

Feb. 16, 1960

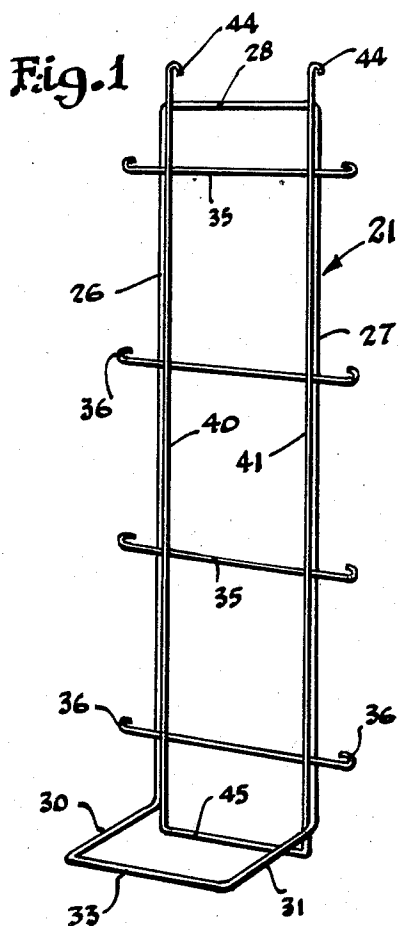
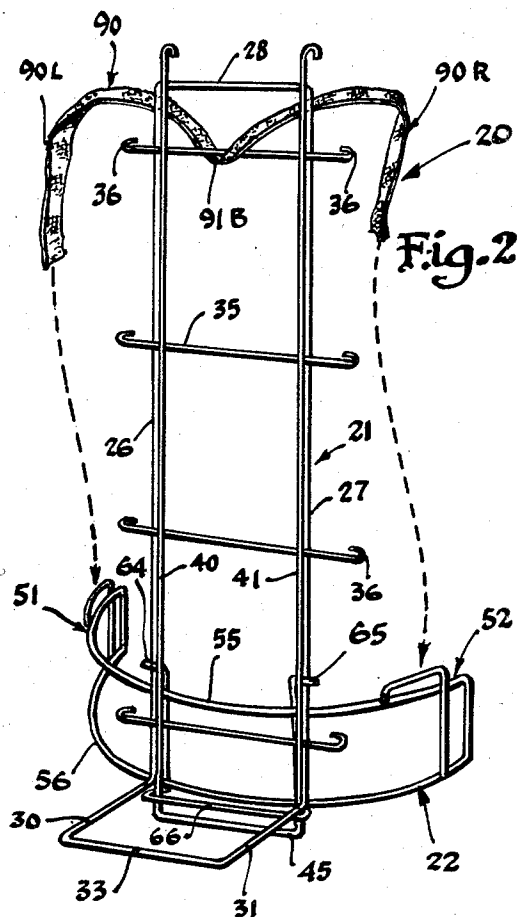
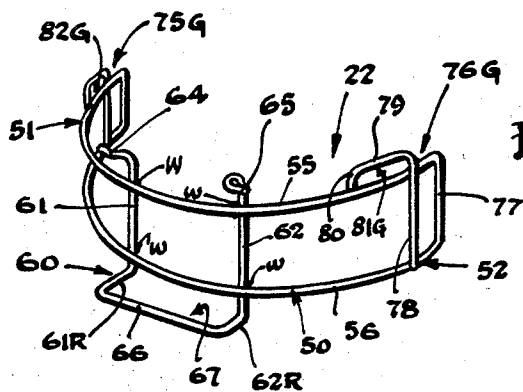
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2,925,205

