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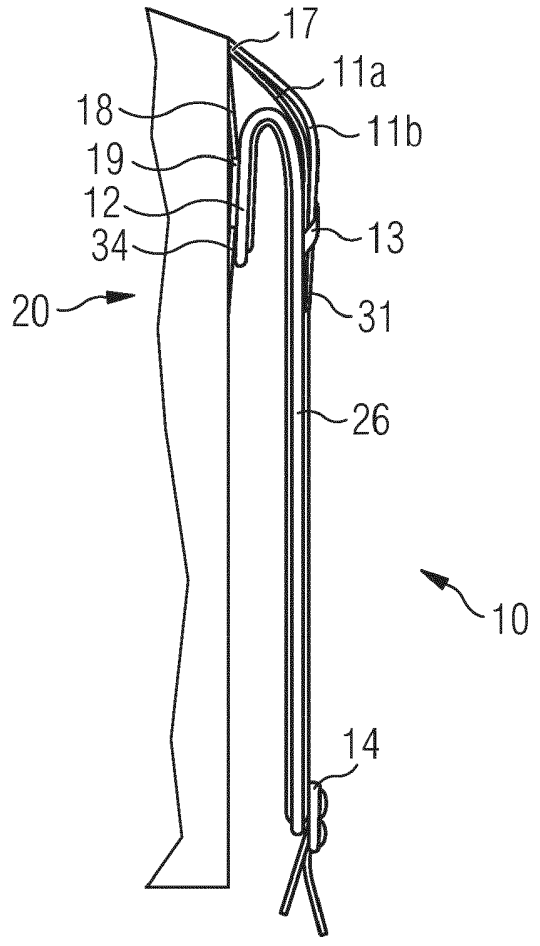
(54) CARRYING SYSTEM

(57) The present invention concerns a carrying system (10) for carrying an object (20), comprising: (a) an essentially elastic portion (11), (b) wherein the essentially elastic portion (11) is attached to the object (20) at a first position (17) located on the object (20); and (c) a limitation arrangement, wherein a length of the limitation arrangement limits a maximum extension of the essentially elastic portion (11), and (d) wherein the limitation arrangement is attached at least at one second position (34) on the object (20) that is different from the first position (17).

FIG 3A



EP 3 549 483 A1

Description

1. Technical field

[0001] The present invention relates to an improved system for carrying an object, such as a backpack or a bag.

2. Prior art

[0002] When carrying an object such as a backpack or a bag, the level of comfort depends not only on the static load due to the weight of the object but also on the dynamic load. For example, when a person is walking or running vertical movements and accelerations of the object can greatly increase the dynamic load compared with the static load. The faster a person is moving, generally, the greater the dynamic load will be for a given static load. Therefore, this problem is particularly important in athletic applications.

[0003] The prior art provides several potential solutions to this problem. EP 2 371 232 A2 concerns an insert for a carrying strap for carrying objects comprising an essentially elastic section, and a limitation section, wherein the length of the limitation section is adjustable. JP 2005-304827 concerns a satchel intended to be stably carried on a back. DE 299 10 127 U1 concerns a backpack comprising two carrying straps, wherein each carrying strap comprises an elastic section and means for limiting the extension of the strap under strain. JP 5713160 B2 concerns a satchel with two shoulder belts, wherein the shoulder belts comprise an inner belt and an outer belt. US 6,070,776 A concerns a backpack in which the length of the shoulder straps automatically adjusts when the wearer twists his or her torso. The shoulder straps are connected at the lower end to form one continuous strap. This strap passes below the bottom panel of the backpack and is contained within a channel. A member of low friction characteristics enables the continuous strap to slide freely within the channel. US 2017/0265630 A1 concerns a backpack including a pack body, two shoulder straps extended from the pack body for allowing the wearer to wear the pack body at the wearer's back and a suspension arrangement which includes a resilient unit provided between the pack body and the shoulder straps for absorbing abounding force of the pack body. US 5,954,253 A concerns a load support system including a flexible frame unit attached to a shoulder support structure and to a hip belt assembly. EP 2 324 731 A2 concerns a load carrying system for a wearer, comprising a carrier made of at least one flexible carrier material and comprising a front portion to be disposed at the wearer's front and a back portion to be disposed at the wearer's back, when the system is worn by the wearer. FR 2 974 981 A concerns a device for carrying loads, comprising a carrier base.

[0004] Further prior art is disclosed in DE 197 81 909 C2.

[0005] However, during the dynamic movement of the wearer, the object will generally not only move vertically but also horizontally. The further the object moves away horizontally from the centre of mass of the body of the wearer, the heavier the object will feel to the wearer. For example, generally the torque exerted by the centre of mass of the object about a pivot, which may be a contacting point of the object on the back of the wearer, will increase, the further the centre of mass of the object is away from the centre of mass of the body of the wearer. It is a shortcoming of the prior art, that this problem is not addressed. This problem is not limited to the dynamic case, but also applicable under static conditions.

[0006] A problem underlying the present invention is thus to provide a carrying system for an object that provides greater wearing comfort than existing carrying systems, especially under dynamic conditions.

3. Summary of the invention

[0007] This object is accomplished by the teachings of the independent claims and in particular by a carrying system for carrying an object, comprising: (a) an essentially elastic portion, (b) wherein the essentially elastic portion is attached to the object at a first position located on the object; and (c) a limitation arrangement, wherein a length of the limitation arrangement limits a maximum extension of the essentially elastic portion, and (d) wherein the limitation arrangement is attached at least at one second position on the object that is different from the first position.

[0008] In this context, an "essentially elastic portion" may return to its unloaded length, apart from small deviations, after application of a force of up to at least 200 N, preferably 500 N. A length of an "essentially elastic portion" increases by at least 1%, preferably 5% under application of a force of 100 N. The increase in length under a load, or a force, is referred to as "extension".

