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(54) LIFTING SLING

(57) A lifting sling (10) manufactured from a piece of cloth material which comprises a back support zone (12), a seat zone (14) and two leg flap zones which are each bounded by an inner edge (16a) and an outer edge (16b), wherein each leg flap zone has a central axis (H1, H2), wherein the central axis (H1) of the first leg flap zone (16)

and the central axis (H2) of the second leg flap zone (18) converge in downward direction and intersect in a point of intersection (S) located outside the lifting sling (10) downward of the leg flap zones (16, 18) on the lifting sling central axis (H).

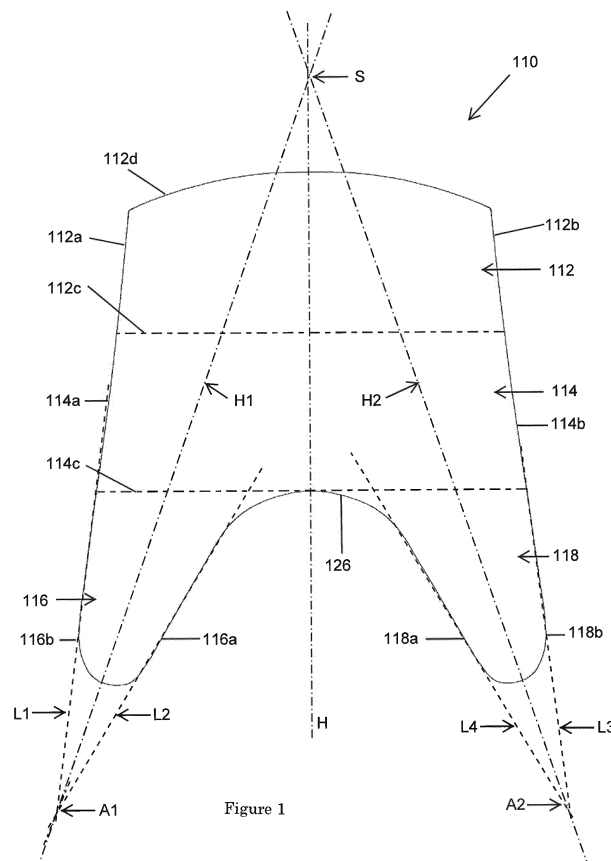


Figure 1

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Description

FIELD

[0001] The invention is drawn to a passive lifting sling for supporting individuals, in particular for supporting care recipients in a substantially sitting position.

BACKGROUND

[0002] In so-called intramural and extramural care, lifting slings for supporting care recipients are widely used. What is involved here is care given to care recipients at home and care recipients living in health care institutions such as nursing homes and hospitals. A distinction is made between active and passive lifting slings.

[0003] Active lifting slings are used with so-called stand assist hoists where the care recipient in the raised position is on his own feet and, in any case during standing up, is supported by an active lifting sling which, generally at two attachment points, which may be designed as suspension loops provided or not provided with fastening clips, is attached to a hoisting arm of a lifting hoist. In use, active lifting slings reach under the armpits and along an upper or middle part of the back of the care recipient.

[0004] Passive lifting slings are used with lifting hoists with a so-called hoisting yoke. In general, passive lifting slings have four suspension loops, provided or not provided with fastening clips, with the aid of which the lifting sling is fastened to the hoisting yoke. The care recipient is supported by the passive lifting sling and is held in a substantially seated position. Again, with the passive lifting slings, a distinction can be made between standard lifting slings, all-day lifting slings and toileting lifting slings. Although standard lifting slings offer a good support, they are not suitable for all-day use. The standard lifting sling can be put on while the care recipient is already in a somewhat seated position. The all-day lifting slings give greater support under the seat and are designed such that the care recipient can remain in-situ all day long. A care recipient can be accommodated in an all-day lifting sling only when the care recipient is in a somewhat reclining position. Conversely, the toileting lifting slings do not provide support under the seat, neither do they cover the lower back so that the toilet can be used without taking the care recipient from the lifting sling.

[0005] An example of a known all-day lifting sling is represented in Figure 1. A known lifting sling 110 has a lifting sling central axis H relative to which the lifting sling is mirror symmetrical, and comprises a piece of cloth material composed of several mutually connected lengths of material. The known lifting sling 110 comprises:

- a back support zone 112 which is bounded by a back zone upper boundary 112d, a first back zone longitudinal edge 112a, a second back zone longitudinal edge 112b which is mirror symmetrical to the first

back zone longitudinal edge 112a relative to the lifting sling central axis H, and a back zone lower boundary 112c;

- a seat zone 114 which is bounded by a seat zone upper boundary which links up with the back zone lower boundary 112c, a first seat zone longitudinal edge 114a which links up with the first back zone longitudinal edge 112a, a second seat zone longitudinal edge 114b which is mirror symmetrical to the first seat zone longitudinal edge 114a relative to the lifting sling central axis H, and a seat zone lower boundary 114c;
- a first leg flap zone 116 which is bounded by leg flap zone upper boundary which links up with the seat zone lower boundary 114c, an inner edge 116a; and an outer edge 116b;
- a second leg flap zone 118 which is bounded by leg flap zone upper boundary which links up with the seat zone lower boundary 114c, an inner edge 118a, and an outer edge 118b.

[0006] The inner edge 116a of the first leg flap zone 116 is connected via a lower edge 126 to the inner edge 118a of the second leg flap zone 118. With the known lifting sling, a line L1 which coincides with the outer edge 116b and a line L2 which coincides with the inner edge 116a of the first leg flap zone intersect in an angular point A1. A bisector of the two lines L1, L2 in this angular point A1 forms a central axis H1 of the first leg flap zone 116.

[0007] Further, a line L3 which coincides with the outer edge 118b and a line L4 which coincides with the inner edge 118a of the second leg flap zone 118 intersect in an angular point A2. A bisector of the two lines L3, L4 in this angular point A2 forms a central axis H2 of the second leg flap zone 118.

[0008] The central axis H1 of the first leg flap zone 116 and the central axis H2 of the second leg flap zone 118 and the lifting sling central axis H intersect in a point of intersection S. With the known lifting sling, this point of intersection S is located above the leg flap zones 116, 117, which is clearly shown in Figure 1. Furthermore, it is clearly visible that adjacent a lower edge 126 which interconnects the two inner edges 116b, 118b, the cloth material has a radius R. With the known lifting sling, this radius is approximately xx cm.

[0009] When using the lifting sling, the leg flaps 116, 118 are brought together by their ends 116c, 118c via a lateral outer side of the upper legs under the upper legs of the care recipient. Here, the ends of the leg flaps 116, 118 reach upwards between the legs of the care recipient. Thus, a concave 3D-shape is formed with a deepened portion at the location of the seat zone, in which the care recipient is seated.