ADJUSTABLE PACK FRAME

Filed Oct. 9, 1957

2 Sheets-Sheet 1



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Fig. 4

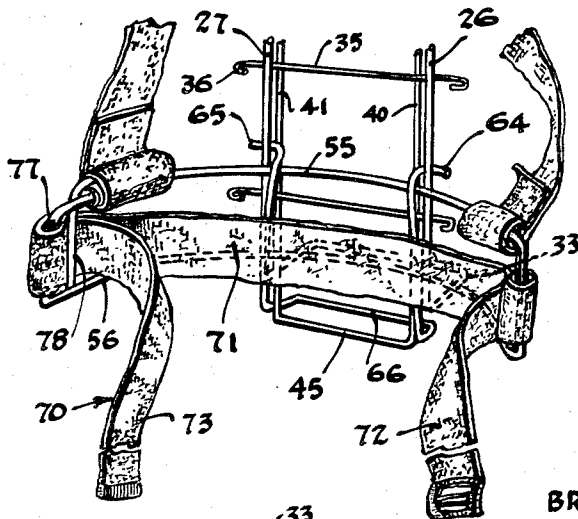


Fig. 5

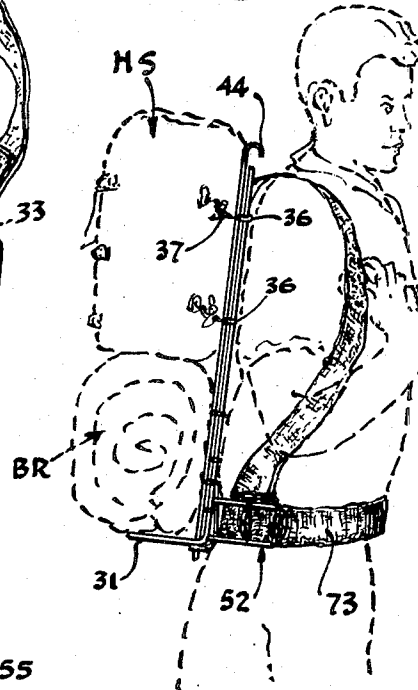


Fig. 6

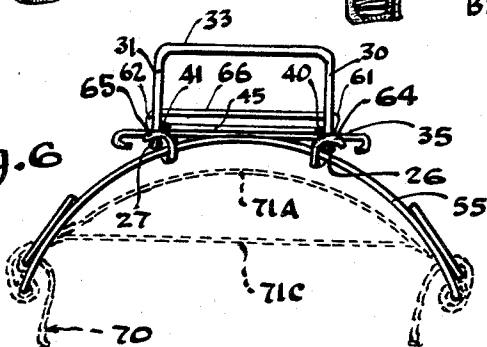


Fig. 7

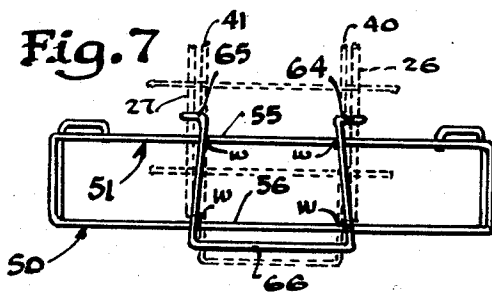
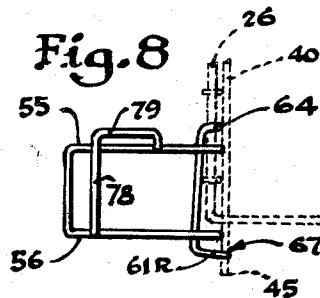


Fig. 8



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2,925,205

ADJUSTABLE PACK FRAME

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2 Claims. (Cl. 224-25)

This invention relates to a pack frame adapted to be borne on a person's back for transporting packs.

It is advantageous in transporting loads by means of a pack frame to relieve as much strain as possible from the shoulders of the bearer where fatigue is most acute, to enable the load to be uniformly balanced or equalized between the shoulders, and also to prevent chafing of the bearer's shoulders normally caused by a taut, ungiving relationship of the shoulder straps. It has been found in accordance with the present invention that these advantageous relationships can be achieved by enabling the weight of the pack to be borne primarily on the bearer's hips, while affording shoulder straps which primarily serve to balance the load and which are capable of shifting or giving in accordance with movement of the torso of the bearer traversing uneven ground, if this is desired by the bearer; and so to do constitutes primary objects of the present invention.

