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(54) A rucksack.

(57) In order to adjust the distance between the scapula pads (18) and the lumbar pad (15) so that the rucksack will fit confortably on users of different torso length, the scapula pads (18) are mounted on a transverse plate (16) which is slideable on vertical frame members 13, e.g. by means of runners (17). The scapula pad position can thus be adjusted steplessly and also quickly and easily whilst the rucksack is actually on the user's back. Optional dependent straps (19) facilitate adjustment by the user him/herself.

The position of pads (24) on the hip belt (23) may also be adjusted to suit users of different physical build.

Fig. 1

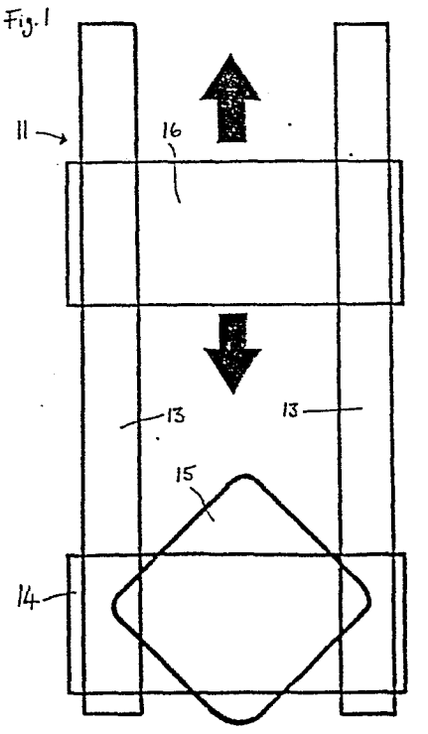

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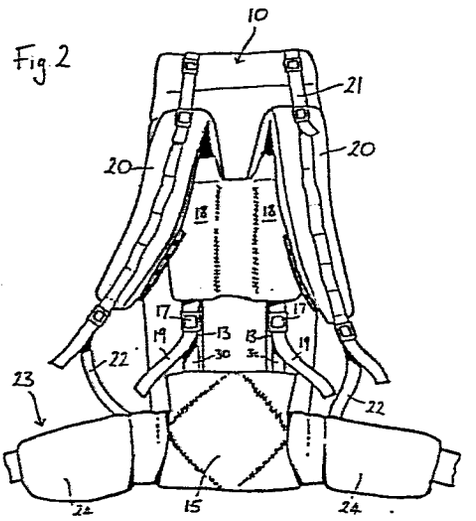
Fig. 2



A RUCKSACK

This invention relates to a rucksack comprising a fabric sack, a substantially rigid frame a part of which is fitted to the sack by projecting into pockets on the sack, and an adjustable harness including a length-adjustable back rest portion, shoulder straps and a hip belt.

The back rest portion includes a lumbar pad and at least one scapula pad for the comfort of the wearer. When a loaded rucksack is fitted correctly to a user's back about 70% of the load should be transmitted through the hip belt, as this is the most comfortable and efficient way for a load to be borne. Accordingly the main function of the scapula pads is just to maintain the stability of the load. The shoulder straps are adjusted to ensure that the load is supported as close as possible to the wearers back because this is the most efficient way for a person to carry a heavy load.

It will be appreciated from the foregoing that it is extremely important, for reasons of both comfort and

efficiency of load carrying, to get the distance between the lumbar pad and the scapula pad to correspond correctly to the"torso length" of each individual rucksack user. In the past rucksacks have simply been made in a range of "torso length" sizes. Recently, however, two types of rucksacks have come onto the market which are adjustable as regards torso length. These so-called 'one-size' rucksacks have the commercial advantage over previous types of reduced stock investment by retailers. Moreover, of course, they are attractive to hikers because they can be comfortably and efficiently used by more than one person, young growing people can adjust their sacks to suit as they grow, and the rucksacks can more easily be resold.

One of the known types of rucksack in which the distance between the scapula pads and the lumbar pad can be varied has a generally V-shaped configuration of the scapula pads (which also form the upper parts of the shoulder straps), with a single strap extending down from the apex of the V and attached thereto by a fastener. This strap goes down the centre of the back of the sack behind a series of transverse webs sewn onto the sack in the configuration of a ladder. When it is desired to raise or lower the scapula pads the fastener can be undone and reattached to the strap between a higher or lower pair of webs.

Accordingly, only incremental adjustment is possible. Morover it is rather a fiddly operation and it certainly cannot be done while the sack is actually on the user's back.

