claim, 3 Drawing Figures





PACK FRAME WITH SWIVELING HIP-RIDERS

The present invention relates to a pack frame of the type used by a back packer, or a hunter, for carrying his camping or other equipment on his back. More particularly, the present invention is a new form of suspension of the pack frame from the back of the carrying person by a combination of shoulder straps and cantilever arms projecting from the lower end of the pack frame to a hip belt worn by the carrying person. The cantilever arms swivel on the pack frame to permit a predetermined restricted movement about a substantially vertical axis; the arms are pivoted at the hip belt, at the sides of the carrying person, to permit restricted movement about a substantially horizontal axis.

The sport of back packing has achieved an amazing growth in popularity in recent years, which has, in turn, produced a great increase in production of back packs for hikers, and has also stimulated the development of many improvements in designs of pack frame assemblies for carrying camping equipment.

Many improved designs have been based on the recent discovery that the back pack should be allowed to swing, to a restricted degree, with each stride of the load-carrying person. The hiker can carry his pack for a longer period of time, with less fatigue and greater comfort, if the pack frame assembly on his back is freely movable, within limits, so that his body is not required to jerk the pack through a series of forceful oscillations corresponding to the walking rhythm. The slight swings of the pack reduce the pounding on the hiker's back.

On the other hand, it is important that the swinging movement be not only restricted, but also adjustable to the peculiar characteristics of each hiker. Every person has a slightly different body build, muscle distribution, and stride characteristic. Even the same person may prefer changing the adjustment of his pack frame assembly from time to time, in order to switch the load slightly from one set of muscles to another. In previously known movable back packs, a crude combination of restricted movement and adjustability has been achieved by simply loosening the canvas straps by which it has been customary to tie the lower end of the pack frame to a padded waist belt encircling the waist of the load carrying person. Such flexible straps permit the pack frame to swing in unpredictable manners, not adequately restricted for the needs of comfort of the wearer. Also, adjustability has proven unreliable, since a canvas strap may stretch, or loosen.

Many expert back packers prefer a pack frame assembly which includes frame structure connected directly to the sides of the waist belt. A person carrying such a pack feels the load on the sides of his hips, rather than as something hanging down behind him. In the past, a few pack frames have actually been constructed with solid bar construction which turns forward at the lower end and attaches to the waist belt. Unfortunately, such a pack frame mounting precludes the use of the swinging feature, also desirable to most expert back packers.

The standard construction for back packs usually includes a horizontal back band of canvas material, usually 4 to 6 inches in vertical width, which rests the load on the back of the person carrying the pack. However, it is a feature desired by many expert backpackers that the pack load be partially distributed to the waist belt,

in addition to the horizontal back band. The only practical way of achieving this is to have part of the pack frame construction anchored on the waist belt in a way which spaces the pack frame back from the body of the person carrying the pack. This feature has heretofore been considered as inconsistent with any type of swinging construction. This is particularly true since the spacing desired by different persons is slightly different.

It is an important object of the present invention to provide upwardly and forwardly projecting swinging arms on each side of the lower end of the pack frame, in order to transmit pack load directly to the pack belt through pack frame structure, while at the same time permitting the restricted swinging which allows the pack to move slightly in a rhythmic manner with each stride of the hiker.

A second important object of the present invention is to provide a swiveling arm structure which has selective adjustability, so that a standard pack frame may be adjusted to a suitable mounting configuration for persons of different builds.

A third important object of the present invention is to provide a solid swiveling arm structure of the type described in the following pages, which can be installed as an additional accessory on most presently known pack frames. Most existing pack frames are constructed of tubular metal, and have downward projections of right and left side bars, suitable for mounting of the swiveling arm structure to be described hereinafter.

The foregoing and other objects and advantages of the invention will best be understood from the following description of a preferred specific embodiment, which description should be read with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view of a pack constructed according to the invention, as viewed looking backwards from the right front of a person (not shown) wearing the pack;

FIG. 2 is an enlarged perspective view of the lower right hand corner fragment of the pack of FIG. 1, as viewed from the right rear in the direction indicated by the arrow in FIG. 1; and

FIG. 3 is an elevational view, in cross-section, of the horizontally swiveling arm structure seen in FIGS. 1 and 2, the section being taken in the direction of the arrows 3-3 as indicated in FIG. 2.

In FIG. 1, the numeral 10 is employed to indicate the pack in its entirety. The pack 10 is mounted on the back of the person carrying it by means of a pack frame assembly indicated generally by the numeral 11. The pack load is carried in a pack bag 12 which is mounted on a pack frame 13 (the principal part of pack frame assembly 11) by means of suitable attachment wires 12a or any other means known to those familiar with pack construction.

The pack frame 13 is supported in part, from the shoulders of the wearer by a pair of shoulder straps, right strap 14 and left strap 15. It is customary to provide shoulder straps 14 and 15 with shoulder pads 14a and 15a, and to make them adjustable by means of buckles 14b and 15b.

As in the standard and well known type of construction, the pack assembly 11 includes a canvas band 16 which provides a comfortable contact between the pack 10 and the back of the wearer.

The load of pack 10 is also partly supported from a waist belt 17, which is typically comprised partly of canvas webbing 17a and partly of a padded construction 17b.

The pack frame assembly 11 is suspended partly from the waist of the carrying person by means of a pair of swiveling arm structures, comprised of right swiveling arm structure 21 and left swiveling arm structure 22, to be described hereinafter in detail.