[0009] An advantage of the carrying system according to the present invention is that the essentially elastic portion pulls the object towards the body of the wearer. In this context, the wearer is the person carrying the object by means of the carrying system. For example, the wearer may carry the object on his back. In this case the essentially elastic portion will pull the object towards the back of the wearer. A key insight of the inventors is that the essentially elastic portion is attached to the object at a first position located on the object, whereas the limitation arrangement is attached at least at one second position on the object that is different from the first position.

[0010] For example, the limitation arrangement may be arranged below the essentially elastic portion on the object, i.e. the at least one second position is located below the first position on the object. "Below" means in this context "arranged under" in the common orientation of the carrying system and the object, when the carrying system is worn by the user to carry the object. Alternatively, the limitation arrangement may be arranged above

the essentially elastic portion on the object. "Above" means in this context "arranged higher" in the common orientation of the carrying system and the object, when the carrying system is worn by the user to carry the object.

[0011] Either arrangement allows the object to be pulled into a more upright arrangement, thus reducing the torque exerted by the object about a pivot, which may be a contacting point between the object and the wearer.

[0012] Note that the limitation arrangement and / or the elastic portion may each be attached to the object at more than one position. In particular, in addition to the at least one second position, the limitation arrangement may be attached on the object on a further position that may be different from the first position or may coincide with the first position. In any case, the limitation arrangement is attached on the object at least at one position (the *"at least one second position"*) that is different from the first position.

[0013] The carrying system therefore advantageously dampens forces due to the vertical and horizontal movement of the object during the movement of the wearer. The limitation arrangement serves to stabilise the carrying system by limiting the maximum extension of the essentially elastic portion.

[0014] The limitation arrangement may comprise a limitation strap and a guiding portion, wherein the guiding portion is attached to the object at the second position, and wherein the limitation strap is slidably attached to the guiding portion.

[0015] Therefore, the limitation strap may move to adapt to the anatomic requirements of the wearer and also during the dynamic movement in order to further dampen the forces due to the vertical and horizontal movement of the object. The guiding portion ensures sufficient stability by restricting the motion of the limitation strap to be along the guiding portion.

[0016] The guiding portion may comprise a guiding tape. A tape may comprise any type of textile such as woven, non-woven, or knitted. Alternatively, or additionally, the guiding tape may comprise an elastomer, for example polyethylene, polypropylene, chlorosulfonated polyethylene, or polyester. This allows the guiding portion to be comfortable, low friction, and low-weight, especially compared with, for example, a metallic structure.

[0017] The limitation strap may be slidably attached to the guiding portion by means of a first essentially loop-shaped tape and/or a first ring. A first "essentially loop-shaped tape" may or may not be a closed-loop. The first ring may have a number of shapes including a circular shape, a rectangular shape, an oval shape, or variations thereof. The first ring may or may not be closed. A ring may be made from a hard material such as a metal or a hard plastic or it may be made from a soft material such as a soft plastic. The first essentially loop-shaped tape or the first ring may comprise any type of textile such as woven, non-woven, or knitted. It is only important that the motion of the limitation strap is restricted to be along the guiding portion. Alternatively, or additionally, the essentially loop-shaped tape or the ring may comprise an elastomer, for example polyethylene, polypropylene, chlorosulfonated polyethylene, or polyester. This allows the first loop-shaped tape or the first ring to be comfortable, low-friction and low-weight.

[0018] It is also possible that the limitation arrangement comprises a guiding portion and a first essentially loop-shaped tape and/or a first ring but no limitation strap. This allows a particularly lightweight construction.

[0019] The limitation arrangement may be less elastic than the essentially elastic portion. In this context, less elastic means that a greater force is required to extend the limitation arrangement by a given amount, for example by 5% in length, than would be required to extend the essentially elastic portion by the same amount, for example 5% in length. This difference may be effected by a different elastic modulus, also known as Young's modulus, and/or by a different thickness. Therefore, the limitation arrangement may effectively limit the maximum extension of the essentially elastic portion. The elasticity of the limitation arrangement may be determined at least by the elasticity of the limitation strap, the elasticity of the guiding portion, and / or the elasticity of the first essentially loop-shaped tape or the first ring.

[0020] The at least one second position may be vertically separated from the first position by a first vertical distance. The separation by a first vertical distance allows the tilt of the object in a static situation as well as the range of possible tilts during dynamic movement to be engineered to allow a more ergonomic fit and better shock absorption.

[0021] The first vertical distance may be at least 2 cm, preferably at least 5 cm, more preferably at least 8 cm. The greater the first vertical distance, the more stable is the orientation of the object and the smaller is the range of possible tilts during dynamic movement.

[0022] The first position located on the object may be located at a second vertical distance of at least 2 cm below the top of the object, preferably at least 5 cm, more preferably at least 10 cm. The greater the distance between the top of the object and the first position, the higher the centre of mass of the object is located with respect to the centre of mass of the body of the wearer. The inventors have found, that it is easier for the wearer to carry the weight of the object if the centre of mass of the object is arranged as high as possible with respect to the centre of mass of the body of the wearer. This is especially true for objects worn on the back of the body, such as backpacks.

[0023] The limitation arrangement may comprise a cushioning element. The cushioning element serves two purposes. First, it provides comfort to the wearer through its cushioning effect. Second, because of its thickness, the cushioning element may act as a pivot. In combination with the essentially elastic portion, this creates a lever for pulling the object into a more upright position during use, thus leading to more ergonomic wearing properties. The cushioning element may act as a shoulder pad. If

the limitation strap is slidably attached to the guiding portion, this arrangement also allows the cushioning element to better adapt to the shape of a shoulder, therefore distributing the load more evenly than a conventional shoulder pad.

[0024] The essentially elastic portion may comprise at least a first layer and a second layer. This way, the properties of the essentially elastic portion may be engineered with a greater variety.