Other objects of the present invention are to afford a frame fabricated from tube or rod material which is of an open nature enabling the frame to be purposely bent by the bearer to conform to the contours of the back of the individual bearer; to mount on a pack frame a hip-encircling member having an adjustable back band and a waist-encircling belt whereby much of the load of the pack is supported in a novel manner by the bearer's hips; to afford shoulder straps which are afforded by a one-piece flexible member which, if desired, is merely looped about the pack frame whereby each shoulder strap is freely expandable and contractable in a give and take manner for equally balancing the load between the shoulders; to embody in the hip-encircling member a flexible band which is adjustable and which spans the small of the bearer's back whereby upon increasing or decreasing the effective length of the band the frame may be shifted toward and away from the bearer's back to change the position of the load accordingly; and to achieve the foregoing in a relatively inexpensive pack frame which can be easily disassembled.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show a preferred embodiment of the present invention and the principle thereof and what I now consider to be the best mode in which I have contemplated applying that principle. Other embodiments of the invention embodying the same or equivalent principle may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings:

Fig. 1 is a perspective view of the assembled upright members of the pack frame;

Fig. 2 is a perspective view of the uprights of Fig. 1 with the hip-encircling, load-bearing member attached thereto;

Fig. 3 is a perspective view of the hip-encircling, load-bearing member;

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Fig. 4 is a fragmentary perspective view of the lower portion of the assembly of Fig. 2 and showing how the several straps are secured in place;

Fig. 5 is a side elevation of the pack frame of the present invention carried by a bearer shown in phantom lines;

Fig. 6 is a top plan view of the hip-encircling member;

Fig. 7 is a front elevation of the hip-encircling member; and

Fig. 8 is a side elevation of the hip-encircling member.

The present invention is illustrated in the drawings as embodied in a pack frame 20 which includes an upright member 21 and a hip-encircling or embracing member 22 which will be described in more detail hereinafter. The frame is preferably fabricated from round steel members or the like as will now be explained.

Thus, the upright 21 of the pack frame is of a general elongated rectangular form and includes a main frame member constructed in part of a pair of parallel elongated side rods 26 and 27 which are joined at the upper ends thereof by a transverse tie rod 28. The lower ends of the rods 26 and 27 are bent rearwardly at right angles to afford a pair of bottom arms 30 and 31 which are joined by a transverse rod 33 which is parallel to the upper tie rod 28. Such construction constitutes what can be considered the primary frame or upright member as mentioned, and this member can be conveniently and inexpensively fabricated from a one-piece rod bent to the desired form and having the free ends thereof welded together.

A plurality of transverse bracing rods 35 are welded to the elongated uprights 26 and 27 at suitably spaced intervals, these transverse members being parallel one to the other and parallel to tie member 28. The outer ends of the transverse rod members 35 project outwardly of the vertical rod members 26 and 27 and are bent forwardly to afford hooks 36 to which a haversack HS or the like may be tied by ropes or other ties 37 in the manner illustrated in Fig. 5. The primary frame member is of course of predetermined length to extend approximately from the shoulders or neck of the bearer to the small of the bearer's back, and is, therefore, of sufficient length to enable additional packs such as a bed-roll BR to be lashed to selected of the hooks 36. In this connection, it will be realized that the rearward projection at the bottom of the primary frame afforded by the members 30, 31 and 33 constitutes a ledge or shelf on which the lower-most portion of the pack such as the bed-roll is adapted to repose.

The frame thus afforded is open and of light-weight construction, and the rod members are preferably of a rugged, sturdy gauge but capable of being purposely bent or warped manually for individual adjustment to the contour of the particular bearer's back if such adjustment is desired.

