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(71) Applicant: **Clark, David Francis**
Pepperpot Cottage Rough Lane
Broseley Shropshire(GB)
 Applicant: **Anderson, Alison Elizabeth**
Pepperpot Cottage Rough Lane
Broseley Shropshire(GB)
 Applicant: **Davison, George Gordon**
24 Low Gosforth Court Melton Park
Gosforth Newcastle upon Tyne(GB)

(72) Inventor: **Clark, David Francis**
Pepperpot Cottage Rough Lane
Broseley Shropshire(GB)
 Inventor: **Davison, George Gordon**
24 Low Gosforth Court
Newcastle-upon-Tyne NE3 5QU(GB)

(74) Representative: **Wallbank, Roger Wickham et al**
BARKER, BRETTELL & DUNCAN 138 Hagley
Road
Edgbaston Birmingham, B16 9PW(GB)

(54) **Back-packs.**

(57) A back-pack comprises a load-carrier (1) and a waist fitment (2) which can be secured around a user's waist. The load-carrier is attached to the waist fitment in such a manner that its height can be adjusted relative to the waist fitment. To this end the load-carrier is provided with rails (8) which extend through clamps (22) on the waist fitment; this locates the load-carrier relative to the waist fitment but enables it to be moved vertically relative to the waist fitment. Clamping straps (12) made from relatively rough textile material are attached at their ends to the load-carrier and extend adjacent to the rails. The clamping straps also extend through the clamps. Each of the clamps can be moved between clamping state, in which it grips the clamping strap to prevent adjustment of the load-carrier relative to the waist fitment, and a release state in which it does not so act. The anchorage for shoulder straps (3) of the

back-pack may be made adjustable in a similar manner.

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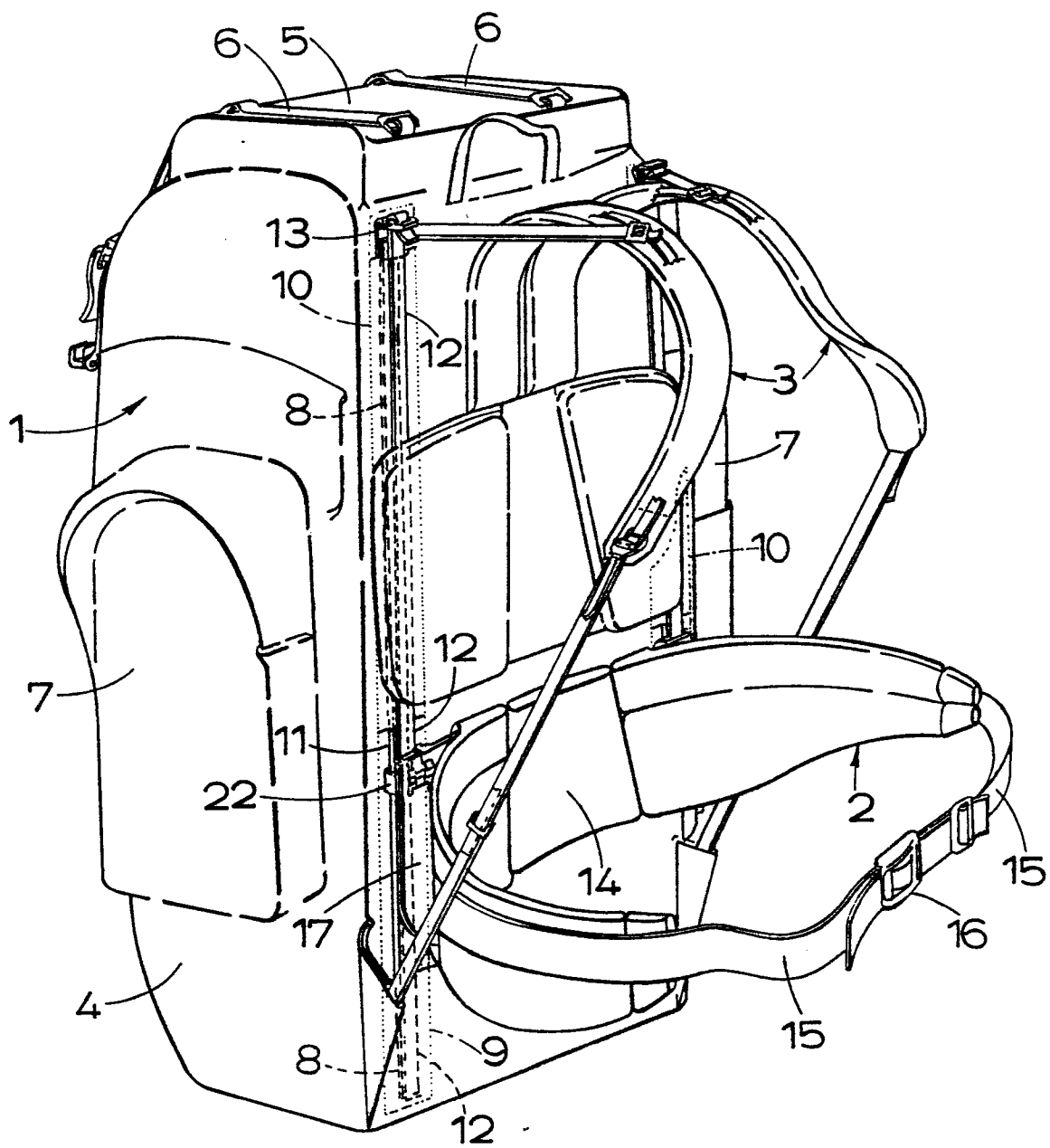


