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## (54) Carrying system

(57) Disclosed is a carrying system (5) for women comprising a waist belt (8), at least one front load carrier (6) and at least one back load carrier (7) connectable to the waist belt. The waist belt (8) is curved in a belt plane and arranged to fit tightly around the waist of a female wearer, and transfers a main part of a load carried by back and front load carriers (6, 7) to the iliac crest. The front load carrier (6) and the back load carrier (7) are interconnectable by at least one stabilizing connector (9) connecting the load carriers (6, 7) above the waist belt (8) when the carrying system is carried by a wearer. The stabilizing connector (9) extends from a back load carrier (7) around a side of the torso of a wearer of the carrying system (5), in an area defined below the axilla of the wearer and above the waist belt (8), to a front load carrier (6). The carrying system (5) is adapted for the specific needs of women and in particular of women suffering from neck/shoulder/back pain conditions.

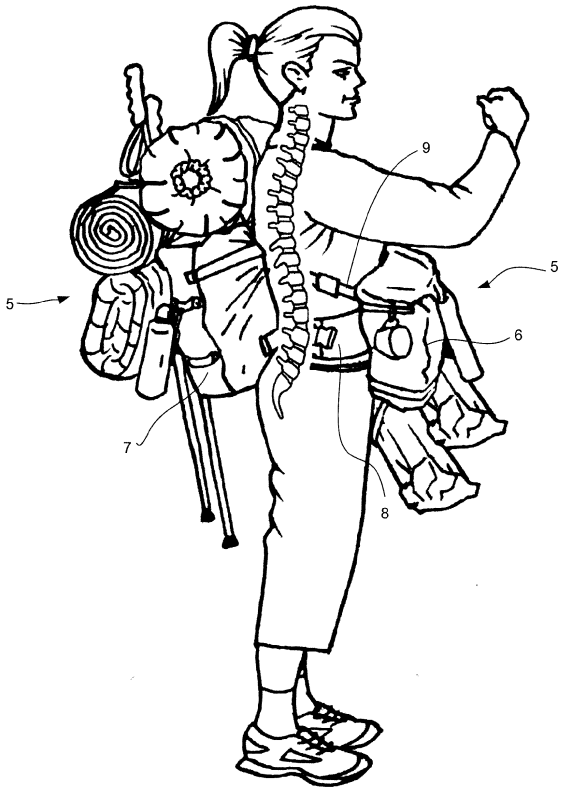


Fig. 2

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## Description

### Technical Field

**[0001]** The present disclosure relates to a carrying system for women, to the use of such a carrying system and to a method of carrying loads.

### Background

**[0002]** Backpacks are often preferred to handbags for carrying heavy loads or carrying any sort of equipment, because of the limited capacity to carry heavy weights for long periods of time in the hands. Large backpacks, used to carry heavier loads, usually offload part of their weight onto hip belts. This improves the potential to carry heavy loads, as the hips are stronger than the shoulders.

**[0003]** When using backpacks, especially heavy loaded ones, the offset load forces the wearer to bend forward in a stooped forward position, to keep the revised centre of gravity centered over the feet. With all the weight behind, leverages are created which increase the forces acting on the body above those of the weight itself. The backpack wearer leans forward to reduce these forces and keep body plus weight centered over the feet. The extra forces act on the spine to distort its natural shape. Using backpacks, especially heavy loaded ones, may therefore be uncomfortable, cause pain in the shoulders, lower back, upper back and neck of the backpack wearer.

**[0004]** A bodypack is a backpack fitted with pocket(s) that are suspended on the wearer's front side and loaded in such a way that the load in the front and the load in the back are about equal. Part of the load of a bodypack is carried by the hips and the center of gravity of the load is matched to the center of gravity of the body, keeping the body in an up-right position and unaltering the posture and balance, which reduces neck, shoulder and back pain compared to normal backpacks.

**[0005]** In US2009/0020580 a backpack and counterbalance system is shown, wherein two load balancing pockets are attachable to the left and right shoulder strap, respectively, on the front of the wearer in order to counterbalance load carried on the back.

**[0006]** The ideal load carrying system should not disturb the wearer's natural posture, balance and movement of the body. The load should be dispersed onto the skeletal structure in a balanced way, and should not produce forces on the body forward, aft, right, or left.

**[0007]** Most backpacks and bodypacks on the market are made for men but marketed as being suitable for both men and women. Since females compared to men generally have breasts, waist, larger hips and smaller shoulders, the backpacks are provided with adjustable hip belts, shoulder straps and chest straps in order to be adjustable to female carriers. However, due to the physiological differences between sexes, no matter how many adjustable straps/belts there are on the backpack or bodypack, a men's backpack/bodypack might not fit properly to a female carrier, and thereby result in discomfort, pain in the shoulders, lower back, upper back and neck of the female wearer.

**[0008]** Neck/shoulder/back pain conditions are seen more frequently in women than in men. The differences in the physical structure of the neck and shoulders of men and women greatly matters and may make a difference in how pressure when carrying a backpack or bodypack affects the joints, muscles and bones in the neck/shoulders/back.

**[0009]** Therefore, it is of great importance for women to carry loads in a correct way, utilizing a carrying system which is adapted for the female physiology in order to prevent neck/shoulder/back pain.

**[0010]** For women already suffering from neck/shoulder/back pain conditions it is of great importance not to carry loads in a way worsening the pain condition.

**[0011]** For both these groups the backpacks and bodypacks discussed above are not a good choice, and a carrying system especially designed for these groups is therefore needed.

### Summary

**[0012]** It is an object of the present disclosure to provide a carrying system adapted for women and in particular for women suffering from neck/shoulder/back pain disorders, which carrying system is adapted for the female physiology in order to prevent neck/shoulder/back pain in women carrying loads and not worsening the pain condition in a woman already suffering from a neck/shoulder/back pain condition. It is also an object of the present disclosure to provide a use of such a carrying system and to provide a method of carrying loads.

**[0013]** The invention is defined by the appended independent claims. Embodiments are set forth in the dependent claims, in the attached drawings and in the following description.