[0025] The first layer may comprise an elastic mesh. An elastic mesh is breathable and lightweight and may be used to provide a highly elastic first layer.

[0026] The first layer may have a first elastic modulus, the second layer may have a second elastic modulus, and the first elastic modulus may not be identical to the second elastic modulus. This advantageously increases the range of elastic properties that can be engineered for the essentially elastic portion. For example, the first elastic modulus may be greater than the second elastic modulus or alternatively the second elastic modulus may be greater than the first elastic modulus. A low elastic modulus means that the material is more elastic, i.e. extends more under a given force.

[0027] The first layer may have a different length than the second layer. This further advantageously increases the range of elastic properties that can be engineered for the essentially elastic portion. For example, the first layer may be longer than the second layer. Here, the length is determined along a longitudinal direction of the first layer. For example, if the first elastic modulus is greater than the second elastic modulus, the essentially elastic portion will then first extend rather easily under application of force and then, when the second layer is extended to the same length as the first layer, a greater force is required to further extend the essentially elastic portion. This way, it is possible to engineer strength into the carrying system for heavy usage situations.

[0028] The limitation arrangement may have a third elastic modulus and the third elastic modulus may be lower than the first elastic modulus and the second elastic modulus. For example, if the limitation arrangement has the same thickness as the first layer and the second layer, the limitation arrangement may be less elastic than the first layer and the second layer. This way the limitation arrangement may effectively limit the maximum extension of the essentially elastic portion but allowing for a relatively low thickness and thus weight of the limitation arrangement.

[0029] The limitation strap and/or the guiding portion may comprise a woven textile. Woven textiles advantageously provide good strength and high breathability. Alternatively, the limitation strap and/or the guiding portion may comprise any other type of textile, such as non-woven or knitted textiles.

[0030] The essentially elastic portion may be attached to the limitation arrangement at a third position located on the limitation arrangement. This way, the stability of the carrying system is improved advantageously. Attached in this context may mean attached directly.

[0031] The carrying system may further comprise a retaining element attached to the limitation arrangement at a fourth position located on the limitation arrangement and a fifth position located on the limitation arrangement, wherein the essentially elastic portion is arranged between the retaining element and the limitation arrangement at the fourth position and the fifth position, and wherein the essentially elastic portion is not attached to the limitation arrangement at the fourth position and/or the fifth position. If the essentially elastic portion is not attached to the limitation arrangement at the fourth position and/or the fifth position, the adaptability of the carrying system is advantageously improved. However, if the essentially elastic portion is arranged between the retaining element and the limitation arrangement at the fourth position and the fifth position, there is also an excellent stability.

[0032] A lateral movement of the essentially elastic portion with respect to the limitation arrangement may be prevented or restricted at the fourth position and/or the fifth position. This improves the lateral stability of the carrying system.

[0033] The retaining element may comprise a second essentially loop-shaped tape or a second ring. The second essentially loop-shaped tape or the second ring, may have the same properties as the first essentially loop-shaped tape or the first ring, respectively, as described herein. Therefore, the second loop-shaped tape or the second ring is comfortable and low-weight.

[0034] The retaining element may comprise an elastomer, for example polyethylene, polypropylene, chlorosulfonated polyethylene, or polyester. Therefore, the retaining element is especially durable and low-weight.

[0035] The essentially elastic portion and the limitation arrangement may be part of a carrying strap. The advantageous properties of the essentially elastic portion and the limitation arrangement are put to excellent use in a carrying strap.

[0036] The object may be a backpack or bag or a part thereof. The invention further concerns a backpack or bag comprising at least one carrying system according to the present invention as described herein. A backpack or a bag is typically worn over the shoulders and may be worn on the back. Therefore, the advantageous properties of the carrying system according to the present invention are particularly beneficial for a backpack or a bag.

4. Short description of the figures

[0037] In the following, exemplary embodiments of the invention are described with reference to the figures. The figures show:

Fig. 1: shows an exemplary backpack and carrying system according to the present invention;

Fig. 2: illustrates an advantage of an exemplary backpack and carrying system according to the present invention;

Figs. 3A-B: show a side view (Fig. 3A) and front view (Fig. 3B) of an exemplary carrying system according to the present invention; and

Figs. 4A-B: show an alternative embodiment of a backpack and carrying system according to the present invention.

5. Detailed description of preferred embodiments

[0038] In the following only some possible embodiments of the invention are described in detail. It is to be understood that these exemplary embodiments can be modified in a number of ways and combined with each other whenever compatible and that certain features may be omitted in so far as they appear dispensable. While the invention is described primarily with reference to a carrying system 10 for a backpack 20, it is to be understood that the carrying system 10 according to the present invention may be used for carrying any object.

[0039] Fig. 1 shows an exemplary carrying system 10 for carrying an object 20, comprising: an essentially elastic portion 11, wherein the essentially elastic portion 11 is attached to the object 20 at a first position 17 located on the object 20; a limitation arrangement, wherein a length of the limitation arrangement limits a maximum extension of the essentially elastic portion 11; wherein the limitation arrangement is attached at a second position on the object 20 that is different from the first position 17 (best shown in Fig. 3A). In this example, the limitation arrangement, of which the limitation strap 12 can be seen in Fig. 1, is arranged below the essentially elastic portion 11 on the object.

[0040] The carrying system 10 advantageously dampens forces due to the vertical and horizontal movement of the object during the movement of the wearer. The limitation arrangement serves to stabilise the carrying system 10 by limiting the maximum extension of the essentially elastic portion 11.

[0041] The limitation arrangement is less elastic than the essentially elastic portion 11. In this example, a force of 120 N is required to extend the limitation arrangement by 5% in length, while a force of only 20 N is required to extend the essentially elastic portion 11 by the same fraction, 5%. In this example, this difference is effected by a different elastic modulus, also known as Young's modulus, and by a different thickness. The elastic modulus of the limitation arrangement is twice as large as the elastic modulus of the essentially elastic portion 11. Moreover, the limitation arrangement is three times as thick, meaning its cross-sectional area is three times as large as that of the essentially elastic portion 11.