FIG.1.

BACK-PACKS

This invention relates to back-packs.

One widely-used form of back-pack comprises a load-carrier with shoulder straps and a waist strap for enabling a user to secure the load-carrier on his or her back. In the great majority of back-packs of that form the waist strap is permanently attached to the load-carrier, near the bottom of the load-carrier, so that when the user fits the waist strap round his or her waist and secures it in place, the position of the load-carrier is thereby determined. The length of the shoulder straps must then be adjusted to suit the build of the particular user. While this arrangement is often satisfactory it does preclude any but a limited adjustment of the vertical location of the load-carrier relative to any particular user's back, for adjustment is only possible by shifting the vertical position of the waist strap so that it is a little above or below the user's true waist. In order to enable vertical adjustment of the load-carrier to be effected it has been proposed to arrange for the waist strap to be attached to the load-carrier in such a manner that its vertical position relative to the load-carrier can be adjusted. One aim of the present invention is to provide an improved arrangement for enabling such adjustment to be carried out.

To this end the present invention, from one aspect, consists in a back-pack comprising a load-carrier and a waist fitment which can be secured around a user's waist, the load-carrier having generally upright rail means locating the load-carrier relative to the waist fitment and slidable lengthwise relative to the waist fitment to enable the height of the load-carrier to be adjusted relative to the waist fitment, the back-pack also including locking means which can be moved between a locking state in which it acts to prevent the vertical position of the load-carrier being adjusted relative to the waist fitment and a release state in which it does not so act.

It is to be understood that in this description - (except when otherwise specifically stated) the back-pack is described in an orientation it is likely to assume in normal use when attached to a user who is standing upright, so that terms such as upright and height must be construed accordingly.

The rail means preferably extends through the locking means, whereby the locking means is located relative to the rail means.

The back-pack may also include shoulder-straps which in use extend forwards over the user's shoulder from a place where the shoulder straps are anchored to the load-carrier, the anchorage being such that the height of the load-carrier can be adjusted relative to the anchorage. The an-

chorage of the shoulder straps is preferably located relative to the load carrier by said rail means and is slidable lengthwise of the rail means. Thus, the same rail means preferably serves to locate both the waist fitment and the anchorage for the shoulder straps. There may be additional locking means which can be moved between a locking state in which it acts to prevent the vertical position of the load-carrier being adjusted relative to the anchorage for the shoulder straps and a release state in which it does not so act. The rail means preferably extends through the additional locking means, whereby the additional locking means is located relative to the rail means.

The locking means or at least one of the locking means (in the case of there being additional locking means) is preferably operative in its locking state to clamp against clamping strap means attached to the load-carrier. The clamping strap means may comprise a single clamping strap or two or more clamping straps. The clamping strap or each clamping strap preferably extends vertically of the load-carrier and is anchored to the load-carrier at both ends. Preferably at least one surface of the clamping strap, or of each clamping strap, is not smooth, the locking means clamping against the non-smooth surface or at least one of the non-smooth surfaces when in its locking state. Conveniently the clamping strap means comprises at least one textile strap presenting a non-smooth surface for engagement by the locking means. The clamping strap means preferably extends closely adjacent to the rail means.

