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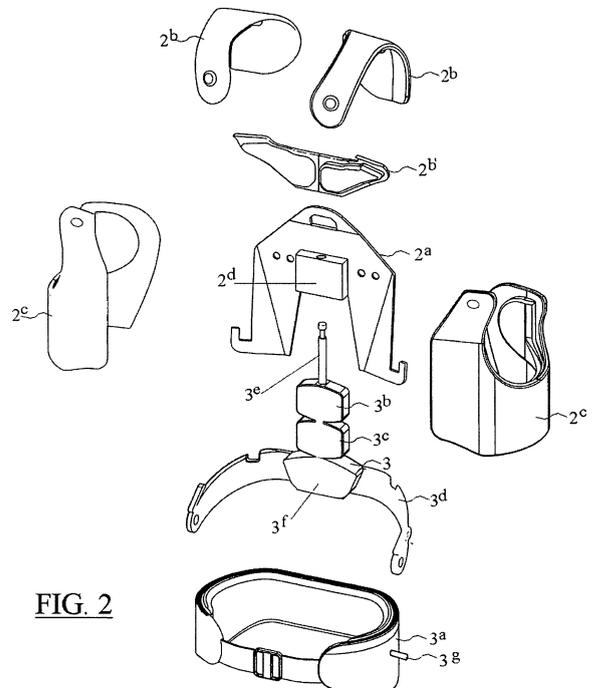
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(54) **Personal carriage system**

(57) Carriage system for carrying burdens (B) by a person (1). A torso module (2) and a support module (3) are arranged to found upon the person's hips in the person's upright position, e.g. via a hip module (3a) around the person's hips. The length of the support module is variable, starting from a minimum length, at which, in the person's upright position, the torso module (2), via the support module (3), founds upon the person's hips. The support module comprises a support element (3b-c) and a forked hip element (3d). The fork ends are swivelingly (3g) connected with the hip module. The support module may be enabled to adjust the degree of flexibility/stiffness of the support module.



**FIG. 2**

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## Description

### Field

**[0001]** The invention concerns a carriage system for carrying burdens by a person in particular at back side, however also at chest side. In particular, however not exclusively, it concerns a carriage system for military personnel.

### Background

**[0002]** Present rucksacks comprise a carriage system with shoulder and hip straps. For the stability the shoulder straps are tightened and in this way the burden, e.g. comprising ballistic protection plates, ammunition, radio etc., is mainly carried by the shoulders.

**[0003]** The following problems occur at the present carriage systems:

- An essential part of the burden is carried by the person's shoulders, resulting in discomfort and reduced performance.
- Combination of the carriage system and ballistic protection is so stiff that the upper part of the body cannot move sufficiently.
- Military actions with heavily burdened shoulders is difficult.

### Summary

**[0004]** The inventions aims to provide a system for carrying burdens by a person, in which the burden - at back and front side - essentially leans on the hips and in which the upper part of the body remains its mobility.

**[0005]** To that end the inventions provides a carriage system for the carriage of burdens by a person, comprising a torso module which is arranged to enclose, at least partly, the person's upper back and/or chest and to enable to attach one or more objects to be carried by the person, the carriage system, moreover, comprising a support module which is at its upperside connected with the torso module and which is at its underside arranged to found upon the person's hips when the person is standing, walking or marching in upright position. In this way the person's back and shoulders are relieved substantially by means of the support module.

**[0006]** The support module preferably comprises a hip module, arranged to enclose, at least partly, the person's hips, enabling that the support module rests well positioned at the person's hips. The support module is preferably arranged that the length between its upperside and its underside is variable, starting from a minimum length e.g. having a value at which in the person's upright position the torso module, via the support module, founds upon the person's hips.

**[0007]** In an advantageous embodiment the support module comprises a support element, essentially at the

person's back side, and a more or less forked hip element, extending from the underside of the support element towards the person's hips, the fork ends preferably being more or less pivotably connected with said hip module. As will be clear from the figures to be discussed below, in this embodiment the burden exercised upon the torso module by e.g. a marching kit, ammunition, radio devices etc. is, when the person is marching, walking or standing upright, deflected from the person's shoulders towards the person's hips, more or less bypassing the person's vertebral column. When, however, the person bends headfirst, e.g. during a run or when climbing over obstacles etc., the support module is able to elongate while the burden largely will rest on the person's back. After the person returns into upright position the support module will return into its default position, adopting again its minimum ("block") length, viz. the length at which the torso module incl. the attached burden founds upon the person's hips via the support module.