[0010] A drawback of this known lifting sling is that the sitting comfort of the lifting sling is relatively limited. This is caused by the fact that when the legs flaps are folded inwards when in use, an accumulation of cloth material occurs at the lower edge 126 in the lower part of the seat

zone 114. As a result, during use, the care recipient is seated on an accumulation of cloth material, which is uncomfortable for the care recipient and also increases the risk of decubitus. The accumulation of cloth material leads to increased friction between the cloth material and the care recipient. This additional friction leads to development of heat, which heat development leads to an increased risk of decubitus. Providing darts in the seat zone can reduce the accumulation of cloth material. However, this improves the sitting comfort only to a limited extent, as the darts themselves also slightly negatively affect the comfort of the care recipient and also cause an increased risk of decubitus. Here, it should be taken into consideration that the care recipient sometimes remains in the lifting sling the entire day and hence optimal comfort is very important. Furthermore, applying darts during manufacture of the lifting sling is time consuming and hence costly.

SUMMARY

[0011] Therefore, an object of the invention is to provide a lifting sling with increased comfort, preserving the advantages of the existing lifting sling while the cost price of manufacturing the lifting sling is preferably lower.

[0012] To that end, the invention provides a lifting sling with a lifting sling central axis relative to which the lifting sling is mirror symmetrical, while the lifting sling comprises a piece of cloth material and comprises:

- a back support zone which is bounded by:
 - a back zone upper boundary;
 - a first back zone longitudinal edge having a curved contour which is concave viewed from the lifting sling central axis,
 - a second back zone longitudinal edge which is mirror symmetrical to the first back zone longitudinal edge relative to the lifting sling central axis; and
 - a back zone lower boundary;
- a seat zone which is bounded by:
 - a seat zone upper boundary which links up with the back zone lower boundary;
 - a first seat zone longitudinal edge having a curved contour which is concave viewed from the lifting sling central axis and links up with the first back zone longitudinal edge;
 - a second seat zone longitudinal edge which is mirror symmetrical to the first seat zone longitudinal edge relative to the lifting sling central axis;
 - a seat zone lower boundary;
- a first leg flap zone which is bounded by:
 - leg flap zone upper boundary which links up with

the seat zone lower boundary;

- an inner edge; and
- an outer edge;

wherein a tangent to the outer edge at the location of a central point thereof and a tangent to the inner edge at the location of a central point thereof intersect in an angular point, wherein a bisector of the two tangents in the angular point forms a central axis of the first leg flap zone;

- a second leg flap zone which is bounded by:

- leg flap zone upper boundary which links up with the seat zone lower boundary;
- an inner edge; and
- an outer edge;

wherein a tangent to the outer edge at the location of a central point thereof and a tangent to the inner edge at the location of a central point thereof intersect in an angular point, wherein a bisector of the two tangents in the angular point forms a central axis of the second leg flap zone,

wherein the inner edge of the first leg flap zone is connected via a lower edge to the inner edge of the second leg flap zone, wherein the central axis of the first leg flap zone and the central axis of the second leg flap zone converge in downward direction and intersect in a point of intersection which is located outside the lifting sling downwards of the leg flap zones on the lifting sling central axis.

[0013] The inwardly directed leg flaps of the lifting sling according to the invention allow the ends of the leg flaps, with the lifting sling in flat condition, to be already closer together than with the known lifting sling. Therefore, when bringing the ends of the leg flaps together between the legs of the care recipient, a smaller distance is to be bridged. Thus, in the seat zone and the back zone, a 3D shape can be realized without accumulation of cloth material of any significance adjacent the lower edge of the seat zone. Therefore, as a result, providing darts in the seat zone adjacent the leg flaps is not necessary. The leg flaps can have an inward directed shape (which is defined by leg flap central axes intersecting downward of the leg flaps) in that the outer edges of the back and seat zones, and preferably also the leg flap zones, are made concave viewed from the lifting sling central axis. The concave shape of the longitudinal edges of the zones provides space in the cloth material at the location of the lateral areas of the back and seat zones and leg flaps for bringing the leg flaps in an inward folded position of use without the occurrence of a cumbersome accumulation of cloth material and hence the formation of folds in the lower range of the seat zone adjacent the lower edge and the leg flaps. This results in an improved sitting comfort when compared to the known, passive all-day lifting slings. As the accumulation of cloth material in the lower

range of the seat zone is completely or at least largely prevented, the risk of decubitus too is considerably reduced. This is an important advantage, especially since an all-day lifting sling is involved, in which the care recipient remains all day.

[0014] In addition, the lifting sling according to the invention also has the advantage that it is easier to manufacture. As there is no or hardly any accumulation of cloth material in the seat zone adjacent the leg flaps, the provision of darts in this part of the lifting sling is superfluous. This leads to a simplified manufacturing process and lower costs of the lifting sling.

[0015] The invention also provides a single piece of cloth material according to claim 16. With it, a lifting sling according to the invention can be manufactured in a simple manner, at relatively low costs. It is possible then to manufacture a lifting sling without darts having to be provided in areas of the cloth material which, during use, the care recipient lies against or is otherwise in contact with. In fact, from such a single piece of cloth material, with a minimum of tailoring operations for fastening suspension loops which may be provided with clips, a lifting sling can be manufactured having all the above described advantages.

[0016] Further elaborations of the invention are described in the subclaims and will be clarified hereinafter in more detail on the basis of an example with reference to the Figures.

BRIEF DESCRIPTION OF THE FIGURES

[0017]

Figure 1 is a schematic top plan view of a known lifting sling; and

Figure 2 is a schematic top plan view of an example of a lifting sling according to the invention.

DETAILED DESCRIPTION OF THE FIGURES

[0018] Figure 2 shows an example of a lifting sling in which several embodiments as described in the subclaims are embodied. It is noted that the embodiments can also be used independently of each other and that the invention is not limited to the example shown in the drawing. The reference numerals are used herein for clarification but have no limiting effect. An embodiment can also be designed in a manner other than represented in the example shown in the drawing.