The locking means preferably comprises a clamp operative to clamp the clamping strap means against a backing and comprising a pivoted operating lever and a pressure flap disposed between the backing and a bearer which forms part of the operating lever, the arrangement being such that as the operating lever is turned from a release position towards a locking position the bearer presses on one side of the pressure flap, thereby pressing the pressure flap towards the backing whereby it can clamp against the clamping strap means disposed between the pressure flap and the backing. The backing may form part of the clamp.

It is to be understood that a clamp of this kind may be used for other purposes. Therefore, from another aspect the present invention provides a clamp operative to clamp a strap or other article against a backing and comprising a pivoted operating lever and a pressure flap disposed between the backing and a bearer which forms part of the operating lever, the arrangement being such that as the operating lever is turned from a release posi-

tion towards a locking position the bearer presses on one side of the pressure flap, thereby pressing the pressure flap towards the backing whereby it can clamp against a strap disposed between the pressure flap and the backing.

An embodiment of the present invention will now be described in more detail, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 is a perspective view of a back-pack embodying the present invention;

Figure 2 is a perspective view of a mounting plate incorporated in the waist fitment of the back-pack shown in Figure 1, and one of a pair of clamps supported by the mounting plate;

Figure 3 is a composite perspective view, to a larger scale than that of Figure 2, of three components which can be assembled to form one of said clamps;

Figure 4 is a cross-section through the clamp of Figure 3, partially assembled, and

Figure 5 is a perspective view from the other side of part of the mounting plate shown in Figure 2, and a clamp supported in the mounting plate.

The back-pack illustrated in Figure 1 is largely of conventional form in that it comprises a load-carrier 1, a waist fitment 2 and shoulder straps 3. The load-carrier 1 comprises a container 4, made principally of textile material lined with a waterproof material. The open top of the container can be closed by a cover flap 5 which can be secured in its closed position by straps 6. Pockets 7 are provided on the sides of the container. It is to be understood that any of a wide variety of other load-carriers could equally well be employed in place of the load-carrier illustrated.

Secured to the front of the load-carrier 1 are a pair of parallel rails 8 which, in use, extend in a generally upright direction. End portions of the rails are attached to upper and lower parts of the container, but the remaining, intermediate parts of the rails are not attached to the container, although in normal use they generally lie against or close to the front of the container 4. Each rail 8 comprises a strip of aluminium alloy and although it is sufficiently stiff to prevent it bending to any significant extent when the back pack is in normal use its capable of being deliberately bent, in a forward or backward direction, though not sideways, so as to conform with the shape of the user's back. The rails could of course be made of any other suitable material, such as a plastics material, if desired.

A lower end portion of each of the rails 8 is housed in an associated fabric pocket 9 provided on the front of the load-carrier 1. Each pocket 9 is open only at the top so that the rail concerned is prevented from downward movement relative to the load-carrier. An upper portion of each of the rails 8

is housed in an associated fabric sleeve 10 provided on the front of the load-carrier. Each sleeve 10 is open at both the top and the bottom so as to enable the associated rail to be inserted into the sleeve from the top and to be pushed downwards until the lower end of the rail leaves the bottom of the sleeve and the lower end portion of the rail eventually enters the associated pocket 9 and becomes lodged in the pocket (not shown). When the rails 8 are in place, intermediate portions 11 thereof, between the pockets 9 and the sleeves 10 are exposed at the front of the carrier.

A clamping strap 12 is disposed in front of each of the rails 8. Each strap 12 is of the same width as the rail and made of a woven material so that its surface is relatively rough as compared with the flat, smooth surface of the associated rail. A lower end portion of each strap 12 is sewn into the associated pocket 9 which also houses the lower end portion of the associated rail 8. The strap then extends upwards immediately in front of the exposed intermediate portion 11 of the rail. From there it extends upwards in front of the associated sleeve 10, and its upper end portion is releasably secured to a buckle 13 which is permanently secured, by means of a short anchorage strap, to the front of the load-carrier immediately above the level of the top of the sleeve 10. When the clamping strap is tightly buckled in place, the anchorage strap extends over the top of the rail so as to prevent upward movement of the rail relative to the load-carrier. To prevent abrasion of the anchorage straps, a cap made of plastics material is preferably fitted on the top of each rail. If, for any reason, it is desired to remove and replace a rail, this can readily be done once the clamping strap has been released from the buckle.