**[0014]** According to a first aspect a carrying system for women is provided, comprising a waist belt, at least one front load carrier, the front load carrier being connectable with a lower portion thereof to the waist belt, the front load carrier to be located on a front of a waist belt wearer's torso, and at least one back load carrier, the back load carrier being connectable with a lower portion thereof to the waist belt, the back load carrier to be located on a back of a waist belt wearer's torso. The waist belt is curved in a belt plane and arranged to fit tightly around the waist of a female wearer, and is further arranged to transfer a main part of a load carried by the back and the front load carriers to the iliac crest. The front load carrier and the back load carrier are interconnectable by at least one stabilizing connector connecting the load carriers above the waist belt when the carrying system is carried by a wearer, wherein a stabilizing connector extends from a back load carrier around a side of the torso of a wearer of the carrying system, in an area defined below the axilla of the wearer and above the waist belt, to a front load

carrier.

**[0015]** The lower portion of a front load carrier and a back load carrier is a relative term and should be interpreted as being a portion lower than an upper portion of the load carrier in a vertical direction when the load carriers are located on the front and back, respectively, of the wearer's torso.

**[0016]** That the load carriers are connectable to the waist belt with their lower portions does not mean that no part of a load carrier may extend below the waist belt when the load carrying system is carried by the wearer.

**[0017]** The waist belt is curved in a belt plane, where a belt plane of the waist belt is the plane when the belt is laid on a flat surface (cf. Figs 4, 5).

**[0018]** The curved and tightly fitting waist belt does not slide downwardly during use, ensuring that the waist belt remains in its correct position transferring a main part of a load carried by back and front load carriers to the iliac crest.

**[0019]** A lower portion of the waist belt when worn may extend below the iliac crest and over at least a part of the hip of the wearer. An upper portion of the waist belt when worn may extend above the waist and cover one or more of the lower ribs of the wearer. The load transferring part is always effectively on or above the iliac crest.

**[0020]** The load carriers are connected to the waist belt in such a way that essentially all weight from loads loading the load carriers is transferred to the wearer's iliac crest located immediately vertically above the hip-joint. Thereby, essentially no weight is carried by shoulders/neck and back.

**[0021]** By counterbalancing the weight of loads loading front and back load carriers an up-right posture is obtained, wherein the vertical gravity line is at or very close to the natural gravity line (line going centrally through knee, hip, ankle shoulder, ear). The center of gravity of the body when carrying the carrying system in a counterbalanced way may thus be matched to the center of the gravity of the body both vertically and horizontally.

**[0022]** The carrying system comprises no shoulder straps. Instead the carrying system comprises at least one stabilizing connector connecting the front load carrier with the back load carrier. Since a stabilizing connector extends from a back load carrier around a side of the torso of a wearer of the carrying system, in an area defined below the axilla of the wearer and above an upper portion of the waist belt, to a front load carrier, no pressure is put on the shoulders or neck.

**[0023]** This taken together makes the carrying system suitable for the specific needs of women and in particular of women suffering from neck/shoulder/back pain conditions. The carrying system is easy to put on even for women with neck/shoulder/back pain conditions and does not load the neck/shoulders/back of the wearer since there are no shoulder straps. The tightly fit waist belt remains in its position in the waist and does not slide downwardly during use and transfers essentially all load to the iliac crest such that essentially no weight is carried by the neck/shoulders/back, and when correctly counterbalanced an up-right posture is obtained in the wearer, thereby avoiding discomfort and pain in shoulders, back and neck.

**[0024]** Part of the waist belt fitting around the waist of a wearer, when seen from the front of the wearer, is lying on a curve which may have a tangent having an angle against the vertical plane, wherein the angle is about 5° to 45°, 5° to 35° or 10° to 30°.

**[0025]** Part of the waist belt fitting around the waist of a wearer, when seen from the front of the wearer, is lying on a curve extending between a waist line (the narrowest point of the waist) and a broadest or outermost point of the hip of the wearer, which curve may have a tangent having an angle against the vertical plane, wherein the angle is about 5° to 45°, 5° to 35° or 10° to 30°.

**[0026]** The angle being different for different users.

**[0027]** The main part of the load transferred from the load carriers to the iliac crest by the waist belt may be at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95% or 100% of a total load provided by the back and front load carriers and any contents thereof.

**[0028]** A ratio of a volume of the at least one back load carrier to a volume of the at least one front load carrier may be 10:1 to 10:10, 10:1 to 10:7, 10:1 to 10:5, or 10:1 to 10:3.

**[0029]** The waist belt and the back and front load carriers may be connectable with releasable connection means for connecting the load carriers to the waist belt, the connection means preferably comprising a strap, a hook-and-loop type connector, a snap, a button, a buckle assembly, a clasp or a clip.

**[0030]** One of the load carriers may be provided with at least one stabilizing internal frame, extending at least a portion of a distance between an upper portion and a bottom portion of the load carrier to stabilize the load carrier, the frame being in the shape of flexible elongate strips or a plate of materials such as plastics, nylon, or metal.

**[0031]** A stabilizing connector may comprise a first part and a second part which are interconnectable by means of a strap, a hook-and-loop type connector, a snap, a button, a buckle assembly, a clasp or a clip.

**[0032]** The stabilizing connector may be adjustable for adjusting the fit of the carrying system to the wearer. The stabilizing connector may for example be adjustable in length and/or in connection point to the front load carrier and/or to the back load carrier.

**[0033]** According to a second aspect there is provided a use of the carrying system as described above, wherein a load of the at least one front load carrier and a load of the at least one back load carrier is chosen so as to counterbalance each other to promote a balanced up-right position of the wearer of the carrying system.

**[0034]** By counterbalanced front and back loads is meant that the weight of the loads loading the at least

one back load carrier and the at last one front load carrier is the same or about the same. The weights of the loads should be such as to create counterbalanced front and back loads promoting an up-right posture of the wearer, wherein the vertical gravity line is at or very close to the natural gravity line (line going centrally through knee, hip, ankle shoulder, ear).

**[0035]** According to a third aspect there is provided a method of carrying loads, the method comprising the steps of:

providing a waist belt, which is curved in a belt plane;
arranging the waist belt to fit tightly around the waist of a female wearer and so as to transfer a main part of a load carried by the waist belt onto the wearer's iliac crest;
providing a front load carrier to be located on a front of the wearer's torso;
causing the front load carrier to be attached at a front portion of the waist belt;
providing a back load carrier to be located on a back of the wearer's torso;
causing the back load carrier to be attached at a back portion of the waist belt;
applying loads to the back load carrier and to the front load carrier so as to promote a balanced up-right position of the wearer;
arranging at least one stabilizing connector to connect the front and back load carriers above the waist belt when carried by a wearer, such that the stabilizing connector extends from the back load carrier around a side of the torso of a wearer, in an area defined below the axilla of the wearer and above the waist belt, to the front load carrier.