[0042] In this example, the backpack 20 comprises a main body 21, a left carrying system 10 and a right carrying system 10. Left carrying system 10 is part of a left shoulder strap 26b and the right carrying system 10 is part of a right shoulder strap 26a. The left shoulder strap 26b further comprises a male connecting element 15 and the right shoulder strap 26a further comprises a female connecting element 16, allowing the left carrying system and the right carrying system to be connected to one another in order to improve the stability of the backpack 20 on the back of a wearer. Each shoulder strap 26a, 26b also comprises a buckle 14 in order to adjust the total length of the shoulder strap 26a, 26b.

[0043] The first position 17 located on the object is located a second vertical distance 23 of 5 cm below the top 22 of the object. The limitation arrangement comprises a cushioning element. The limitation strap 12 also comprises a woven textile. The essentially elastic portion 11 is attached to the limitation arrangement at a third position 31 located on the limitation arrangement. The carrying system 10 further comprises a retaining element 13 described in more detail with reference to Fig. 3B below.

[0044] Fig. 2 illustrates an advantageous technical effect of the carrying system 10 according to the present invention. An advantage of the carrying system 10 according to the present invention is that the essentially elastic portion 11 pulls the object towards the body 25 of the wearer and provides a shock-absorbing effect. In this example, the object is a backpack 20. In this context, the wearer is the person carrying the object by means of the carrying system 10. For example, the wearer may carry the backpack 20 on his back.

[0045] In this case the essentially elastic portion 11 will pull the backpack 20 towards the back of the wearer.

[0046] Consider for example the situation in which the wearer makes a quick step or a jump. This will cause a sudden acceleration of the backpack 20 both horizontally and vertically. Reference sign 27a indicates the position of a backpack comprising a carrying system 10 according to the present invention during the acceleration. The backpack 20 has tilted away from the body 25 of the wearer. When the backpack 20 is in position 27a, the centre of mass of the backpack 20 is located at position 24a. The essentially elastic portion of the carrying system 10 allows the backpack to move, therefore advantageously allowing shocks to be absorbed. Reference sign 27b indicates the position of the backpack 20 shortly after the acceleration. The backpack 20 is quickly pulled back into a more upright arrangement, in which the centre of mass 24b of the backpack 20, is located closer to the body 25 than the centre of mass 24a during the acceleration, thus reducing the torque exerted by the backpack 20 about a pivot, which may be a contacting point between the object and the wearer.

[0047] Fig. 3A shows an exemplary carrying system 10 for carrying an object 20 (shown on the left side), comprising: an essentially elastic portion 11, wherein the essentially elastic portion 11 is attached to the object 20 at a first position 17 located on the object 20; a limitation

arrangement, wherein a length of the limitation arrangement limits a maximum extension of the essentially elastic portion 11; wherein the limitation arrangement is attached at a second position 34 on the object 20 that is different from the first position 17. Note that the limitation arrangement is also attached to the object 20 at the first position 17. However, what is important is that it is also attached to the object 20 at the second position 34 that is different from the first position 17. In this example, the limitation arrangement is arranged below the essentially elastic portion 11 on the object. The essentially elastic portion 11 and the limitation arrangement are part of a shoulder strap 26.

[0048] The limitation arrangement comprises a limitation strap 12 and a guiding portion 18, wherein the guiding portion 18 is attached to the object 20 at the second position 34, and wherein the limitation strap 12 is slidably attached to the guiding portion 18.

[0049] The guiding portion 18 comprises a guiding tape. The guiding tape comprises a woven textile, comprising an elastomer, in this example polypropylene. The limitation strap 12 is slidably attached to the guiding portion 18 by means of a first essentially loop-shaped tape 19, which also comprises a woven textile, comprising an elastomer, in this example polypropylene.

[0050] The essentially elastic portion 11 comprises at least a first layer 11a and a second layer 11b. The first layer 11a comprises an elastic mesh. The first layer 11a has a first elastic modulus, the second layer 11b has a second elastic modulus, and the first elastic modulus is not identical to the second elastic modulus. In this example, the first elastic modulus is greater than the second elastic modulus. The first layer 11a has a different length than the second layer 11b. In this example, the first layer 11a is longer than the second layer 11b. The limitation arrangement has a third elastic modulus and the third elastic modulus is lower than the first elastic modulus and the second elastic modulus.

[0051] Fig. 3B shows a front view of the carrying system 10 for carrying an object shown in a lateral view in Fig. 3A.

[0052] The essentially elastic portion 11 is attached to the limitation arrangement at a third position 31 located on the limitation arrangement.

[0053] The carrying system 10 further comprises a retaining element 13 attached to the limitation arrangement at a fourth position 32 located on the limitation arrangement and a fifth position 33 located on the limitation arrangement, wherein the essentially elastic portion 11 is arranged between the retaining element 13 and the limitation arrangement at the fourth position 32 and the fifth position 33, and wherein the essentially elastic portion 11 is not attached to the limitation arrangement at the fourth position 32 and/or the fifth position 33. A lateral movement of the essentially elastic portion 11 with respect to the limitation arrangement is restricted at the fourth position 32 and/or the fifth position 33. This improves the lateral stability of the carrying system 10.

[0054] The limitation arrangement comprises a limitation strap 12 and a guiding portion 18, wherein the guiding portion 18 is attached to the object 20 at the second position 34, and wherein the limitation strap 12 is slidably attached to the guiding portion 18.

[0055] The guiding portion 18 comprises a guiding tape. The guiding tape comprises a woven textile, comprising an elastomer, in this example polypropylene. The limitation strap 12 is slidably attached to the guiding portion 18 by means of a first essentially loop-shaped tape 19, which also comprises a woven textile, comprising an elastomer, in this example polypropylene.