[0019] In general terms, the invention comprises a lifting sling 10 with a lifting sling central axis H relative to which the lifting sling is mirror symmetrical. The lifting sling 10 comprises a piece of cloth material which may optionally be composed of different pieces. The lifting sling 10 comprises a back support zone 12, a seat zone 14, a first leg flap zone 16 and a second leg flap zone 18. The back support zone 12 is bounded by a back zone upper boundary, a first back zone longitudinal edge 12a

having a curved contour which is concave viewed from the lifting sling central axis H, a second back zone longitudinal edge 12b which is mirror symmetrical to the first back zone longitudinal edge 12a relative to the lifting sling central axis H and a back zone lower boundary 12c. The seat zone 14 is bounded by a seat zone upper boundary which links up with the back zone lower boundary 12c. The seat zone 14 is further bounded by a first seat zone longitudinal edge 14a having a curved contour which is concave viewed from the lifting sling central axis H, and which links up with a first back zone longitudinal edge 12a, preferably in a continuous manner. The opposite lateral side seat zone 14 is bounded by a second seat zone longitudinal edge 14b which is mirror symmetrical to the first seat zone longitudinal edge 14a relative to the lifting sling central axis H. A further boundary of the seat zone 14 is formed by a seat zone lower boundary 14c. The piece of cloth material is further provided with a first leg flap zone 16 which is bounded by a leg flap zone upper boundary which links up with the seat zone lower boundary 14c, an inner edge 16a and an outer edge 16b. A tangent L1 to the outer edge 16b at the location of a central point 16c thereof and a tangent L2 to the inner edge 16a at the location of a central point thereof intersect in an angular point A1. A bisector of the two tangents L1, L2 in the angular point A1 forms a central axis H1 of the first leg flap zone 16. The piece of cloth material further comprises a second leg flap zone 18 which is bounded by leg flap zone upper boundary which links up with the seat zone lower boundary 14c, an inner edge 18a and an outer edge 18b. A tangent L3 to the outer edge 18b at the location of a central point 18c thereof and a tangent L4 to the inner edge 18a at the location of a central point 18a thereof intersect in an angular point A2. A bisector of the two tangents L3, L4 in the angular point A2 forms a central axis H2 of the second leg flap zone 18. The inner edge 16a of the first leg flap zone 16 is connected via a lower edge 26 to the inside edge 18a of the second leg flap zone 18. The central axis H1 of the first leg flap zone 16 and the central axis H2 of the second leg flap zone 18 converge in downward direction and intersect in a point of intersection S located outside the lifting sling 10 downward of the leg flap zones 16, 18 on the lifting sling central axis H.

[0020] The advantages of the lifting sling according to the invention have already been described in the summary, to which reference is made here. The lifting sling 10 according to the invention can be configured in several embodiments. This includes, for instance, an embodiment which is reusable, and an embodiment which is disposable. Also, different fabrics can be used for the cloth material to manufacture the lifting sling. Here, for instance a woven or knitted fabric or for instance polyester, cotton or a stretch fabric such as elastan can be considered. Additionally, the lifting sling can be designed in different sizes, with the mutual ratios between the back zone, the seat zone and the leg flaps being substantially equal for the different sizes of the lifting slings.

[0021] In one embodiment, of which an example is shown in Figure 2, the lower edge 26 can comprise a substantially circular segment which is symmetrical relative to the lifting sling central axis H and which has a radius that is in the range of 5-9 cm, more particularly approximately 7 cm. The circular segment extends over a angular range of at least 170°. It is preferred that the circular segment 26 extends over an angular range of at least approximately 190°.

[0022] Experiments have shown that with such an embodiment, the risk of fold formation at the location of the lower edge 26 in the seat zone 14 is minimized still further.

[0023] It is noted that the angular range of at least 170° and preferably at least 190° can also be applied in embodiments with a different radius than in the range mentioned hereinabove. Through the use of an angular range greater than 180° it is effected that central axes H1, H2 of the leg flap zones converge in downward direction so that the point of intersection is outside the cloth material downwards of the leg flap zones 16, 18. This is of importance for the purpose of, without using darts in the seat zone 14, still obtaining a good, bowl-shaped 3D shape, while moreover accumulation of cloth material and hence fold formation is prevented.

[0024] In an embodiment, the piece of cloth material can comprise a head support zone 20 which is mirror symmetrical relative to the lifting sling central axis H. The head support zone 20 is bounded at its underside by a head support zone lower boundary 20c which links up with the back support zone upper boundary 12d. At one lateral side, the head support zone is bounded by a first head support zone longitudinal edge 20a having a substantially curved contour which is concave viewed from the lifting sling central axis H. At the other lateral side, the head support zone 20 is bounded by a second head support zone longitudinal edge 20b which, relative to the central axis H, is mirror symmetrical to the first head support zone longitudinal edge 20a. At an upper side, the head support zone 20 is bounded by a head support zone upper edge 20d which interconnects the two head support zone longitudinal edges 20a, 20b.

[0025] The head support zone 20 can increase the comfort of the lifting sling 10 further. This is particularly favorable for care recipients who suffer from neck and/or head instability, or care recipients suffering from a condition of the head and/or the neck. The head support zone 20 provides an additional support for neck and head which links up seamlessly with the back zone 12 and the 3D fit of the lifting sling 10. An example of this embodiment is shown in Figure 2. Owing to the seamless connection of the head support zone 20 to the back zone upper boundary, the 3D fit of the lifting sling is continued in the head support zone 20, which forms a deepened portion in which the neck and the head are well supported.

[0026] In an embodiment, the zones 12, 14, 16, 18, 20 can be integrally manufactured from one length of the cloth material mentioned.

[0027] By manufacturing the lifting sling 20 from one single piece of cloth material, a considerable improvement of comfort for the user/care recipient is achieved. Owing to the absence of connecting seams, the care recipient experiences no negative effects, even when remaining in the lifting sling for a longer period of time. Additionally, it holds that the provision of connecting seams is superfluous because the zones are integrally manufactured in one piece of cloth material. This enables a simplified production of the lifting sling which can be realized at lower costs compared to the known lifting slings.

[0028] In one embodiment, the seat zone 14 is not provided with darts adjacent the lower edge 26 and the leg flap zones 16, 18.

[0029] The shape of the lifting sling 10 whereby the central axis H1 of the first leg flap zone 16 and the central axis H2 of the second leg flap zone 18 converge in downward direction and intersect in a point of intersection S which is located outside the lifting sling 10 downward of the leg flap zones 16, 18 on the lifting sling central axis H, has as a result that the provision of darts in the seat zone 14 is not necessary to prevent accumulation of cloth material. The necessary space in the cloth material to create the 3D shape is also obtained in that the longitudinal edges of the back and seat zones 12, 14 as well as the outer edges 16a, 18a of the leg flaps 16, 18, are made concave, viewed from the lifting sling central axis H. This eliminates the necessity of providing the 3D fit by means of the use of darts in the seat zone 14.

[0030] In an embodiment, of which an example is shown in Figure 2, the lifting sling 10 may be provided, at the location of at least an upper portion of the back zone 12, with a substantially line-shaped shaped opening 28, which extends over a particular length L in the longitudinal direction of the lifting sling central axis H and which is symmetrical relative to the lifting sling central axis H. The substantially linear opening 28 has a width which extends perpendicular to the central axis H of the lifting sling 10.