In the other known rucksack with provision for torso length adjustment there is a sachet-like strip attached down the back of the sack. The position of the scapula pads, which are mounted on a plate is varied by selective engagement of a ring member in one of a series of vertically arranged notches in the sachet-like strip. Again, adjustment cannot be accomplished while the sack is on the user's back. Moreover, this arrangement has the added disadvantage that the position of the scapula pads can only be varied by pre-determined intervals. In other words their position is only incrementally variable.

The main object of the invention is provision of a rucksack of the type set forth in the opening paragraph in which the back rest portion of the harness (comprising scapula and lumbar pads) is, lengthwise, steplessly or non-incrementally adjustable in a quick and simple manner while positioned on a user's back.

It should be noted that in the known rucksacks the hip belts can be varied in length in conventional

manner by means of one or more buckles. However, no provision is made for altering the position of the padding on the hip belt to suit people of different anatomy i.e. different sex and different girth.

Accordingly, a secondary object of the present invention is provision of a fully adjustable rucksack hip belt which can be readily altered to fit users of different build with optimum comfort.

The main object of the invention is achieved in that the frame is formed by at least one substantially rigid frame a part of which is fitted to the sack by projecting into pockets on the sack, and an adjustable harness including a length-adjustable back rest portion, shoulder straps and a hip belt, characterised in that the frame is formed by at least one substantially vertical bar and a transverse plate which is slideable on the bar, and in that the back rest portion includes at least one scapula pad which is arranged on the slideable plate.

The plate is advantageously mounted on at least one runner which is in direct sliding contact with the vertical bar so that it may be selectively moved to any location on the bar.

To facilitate downward adjustment of the plate position by the user him/herself while the rucksack is on the user's back, dependent straps are preferably provided on the plate or the runner respectively whereby these may be pulled downwards.

With the proposed arrangement stepless vertical adjustment of the scapula pads of over 11cm can be achieved.

The frame preferably also includes a lumbar plate attached to the sack below the slideable belt for attachment of the lumbar pad of the back rest. In the preferred embodiment of the invention there are two vertical bars in the frame and the slideable plate and the lumbar plate extend between these and serve to brace the bars apart. The lumbar plate may be connected to the vertical bars but this is not essential. Indeed, in the preferred embodiment the lumbar plate is simply attached to webbing pockets in which the lower ends of the vertical bars are located.

The most favourable shape for the lumbar pad is diamond-shaped (when considered with reference to the upright rucksack) as this fits neatly into the concavity of the lumbar area of the wearer and minimises pressure

on surrounding muscles. It acts to support the spine as does a weight lifters belt, and gives maximum comfort.

The secondary object of the invention is achieved in that the hip belt comprises further flexible plates on which hip pads are mounted, these further plates being adjustably attached to the respective sides of the lumbar plate so that the positions of the hip pads can be varied as desired for optimum comfort of the user.

The aforesaid adjustable attachment of the further plates may conveniently be achieved by the lumbar plate having apertures at each side and the plates of the hip belt each having a series of corresponding apertures so that they can be selectively connected to the lumbar plate at different positions by means of fasteners projecting through respective aligned apertures.

The hip pads are thus adjustable as regards their position lengthwise of the hip belt and also as regards their angular position. Overall, a length adjustment of the hip belt of about 16cm may be achieved with the aforesaid arrangement. In general, as waist size decreases, the angle of hip inclination increases.

The proposed hip belt can be adjusted to a wide variety of pelvic shapes and can be satisfactorily fitted to 95% of male and female users.

The most favourable material for the slideable plate, the lumbar plate and the hip belt plate, all of which should be somewhat flexible, has been found to be polypropylene.

The invention will be described further, by way of example, with reference to the accompanying drawings, in which:-

Fig. 1 is a simple diagram of the frame and lumbar pad of a preferred embodiment of the rucksack of the invention;

Fig. 2 is a detailed rear view of a preferred embodiment of the rucksack of the invention, with the ends of the hip belt broken away;

Fig. 3 is an enlarged perspective view illustrating one vertical bar and two runners of the rucksack of Fig. 2 with the slideable plate removed;

Fig. 4 is an enlarged perspective view illustrating the scapula pads of the rucksack of Fig. 2 mounted on the frame;

Fig. 5 is a diagrammatic plan view illustrating the position of the scapula pads when the rucksack of Fig. 2 is properly fitted on a user's back;

Fig. 6 is a diagrammatic side view of the rucksack of Fig. 2; and

Fig. 7 is an enlarged exploded perspective view illustrating the means of adjustment of the hip pads on the hip belt of the rucksack shown in Fig. 2.