[0056] The retaining element 13 comprises a second essentially loop-shaped tape. In this example, the retaining element 13 comprises chlorosulfonated polyethylene.

[0057] Figs. 4A and 4B show an exemplary embodiment in which the limitation arrangement is arranged above the essentially elastic portion 11 on the object 20. The object 20 is a rucksack and is shown as an outline only. The carrying system 10 for carrying an object 20, comprises: an essentially elastic portion 11, wherein the essentially elastic portion 11 is attached to the object 20 at a first position 17 located on the object 20; a limitation arrangement, wherein a length of the limitation arrangement limits a maximum extension of the essentially elastic portion 11; wherein the limitation arrangement is attached at a second position 34a on the object 20 that is different from the first position 17. Note that the limitation arrangement is also attached to the object 20 at another second position 34b which is also different to the first position 17. Both second positions 34a and 34b are located above the first position 17. However, it may also be possible that only one of the second positions 34a and 34b is located above the first position 17. In this example, the second position 34a is vertically separated from the first position 17 by a first vertical distance of 5 cm. In this example, the elastic portion 11 is pleated.

[0058] The limitation arrangement, which limits a maximum extension of the essentially elastic portion 11, comprises a guiding portion 18, a first essentially loop-shaped tape 19, a first ring 41a and a second ring 41b. The essentially elastic portion 11 and the limitation arrangement are part of a shoulder strap 26.

[0059] The guiding portion 18 is attached to the object 20 at the second positions 34a and 34b. The guiding portion 18 comprises a guiding tape. The guiding portion 18 is slidably attached to a first essentially loop-shaped tape 19 and to the first ring 41a, i.e. the essentially loop-shaped tape 19 and the first ring 41a may slide along the guiding portion 18. The essentially elastic portion 11 is coupled to the limitation arrangement by means of the second ring 41b through which the tape-shaped elastic portion 11 is threaded.

Reference signs:

[0060]

10: carrying system
11: essentially elastic portion
11a: first layer
11b: second layer
12: limitation strap
13: retaining element
14: buckle
15: male connecting element
16: female connecting element
17: first position
18: guiding portion
19: first essentially loop-shaped tape
20: backpack
21: main body
22: top of backpack
23: second vertical distance
24: centre of mass of backpack
25: body of wearer
26: shoulder strap
27a: position during acceleration
27b: position shortly after acceleration
31: third position
32: fourth position
33: fifth position
34: second position
41: first ring

[0061] In the following, further embodiments are described to facilitate the understanding of the invention:

1. A carrying system (10) for carrying an object (20), comprising:

(a) an essentially elastic portion (11),
(b) wherein the essentially elastic portion (11) is attached to the object (20) at a first position (17) located on the object (20); and
(c) a limitation arrangement, wherein a length of the limitation arrangement limits a maximum extension of the essentially elastic portion (11), and
(d) wherein the limitation arrangement is attached at least at one second position (34) on the object (20) that is different from the first position (17).

2. The carrying system (10) according to the preceding embodiment, wherein the limitation arrangement comprises a limitation strap (12) and a guiding portion (18), wherein the guiding portion (18) is attached to the object (20) at the second position (34), and wherein the limitation strap (12) is slidably attached to the guiding portion (18).

3. The carrying system (10) according to the preceding embodiment, wherein the guiding portion (18) comprises a guiding tape.

4. The carrying system (10) according to one of embodiments 2 or 3, wherein the limitation strap (12) is slidably attached to the guiding portion (18) by means of a first essentially loop-shaped tape (19) and/or a first ring (41).

5. The carrying system (10) according to one of the preceding embodiments, wherein the limitation arrangement is less elastic than the essentially elastic portion (11).

6. The carrying system (10) according to one of the preceding embodiments, wherein the at least one second position (34) is vertically separated from the first position by a first vertical distance.

7. The carrying system (10) according to the preceding embodiment, wherein the first vertical distance is at least 2 cm.

8. The carrying system (10) according to one of the preceding embodiments, wherein the first position (17) located on the object (20) is located at a second vertical distance 23 of at least 2 cm below the top (22) of the object (20).

9. The carrying system (10) according to one of the preceding embodiments, wherein the limitation arrangement comprises a cushioning element.

10. The carrying system (10) according to one of the preceding embodiments, wherein the essentially elastic portion (11) comprises at least a first layer (11a) and a second layer (11b).

11. The carrying system (10) according to the preceding embodiment, wherein the first layer (11a) comprises an elastic mesh.

12. The carrying system (10) according to one of embodiments 8 or 9, wherein the first layer (11a) has a first elastic modulus, wherein the second layer (11b) has a second elastic modulus, and wherein the first elastic modulus is not identical to the second elastic modulus.

13. The carrying system (10) according to one of embodiments 8-10, wherein the first layer (11a) has a different length than the second layer (11b).

14. The carrying system (10) according to one of embodiments 12-13, wherein the limitation arrangement has a third elastic modulus and wherein the third elastic modulus is lower than the first elastic modulus and the second elastic modulus.

15. The carrying system (10) according to one of the preceding embodiments, wherein the limitation ar-

rangement and/or the guiding portion (18) comprises a woven textile.

16. The carrying system (10) according to one of the preceding embodiments, wherein the essentially elastic portion (11) is attached to the limitation strap (12) at a third position (31) located on the limitation strap (12).

17. The carrying system (10) according to the preceding embodiment, further comprising a retaining element (13) attached to the limitation arrangement at a fourth position (32) located on the limitation arrangement and a fifth position (33) located on the limitation arrangement, wherein the essentially elastic portion (11) is arranged between the retaining element (13) and the limitation arrangement at the fourth position (32) and the fifth position (33), and wherein the essentially elastic portion (11) is not attached to the limitation arrangement at the fourth position (32) and/or the fifth position (33).