**[0008]** Preferably, the support module is laterally, axially, and/or longitudinally flexible in some degree. When, however, a heavy burden has to be carried it is advantageous to adjust (viz. to reduce) the support module's flexibility. For very heavy burdens it may be preferred - to increase the complete system's stability - to lock the flexibility, in other words to make the support module as stiff as possible. For this reason the carriage system preferably comprises means which are arranged to enable to the relevant person to set the degree of flexibility/stiffness of the support module, viz. to a degree which the person experiences as optimal.

### Exemplary embodiment

**[0009]** Figure 1 shows a rather schematic side-view of a preferred embodiment of the invention.

**[0010]** Figure 2 shows the preferred embodiment more in detail in the form of an 'exploded view'.

**[0011]** Figure 3 shows the preferred embodiment in 3D shape.

**[0012]** Figure 1 shows a system for the carriage of a burden by a person 1, comprising a torso module 2 (= 2a-d), enclosing (partly) the person's upper back and chest and to enable to attach burdens (B) to be carried by the person. The system, moreover, comprises a support module 3 (= 3a-d) which is at its upperside connected with the torso module 2 and which is at its underside arranged to found upon the person's hips in the person's upright position. In the preferred embodiment as shown in the figures the support module comprises a hip module 3a which encloses the person's hips.

**[0013]** The support module 3 is arranged that the length between its upperside and its underside is variable, starting from a minimum ("block") length, having a value at which in the person's upright position the torso module 2, via the support module 3, founds upon the person's hips. The support module comprises a support element 3b/c at the person's back side, and a forked hip

element 3d, extending from the underside of the support element 3b/c towards the person's hips, the fork ends being swivelingly (or pivotably) connected with said hip module 3a.

**[0014]** The support module is laterally, axially and possibly longitudinally flexible and preferably comprises means which are arranged to enable to the person to set the degree of flexibility/stiffness of the support module 3, which will be explained more in detail below.

**[0015]** Pointing now to figures 2 and 3, torso module 2 encloses the person's upper back and chest by means of a back element 2a, a shoulder element 2b - via an interconnection element 2b' - is connected to two side elements 2c, which at front side can be interconnected via an (possibly armoured) chest element (not shown) to which (additional) burdens may be attached. The back element 2a is provided with means to attach the (main) burdens B which have to be carried.

**[0016]** In figures 2 and 3 the support element 3 is constituted by two support swivels 3b and 3c, which are interconnected by means of a flexible rod 3e, extending through the swivels 3b and 3c as well as through a swivel 2d provided at the back element 2a and a swivel 3f provided at the forked hip element 3d. The flexible rod 3e is fixed to the upperside of swivel 2d and to the underside of swivel 3f.

**[0017]** It is noted that in practice the number and/or dimensions of the swivels (3b and 3c in the exemplary embodiment of figures 2 and 3), as well as the length of rod 3e may be adapted to the relevant person's (back) length.

**[0018]** The forks of hip element 3d extend towards the person's hips those ends being swivelingly - around pivots 3g - connected to the hip module 3a. The hip module 3a and the extensions of hip element 3d are constructed so that the extensions are blocked - e.g. by an eccentric cam (not shown) upon the exterior of the hip module 3a - to a fixed bottom position. By means of this construction the length between the upperside and underside of the support module 3 - i.e. the distance between the upperside of rod 3e and the pivots 3g - is, starting at said minimum ("block") length, variable. When the person bends headfirst e.g. during a run or when climbing over obstacles etc., the support module elongates due to rotation of the hip element extensions, pivoting around the pivots 3g.

**[0019]** The support module 3 is laterally and axially flexible due to the rounded shape of the surfaces of the adjacent swivels 2d, 3b, 3c, 3f together with the interconnecting rod 3e, which can, besides, also be longitudinally flexible (elastic) to some extent. Although rod 3e is flexible, the flexibility of the whole - the rod and the swivels - not only depends on the flexibility of rod 3e but also on its tensile tension: the higher the tensile tension, the higher the stiffness of the support element. This effect, of course depends on the exact shape of the swivel surfaces: when e.g. the centre of the rounded surface of the swivels comprises a rather flat area, the stiffness of the

support member will increase substantially when the longitudinal rod tension is increased. Although not shown in the figures, any person skilled in the art can imagine that the rod tension could be adjusted by the person using the carriage system as outlined above, by means of e.g. a kind of winged nut, screwed on one end of the (tie) rod 3e and thus enabling the person to set the degree of flexibility/stiffness of the support module 3.