Other arrangements (not illustrated) are of course possible. For example, the rails may be secured by sewing up the top of the sleeves 10 after insertion of the rails. Removal can then be effected only by unpicking the stitching. Each clamping strap could be attached permanently to its associated rail; for example the straps and rails could be riveted together at their ends. In an alternative construction each clamping strap and its associated rail are riveted or otherwise permanently secured together at their lower ends only, while at its upper end each strap is releasably attached to the container 4. For this purpose an upper end portion of the strap and an adjacent portion of the container may be provided with strips of co-operating material of the kind marketed under the Registered Trade Mark "Velcro", one strip presenting a pile of upstanding loops and the other presenting a pile of resilient, upstanding hooks.

The waist fitment 2 is attached to the rails 8 in such a manner as to permit relative vertical adjustment between the waist fitment and the load-carrier 1. The major part of the waist fitment 2 comprises a padded band 14 with a flexible strap 15 extending beyond each end. The free ends of the straps 15 carry the components of a releasable buckle 16, the position of at least one of the components being adjustable along its strap so as to enable the fitment to be worn by users of different girths. In use the waist fitment is fitted round the user's waist with the padded band 14 at the back and extending round the sides of the user and with the straps buckled together at the front of the user. The waist fitment 2 also includes a mounting plate 17 made as a unitary moulding of a plastics material such as polypropylene. A central part 18 of the plate 17 is in the shape of a trapezium. It is of uniform thickness and is relatively flexible. If desired it may be formed with one or more apertures. The central part 18 is attached to a central part of the padded band 14 so that in use it is disposed, with its main plane upright, behind a part of the band that lies in the small of the user's back. The central part 18 is housed in a horizontally extending tubular pocket in the band, with edge portions 19 of the plate projecting from the pocket. Lines of sewing across the ends of the pocket extend through the plate 17 and secures it permanently to the waist fitment. In an alternative arrangement the back of the pocket comprises two fabric flaps interconnected by a horizontally extending zip which can be opened to enable the plate to be inserted and can be closed to secure the plate in the pocket.

Each of the edge portions 19 of the plate 17 is provided on its rear surface with an array of forwardly projecting stiffening ribs 20, as shown in Figure 5. Near the lower end of each edge portion 19 is a through hole 21 which houses a clamp 22 constituting locking means.

In the fully assembled back-pack each of the rails 8 extends through a passageway 23 in an associated one of the two clamps 22 so that it is held adjacent to the rear surface of the mounting plate 17. The cross-sectional shape of each passageway 23 is such that the associated rail is a sliding fit in the passageway. From the description of the back-pack given so far it will be appreciated that the position of the load-carrier, with its rails, can be adjusted relative to the position of the waist fitment by sliding the rails up or down through the passageways 23 in the two clamps. There follows a description of the clamps and the manner in which they can be used to secure the load-carrier against further movement relative to the waist fitment once it has been adjusted to the desired position.

For convenience of description the clamp is described in the orientation shown in Figures 3 and 4, and terms such as base and upstanding are to be construed accordingly. As will be apparent, however, the clamp assumes a different orientation when incorporated in a back-pack worn by a user who is standing upright.

As the two clamps 22 are of similar construction (and indeed are interchangeable) only one will be described in detail. As can be seen from Figures 3 and 4 the clamp comprises an assembly of three components. Each of these components is made as a unitary moulding of a suitable plastics material such as an acetal resin. The three components are a body 24, a lever 25 and a pressure flap 26. The body 24 has a rectangular base 27 with mutually parallel end walls 28 interconnected by upper and lower webs 29 and 30 respectively. These webs are parallel with the base 27 and with each other but are spaced from it. The space bounded by the base 27, the end walls 28 and lower web 30 constitutes the passageway 23. At the upper ends of the end walls 28 are projecting lugs 31. The lever 25 has trunions 32 which can be snapped into bearing grooves 33 formed in the inner faces of the end walls 28 of the body 24. This arrangement enables the lever to be turned about the trunion axis. The lever has an operating tab 34 and a bearer 35, both of which extend radially away from the trunion axis, though in directions at right angles to each other. The pressure flap 26 has trunions 36 which can be snapped into bearing grooves 37 also formed in the inner faces of the end walls 28. The main part of the pressure flap is a blade 38 which extends radially away from the axis of the trunions 36 and overlies the lower web 30 of the body 24. The adjacent faces of the blade 38 and web 30 are formed with ribs 39 which are at different distances from the trunion axis.