As best shown in Fig. 6, a preferred embodiment of the rucksack of the invention comprises a fabric sack 10, a substantially rigid frame 11 and an adjustable harness 12. The frame 11 consists of a pair of flat aluminium bars 13 which are arranged substantially parallel and vertical on the exterior rear wall of the sack 10 by projecting into appropriately positioned webbing pockets (not shown) formed at the top and bottom of that wall. The bars 13 may also extend behind a number of strips of retaining webbing and they are, of course, removable from the sack 10. The frame 11 also includes a polypropylene lumbar plate 14 which extends across the lower portions of the bars 13, e.g. by being held in position by the stitching of the lower webbing pockets. A diamond-shaped lumbar pad 15 is

mounted centrally on the lumbar plate, as shown in Fig. 1. A third element of the frame 11 is another polypropylene transverse plate 16 which is located above the lumbar plate 14 and is slideably mounted between the bars 13. This is also shown in Fig. 1.

Each bar 13 functions as a rail for two runners 17, the upper of which at each side is attached to the plate 16 by means of webbing. This webbing extends downwards at each side as a lower strap 30 which is attached to the sack and is length-adjustable by means of a buckle (not shown). A pair of scapula pads 18 are attached to the slideable plate 16, as shown in Figs. 2 and 4. Additional webbing straps 19 connect the two runners 17 at each side and the ends of the straps 19 hang down at a convenient height where they can be grasped by someone wearing the rucksack so as to cause the scapula pads 18 on the plate 16 to slide downwards to a comfortable position on the wearer's back. The runners 17 are a snug fit on the respective aluminium bars 13 so that they will slide therealong when force is applied, but otherwise will sit firmly at any desired position along the respective bars 13.

The harness 12 includes padded shoulder straps 20 which extend from the top of the scapula pads 18,

as shown in Figs. 2 and 6. These are attached to the top of the rucksack by adjustable top balancer straps 21 whereby the load may be brought as close as possible to the wearer's shoulder blades for maximum efficiency of load transmission. The padded straps 20 are also attached to base of the rucksack in the conventional manner by means of adjustable webbing straps 22.

At the base of the sack, the harness 13 is completed by provision of a hip belt 23 extending from each side of the lumbar plate 14. At each side of the lumbar plate 14, a hip pad 24 is supported on a further polypropylene plate 25 which is adjustably connected to the lumbar plate 14. The manner of adjustment is clearly shown in Fig. 7. There are two apertures 26 one above each other adjacent each end of the lumbar plate 14. The further hip belt plates 25 each have two rows of apertures 27 of similar size to the apertures 26. When the apertures 26 at each side of the lumbar plate 14 are aligned with respective selected pairs of apertures 27, the hip belt plates 25 can be attached to the lumbar plate 14 by means of quarter-turn fasteners or pegs 28 projecting through the aligned apertures 26, 27 and being turned for securement. In this way both the length of the belt 23 and the angle of the pads 24 may be varied. The hip belt pads 24 may be attached together, e.g. by means of a Velcro (regd. Trademark) strip, between the

lumbar pad 15, and the lumbar plate 14. The hip belt plates 25 are attached to the sack by bottom balance straps 29.

All the plates, namely the slideable plate 16, the lumbar plate 14 and the hip belt 25 are made of polypropylene.

The operation of the above-described arrangement will readily be understood. When a rucksack is to be fitted onto a user's back for maximum comfort and load transmission efficiency, the top balancer straps 21 and the lower straps 30 are loosened and thes slideable plate 16 and scapula pads 18 are pushed to an upper position on the bars 13. The user then puts the rucksack onto his/her back with arms under (through) the shoulder straps 20, 22. The user then reaches back at each side, graps the dependent straps 19 and pulls the scapula pads 18 down to a comfortable position. Therunners, of course, allow this by sliding down the bars 13. The position of the pads 18 on the user's back is shown in Fig. 5. Free circulation of air is allowed between the pads 18 and this improves the wearer's comfort during long journeys. The position of the plate 16 and pad 18 is stabilised by the tightening of the straps 30.

It will be appreciated that the aforesaid adjustment in the length of the back rest portion of the rucksack, i.e. in the distance between the lumbar pad 15 and the scapula pads 18, by the lowering of the scapula pads 18 on a slide is an extremely quick and simple operation. Moreover, it is especially advantageous in being possible while on the wearer's back and in being a step-less adjustment so that most accurate fitting can be achieved. A torso length adjustment of over 11cm is possible.

The length of the balancer strap 21 and the shoulder strap 22 can subsequently be adjusted in conventional manner by the respective buckles.

The length of the hip belt 23 and the angle of the hip pads 24 can also be adjusted to suite the build and girth of the wearer, but this can only be done by trial and error with the wearer taking the rucksack off for disconnection of the hip belt plates 25 from the lumbar plate 14, re-aligning of the apertures 26, 27 and re-fastening in the new position. Overall a length adjustment of about 16cm is possible.