[0031] The length L can be in the range of approximately 15-35 cm. In non-loaded condition, the width B of the linear opening can be approximately 0.5-5 cm.

[0032] In loaded condition, the width of the opening will be greater. The pressure on the spine is relieved by the linear opening 28, which is favorable for the comfort of the care recipient.

[0033] In a further embodiment of the lifting sling 10, when the lifting sling 10 is provided with a head support zone 20 as described hereinabove, the linear opening 28 can also extend in a lower portion of the head support zone.

[0034] This further elaboration, too, can contribute to an improved comfort of the care recipient because then also the cervical part of the spine is at least partly relieved.

[0035] In one embodiment, the outer edge 16b of the first leg flap zone 16, the first seat zone longitudinal edge 14a and the first back zone longitudinal edge 12a can

extend along a continuous contour which is concave viewed from the lifting sling central axis H. In this embodiment, the outer edge 18b of the second leg flap zone 18, the second seat zone longitudinal edge 14b and the second back support zone longitudinal edge 12b also extend along a continuous contour which is concave viewed from the lifting sling central axis H.

[0036] Owing to the continuous contours of the two longitudinal edges 12a, 14a, 16b and 12b, 14, 18b of the lifting sling 10, the tension on these longitudinal edges is substantially uniform, so that the longitudinal edges have no extra heavily loaded points entailing extra risk of wear or damage. Furthermore, as already set out hereinabove, the concave contour of the longitudinal edges provides the necessary space in the cloth material for bringing the leg flaps 16 and 18 in the mutually approximated condition, thereby forming the desired 3D shape in the lifting sling 10, so that a comfortable support is provided for the care recipient.

[0037] This advantage is also obtained with the embodiment provided with a head support zone 20, when first head support longitudinal edge 20a extends along a contour which links up in a continuous manner with the continuous contour along which extend the outer edge 16b of the first leg flap zone 16, the first seat zone longitudinal edge 14a and the first back zone longitudinal edge 12a. With this embodiment, the second head support longitudinal edge 20b extends along a contour which links up in a continuous manner with the continuous contour along which extend the outer edge 18b of the second leg flap zone 18, the second seat zone longitudinal edge 14b and the second back longitudinal edge 12b.

[0038] Formation of folds and creases due to discontinuities in the contours of the longitudinal edges is prevented, so that during use, the cloth material maintains a virtually creaseless configuration without darts needing to be provided in the cloth material. This leads to an improved comfort for the care recipient during use of the lifting sling.

[0039] In an embodiment of which an example is shown in Figure 2, the lifting sling 10 can comprise four suspension points for fastening suspension means to the lifting sling. Here, each leg flap zone 16, 18 can comprise at least one suspension point 24a, 24b which is provided adjacent a free lower end of the leg flap zone 16, 18 where the inner edge 16a, 18a links up with the outer edge 16b, 18b. The two remaining suspension points 22a, 22b can be connected to the back zone upper edge 12 or, in case the lifting sling 10 comprises a head support zone 20 as described hereinabove, to the head support zone longitudinal edges 20a, 20b or to the head support zone upper edge 20d. The widened parts at the location of the suspension points 22a, 22b, 24a, 24b shown in the Figure do not form the suspension points as such. During tailoring of the lifting sling 10, these widened parts are folded over and sewn up and serve for strengthening at the location of the fastening of the suspension points.

[0040] In one embodiment of the invention, the lifting

sling 10 which comprises a head support zone 20 as described hereinabove can, as already indicated and as shown in Figure 2, comprise a widened part in the lock material at the location of each head support longitudinal edge 20a, 20b. With the lifting sling 10 in tailored condition, each widened part is folded over and sewn to the head support zone 20. With such an embodiment, at the location of each folded-over and sewn-up widened part of the head support zone 20, a dart can be provided adjacent each head support zone suspension point 22a, 22b. Then, the lifting sling 10 can be free of darts at the location of the upper boundary 12d of the back zone 12 and the lower boundary 20c of the head support zone 20 in a middle range of the lifting sling 10 which, in use, abuts against the care recipient. Here, only one dart or a few darts at each suspension point 22a, 22b can suffice. With the aid of these darts, which are located adjacent the head support longitudinal edges 20a, 20b, the head support zone can be given a shape such that it provides a good head support. As only one or two darts are provided in the head support zone 20 adjacent each suspension point 22a, 22b, the head support zone 20 is free of darts adjacent the head support zone lower boundary 20c and the back zone 12 adjacent the back zone upper boundary 12d. Specifically the absence of darts in the central area of the back zone 12 and the head support zone 20 adjacent the back zone upper boundary 12d and the head zone lower boundary 20c provides a much better comfort than with the known all-day lifting slings. The fact is that with these known all-day lifting sling, the head support zone and the back zone were manufactured from separate lengths of cloth material. Then, the lower boundary of the head support zone was considerably shorter than the upper boundary of the back zone. In order to compensate for this difference in length, in the top side of the back zone darts were provided. Therefore, with the known all-day lifting sling, darts were present over the entire width of the lifting sling at the location of the boundary between the head support zone and the back zone. In use, these darts exert additional pressure on the back of the care recipient, which is not optimal for comfort and can furthermore lead to decubitus. With the lifting sling 10 according to this embodiment, the seat zone 14, the back zone 12, the head support zone 20 and the leg flap zones 16, 18 are manufactured from a single piece of cloth, so that connecting seams are absent which is beneficial to comfort and minimizes the risk of decubitus.

[0041] The suspension points can for instance be provided with suspension loops and/or clips (not shown) with the aid of which the lifting sling 10 can be fastened to a hoisting yoke (not shown). Such a hoisting yoke is known per se and can for instance be fastened to a rollable hoist or to a hoist rail system. The configuration described hereinabove of four suspension points 22a, 22b, 24a, 24b provides a stable support for a care recipient. Here, the leg flap zones 16, 18 run via the lateral outer sides of the upper legs of the care recipient, via an underside

of the upper legs of the care recipient to a central area, such that the suspension points 24a, 24b of the leg flap zones 16, 18, when connected to the hoisting yoke, reach in upward direction between the upper legs. Thus, a stable support of the care recipient is obtained whereby he in more or less a sitting position is carried by the lifting sling 10 and is also movable in this position.

[0042] In one embodiment of which an example is shown in Figure 2, and where the lifting sling 10 comprises a head support zone 20, each suspension point 22a, 22b can be connected to the head support zone longitudinal edge 20a, 20b at a position where, in use, the neck of the care recipient is located.