**[0036]** It is realized that these method steps may be performed in a different order than presented above. For example may the arranging of the at least one stabilizing connector take place in a step before the loading of the carriers.

Brief Description of the Drawings

**[0037]**

Fig. 1 a shows the profile of a person carrying a common backpack.
Fig. 1b shows the profile of part of the skeleton of the person carrying the backpack in Fig. 1 a.
Fig. 2 shows the profile and the spine of a person carrying the carrying system of the present disclosure.
Fig. 3a shows the profile of a person carrying the carrying system of the present disclosure.
Fig. 3b shows the profile of part of the skeleton of the person carrying the carrying system in Fig. 3a.
Fig. 4 shows examples of the waist belt of the carrying system interconnectable at the front of the wearer by means of a buckle assembly.
Fig. 5 shows an example of the waist belt of the carrying system comprising two separate parts interconnectable at the sides of the wearer by means of buckle assemblies.
Fig. 6 shows the waist belt shown in Fig. 4 when carried by a female wearer.

Detailed Description

**[0038]** In Fig. 1 the profile of a person carrying a common backpack 1 provided with shoulder straps 2 is shown. When carrying backpacks 1, especially heavily loaded ones, the offset load forces the wearer to bend forward in a stooped forward position, to keep the revised centre of gravity centered over the feet, as seen in Fig. 1 b. In Fig. 3b, the natural vertical gravity line 3 is shown, which goes centrally through the knee, hip, ankle, shoulder and ear. With all the weight behind, leverages are created which increase the forces acting on the body above that of the weight itself. The backpack wearer leans forward to reduce these forces and keep body plus weight centered over the feet. The extra forces act on the spine to distort its natural shape. A seen in Fig. 1b, as the backpack wearer leans forward, the vertical gravity line 4 no longer goes centrally through the knee, hip, ankle shoulder and ear. Using backpacks, especially heavy loaded ones, may therefore be uncomfortable, cause pain in the shoulders, lower back, upper back and neck of the backpack carrier.

**[0039]** Due to the physiological differences between sexes a backpack or bodypack made for men, no matter how many adjustable straps/belts there are on the backpack or bodypack, might not fit properly to a female carrier, and thereby result in discomfort, pain in the shoulders, lower back, upper back and neck of the female wearer and in particular in women already suffering from neck/shoulder/back pain conditions.

**[0040]** In Fig. 2 and Fig 3a the profile of a person carrying the carrying system 5 of the present disclosure is shown.

**[0041]** The center of gravity of the body when carrying the carrying system 5 is matched to the center of gravity of the body both vertically 3 and horizontally.

**[0042]** In the carrying system 5, see Fig. 2 and Fig. 3a, a load is suspended on the wearer's front side 6 and back side 7. The loads carried on the front 6 and on the back 7 of the wearer should be counterbalanced. By counterbalanced front and back loads 6, 7 is here meant that the weight of the loads 6, 7 are selected so as to obtain an up-right posture of the wearer of the carrying system 5, wherein the vertical gravity line is at or very close to the natural gravity line 3. The center of gravity of the body when carrying the carrying system 5 is then matched to the center of the gravity of the body both vertically 3 and horizontally.

**[0043]** The carrying system 5 comprises a waist belt 8, Fig. 2-6, at least one front load carrier 6 connected to

the waist belt 8, at least one back load carrier 7 connected to the waist belt 8 and at least one stabilizing connector 9 connecting the back and front load carriers 6, 7, and no shoulder straps.

**[0044]** The waist belt 8 is curved in a belt plane (Fig. 4, Fig. 5) and arranged to fit tightly around the waist of a female wearer, and is further arranged to transfer a main part of a load carried by back and front load carriers 6, 7 to the iliac crest 10.

**[0045]** This curve may be designed such that it presents two spaced apart portions, which, or the tangents of which, present an angle X against each other, see Fig. 4, which angle may be between 70° and 160°, between 80° and 150°, between 90° and 140°, between 90° and 130°, between 90° and 120°, between 90 and 110° or between 90 and 100°.

**[0046]** The curved and tightly fitting waist belt 8, compared to hip belts of many conventional backpacks or bodypacks, does not slide downwardly during use, ensuring that the waist belt 8 remains in its correct position.

**[0047]** A lower portion 11 of the waist belt 8 may, when worn, extend below the iliac crest 10 and over at least a part of the hip of the wearer. An upper portion 12 of the waist belt 8 when worn may extend above the waist and cover one or more of the lower ribs of the wearer.

**[0048]** Part of the waist 8 belt fitting around the waist of a wearer, when seen right from the front of the wearer, is lying on a curve which may have a tangent T having an angle $\alpha$ against the vertical plane VP, wherein the angle $\alpha$ is about 5° to 45°, 5° to 35° or 10° to 30°. The size of the angle $\alpha$ varies naturally between individual female wearers.

**[0049]** Part of the waist belt 8 fitting around the waist of a wearer, when seen from the front of the wearer, is lying on a curve extending between a waist line (the narrowest point of the waist) A and a broadest or outermost point of the hip of the wearer B, which curve may have a tangent T having an angle against the vertical plane VP, wherein the angle $\alpha$ is about 5° to 45°, 5° to 35° or 10° to 30°.

**[0050]** The main part of the load transferred from the load carriers to the iliac crest by the waist belt 8 may be at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95% or 100% of a total load provided by the back and front load carriers 6, 7 and any contents thereof.

**[0051]** The design of the "hip portions" of the waist belt 8 in relation to the "interconnecting portions" of the waist belt 8, see for example Fig. 4, ensures that the load is transferred essentially, and preferably entirely, to the iliac crest of the wearer. The interconnecting portions located on the back and front of the wearer when the carrying system 5 is carried by the wearer should not take any essential load.

**[0052]** The percentage figures given with respect to the load transfer provide some alternative definitions of the term "transferred essentially". To determine the exact load transferred from the load carriers 6, 7 to the iliac crest by the waist belt 8 empiric experiments would be needed. The degree of load transferred to the iliac crest also differs between different carriers of the carrying system 5. It is noted that although it would be preferred to transfer load only onto the iliac crest, due to variations in anatomy between different wearers, some load may be accidentally transferred by e.g. the back or front portions of the waist belt 8, and/or by the stabilizing connectors.