An auxiliary bracing frame or upright member is preferably provided which is also of general rectangular configuration. Thus, the auxiliary frame includes a pair of spaced parallel elongated uprights 40 and 41 of rod form which are spaced closely inwardly of the uprights 26 and 27 of the main frame in a parallel manner, and are welded to the main frame at convenient spots thereby serving to reinforce the main frame. The upper ends of the uprights 40 and 41 are provided with forwardly and downwardly bent hooks 44. The lower ends of the uprights 40 and 41 extend below the lower ends of the uprights 26 and 27 of the main frame and are connected by a transverse tie rod 45. It will be realized that the auxiliary or inner frame can also be fabricated from one-piece rod material bent to the desired shape and form.

The hip member 22 is shown in detail in Figs. 3 and 6 to 8 inclusive. The member 22 is generally yoke-

shaped, being substantially arcuate throughout, and comprises a main back portion 50 which is curved to conform generally to the contour of the small of the bearer's back. Extending forwardly of the back portion 50 of the hip member 22 are a pair of forwardly directed arcuate left and right-hand arm members 51 and 52 which are adapted to neatly embrace the small of the bearer's back as best shown in Fig. 5. The hip member 22 is conveniently fabricated from rod material bent to the desired form with the free ends thereof welded together in a suitable fashion. Such construction utilizes an upper arcuate rod 55 and lower arcuate rod 56 parallel thereto.

The hip member can, of course, be permanently united to the upright 21 of the pack frame, if desired, but I prefer to utilize a detachable connection in order that the members 21 and 22 may be easily disassembled for storage purposes. In achieving such detachable connection, the medial section of the hip member 22 is provided with a looped connector 60 adapted to be telescopically coupled to the lower section of the auxiliary frame which projects below the ledge member of the main frame. Thus, the connector 60 is fabricated from a one-piece rod member so as to have a pair of vertical parallel arms 61 and 62 which are welded as at W to spaced points on the rod members 56 and of the back portion 50 of the member 22. The upper ends of the arms 61 and 62 project above the upper rod member 55 and are bent to afford outwardly directed tongues 64 and 65.

The arms 61 and 62 at the lower ends thereof project below the lower rod member 56 as best shown in Figs. 7 and 8, and are bent rearwardly at 61R and 62R and joined by a transverse member 66. Such construction is dimensioned to afford a socket or opening 67, Fig. 3, into which the lower projecting section on the auxiliary frame is adapted to be freely inserted as shown particularly in Figs. 2, 4 and 8. Such coupling is of course related so that the arm portions 51 and 52 of the hip member 22 project forwardly as shown in Fig. 2, that is, in the direction opposite the direction in which the ledge member of the main frame points.

In coupling the member 22 to the upright 21, the member 22 is cantled relative to the upright 21 to dispose the arms 61 and 62 out of parallel with the upright rods as 26 and 27, and with the tongues 64 and 65 in alignment with the spaces between the upright rods 26 and 40 on one hand and the upright rods 27 and 41 on the other hand. The opening 67 defined by the parts 61R, 62R and 66 is aligned with the projecting lower end 45 of the frame member. Then, upon straightening the member 22 to dispose the arms 61 and 62 parallel to the upright rods, the member 22 can be slid up on the upright with the tongues 64 and 65 hooked in place between the upright rods. The part 45 enters the opening 67 and eventually the parts 61R and 62R engage the arms 30 and 31 as shown in Fig. 2.

The primary advantage of the present invention is that much of the weight of the pack is impressed on and borne by the hips of the bearer. In stabilizing the pack frame, and transferring most of the load to the hips, a flexible belt is secured to the arms of the hip member 22 so as to gird the waist of the bearer. The hip member is also provided with an adjustable, rather wide flexible band which spans the small of the bearer's back. This band acts as a spring, or in any event constitutes a cushion of wide area which comfortably cushions the load and holds the upright away from the bearer's back allowing free ventilation. Thus, the yoke-shaped member 22 transfers the load to the back band which in turn, through the belt, transfers the load to the hips. Additionally, free ends of a one-piece flexible strap affording a pair of shoulder straps are also secured to the hip-encircling member. The details regarding the manner in which such belting and strapping is afforded will now be described.