[0043] As the suspension points 22a, 22b are at the location of the neck of the care recipient, a much better support of the neck of the care recipient can be obtained, which has a beneficial effect on the stability of the support of the care recipient. As the suspension points 22a, 22b are at the location of the neck, the pressure on the shoulders of the patient is eased. With the known all-day lifting slings, the suspension points were at the location of the shoulders. This means that with the known all-day lifting slings, the lifting force is exerted approximately at the widest point of the care recipient, which leads to greater pressure forces on the care recipient. This adversely affects the comfort of the patient. By providing the suspension points, according to this further embodiment, at the location of the neck, this drawback of the known all-day lifting sling is obviated and a lifting sling is obtained which provides improved comfort when compared to the known all-day lifting slings.

[0044] In one embodiment, the lifting sling 10 can comprise a neck roll for supporting a neck of a user. Here, the neck roll extends in a direction substantially perpendicular to the lifting sling central axis H.

[0045] When the lifting sling 10 comprises a head support zone 20 with suspension points 22a, 22b connected thereto as described hereinabove, the lifting sling 10 can comprise a neck roll 30 which extends in the head support zone 20 in a direction substantially perpendicular to the lifting sling central axis H. More particularly, the neck roll can then be connected to and extend between the suspension points 22a, 22b of the head support zone 20.

[0046] Thus, an even better and more stable support of the neck of the care recipient is obtained.

[0047] In one embodiment, the suspension points 22a, 22b, 24a, 24b can comprise suspension loops with clips which are configured to connect the lifting sling to a hoisting yoke which is connected to a hoist or a hoist rail system.

[0048] Such clips simplify connecting and disconnecting the lifting sling to and from a hoisting yoke. An example of hoist clips which can be used to that end are described in WO2014084740.

[0049] The invention also provides a single, non-tailored piece of cloth material for manufacturing a lifting sling according to the invention. The single, non-tailored piece of cloth material has a central axis H relative to

which the cloth material is mirror symmetrical. The single, non-tailored piece of cloth material comprises a back support zone 12 which is bounded by a back zone upper boundary, a first back zone longitudinal edge 12a having a curved contour which is concave viewed from the central axis H, a second back zone longitudinal edge 12b which is mirror symmetrical to the first back zone longitudinal edge 12a relative to the central axis H and a back zone lower boundary 12c. Further, the single, non-tailored piece of cloth material comprises a seat zone 14 which is bounded by a seat zone upper boundary which links up with the back zone lower boundary 12c, a first seat zone longitudinal edge 14a having a curved contour which is concave viewed from the central axis H, and links up with the first back zone longitudinal edge 12a, a second seat zone longitudinal edge 14b which is mirror symmetrical to the first seat zone longitudinal edge 14a relative to the central axis H, and a seat zone lower boundary 14c. Further, the single, non-tailored piece of cloth material comprises a first leg flap zone 16 which is bounded by leg flap zone upper boundary which links up with the seat zone lower boundary 14c, an inner edge 16a, and an outer edge 16b. A tangent L1 to the outer edge 16b at the location of a central point 16bc thereof and a tangent L2 to the inner edge 16a at the location of a central point 16ac thereof intersect in an angular point A1. A bisector of the two tangents in the angular point A1 forms a central axis H1 of the first leg flap zone 16. The non-tailored piece of cloth material also comprises a second leg flap zone 18 which is bounded by leg flap zone upper boundary which links up with the seat zone lower boundary 14c, an inner edge 18a, and an outer edge 18b. A tangent L3 to the outer edge 18b at the location of a central point 18bc thereof and a tangent L4 to the inner edge 18a at the location of a central point 18ac thereof intersect in an angular point A2. A bisector of the two tangents L3, L4 in the angular point A2 forms a central axis H2 of the second leg flap zone. The inner edge 16a of the first leg flap zone 16 is connected via a lower edge 26 to the inner edge 18a of the second leg flap zone 18. The central axis H1 of the first leg flap zone 16 and the central axis H2 of the second leg flap zone 18 converge in downward direction and intersect in a point of intersection S located outside the cloth material 10 downwards of the leg flap zones 16, 18 on the central axis H.

[0050] In one embodiment, the lower edge 26 can comprise a substantially circular segment which is symmetrical relative to the lifting sling central axis H and which has a radius in the range of 5 - 9 cm, more particularly is approximately 7 cm. The circular segment extends over an angular range of at least 170°, preferably at least approximately 190°.

[0051] It is noted that the angular range of at least 170° and preferably at least 190° can also be applied in embodiments with a different radius than in the range mentioned hereinabove. Through the use of an angular range greater than 180°, it is effected that central axes H1, H2

of the leg flap zones converge in a downward direction, so that the point of intersection lies outside the cloth material downwards of the leg flap zones 16, 18. This is important to still obtain a good, bowl-shaped 3D shape without using darts in the seat zone 14 while furthermore, accumulation of cloth and hence formation of folds is prevented.

[0052] In one embodiment, the single, non-tailored piece of cloth material can comprise a head support zone 20 which is mirror symmetrical relative to the lifting sling central axis H. Here, the head support zone 20 is bounded by a head support zone lower boundary which links up with the back support upper boundary, a first head support longitudinal edge 20a with a substantially curved contour which is concave viewed from the lifting sling central axis, a second head support zone longitudinal edge 20b which, relative to the central axis H, is mirror symmetrical to the first head support zone longitudinal edge 20a, and a head support zone upper edge 20d which interconnects the two head support zone longitudinal edges 20a, 20b.

[0053] The various embodiments described hereinabove can be used independently of each other and be combined in various manners. The reference numerals in the detailed description and the claims do not limit the description of the embodiments and the claims and merely serve for clarification.

KEY TO SYMBOLS/LEGEND

[0054]

10 -	lifting sling
12 -	back support zone
12a -	first back zone longitudinal edge
12b -	second back zone longitudinal edge
12c -	back zone lower boundary
12d -	back zone upper boundary
14 -	seat zone
14a -	first seat zone longitudinal edge
14b -	second seat zone longitudinal edge
14c -	seat zone lower boundary
16 -	first leg flap zone
16a -	inner edge
16b -	outer edge
16ac -	central point inner edge
16bc -	central point outer edge
18 -	second leg flap zone
18a -	inner edge
18b -	outer edge
18ac -	central point inner edge
18bc -	central point outer edge
20 -	head support zone
20a -	first head support longitudinal edge
20b -	second head support longitudinal edge
20c -	head support zone lower boundary
20d -	head support zone upper edge
22a, 22b -	suspension points