When the clamps 22 have been assembled they are inserted into the holes 21 from the front of the plate 17. When they are in position the lugs 31 on their bodies 24 engage recessed portions of the plate bordering the holes 21 and thus prevent the clamps passing through the holes. As can be seen from Figures 2 and 5, holes 21 are in the shape of short tubes of rectangular cross-section bounded or defined by walls extending from front to back of the edge portions 19. The presence of the lowermost of those walls positively prevents the pressure flaps 26 becoming displaced from the bodies 24 after assembly. Wedge-shaped projections 40 on the outer faces of the end walls 28 of the body snap into recesses 41 in the side walls of the holes 21 and temporarily secure the clamps in place.

During assembly of the back-plate, the clamping straps 12 are passed through the associated clamps 22. Each strap extends between lower web 30 and the adjacent blade 38, and between the upper and lower webs 29 and 30. To enable each strap to pass freely between the lower web 30 and blade 38 of its associated clamp it is necessary for the lever 25 to be moved to a release position in which the tab 34 projects at right angles to the plate 17, and the bearer 35 is consequently moved away from the blade 38. Also during assembly of the back-pack the rails are passed through the passageways 23 in the clamps as described above. The presence of the straps and rails, which thus lie immediately behind the plate 17, positively prevents the clamps 22 leaving the holes 21 in the plate. When the clamping straps and rails have been assembled with the clamps in the manner described, the straps are attached to the buckles 13 to prevent disassembly.

As long as the tabs 34 project at right angles to the plate 17, the height of the carrier 1 relative to the waist fitment 2 can be adjusted, merely by shifting the carrier upwards or downwards and thus causing the rails and straps to slide through the clamps. When the load-carrier 1 has been adjusted to the desired position the tabs 34 are rotated to locking or clamping positions in which they are parallel with the plate 17, that is to the position illustrated in Figure 2. As each tab 34 is moved to its clamping position its associated bearer 35 engages the adjacent pressure flap 26 and presses it towards the lower web 30, thereby trapping the strap securely between the pressure flap and the web. The web 30 therefore constitutes a backing of the kind hereinbefore referred to. The ribs 39 on the pressure flap and the web are pressed into the rough surfaces of the strap and ensure a positive grip which strongly resists any longitudinal forces applied to the clamping strap. It will also be noted that if any such longitudinal forces are applied to the clamping strap the resultant forces applied to the clamp are not such as to tend to move the clamp to its release position. Had the clamp been of a simpler construction, with the pressure flap 26 omitted and the bearer 35 of the lever 25 arranged to press directly onto the front surface of the strap, then tension applied to the strap in one direction would have tended to have rotated the lever 25 to its release position. The interposition of the pressure flap 26 between the clamping strap and the bearer overcomes any such tendency.

When the back-pack is in use and it is desired to adjust the height of the load-carrier relative to the waist fitment, the tabs 34 are moved to their release positions, the load-carrier is adjusted to the desired height and the tabs are returned to their clamping positions. In moving to their release posi-

tions the tabs are turned so that they project forwards, in a direction such that they point towards the user's back. As the clamps 22 are spaced laterally away from the centre-line of the back-pack, however, there is normally a gap adequate to receive the projecting tab between the clamp and the adjacent part of the waist fitment.

Among other advantages of the construction described and illustrated are the following. The clamps 22 can be operated simply but are very positive in their action. The clamps are made from relatively few components each of which can be moulded quite easily, their assembly also being simple. When the clamps are installed they are held positively in place and cannot be disassembled until or unless the rails 8 are removed. Nevertheless the whole assembly can be readily disassembled for repair, if that becomes necessary, and no tools are required to effect disassembly and reassembly. The height of the load-carrier relative to the waist fitment is infinitely adjustable. Even in freezing conditions adjustment can be effected, for none of the components is so inaccessible as to become incapable of being freed from ice. Finally, in back-packs of the kind in which the mounting plate 17 can be detached from the waist fitting 2, removal of the load-carrier with its mounting plate and its replacement by another load-carrier provided with an associated mounting plate can be effected simply and quickly.