The invention is not limited to the details of the illustrated embodiment and variations may be made.

within the scope of the claims. In particular, there may be only one vertical bar in the frame instead of two, and the bar or bars may be permanently attached to the sack.

PATENT CLAIMS

1. A rucksack comprising a fabric sack (10), a substantially rigid frame (11) a part of which is fitted to the sack (10) by projecting into pockets on the sack (10), and an adjustable harness (13) including a length-adjustable back rest portion, shoulder straps (20) and a hip belt (23), characterised in that the frame (11) is formed by at least one substantially vertical bar (13) and a transverse plate (16) which is slideable on the bar (13), and in that the back rest portion includes at least one scapula pad (18) which is arranged on the slideable plate (16).

2. A rucksack as claimed in claim 1 wherein the plate (16) is slideable on the bar (13) by means of at least one runner (17).

3. A rucksack as claimed in claim 1 or 2 wherein dependent straps (19) are provided on the slideable plate (13) or the runners (17) respectively so that a user can easily lower the scapula pads (18) to a position of optimum comfort while the rucksack is on the user's back.

4. A rucksack as claimed in claim 1, 2 or 3 wherein the frame (11) includes a lumbar plate (14) attached to the sack (10) below the slideable plate (16) and the back rest portion includes a lumbar pad (15) arranged on the lumbar plate (14).

5. A rucksack as claimed in claim 4 wherein the lumbar pad (15) is, in its normal orientation in use, substantially diamond-shaped.

6. A rucksack as claimed in claim 4 or 5 wherein the frame (11) includes two substantially parallel bars (13) and both the slideable plate (16) and the lumbar plate (14) extend between and brace apart these bars (13).

7. A rucksack as claimed in claim 4, 5 or 6 characterised in that the hip belt (23) comprises further flexible plates (25) on which hip pads (24) are mounted, these further plates (25) being adjustably attached to the respective sides of the lumbar plate (14) so that the positions of the hip pads (24) can be varied as desired for optimum comfort of the user.

8. A rucksack as claimed in claim 7 wherein the lumbar plate (14) has apertures (26) at each side and

the plates (25) of the hip belt (23) each have a series of corresponding apertures (27) so that they can be selectively connected to the lumbar plate (14) at different positions by means of fasteners (28) projecting through respective aligned apertures (26, 27).

9. A rucksack as claimed in any preceding claim wherein the plate or plates (14, 16, 25) is/are made of flexible polypropylene.