24a -	suspension point first leg flap zone
24b -	suspension point second leg flap zone
26 -	lower edge
28 -	linear opening
5 30 -	neck roll
110 -	lifting sling
112 -	back support zone
112a -	first back zone longitudinal edge
112b -	second back zone longitudinal edge
10 112c -	back zone lower boundary
112d -	back zone upper boundary
114 -	seat zone
114a -	first seat zone longitudinal edge
114b -	second seat zone longitudinal edge
15 114c -	seat zone lower boundary
116 -	first leg flap zone
116a -	inner edge
116b -	outer edge
118 -	second leg flap zone
20 118a -	inner edge
118b -	outer edge
126 -	lower edge
A1 -	angular point of line L1 and L2
25 A2 -	angular point of line L3 and L4
B -	width linear opening
H -	lifting sling central axis
H1 -	central axis of the first leg flap zone
H2 -	central axis of the second leg flap zone
30 L1 -	tangent coinciding with outer edge first leg flap zone
L2 -	tangent coinciding with inner edge first leg flap zone
L3 -	tangent coinciding with outer edge second leg flap zone
35 L4 -	tangent coinciding with inner edge second leg flap zone
L -	length linear opening
R -	radius
40 S -	point of intersection

Claims

- 45 **1.** A lifting sling (10) with a lifting sling central axis (H) relative to which the lifting sling is mirror symmetrical, wherein the lifting sling (10) comprises a piece of cloth material, wherein the lifting sling (10) comprises:
- 50 - a back support zone (12) which is bounded by:
- a back zone upper boundary;
- a first back zone longitudinal edge (12a) having a curved contour which is concave viewed from the lifting sling central axis (H),
- a second back zone longitudinal edge (12b) which is mirror symmetrical to the first
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back zone longitudinal edge (12a) relative to the lifting sling central axis (H); and
 - a back zone lower boundary (12c);

- a seat zone (14) which is bounded by:

- a seat zone upper boundary which links up with the back zone lower boundary (12c);
- a first seat zone longitudinal edge (14a) having a curved contour which is concave viewed from the lifting sling central axis (H), and links up with the first back zone longitudinal edge (12a);
- a second seat zone longitudinal edge (14b) which is mirror symmetrical to the first seat zone longitudinal edge (14a) relative to the lifting sling central axis (H);
- a seat zone lower boundary (14c);

- a first leg flap zone (16) which is bounded by:

- leg flap zone upper boundary which links up with the seat zone lower boundary (14c);
- an inner edge (16a); and
- an outer edge (16b);

wherein a tangent (L1) to the outer edge (16b) at the location of a central point (16bc) thereof and a tangent (L2) to the inner edge (16a) at the location of a central point (16ac) thereof intersect in an angular point (A1), wherein a bisector of the two tangents (L1, L2) in said angular point forms a central axis (H1) of the first leg flap zone (16);

- a second leg flap zone (18) which is bounded by:

- leg flap zone upper boundary which links up with the seat zone lower boundary (14c);
- an inner edge (18a); and
- an outer edge (18b);

wherein a tangent (L3) to the outer edge (18b) at the location of a central point (18bc) thereof and a tangent (L4) to the inner edge (18a) at the location of a central point (18ac) thereof intersect in an angular point (A2), wherein a bisector of the two tangents (L3, L4) in said angular point forms a central axis (H2) of the second leg flap zone (18),

wherein the inner edge (16a) of the first leg flap zone (16) is connected via a lower edge (26) to the inner edge (18a) of the second leg flap zone (18), wherein the central axis (H1) of the first leg flap zone (16) and the central axis (H2) of the second leg flap zone (18) converge in downward direction and intersect in a point of intersection (S) which is located outside the lifting sling (10)

downwards of the leg flap zones (16, 18) on the lifting sling central axis (H).

2. The lifting sling according to claim 1, wherein the lower edge (26) comprises a substantially circular segment which is symmetrical relative to the lifting sling central axis (H) and which has a radius which is in the range of 5 - 9 cm, more particularly is approximately 7 cm, wherein the circular segment extends over an angular range of at least 170°, preferably at least approximately 190°.
3. The lifting sling according to claim 1 or 2, provided with a head support zone (20) which is mirror symmetrical relative to the lifting sling central axis (H), and wherein the head support zone (20) is bounded by:
 - a head support zone lower boundary which links up with the back support zone upper boundary;
 - a first head support zone longitudinal edge (20a) with a substantially curved contour which is concave viewed from the lifting sling central axis;
 - a second head support zone longitudinal edge (20b) which, relative to the central axis (H), is mirror symmetrical to the first head support zone longitudinal edge (20a); and
 - a head support zone upper boundary (20d) which interconnects the two head support zone longitudinal edges (20a, 20b).
4. The lifting sling according to any one of claims 1 - 3, wherein the said zones (12, 14, 16 18, 20) are integrally manufactured in one piece of said cloth material.
5. The lifting sling according to any one of the preceding claims, wherein the seat zone (14) is not provided with darts adjacent the lower edge (26) and the leg flap zones (16, 18).
6. The lifting sling according to any one of the preceding claims, wherein the lifting sling (10) comprises, at the location of at least an upper portion of the back zone (12), a substantially linear opening (28) which extends over a certain length in the longitudinal direction of the lifting sling central axis (H) and which is symmetrical relative to the lifting sling central axis (H), wherein the substantially linear opening has a width which extends perpendicular to the central axis (H) of the lifting sling (10).
7. The lifting sling according to claim 6 provided with a head support zone according to claim 3, wherein the linear opening (28) also extends in a lower portion of the head support zone.