In the back-pack illustrated, the load-carrier 1 is provided with shoulder straps 3 which in use extend forwards over the user's shoulders and are tightened both to assist in locating the load-carrier and to enable some of the weight to be carried by the user's shoulders. The rear ends of the shoulder straps 3 are permanently attached to the load-carrier 1 in a non-adjustable manner. In consequence, different parts of the straps bear on the shoulders depending on the height-adjustment of the load-carrier and on the user's build. This kind of arrangement is usual in existing back-packs. Although the shoulder straps are well padded over their whole length, however, this arrangement is not always convenient. To afford greater flexibility of use, an arrangement (not illustrated) may be used in which the shoulder straps are attached to the load-carrier in such a manner that the height of the load-carrier relative to the shoulder straps can be adjusted. The adjustment is preferably carried out with the aid of additional clamping means similar to that operative between the load-carrier and the waist fitment. When this is so, the additional clamping means preferably co-operates with the same rails and straps as those with which the clamping means on the waist fitment co-operates.

Whether or not the anchorage for the shoulder straps is adjustable in the manner described, the rails 8 preferably extend for at least most of the height of the load-carrier, as shown in Figure 1, as they assist in stiffening the load-carrier and prevent it from sagging. When the rails are made from aluminium or a similar material they may be bent somewhat, as mentioned above, to accommodate the shape of the user's back.

Various modifications may be made without departing from the scope of the invention, and in particular the locking means and those parts of the load-carrier with which it co-operates may be so arranged that the load-carrier can be locked relative to the waist fitment only in a number of spaced positions. A similar arrangement may be provided for the anchorage of the shoulder straps when the position of the anchorage is adjustable. When such an arrangement is adopted, the locking means or each locking means may be provided with at least one projection which, when the locking means is in the locking state, engages a selected notch or hole in the associated rail or in an associated locking strap which replaces the clamping strap 12. Thus the rail or locking strap, or each such rail or strap, may be formed with vertically spaced notches or holes for this purpose.

Claims

1. A back-pack comprising a load-carrier (1) and a waist fitment (2) which can be secured around a user's waist, characterised in that the load-carrier having generally upright rail means (8) locating the load-carrier relative to the waist fitment and slidable lengthwise relative to the waist fitment to enable the height of the load-carrier to be adjusted relative to the waist fitment, the back-pack also including locking means (22) which can be moved between a locking state in which it acts to prevent the vertical position of the load-carrier being adjusted relative to the waist fitment and a release state in which it does not so act.

2. A back-pack according to claim 1 characterised in that the rail means extends through the locking means, whereby the locking means is located relative to the rail means.

3. A back-pack according to either of claims 1 and 2 which also includes shoulder straps (3) which in use extend forwards over the user's shoulder from a place where the shoulder straps are anchored to the load-carrier, characterised in that the anchorage is such that the height of the load-carrier can be adjusted relative to the anchorage.

4. A back-pack according to claim 3 characterised in that the anchorage of the shoulder straps is located relative to the load carrier by said rail means and is slidable lengthwise of the rail means.

5. A back-pack according to either of claims 3 and 4 characterised in that there is additional locking means which can be moved between a locking state in which it acts to prevent the vertical position of the load-carrier being adjusted relative to the anchorage for the shoulder straps and a release state in which it does not so act.

6. A back-pack according to claims 4 and 5 characterised in that the rail means extends through the additional locking means, whereby the additional locking means is located relative to the rail means.

7. A back-pack according to any one of the preceding claims characterised in that the locking means or at least one of the locking means comprises a clamp, operative in its locking state to clamp against clamping strap means (12) attached to the load-carrier.

8. A back-pack according to claim 7 characterised in that at least one surface of the clamping strap means (12) is not smooth, the clamping means (22) clamping against the non-smooth surface or at least one of the non-smooth surfaces when in its locking state.

9. A back-pack according to claim 8 characterised in that the clamping strap means (12) comprises at least one textile strap presenting a non-smooth surface for engagement by the locking means (22).

10. A back-pack according to any one of claims 7 to 9 characterised in that the clamping strap means (12) extends closely adjacent to the rail means (8).