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Fig. 1

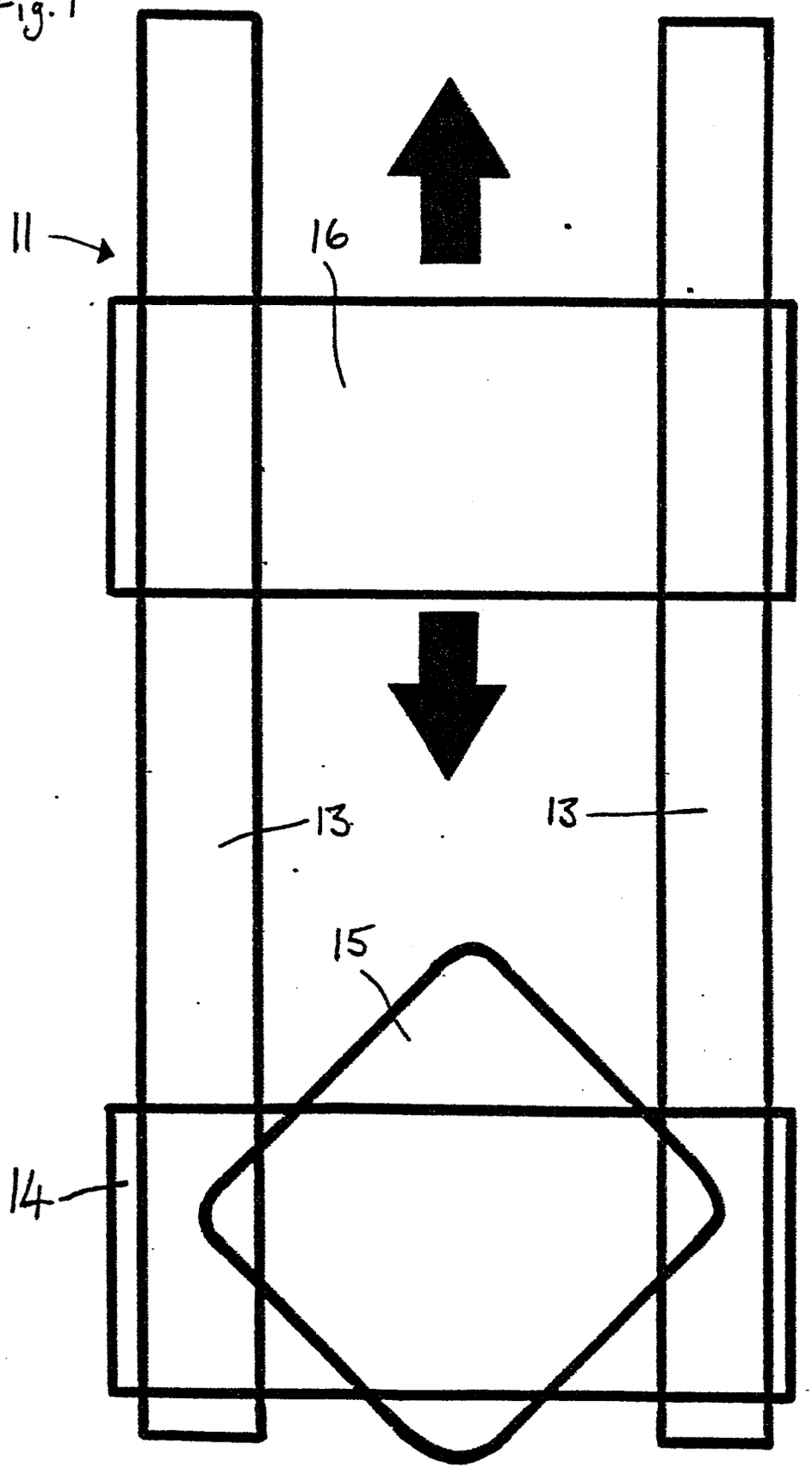


Fig. 2