8. The lifting sling according to any one of the preceding claims, wherein the outer edge (16b) of the first leg flap zone (16), the first seat zone longitudinal edge (14a) and the first back zone longitudinal edge (12a) extend along a continuous contour which is concave viewed from the lifting sling central axis (H), and wherein the outer edge (18b) of the second leg flap zone (18), the second seat zone longitudinal edge (14b) and the second back support zone longitudinal edge (12b) extend along a continuous contour which is concave viewed from the lifting sling central axis (H).
9. The lifting sling according to claim 8, wherein the first head support longitudinal edge (20a) extends along a contour which links up in a continuous manner with the continuous contour along which extend the outer edge (16b) of the first leg flap zone (16), the first seat zone longitudinal edge (14a) and the first back zone longitudinal edge (12a), and wherein the second head support longitudinal edge (20b) extends along a contour which links up in a continuous manner with the continuous contour along which extend the outer edge (18b) of the second leg flap zone (18), the second seat zone longitudinal edge (14b) and the second back zone longitudinal edge (12b).
10. The lifting sling according to any one of the preceding claims, wherein the lifting sling is provided with four suspension points for fastening suspension means to the lifting sling, wherein each leg flap zone (16, 18) is provided with at least one suspension point (24a, 24b) which is provided adjacent a free lower end of the leg flap zone (16, 18) where the inner edge (16a, 18a) links up with the outer edge (16b, 18b), and wherein two remaining suspension points (22a, 22b) are connected to the back zone upper edge (12), or, if a the lifting sling (10) is provided with a head support zone (20) according to claim 3, to the head support longitudinal edges (20a, 20b) or to the head support upper edge (20d).
11. The lifting sling according to claim 10 provided with a head support zone according to claim 3, wherein the head support zone (20), wherein each suspension point (22a, 22b) is connected with the head support zone longitudinal edge (20a, 20b) adjacent a position where in use the neck of the care recipient is situated.
12. The lifting sling according to any one of the preceding claims, wherein the lifting sling (10) is provided with a neck roll (30) for supporting a neck of a user, wherein the neck roll (30) extends in a direction substantially perpendicular to the lifting sling central axis (H).
13. The lifting sling according to claim 11, wherein the lifting sling (10) is provided with a neck roll for supporting a neck of a user, wherein the neck roll (30) extends in the head support zone (20) in a direction substantially perpendicular to the lifting sling central axis (H), wherein the neck roll (30) is connected with and extends between the suspension points (22a, 22b) of the head support zone (20).
14. The lifting sling according to claim 10 or 11, wherein the suspension points (22a, 22b, 24a, 24b) are provided with clips which are configured to connect the lifting sling with a hoisting yoke which is connected with a hoist or a hoist rail system.
15. The lifting sling according to any one of the preceding claims, provided with a head support zone (20) which is mirror symmetrical relative to the lifting sling central axis (H), and wherein the head support zone (20) is bounded by:
- a head support zone lower boundary which links up with the back support zone upper boundary;
 - a first head support zone longitudinal edge (20a) with a substantially curved contour which is concave viewed from the lifting sling central axis;
 - a second head support zone longitudinal edge (20b) which, relative to the central axis (H), is mirror symmetrical to the first head support zone longitudinal edge (20a); and
 - a head support zone upper boundary (20d) which interconnects the two head support zone longitudinal edges (20a, 20b),
 - a widened part in the cloth material at the location of each head support zone longitudinal edge (20a, 20b) which in tailored condition of the lifting sling (10) is folded over and sewn to the head support zone (20);
 - a dart at the location of each folded-over and sewn-up widened part of the head support zone (20) adjacent each head support zone suspension point (22a, 22b);
- wherein the lifting sling (10) is free of darts at the location of the upper boundary (12d) of the back zone (12) and the lower boundary (20c) of the head support zone (20) in a middle range of the lifting sling (10) which in use abuts against the care recipient.
16. A single piece of cloth material for manufacturing a lifting sling according to any one of the preceding claims, wherein the single piece of cloth material in non-tailored condition has a central axis (H) relative to which the cloth material is mirror symmetrical, wherein the single piece of cloth material in non-tailored condition is provided with:
- a back support zone (12) which is bounded by:

- a back zone upper boundary;
 - a first back zone longitudinal edge (12a) having a curved contour which is concave viewed from the central axis (H);
 - a second back zone longitudinal edge (12b) which is mirror symmetrical to the first back zone longitudinal edge (12a) relative to the central axis (H); and
 - a back zone lower boundary (12c);
- a seat zone (14) which is bounded by:
- a seat zone upper boundary which links up with the back zone lower boundary (12c);
 - a first seat zone longitudinal edge (14a) having a curved contour which is concave viewed from the central axis (H), and links up with the first back zone longitudinal edge (12a);
 - a second seat zone longitudinal edge (14b) which is mirror symmetrical to the first seat zone longitudinal edge (14a) relative to the central axis (H);
 - a seat zone lower boundary (14c);
- a first leg flap zone (16) which is bounded by:
- leg flap zone upper boundary which links up with the seat zone lower boundary (14c);
 - an inner edge (16a); and
 - an outer edge (16b);
- wherein a tangent (L1) to the outer edge (16b) at the location of a central point (16bc) thereof and a tangent (L2) to the inner edge (16a) at the location of a central point (16ac) thereof intersect in an angular point (A1), wherein a bisector of the two tangents (L1, L2) in said angular point forms a central axis (H1) of the first leg flap zone;
- a second leg flap zone (18) which is bounded by:
- leg flap zone upper boundary which links up with the seat zone lower boundary (14c);
 - an inner edge (18a); and
 - an outer edge (18b);

wherein a tangent (L3) to the outer edge (18b) at the location of a central point (18bc) thereof and a tangent (L4) to the inner edge (18a) at the location of a central point (18ac) thereof intersect in an angular point (A2), wherein a bisector of the two tangents (L3, L4) in said angular point (A2) forms a central axis (H2) of the second leg flap zone (18),

wherein the inner edge (16a) of the first leg flap zone (16) is connected via a lower edge (26) to the inner edge (18a) of the second leg flap zone

(18), wherein the central axis (H1) of the first leg flap zone (16) and the central axis (H2) of the second leg flap zone (18) converge in downward direction and intersect in a point of intersection (S) which is located outside the lifting sling (10) downwards of the leg flap zones (16, 18) on the central axis (H) of the non-tailored piece of cloth material.

17. The single, non-tailored piece of cloth material according to claim 16, wherein the lower edge (26) comprises a substantially circular segment which is symmetrical relative to the lifting sling central axis (H) and which has a radius which is in the range of 5 - 9 cm, more particularly is approximately 7 cm, wherein the circular segment extends over an angular range of at least 170°, preferably at least approximately 190°.
18. The single, non-tailored piece of cloth material according to claim 16 or 17, provided with a head support zone (20) which is mirror symmetrical relative to the lifting sling central axis (H), and wherein the head support zone (20) is bounded by:
- a head support zone lower boundary which links up with the back support zone upper boundary;
 - a first head support zone longitudinal edge (20a) with a substantially curved contour which is concave viewed from the lifting sling central axis;
 - a second head support zone longitudinal edge (20b) which, relative to the central axis (H), is mirror symmetrical to the first head support zone longitudinal edge (20a); and
 - a head support zone upper boundary (20d) which interconnects the two head support zone longitudinal edges (20a, 20b).