## Claims

1. Carriage system for the carriage of burdens (B) by a person (1), comprising a torso module (2) which is arranged to enclose, at least partly, the person's upper back and/or chest and to enable to attach of one or more objects to be carried by the person, the carriage system, moreover, comprising a support module (3) which is at its upperside connected with the torso module and which is at its underside arranged to found upon the person's hips in the person's upright position.
2. Carriage system according to claim 1, said support module comprising a hip module (3a), arranged to enclose, at least partly, the person's hips.
3. Carriage system according to claim 2, said support module being arranged that the length between its upperside and its underside is variable, starting from a minimum length.
4. Carriage system according to claim 3, the support module being arranged that said minimum length has a value at which in the person's upright position the torso module (2), via the support module (3), founds upon the person's hips.
5. Carriage system according to claim 2, the support module comprising a support element (3b-c) essentially at the person's back side, and a forked hip element (3d), extending from the underside of the support element towards the person's hips, the fork ends being swivelingly (3g) connected with said hip module.
6. Carriage system according to claim 1, said support module being flexible.
7. Carriage system according to claim 6, comprising means which are arranged to enable to the relevant person to set the degree of flexibility/stiffness of the support module.

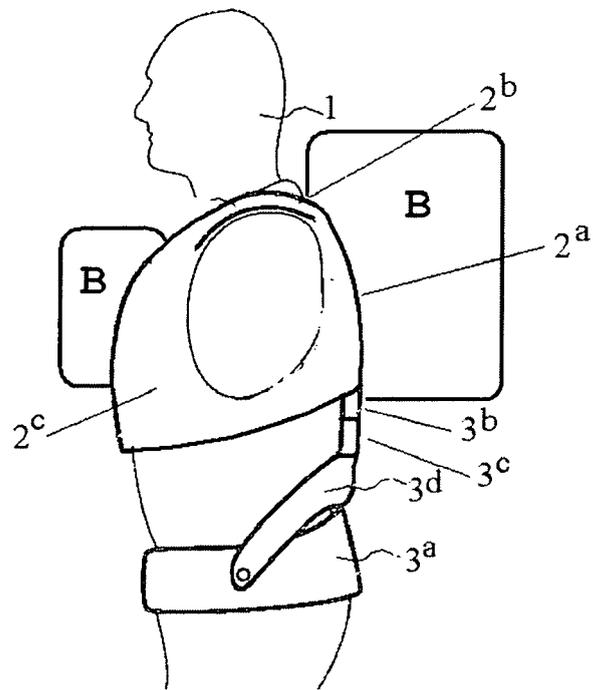


FIG. 1

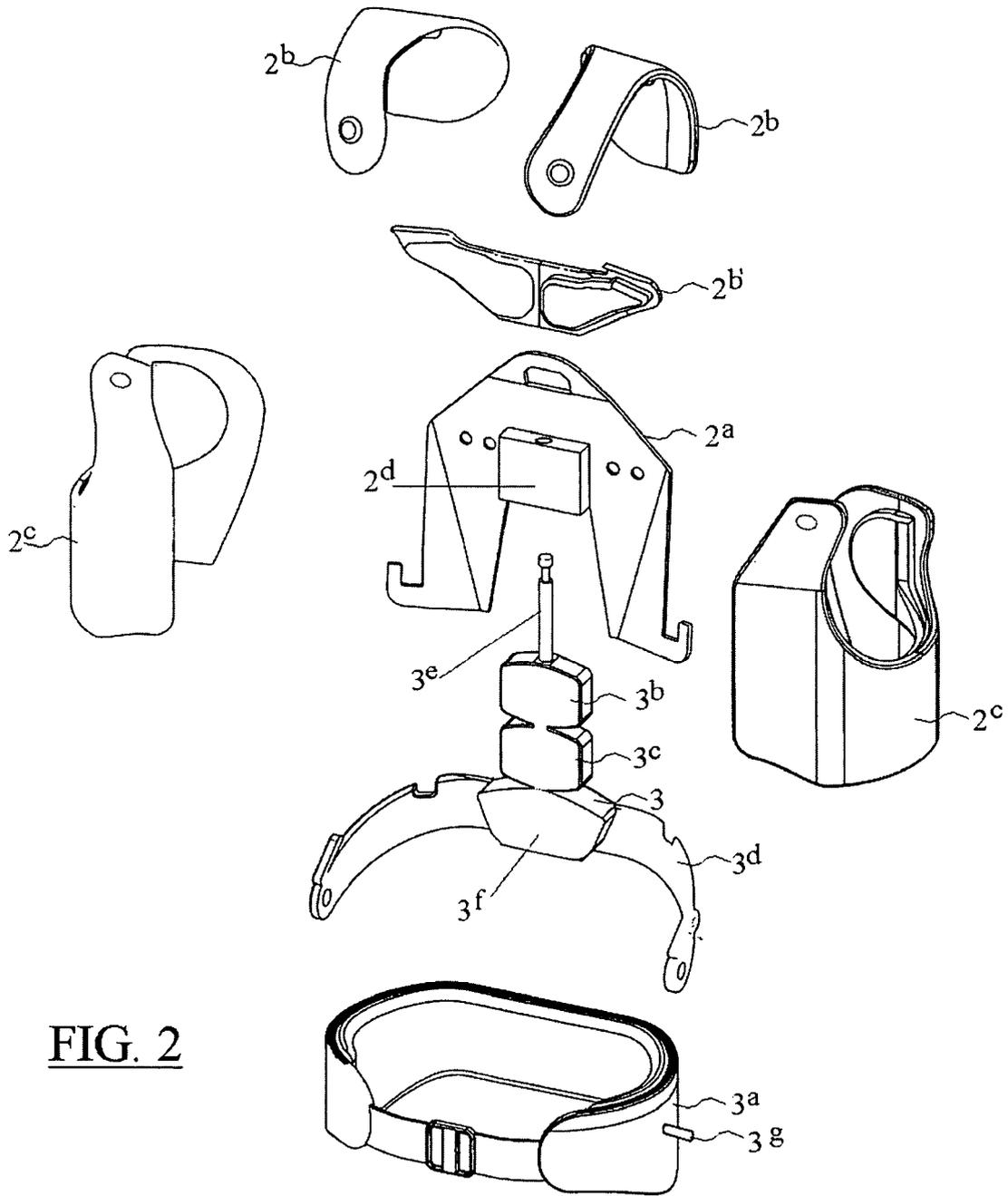


FIG. 2

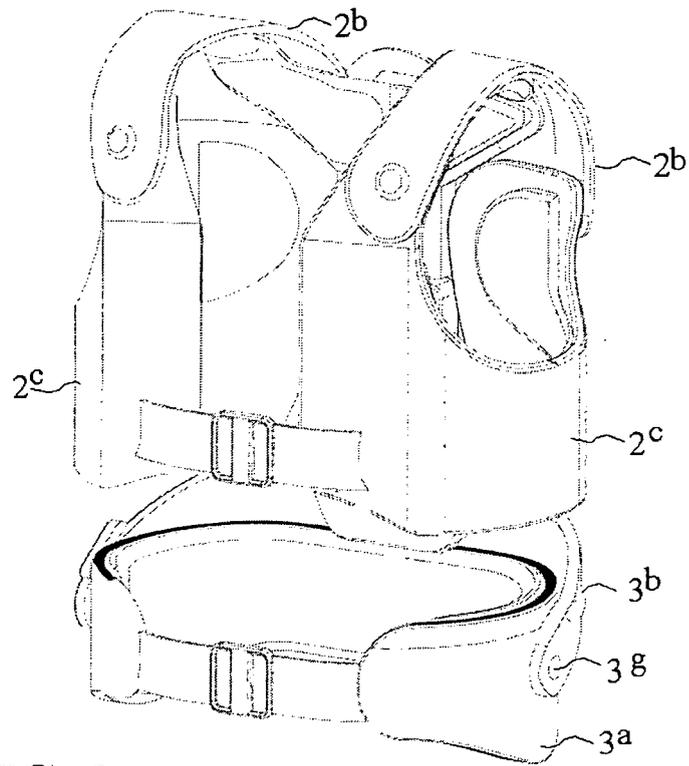


FIG. 3



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			A45F
Place of search		Date of completion of the search	Examiner
Munich		29 August 2006	Escudero, R
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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EP 06 07 5809

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
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