18. The carrying system (10) according to the preceding embodiment, wherein the retaining element (13) comprises a second essentially loop-shaped tape.

19. The carrying system (10) according to one of embodiments 17 or 18, wherein the retaining element (13) comprises an elastomer.

20. The carrying system (10) according to one of the preceding embodiments, wherein the essentially elastic portion (11) and the limitation arrangement are part of a carrying strap.

21. The carrying system (10) according to one of the preceding embodiments, wherein the object (20) is a backpack or bag, or a part (21) thereof.

22. A backpack or bag comprising at least one carrying system (10) according to one of the preceding embodiments.

Claims

1. A carrying system (10) for carrying an object (20), comprising:

   (a) an essentially elastic portion (11),
   (b) wherein the essentially elastic portion (11) is attached to the object (20) at a first position (17) located on the object (20); and
   (c) a limitation arrangement, wherein a length of the limitation arrangement limits a maximum extension of the essentially elastic portion (11), and
   (d) wherein the limitation arrangement is attached at least at one second position (34) on the object (20) that is different from the first position (17).

2. The carrying system (10) according to the preceding claim, wherein the limitation arrangement comprises a limitation strap (12) and a guiding portion (18), wherein the guiding portion (18) is attached to the object (20) at the second position (34), and wherein the limitation strap (12) is slidably attached to the guiding portion (18).

3. The carrying system (10) according to the preceding claim, wherein the guiding portion (18) comprises a guiding tape.

4. The carrying system (10) according to one of the preceding claims, wherein the at least one second position (34) is vertically separated from the first position by a first vertical distance.

5. The carrying system (10) according to one of the preceding claims, wherein the first position (17) located on the object (20) is located at a second vertical distance 23 of at least 2 cm below the top (22) of the object (20).

6. The carrying system (10) according to one of the preceding claims, wherein the limitation arrangement comprises a cushioning element.

7. The carrying system (10) according to one of the preceding claims, wherein the essentially elastic portion (11) comprises at least a first layer (11a) and a second layer (11b).

8. The carrying system (10) according to one of claims 5 or 6, wherein the first layer (11a) has a first elastic modulus, wherein the second layer (11b) has a second elastic modulus, and wherein the first elastic modulus is not identical to the second elastic modulus.

9. The carrying system (10) according to claim 8, wherein the limitation arrangement has a third elastic modulus and wherein the third elastic modulus is lower than the first elastic modulus and the second elastic modulus.

10. The carrying system (10) according to one of the preceding claims, wherein the limitation arrangement and/or the guiding portion (18) comprises a woven textile.

11. The carrying system (10) according to one of the preceding claims, wherein the essentially elastic portion (11) is attached to the limitation strap (12) at a

third position (31) located on the limitation strap (12).

12. The carrying system (10) according to the preceding claim, further comprising a retaining element (13) attached to the limitation arrangement at a fourth position (32) located on the limitation arrangement and a fifth position (33) located on the limitation arrangement, wherein the essentially elastic portion (11) is arranged between the retaining element (13) and the limitation arrangement at the fourth position (32) and the fifth position (33), and wherein the essentially elastic portion (11) is not attached to the limitation arrangement at the fourth position (32) and/or the fifth position (33).

13. The carrying system (10) according to one of the preceding claims, wherein the essentially elastic portion (11) and the limitation arrangement are part of a carrying strap.

14. The carrying system (10) according to one of the preceding claims, wherein the object (20) is a backpack or bag, or a part (21) thereof.