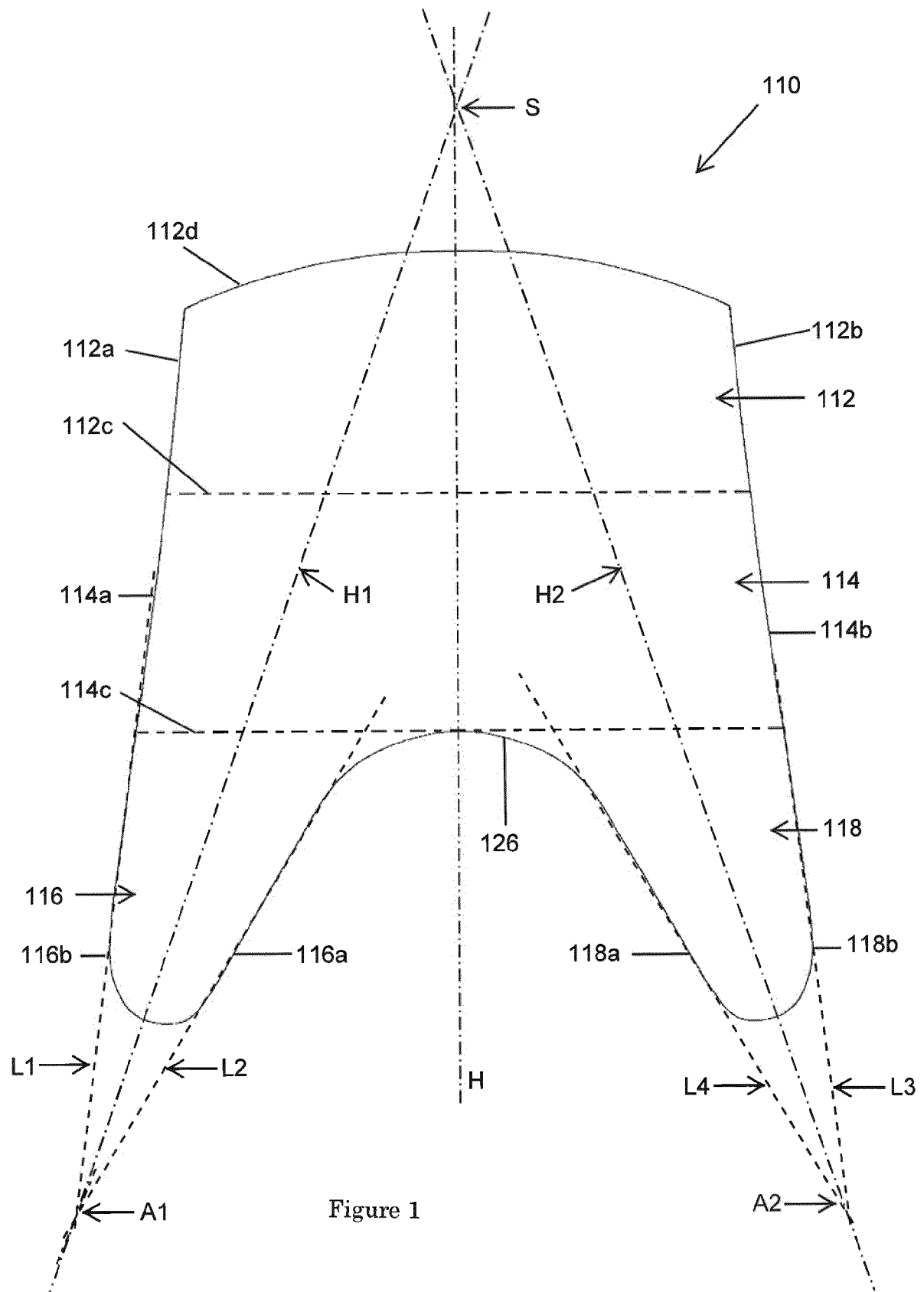


Figure 1

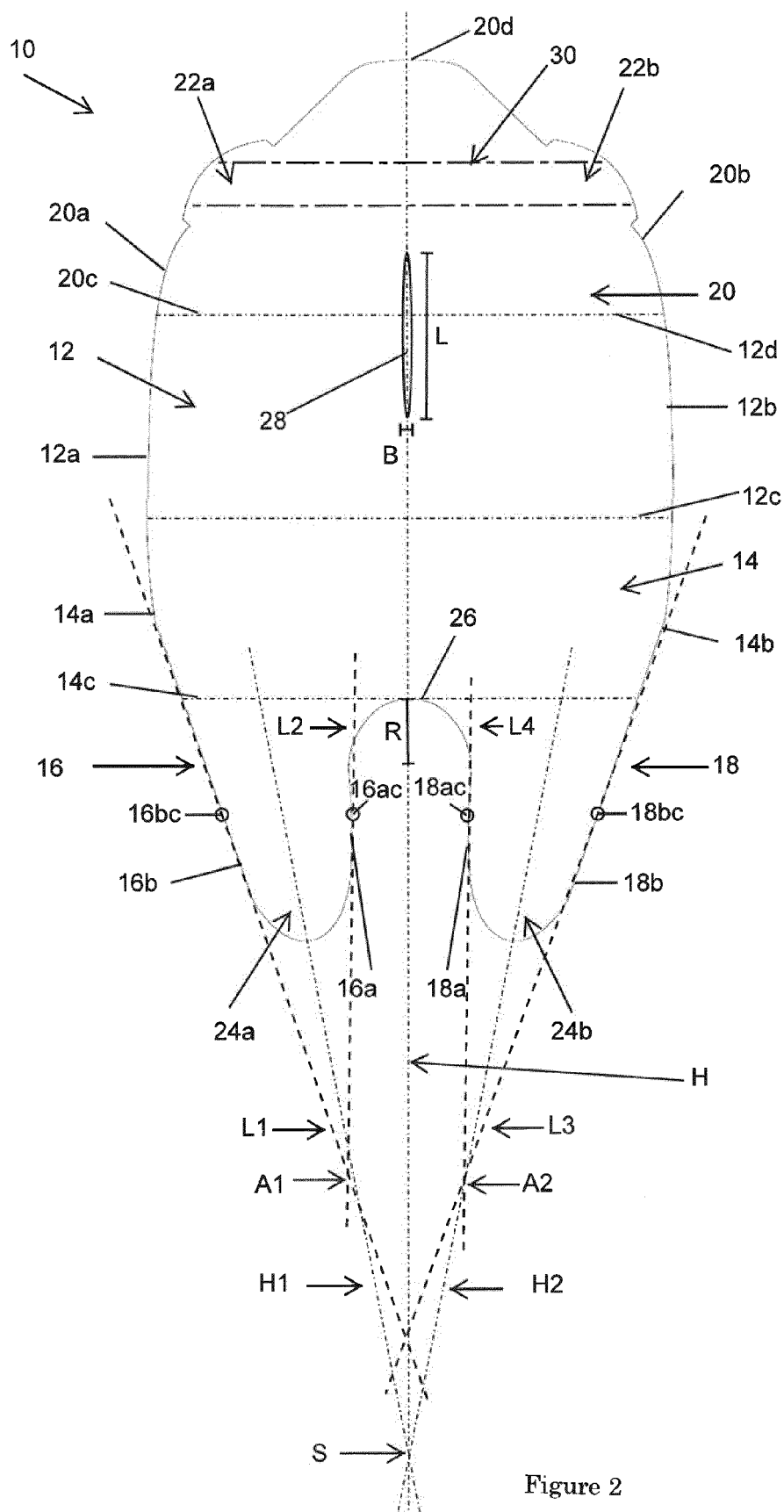


Figure 2



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Application Number
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