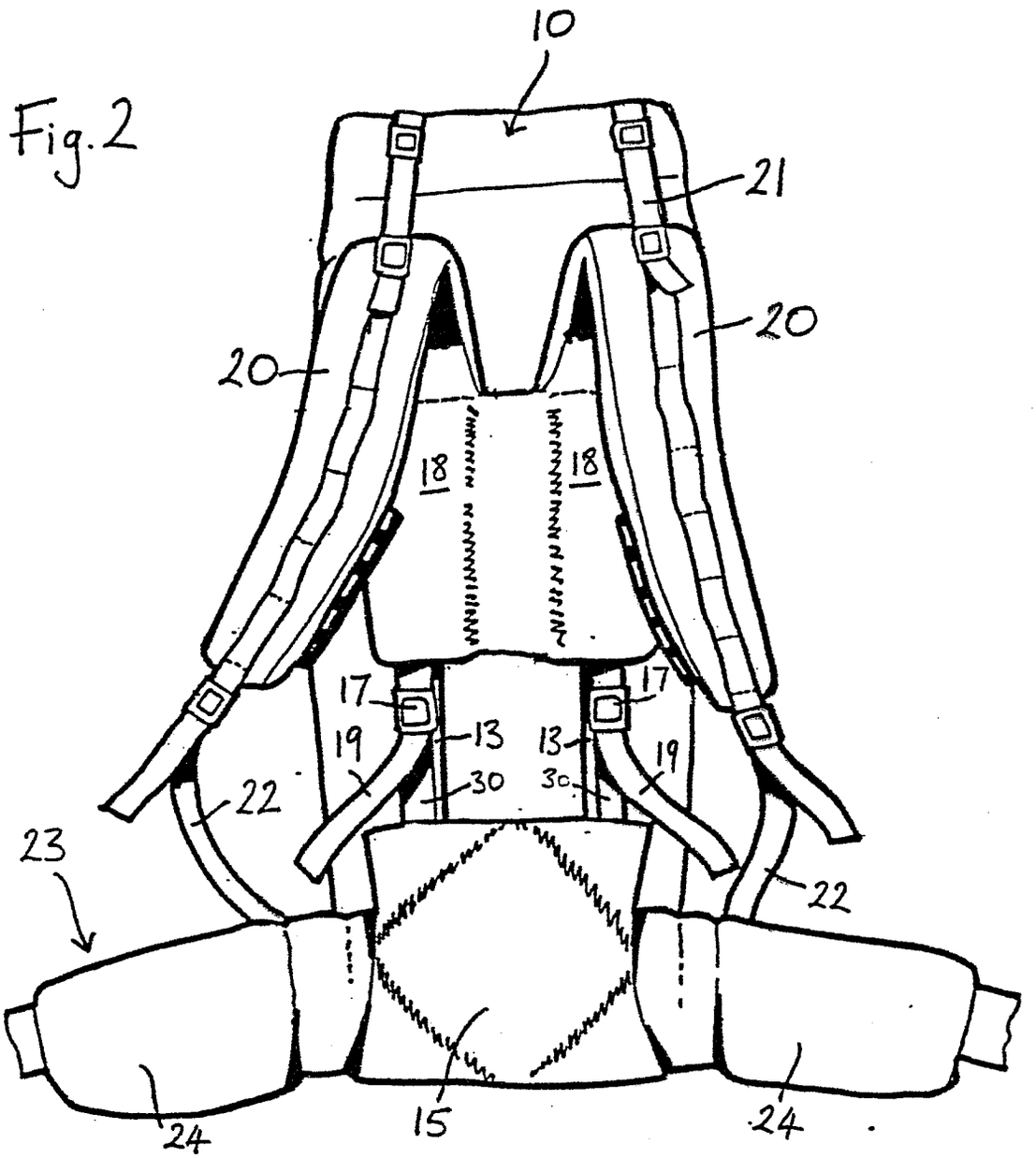


Fig. 3

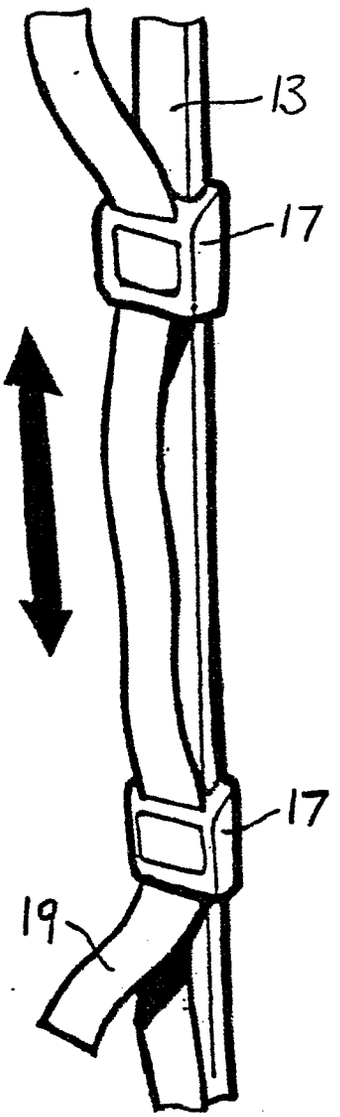
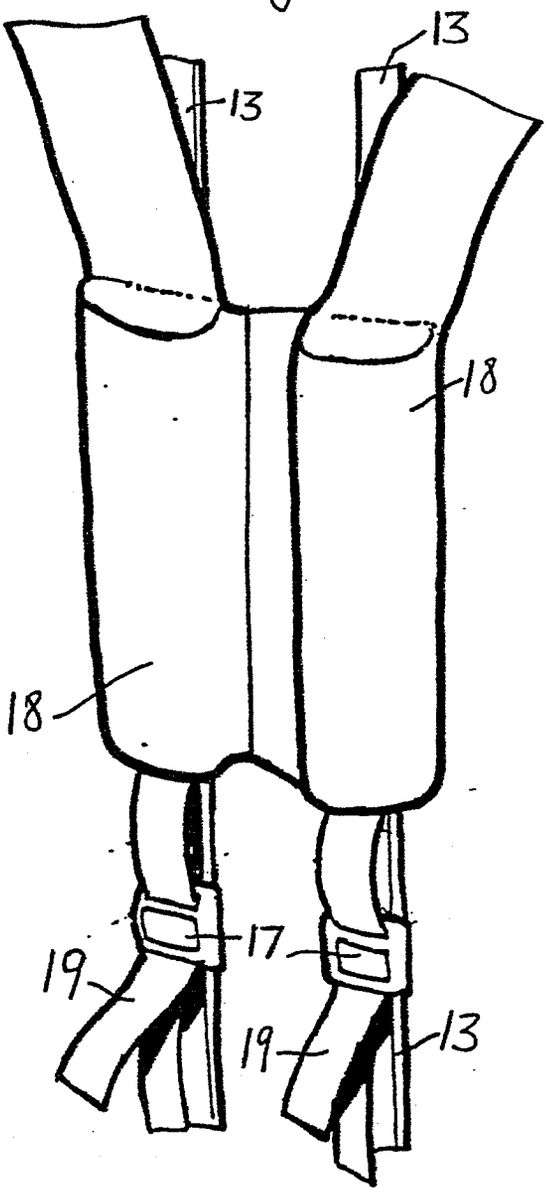