15. A backpack or bag comprising at least one carrying system (10) according to one of the preceding claims.

FIG 1

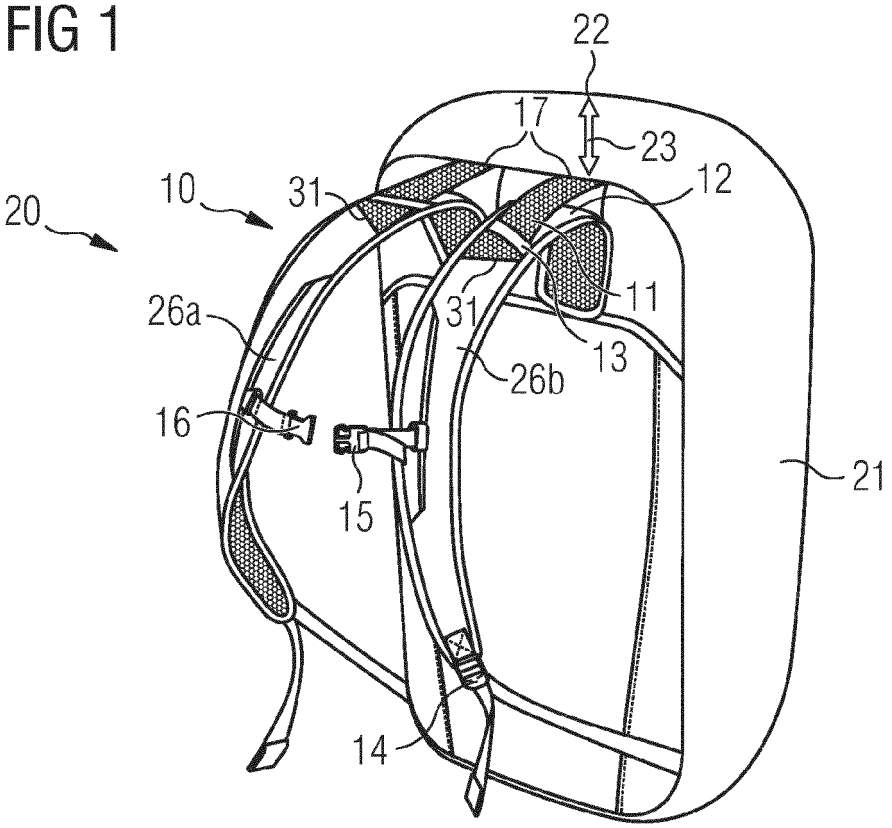

22
17
23
12
10
31
20
11
31
26a
13
26b
16
21
15
14

FIG 2

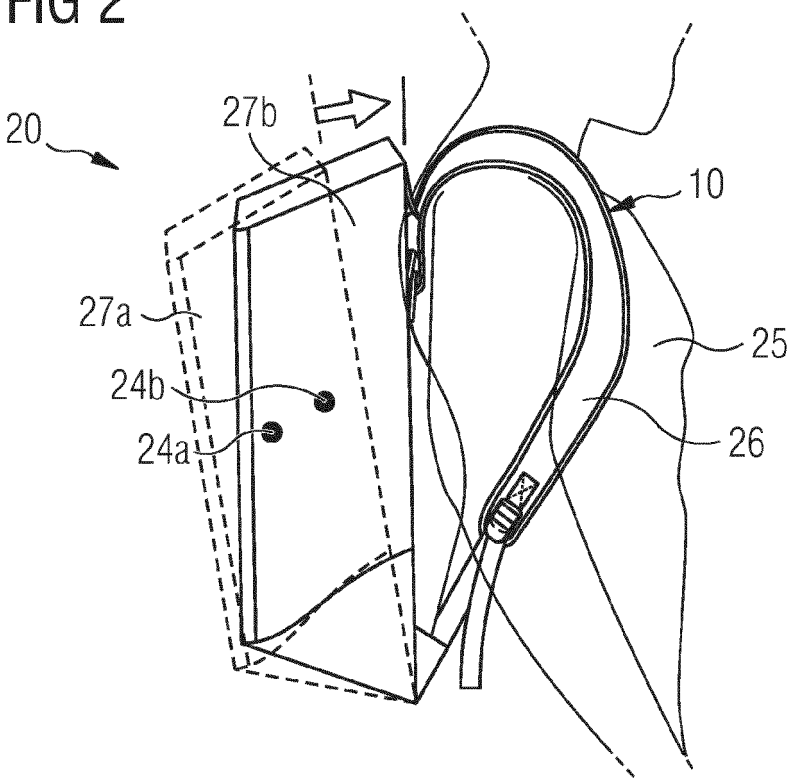

27b
20
10
27a
25
24b
26
24a

FIG 3A

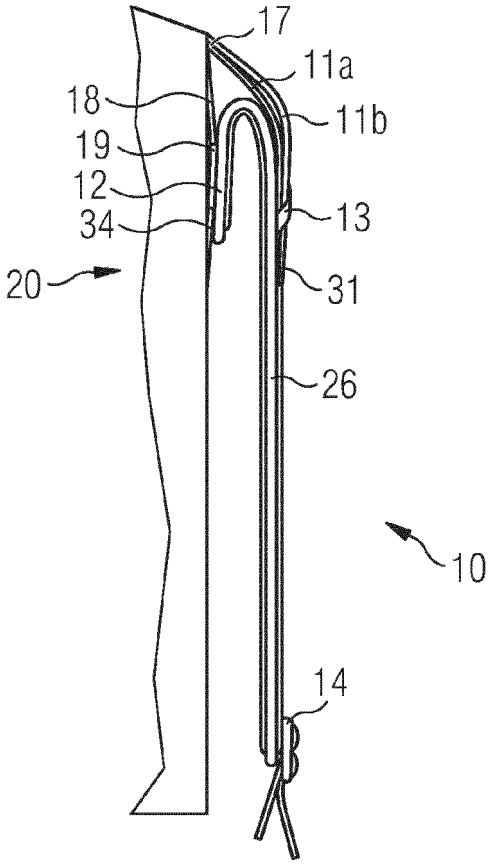


FIG 3B

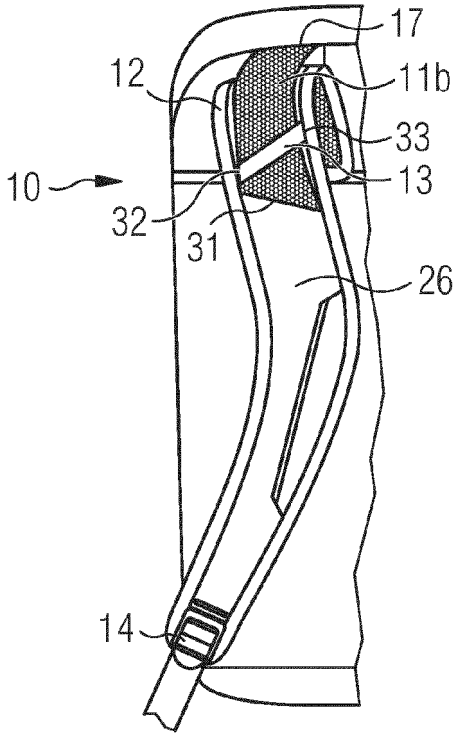


FIG 4A

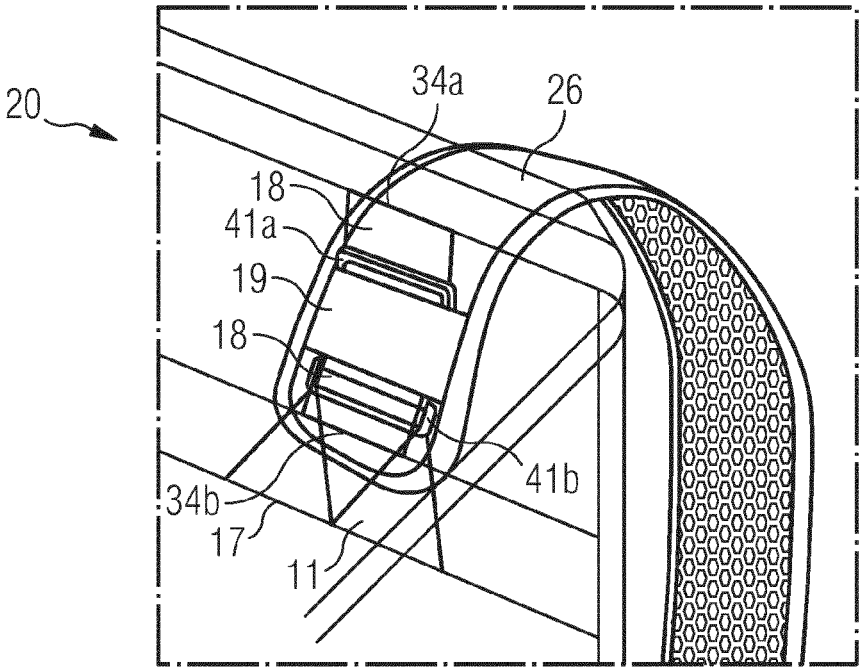
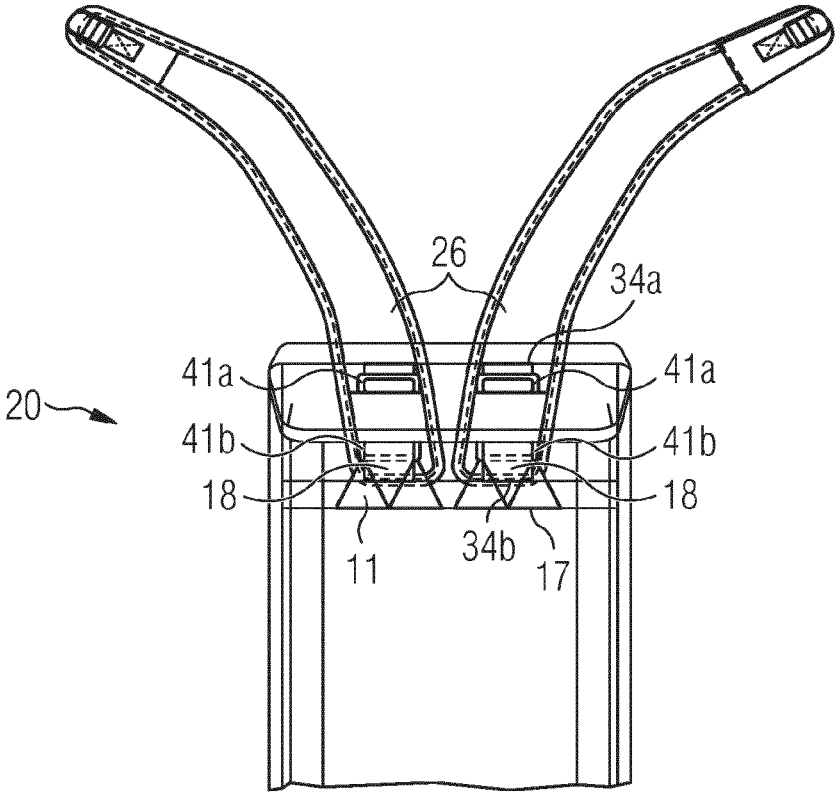

20
34a
26
18
41a
19
18
41b
34b
17
11

FIG 4B


20
26
34a
41a
41a
41b
41b
18
18
11
34b
17

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EUROPEAN SEARCH REPORT

Application Number
EP 19 15 7684

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 Y	US 2006/131355 A1 (TATE AARN [NZ]) 22 June 2006 (2006-06-22) * paragraphs [0046] - [0049]; figure 1 *	1,4-11, 13-15 2,3,12	INV. A45F3/04
X	US 6 070 776 A (FURNARY KEVIN P [US] ET AL) 6 June 2000 (2000-06-06) * column 3, line 58 - column 4, line 67; figures 3A-3D *	1	
Y	EP 2 371 232 A2 (ADIDAS AG [DE]) 5 October 2011 (2011-10-05) * paragraphs [0034], [0035]; figure 1 *	2,3,12	
A	DE 299 10 127 U1 (ROSSIGNOL SA [FR]) 9 September 1999 (1999-09-09) * the whole document *	1-15	
A	FR 2 974 981 A1 (RUFFINATI HERVE DENIS [FR]) 16 November 2012 (2012-11-16) * the whole document *	1-15	