The waist belt and the back band are preferably in the form of a one-piece flexible member 70, Fig. 4, including

a bight portion 71 which affords the back band and left and right-hand side portions 72 and 73 which afford the waist belt. The free ends of the side portions 72 and 73 of the belt 70 are provided with any desired type of buckle as indicated in Fig. 4, which can be tightened and maintained tight. The band 71, as best shown in Figs. 4 and 6, is stretched between the forward extremities of the arcuate arms 51 and 52 of the hip member 22 well forwardly of the bowed back portion 50, and an essential feature of the invention is adjustability of the band 71 whereby the band 71 can be adjusted between a chord position 71C, Fig. 6, and any selected rearward arc position 71A. In achieving adjustability of the band 71, guides 75G and 76G, Fig. 3, are provided on the arms 51 and 52. The guides 75G and 76G enable the band 71 to be run therethrough either to tighten or to loosen the band. Each guide is conveniently provided in part by a solid bight portion 77, Fig. 3, which joins the ends of the parallel rod members 55 and 56. The remainder of each guide is defined by the vertical leg 78 of an inverted and reversed L-shaped separate one-piece rod member having the horizontal leg 79 thereof spaced above the upper rod 55. The vertical leg 78 is parallel to the bight member 77, being spaced rearwardly therefrom, and the horizontal leg 79 is directed rearwardly and is joined by a downwardly extended toe portion 80 to the upper rod 55. Each such L-shaped member thus provided is conveniently welded in place, and the spacing between the leg 79 and the adjacent portion of the upper rod 55 provides a second pair of guides 81G and 82G for a purpose to be described.

The manner in which the one-piece flexible belt member 70 is looped through the guides 75G and 76G is best shown in Fig. 4. Thus, the back band portion 71 thereof is stretched between the guides 75G and 76G, and each side portion 72 and 73 affording the waist-encircling belt is passed outwardly about and forwardly around the members 77 and 78, being next reversely looped about the front side of the member 77, next passed through the guide, that is, in between the members 77 and 78 in a rearwardly directed manner, and finally is directed rearwardly about and then forwardly of the member 78. Hence, by slipping and feeding a selected portion of either free end belt portion of the flexible member 70 rearwardly through a guide, the resultant slack will extend, that is, lengthen the back band 71. Conversely, upon shortening the back band 71, say from its extended state 71A, Fig. 6, to its chord state 71C, the resultant slack is taken up by feeding the slack portion through the guide 75G or 76G and lengthening the resultant belt end portion 72 or 73. Such lengthening or shortening of the band 71 allows the medial back portion 50 of the hip-encircling member 22 to be, respectively, moved further away from or closer to the small of the bearer's back, thereby changing the center of gravity of the load relative to the bearer. Of course, by tensioning the waist belt portions 72 and 73 about the waist of the bearer by means of the buckle, the weight of the pack is appropriately stabilized, and it will be recognized that the pack frame is supported primarily on the hips of the bearer where it is most easily borne when loaded and is adapted to pivot on the hips. The back band 71 holds the frame away from contact with the bearer's back whether or not the belt 72-73 is buckled. If the belt 72-73 is made tight, the load is borne primarily by the hips. If the belt 72-73 is opened, the load can be borne by the shoulders as will be explained. By selectively tightening or loosening the belt, the load can be appropriately divided between the shoulders and hips.