**[0053]** The waist belt 8 may comprise length adjustment means 13, such as a strap arrangement, for adjusting an effective length of the waist belt 8.

**[0054]** Although the waist belt 8 may comprise length adjustment means 13, the natural differences in hip and waist size between individual women may make it difficult to manufacture a waist belt 8 where one size fits all. It could therefore be necessary to manufacture adjustable waist belts 8 of different sizes, e.g. size small, medium and large.

**[0055]** The waist belt 8 may comprise two separate parts 8a, 8b releasably interconnectable at the sides of the waist belt wearer, as seen in Fig. 5.

**[0056]** The waist belt 8 may be in one piece, Fig. 4, with two free parts 14a, 14b which are releasably interconnectable along the front or side of the wearer.

**[0057]** The waist belt parts may releasably interconnectable by means of a buckle assembly 15a, 15b or a hook-and-loop type connector, a clasp or a clip (not shown).

**[0058]** The material of the waist belt 8 may be suede, leather, nylon fabric or any suitable material.

**[0059]** The waist belt 8 may be padded or partly padded to increase the comfort of the wearer.

**[0060]** At least one front load carrier 6 may be connectable with a lower portion thereof to the waist belt 8. The front load carrier 6 is to be located on a front of a waist belt 8 wearer's torso. At least one back load carrier 7 may be connectable with a lower portion thereof to the waist belt 8. The back load carrier 7 is to be located on a back of a waist belt 8 wearer's torso.

**[0061]** The lower portion of the front load carrier 6 and back load carrier 7 is a relative term and should be interpreted as being a portion lower than an upper portion of the load carrier 6, 7 in a vertical direction when the load carriers 6, 7 are located on the front and back, respectively, of the wearer's torso.

**[0062]** That the load carriers 6, 7 are connectable to the waist belt 8 with their lower portions does not mean that no part of a load carrier 6, 7 may extend below the waist belt 8 when the load carrying system 5 is carried by the wearer.

**[0063]** The load carriers 6, 7 are connected to the waist belt 8 in such a way that essentially all weight from loads loading the load carriers 6, 7 is transferred to the wearer's iliac crest located immediately vertically above the hip-joint. Thereby, essentially no weight is carried by shoulders/neck and back.

**[0064]** The back and front load carriers 6, 7 may be fixedly connected to the waist belt 8.

**[0065]** By fixedly connected is here for example meant that a load carrier and the waist belt may be sewn together, fixed to each other with pins, rivets etc.

**[0066]** The waist belt 8 and the back and front load carriers 6, 7 may be connected with releasable connection means for connecting the load carriers 6, 7 to the waist belt 8.

**[0067]** In Fig. 4 a first part of such a connection means 16 is shown connected to the waist belt 8 as a buckle part 16. The corresponding second part of the connection means, in this case a corresponding buckle part, connected to a load carrier 6, 7 is not shown in the figures. Apart from a buckle assembly, such releasable connection means 16 may be a strap, a hook-and-loop type connector, a snap, a button, a clasp or a clip.

**[0068]** In another embodiment the at least one back load carrier 7 and/or the at least one front load carrier 6 are fixedly connected to the waist belt 8. The load carrier and the waist belt may be sewn together, fixed to each other with pins etc.

**[0069]** A load carrier 6, 7 may be provided with at least one stabilizing internal frame (not shown), extending at least a portion of a distance between an upper portion and a bottom portion of the load carrier 6, 7 to stabilize the load carrier 6, 7, the frame being in the shape of flexible elongate strips or a plate of materials such as plastics, nylon, or metal.

**[0070]** The load carrier 6, 7 may comprise a bag (as shown in the figures), a holster, a harness or the like.

**[0071]** The material used in the bag, holster, harness may be materials conventionally used in the manufacture of backpacks, suitcases or other bags.

**[0072]** In one embodiment one load carrier 7 is located on the back and on the front 6 of the wearer as seen in Fig 2 and 3a. In another embodiment, not shown, more than one load carrier 6, 7 may be located on the front side and/or back side of the wearer. Two such load carriers 6, 7 may be interspacedly placed on the front side/back side of the wearer.

**[0073]** A ratio of a volume of at least one back load carrier to a volume of at least one front load carrier may be 10:1 to 10:10, 10:1 to 10:7, 10:1 to 10:5, or 10:1 to 10:3.

**[0074]** As seen in Fig. 2 and 3a, a front load carrier 6 and a back load carrier 7 are interconnectable by means of at least one stabilizing connector 9 connecting the load carriers 6, 7 above the waist belt 8 when the carrying system 5 is carried by a wearer. The stabilizing connector 9 extends from a back load carrier 7 around a side of the torso of a wearer of the carrying system 5, in an area defined below the axilla of the wearer and above the waist belt 8, to a front load carrier 6.

**[0075]** Since the carrying system 5 instead of conventional shoulder straps 2 comprises at least one stabilizing connector 9, no or very little pressure is put on the shoulders or neck of the wearer of the carrying system.

**[0076]** The stabilizer connector 9 may be adjustable for adjusting the fit of the carrying system 5 to the wearer. The stabilizing connector(s) 9 may for example be adjustable in length and/or in connection point to the front load carrier 6 and/or to the back load carrier 7.

**[0077]** The length of the stabilizing connector(s) 9 may be adjustable to adjust the fit to the wearer. Alternatively, the carrying system 5 may be provided with exchangeable stabilizing connectors of different lengths.

**[0078]** The point where the stabilizing connector 9 is connected to the back load carrier 7 and/or to the front load carrier 6 may be adjustable such that the distance between the stabilizing connector 9 relative the waist belt 8 may be adjusted. Such adjustment may be provided by a moveable point of connection, which may be moveable between at least two in the vertical direction (when the carrier system 5 is carried by the wearer) interspaced points on the front load carrier 6 and/or the back load carrier 7. Alternatively, the front load carrier 6 and/or back load carrier 7 may be provided with at least two in the vertical direction (when the carrier system 5 is carried by the wearer) separate interspaced points of connection.

**[0079]** The stabilizing connector 9 may prevent excessive motion between the load carriers 6, 7 and the torso of the wearer.