11. A back-pack according to any one of the preceding claims characterised in that the locking means (22) or at least one of the locking means comprises a clamp operative to clamp the strap means against a backing (30) and comprising an operating lever (25) and a pivoted pressure flap - (38) disposed between the backing and a bearer - (35) which forms part of the operating lever, the arrangement being such that as the operating lever is turned from a release position towards a locking position the bearer presses on one side of the pressure flap, thereby pressing the pressure flap towards the backing whereby it can clamp against a strap (12) disposed between the pressure flap and the backing.

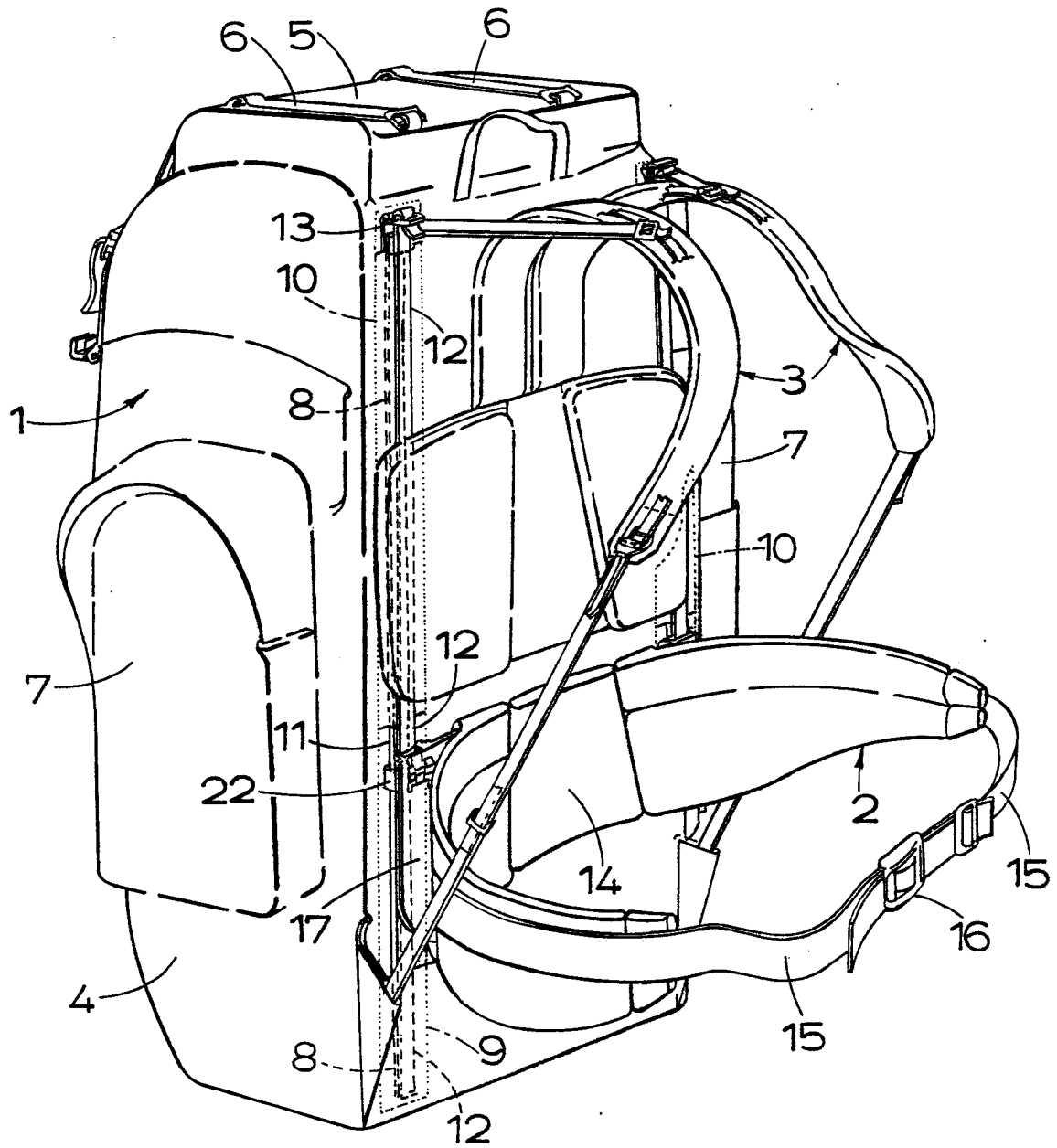


FIG.1.