Fig. 4



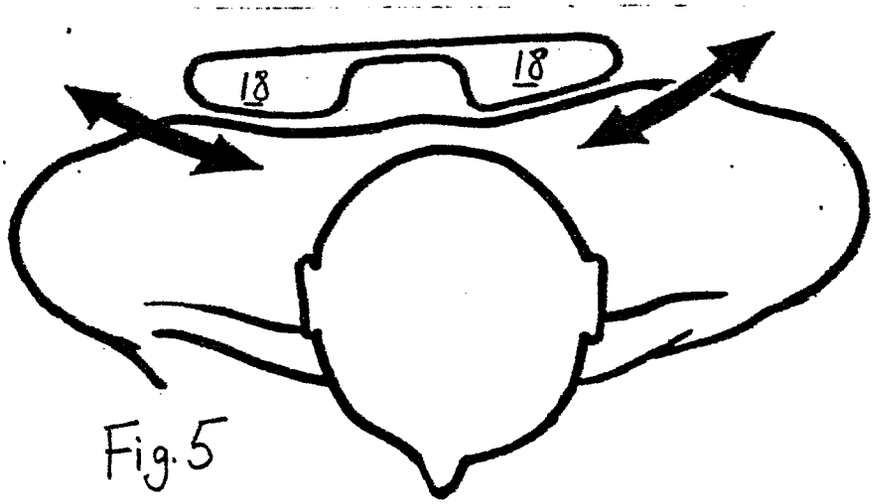
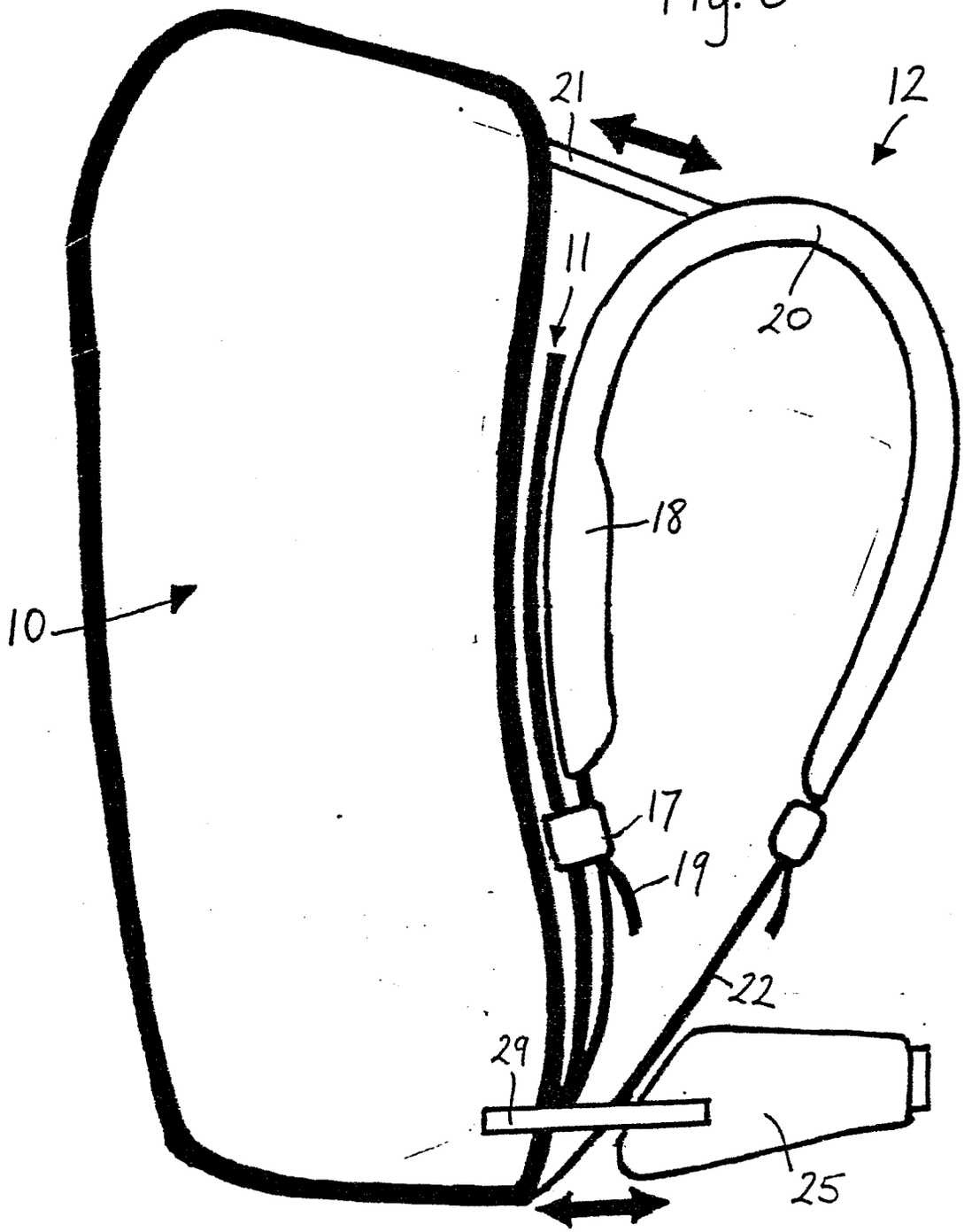