**[0080]** A stabilizing connector 9 connecting a front load carrier 6 with a back load carrier 7 may comprise a first part and a second part interconnectable by means of straps, hook-and-loop type connectors, snaps, buttons, buckle assemblies, clasps or clips (not shown).

**[0081]** The stabilizing connector 9 may be made of materials such as nylon fabric and other materials conventionally used in for example shoulder straps on backpacks.

**[0082]** In one embodiment stabilizing connectors 9 extending around both sides of the torso of a wearer of the carrying system 5 in an area defined below the axilla of the wearer and above the waist belt 8, from a back load carrier 7 to a front load carrier 6 may be used.

**[0083]** The presented carrying system 5 is adapted for the specific needs of women and also of women suffering from neck/shoulder/back pain conditions.

**[0084]** The carrying system 5 is easy to put on even for women with neck/shoulder/back pain conditions and does not load the neck/shoulders/back of the wearer since there are no shoulder straps 2. The tightly fit waist belt 8 transfers essentially all load to the iliac crest 10, such that essentially no weight is carried by the neck/shoulders/back. When correctly counterbalanced an up-right posture is obtained in the wearer, thereby avoiding discomfort and pain in shoulders, back and neck.

**[0085]** Putting the carrying system on could be made in different ways. In one embodiment the waist belt is first arranged around the waist. The front and back load carriers 6, 7 are loaded and counterbalanced, and thereafter the load carriers are connected to the waist belt and finally load carriers 6, 7 on the front and back are connected by the at least one stabilizing connector 9.

**[0086]** In another embodiment, front and back load carriers 6, 7 are releasably connected to the waist belt 8, or

are fixedly connected to the waist belt 8. Thereafter the load carriers 6, 7 are connected by at least one stabilizing connector 9 and finally loaded and counterbalanced.

## Claims

1. Carrying system (5) for women, comprising
a waist belt (8);
at least one front load carrier (6), the front load carrier (6) being connectable with a lower portion thereof to the waist belt (8), the front load carrier (6) to be located on a front of a waist belt wearer's torso;
at least one back load carrier (7), the back load carrier (7) being connectable with a lower portion thereof to the waist belt (8), the back load carrier (7) to be located on a back of a waist belt wearer's torso,
**characterized in that**
the waist belt (8) is curved in a belt plane and arranged to fit tightly around the waist of a female wearer, and further is arranged to transfer a main part of a load carried by the back and the front load carriers (6, 7) to the iliac crest, and **in that**
the front load carrier (6) and the back load carrier (7) are interconnectable by at least one stabilizing connector (9) connecting the load carriers (6. 7) above the waist belt (8) when the carrying system (5) is carried by a wearer, wherein a stabilizing connector (9) extends from a back load carrier (7) around a side of the torso of a wearer of the carrying system (5), in an area defined below the axilla of the wearer and above the waist belt (8), to a front load carrier (6).

2. Carrying system (5) according to claim 1, wherein part of the waist belt (8) fitting around the waist of a wearer, when seen from the front of the wearer, is lying on a curve which has a tangent (T) having an angle ($\alpha$) against the vertical plane (VP), wherein the angle ($\alpha$) is about 5° to 45°, 5° to 35° or 10° to 30°.

3. Carrying system (5) according to claim 1, wherein part of the waist belt (8) fitting around the waist of a wearer, when seen from the front of the wearer, is lying on a curve extending between a waist line (the narrowest point of the waist) (A) and a broadest or outermost point of the hip of the wearer (B), which curve has a tangent (T) having an angle ($\alpha$) against the vertical plane (VP) when the wearer is seen from the front, wherein the angle ($\alpha$) is about 5° to 45°, 5° to 35° or 10° to 30°.

4. Carrying system (5) according to any of the preceding claims, wherein the main part of the load transferred from the load carriers (6, 7) to the iliac crest by the waist belt (8) is at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95% or 100% of a total load provided by the back and front load carriers (6, 7) and any contents thereof.

5. Carrying system (5) according to any of the preceding claims, wherein a ratio of a volume of the at least one back load carrier (7) to a volume of the at least one front load carrier (6) is 10:1 to 10:10, 10:1 to 10:7, 10:1 to 10:5, or 10:1 to 10:3.

6. Carrying system (5) according to any of the preceding claims, wherein the waist belt (8) and the back and front load carrier (6, 7) are connectable by releasable connection means (16) for connecting the load carriers (6, 7) to the waist belt (8), the connection means preferably comprising a strap, a hook-and-loop type connector, a snap, a button, a buckle assembly, a clasp or a clip.

7. Carrying system (5) according to any of the preceding claims, wherein one of the load carriers (6, 7) is provided with at least one stabilizing internal frame, extending at least a portion of a distance between an upper portion and a bottom portion of the load carrier (6, 7) to stabilize the load carrier (6, 7), the frame being in the shape of flexible elongate strips or a plate of materials such as plastics, nylon, or metal.

8. Carrying system (5) according to any of the preceding claims, wherein the stabilizing connector (9) comprises a first part and a second part which are interconnectable by means of a strap, a hook-and-loop type connector, a snap, a button, a buckle assembly, a clasp or a clip.

9. Carrying system (5) according to any of the preceding claims, wherein the stabilizing connector (9) is adjustable for adjusting the fit of the carrying system (5) to the wearer, said stabilizing connector (9) for example being adjustable in length and/or in connection point to the front load carrier (6) and/or to the back load carrier (7).

10. Use of the carrying system (5) according to any of the preceding claims, wherein a load of the at least one front load carrier (6) and a load of the at least one back load carrier (7) is chosen so as to counterbalance each other to promote a balanced up-right position of the wearer of the carrying system (5).

11. Method of carrying loads, the method comprising the steps of:

providing a waist belt (8), which is curved in a belt plane;
arranging the waist belt to fit tightly around the waist of a female wearer and so as to transfer a main part of a load carried by the waist belt (8) onto the wearer's iliac crest;
providing a front load carrier (6) to be located on a front of the wearer's torso;

causing the front load carrier (6) to be attached at a front portion of the waist belt (8);
providing a back load carrier (7) to be located on a back of the wearer's torso;
causing the back load carrier (7) to be attached at a back portion of the waist belt (8);
applying loads to the back load carrier (7) and to the front load carrier (6) so as to promote a balanced up-right position of the wearer;
arranging at least one stabilizing connector (9) to connect the front and back load carriers (6, 7) above the waist belt (8) when carried by a wearer, such that the stabilizing connector (9) extends from the back load carrier (7) around a side of the torso of a wearer, in an area defined below the axilla of the wearer and above the waist belt (8), to the front load carrier (6).