A	US 2017/265630 A1 (KAO PETER [US]) 21 September 2017 (2017-09-21) * the whole document *	1-15	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	15 August 2019	Fidalgo Marron, B

CATEGORY OF CITED DOCUMENTS

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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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15-08-2019

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006131355 A1	22-06-2006	AU 2005234623 A1	01-06-2006
		DE 102005055688 A1	18-05-2006
		NZ 536593 A	24-03-2005
		US 2006131355 A1	22-06-2006
US 6070776 A	06-06-2000	NONE	
EP 2371232 A2	05-10-2011	CN 102204749 A	05-10-2011
		DE 102010003481 A1	06-10-2011
		EP 2371232 A2	05-10-2011
		US 2012012628 A1	19-01-2012
DE 29910127 U1	09-09-1999	DE 29910127 U1	09-09-1999
		FR 2781135 A1	21-01-2000
		US 6375053 B1	23-04-2002
FR 2974981 A1	16-11-2012	NONE	
US 2017265630 A1	21-09-2017	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 2371232 A2 **[0003]**
- JP 2005304827 A **[0003]**
- DE 29910127 U1 **[0003]**
- JP 5713160 B **[0003]**
- US 6070776 A **[0003]**
- US 20170265630 A1 **[0003]**
- US 5954253 A **[0003]**
- EP 2324731 A2 **[0003]**
- FR 2974981 A **[0003]**
- DE 19781909 C2 **[0004]**