Fig. 5

Fig. 6



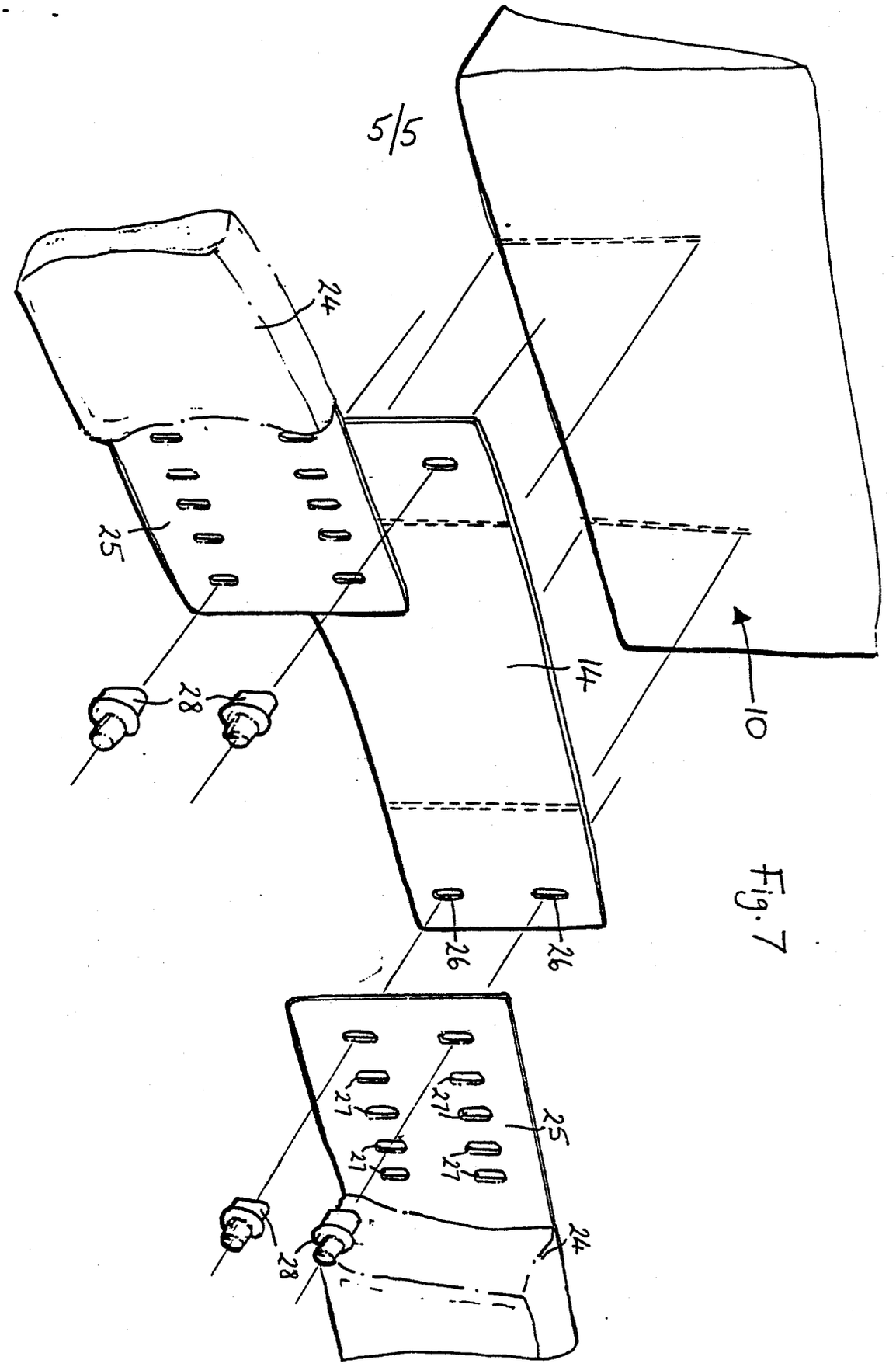


Fig. 7