Fig. 1a

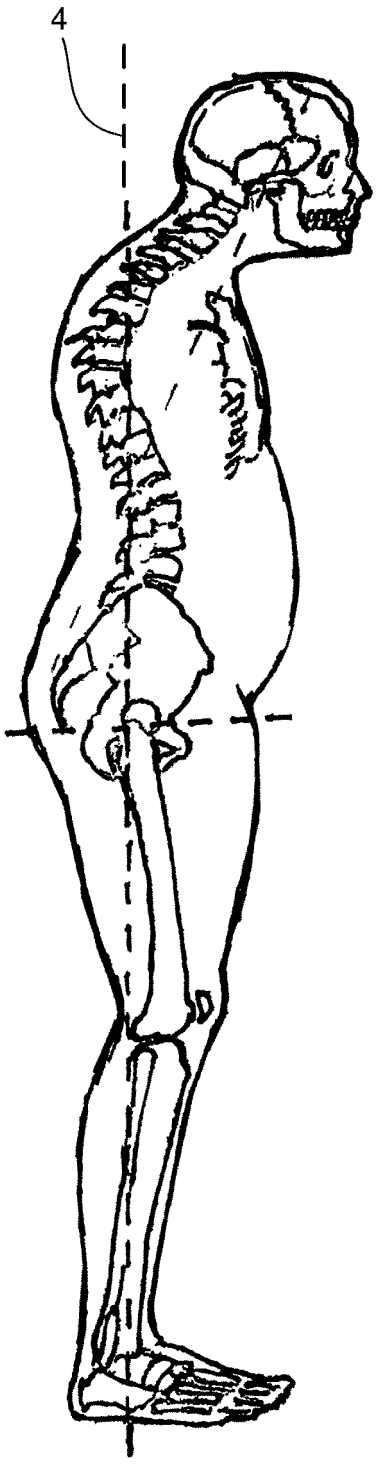


Fig. 1b


Fig. 2

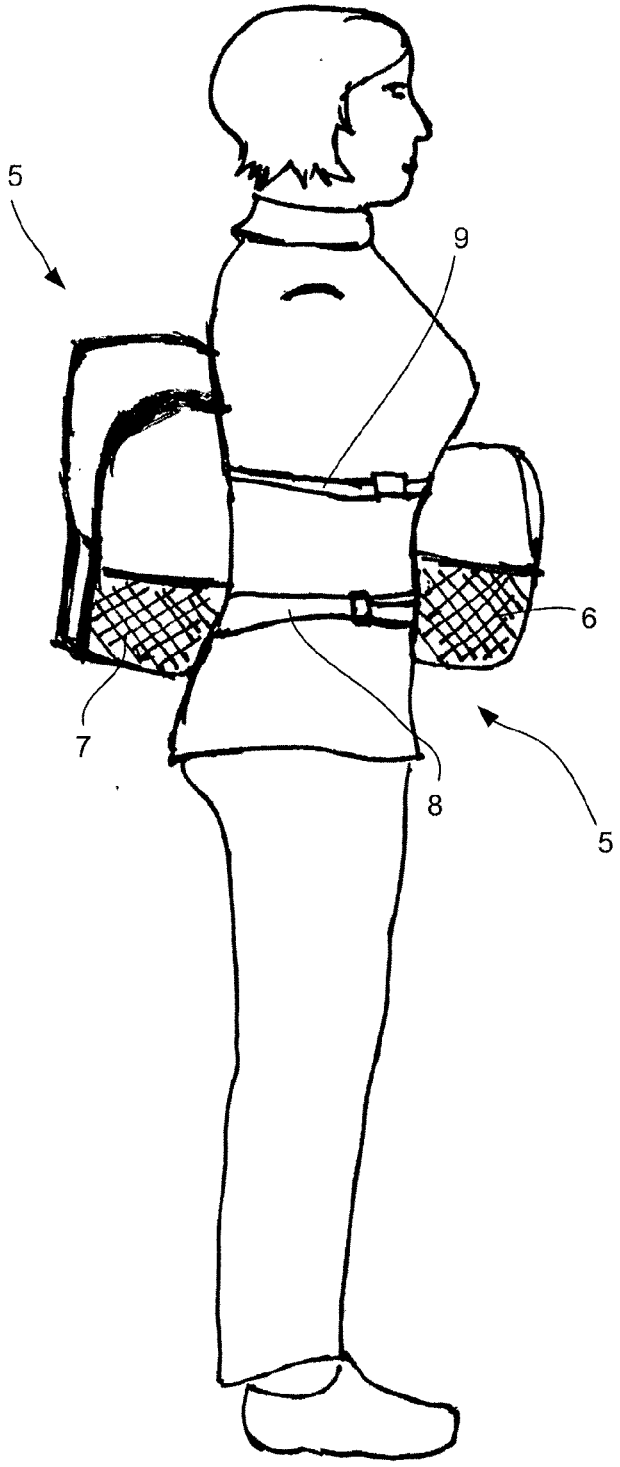


Fig. 3a

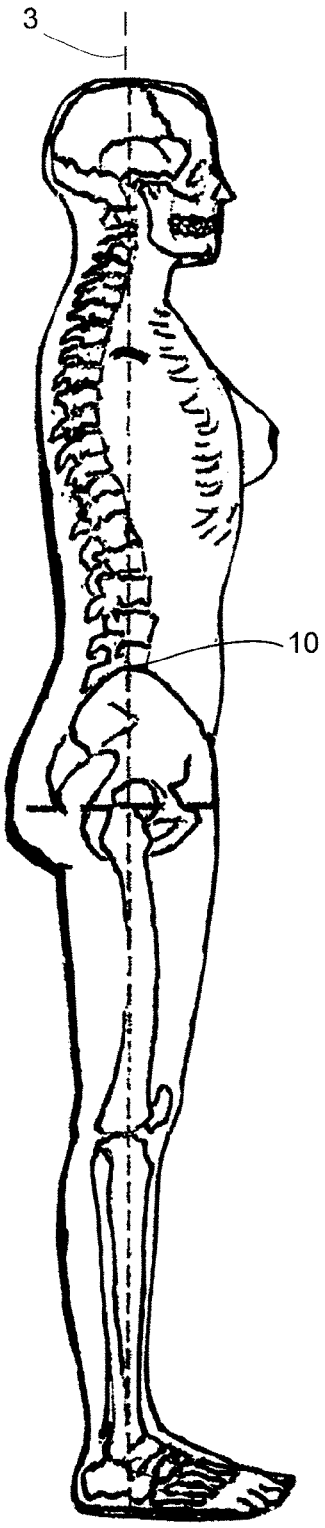


Fig. 3b

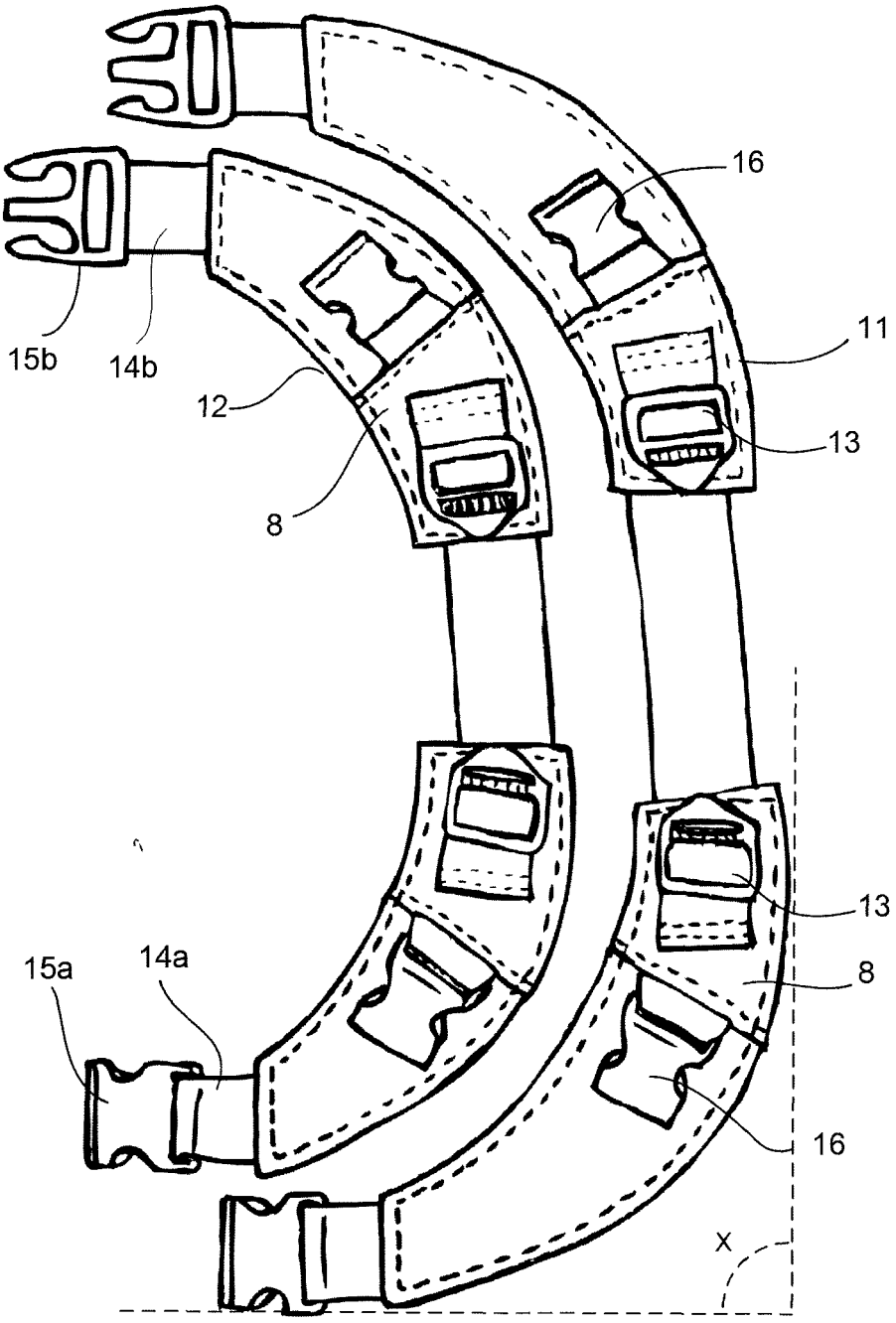


Fig. 4

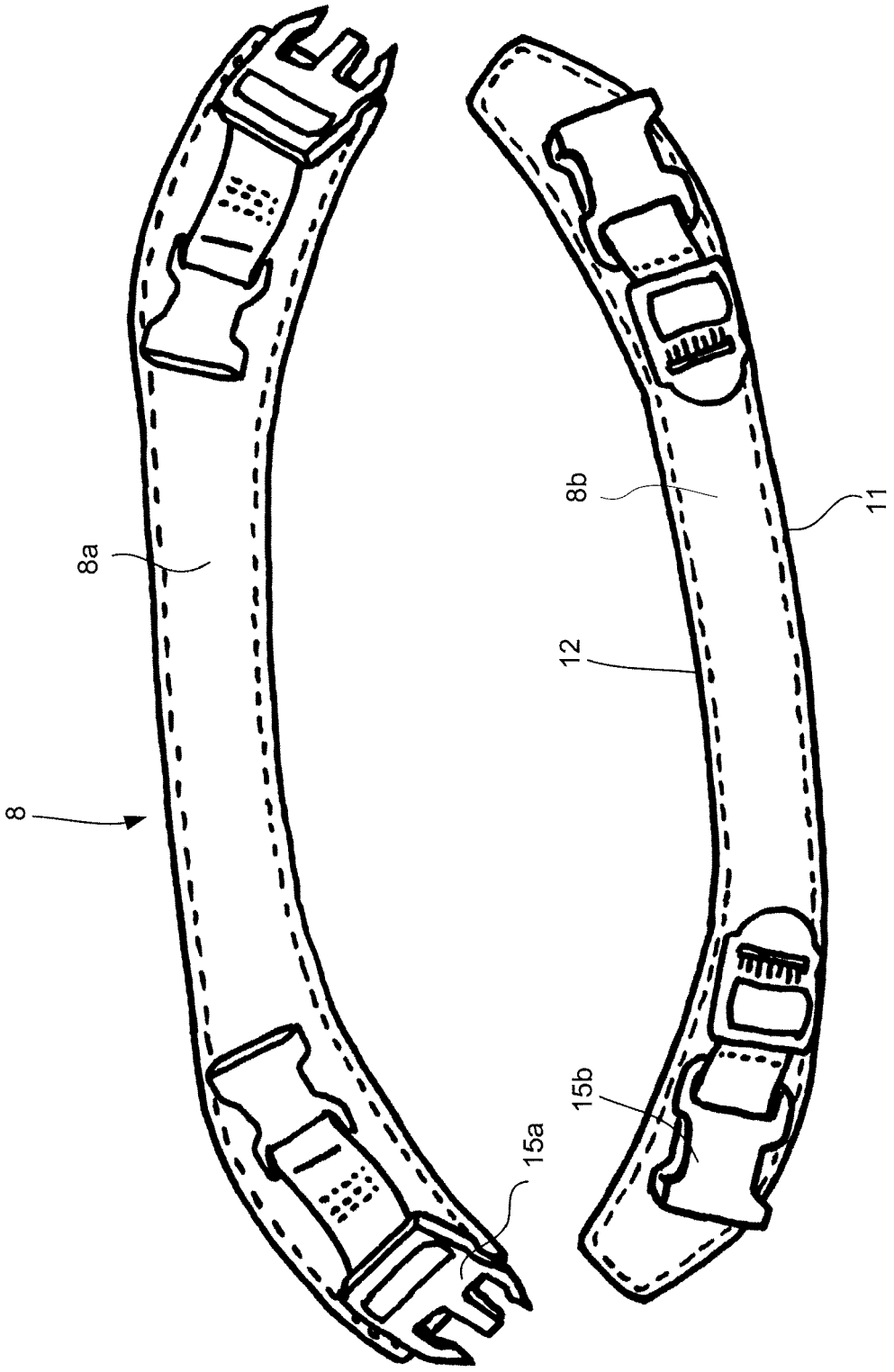


Fig. 5

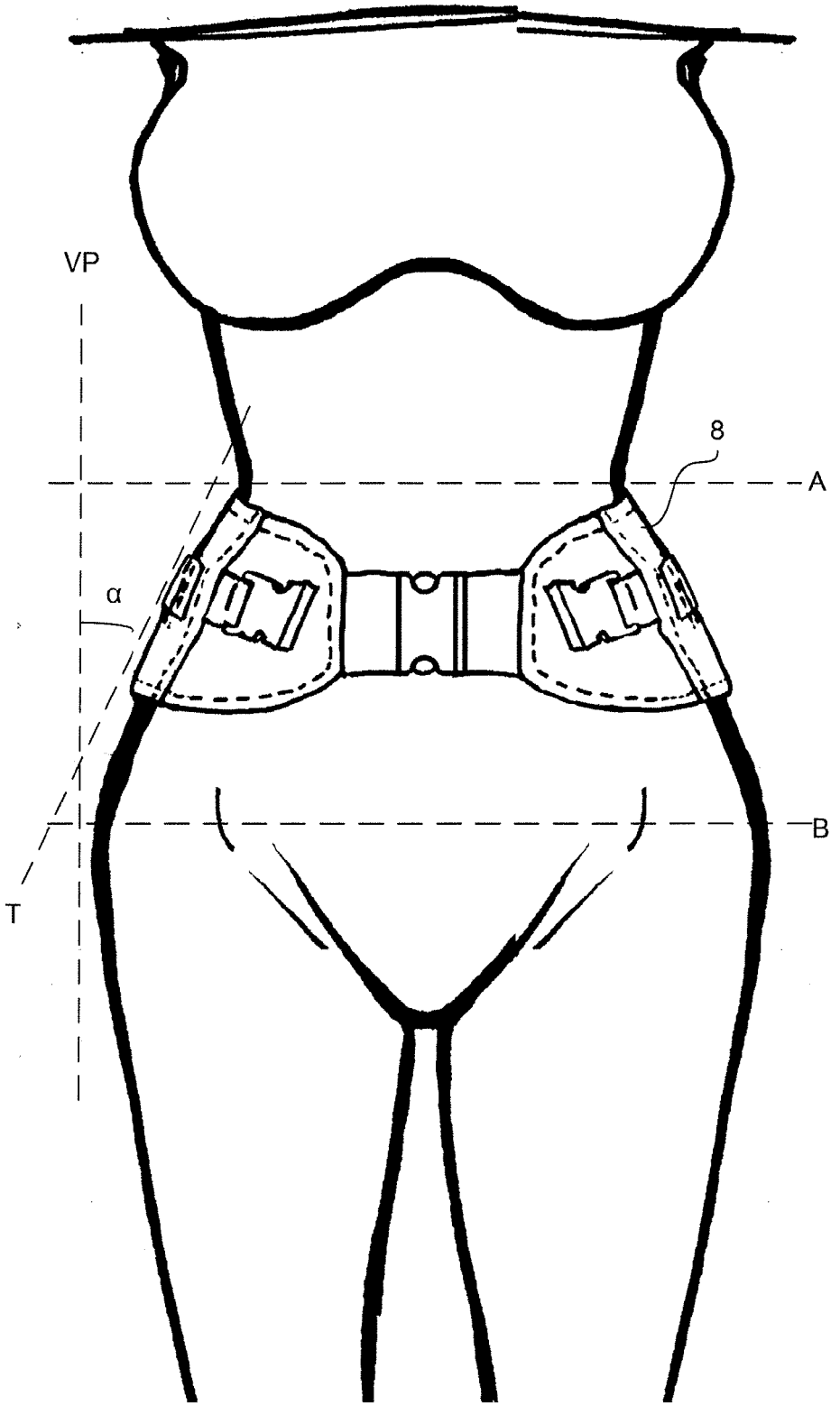


Fig. 6

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# EUROPEAN SEARCH REPORT

Application Number
EP 14 16 6959

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
| X,D | US 2009/020580 A1 (TATE AARN [NZ])<br>22 January 2009 (2009-01-22)<br>* paragraph [0029] - paragraph [0040]; figures 1, 3 *<br>----- | 1-11 | INV.<br>A45F3/04 |

TECHNICAL FIELDS SEARCHED (IPC)

A45F

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| The Hague | 6 October 2014 | Hinrichs, Wiebke |

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06-10-2014

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| US 2009020580 A1 | 22-01-2009 | NZ 556509 A | 28-03-2008 |
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