It will be convenient, hereinafter, to refer to the support of pack 10 on the back of the carrying person as being accomplished by an upper suspension 23, comprising shoulder straps 14 and 15, and a lower suspension comprised of the arm structures 21 and 22, and waist belt 17, referred to collectively as a lower suspension 24.

Frame 13 is illustrated as a typical construction of metal tubes, usually aluminum or magnesium. Frame 13, in the particular embodiment, is comprised of a pair of vertically extended side bars, comprising right side bar 25 and left side bar 26, and a number of horizontal cross bars running transversely across the back of the carrying person, and including a pack cross bar 27, a shoulder level cross bar 28, and a pair of concave contoured lower bars 29 and 30. The rigidity and strength of frame 13 is augmented by a pair of light vertical bars 31 and 32.

Shoulder straps 14 and 15 may be attached to frame 13 in a variety of ways, the upper anchoring points 33 and 34 being somewhat below the level of the shoulders of the wearer, and the lower anchoring points 35 and 36 being in the general region of the wearer's waist.

The total load of pack 10 may be apportioned between the upper suspension 23 and the lower suspension 24 by adjustment of shoulder straps 14 and 15.

The new and hitherto unknown construction of arm structures 21 and 22, which provide the most important features of novelty of the invention, will be described in connection with right arm structure 21, only, since left arm structure 22 is simply a substantially identical left-hand version. Right arm structure 21 is illustrated in detail in FIGS. 2 and 3.

It will be seen in FIG. 2 that right side bar 25 has a downwardly projecting end section 25a (left side bar 26 being similarly provided with a downward projection 26a). A vertically extended tubular sleeve 40 is closely received on downward projection 25a and is rotatable thereon about an axis which may be referred to as substantially vertical, although it may in fact be bent rearwardly from the vertical since it is customary to form side bars 25 and 26 to fit the contours of the human body as shown in FIG. 1.

An arm structure 41 is welded integrally to sleeve 40, and swings therewith. In the assembly 21, arm structure 41 swings horizontally about the substantially vertical axis, already mentioned, of the rotation of sleeve 40. In the preferred construction shown in the drawings, arm structure 41 is comprised of a U-shaped rod 42, which has upper and lower legs, 43 and 44 respectively, welded at upper and lower ends, respectively, of sleeve 40, to provide them with the maximum vertical spacing from one another.

A substantially vertically disposed attachment plate 45 is welded integrally to rod 42, and is provided along its vertical dimension with spaced pivot attachment holes 46a, 46b, and 46c. In the particular assembly illustrated, arm structure 41 is pivotally attached to the

side of waist belt 17 by a pivot assembly 47 which passes through a grommated hole 48 in the side of waist belt 17. In FIG. 2, a second grommated hole 49 in waist belt 17 is illustrated to show that a plurality of grommated holes 48 and 49 may be used to provide selective location of waist pivot 47, to accommodate the needs of a particular person. Pivot assembly 47 may be constructed of a typical bolt 50, nut 51 and spacing washers 52.

It is a preferred construction to restrict the movement of the hip riders 21 and 22, to optimum defined ranges of movement which cooperate with the stride of the person as he hikes along, without subjecting him to exaggerated jerkiness. Suitable restriction of rotation about waist belt pivot 47, which projects approximately sidewise of the person wearing pack 10 and approximately horizontally, is accomplished simply by adjustment of the shoulder straps 14 and 15, and is restricted to some extent by the pivot attachment 47, in cooperation with the force of gravity in the load of pack 10.

The swinging of the lower end of pack 10 in a horizontal plane, about the substantially vertical axis of sleeve 40, is preferably restricted by a stop 60, which defines a predetermined angle of swinging range permitted to the arm structure 41. The simple but effective stop construction 60 shown in the preferred embodiment illustrated is comprised of a stop pin 61, which is mounted transversely in right side bar 25, with its ends projecting through opposite arcuate slots 62 and 63 in the sidewalls of the sleeve 40. Pin 61 is retained by a head 64 and a retainer ring of any suitable type 65. It will be seen from FIG. 2 and the sectional view of FIG. 3 that horizontal swiveling of arm 41 is permitted through a restricted angle indicated by the double-headed arrow 67.

I claim:

1. An improved pack frame assembly for movable suspension of a pack frame carried on the back of a walking person, said assembly comprising:

a pack frame including substantially vertical right and left side bars disposed behind the right and left sides of the carrying person, each of said side bars having a lower end projecting downwardly and bent rearwardly of said person, and cross bars connecting said side bars;

an upper suspension comprising a pair of shoulder straps for suspending said pack frame from the shoulders of said person;

a lower suspension comprising:

a waist belt for encircling the waist of said person;

a pair of hip-rider means, one for each of said side bars, each hip-rider including:

a substantially vertical sleeve rotatably received on said downwardly projecting lower end;

stop means between said sleeve and said side bar for restricting the rotation of said sleeve to a predetermined arc;

an arm structure integral with said sleeve and projecting angularly relative to said lower ends and horizontally forwardly to the region of the side of said waist belt; and

pivotal attachment means between the forward end of said arm structure and said belt to permit rotational movement of said arm about a substantially horizontal axis projecting side-wardly of said person;

whereby said pack frame is suspended from said person with freedom to undergo restricted movement with respect to said person during walking.

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