The shoulder straps 90L and 90R are afforded by a one-piece flexible strap member 90, Fig. 2, which in the intermediate portion 91B thereof is looped under whichever one of the transverse rod members 35 of the main frame suits the bearer for comfort and load distribution. The free ends of the shoulder strap member 90 are se-

cured to the guides 81G and 82G in the manner shown in Fig. 4. Thus, each free end of the strap 90 is adjustably coupled to the related guide 81G or 82G as follows: Each lower free end portion of the strap 90 is passed under the upper rod member 55 of the yoke-shaped hip member, upward on the inside thereof and on the inside of the leg member 79, then is passed over the top of member 79 and in between the members 55 and 79, that is, into the guide 81G or 82G from the outside of the leg member 79, and finally is reversed on itself under the adjacent portion of the rod member 55 and upwardly on the outside of the guide. It will be realized from the showing in Fig. 2 that the strap 90 is capable of passing back and forth and resultantly that the left and right-hand shoulder straps 90L and 90R are capable of lengthening and shortening much in the nature of a pulley belt, on the transverse member of the main frame on which it plays, accordingly as the bearer finds it necessary to shift his torso from one side to the other. It is important to point out, however, that the shoulder straps primarily balance the load when the waist belt is tight.

It will be seen from the foregoing that the present invention affords a relatively inexpensive pack frame including an upright member and a hip-encircling member. Both members are fabricated from light-weight rod material, and hence are capable of being shaped to suit the bearer, and afford wide open areas assuring ample ventilation. The hip-encircling member carries substantially the entire load of the pack, thereby relieving strain on the shoulders of the bearer. Because of the adjustable association of the back band, which is looped through slot-defining means in the hip-encircling member, the load can be shifted toward or away from the bearer's back. The shoulder straps are afforded by a one-piece strap member which has a flexible free-running connection to the pack frame and which has free ends looped through slot-defining means in the hip-encircling member, and hence the shoulder straps are capable of free play. The bottom of the main frame of the upright is formed with a ledge on which a portion of the pack is adapted to repose, and the bottom of the upright is designed for removable attachment of the hip-encircling member thereto. The pack frame is capable of easy adjustment to the posture of the individual and permits free movement of the individual's torso, and the upright is capable of carrying many different kinds of loads and packs.

Hence, while I have illustrated and described the preferred embodiment of my invention, it is to be understood that this is capable of variation and modification, and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. In a pack frame adapted to be borne on a person's

back, means affording a primary frame including spaced elongated upright bendable members and spaced transverse bendable members secured to said uprights, said transverse members having means thereon for lashing the pack to the rear side of the frame, an auxiliary bracing frame mounted on the first-named frame and having elongated uprights disposed in spaced parallel relation to the first-named upright, the first-named frame having a rearwardly projecting ledge means at the lower end thereof and the lower end of the bracing frame having a portion projected below said ledge means, a bowed hip member having a looped connector freely telescoped over the projected lower end of the bracing frame, said hip member having a pair of attaching arms with attaching tongues hooked into place between said uprights and detachably holding said hip member in place on said frames, said hip member including a pair of forwardly extended arcuate arms adapted to span the small of the bearer's back and the bearer's hips, a one-piece belt having a band portion stretched between said arcuate arms and having free portions for girdling the bearer's waist, intermediate portions of said belt being freely looped to the forward ends of said arms enabling the band portion thereof to be adjusted between a chord and any selected arc, and a one-piece flexible strap having a central bight portion loosely engaging one of said transverse members and secured at the opposite free ends thereof to said arcuate arms to afford a pair of shoulder straps.

2. In a pack frame adapted to be borne on a person's back, means affording a frame and means on the frame enabling a pack to be lashed thereto, said frame including spaced generally parallel elongated uprights at each side of the frame, a bowed hip member having a looped connector freely and removably telescoped over the lower end of said frame, said hip member having a pair of attaching arms with attaching tongues hooked into place between the spaced uprights on both sides of the frame and detachably holding said hip member in place on said frame, said hip member including a pair of forwardly extended arcuate arms adapted to span the small of the bearer's back and the bearer's hips, a belt having a band portion attached to and stretched between said arcuate arms and having free end portions for girdling the bearer's waist, and a strap connected to the frame and to said arcuate arms and affording a pair of shoulder straps.

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