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(11) **EP 0 959 825 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention  
of the grant of the patent:

**12.05.2004 Bulletin 2004/20**

(21) Application number: **98902289.2**

(22) Date of filing: **02.02.1998**

(51) Int Cl.7: **A61F 5/02**

(86) International application number:  
**PCT/NL1998/000066**

(87) International publication number:  
**WO 1998/034570 (13.08.1998 Gazette 1998/32)**

(54) **CORSET**

KORSETT

CORSET

(84) Designated Contracting States:  
**BE DE FR GB LU NL**

(30) Priority: **05.02.1997 NL 1005187**

(43) Date of publication of application:  
**01.12.1999 Bulletin 1999/48**

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## Description

**[0001]** The invention relates to a corset for the treatment of a patient suffering from a back complaint, such as scoliosis, comprising a lower part to be supported by the hip, and an upper part to be fitted around the patient's chest, and a coupling which is provided to connect the lower part and the upper part.

**[0002]** The corset may be applied for various kinds of complaints, but for the sake of clarity it will be discussed in relation to scoliosis.

**[0003]** A corset of this kind is known, for instance, from the European patent application EP-A-0 234 372. The corset known from this publication is comprised of relatively rigid elements and forces the patient into a particular posture. In order to allow the patient some freedom of movement, a removable connecting element is provided between the lower part and the upper part. The known corset applies stationary pressure forces to the patient's body in order to stabilize and, if possible, to correct the scoliosis.

**[0004]** From DE-A-66,593 a corset is known comprising a lower part and an upper part which are interconnected in three places. The connecting elements comprise a band of spring steel, a steel element in the form of a horse shoe, and a pressure spring. The construction aims to provide the wearer of the corset with a permanent support and rotational pressure. However, the construction of this corset locks the patient into a rather tight straitjacket.

**[0005]** With regard to the working of the known corset, several theories exist which, briefly, amount to the following. In a first theory the body of the patient is stimulated to withdraw from the unpleasant feeling of the corset. To allow room for this, the known corset is provided with openings opposite to places where pressure is exerted on the patient's body. Another theory is that the corset produces an elastic deformation of the patient's body which with time will become a permanent correction.

**[0006]** Anyway, the known corset has a number of disadvantages obstructing effectiveness. As mentioned above, the known corset is rigid, resulting in poor wearing comfort. For this reason the known corset is usually only employed with the more serious forms of scoliosis. It is precisely these more serious forms of scoliosis that are less suitable for correction by means of a corset. The best result to be achieved with the known corset in such a case is stabilization of the scoliosis. Therefore, a need exists for a corset which is more comfortable in wear so that it invites usage even with lighter forms of scoliosis, whereby wearing the corset can become more effective.

**[0007]** A further disadvantage of the known corset is that because of the construction being so rigid, the patient runs the risk of hanging in the corset. The muscles are used less, especially since for the corset to be effective it must be worn at least 23 hours a day. The con-

sequential weakening of the muscles is counterproductive with respect to the use of the known corset, in the sense that this may result in the worsening of the scoliosis. Yet another disadvantage of the known corset is that due to the rigid construction the corrective forces decrease, as the scoliosis improves. This requires constant adjustment of the known corset if the scoliosis is to be treated fully.

**[0008]** Still another disadvantage of the known corset is that the lower part is fitted so closely and even clasping the pelvic region so tightly that it causes pain.

**[0009]** Still another disadvantage of the known corset construction is that it forces the patient into so unnatural a posture, that it becomes obvious to others, which from a psychological viewpoint has a negative influence on the willingness to start wearing a corset.

**[0010]** The object of the invention is now to remove these disadvantages. To this end the corset according to the invention is characterized in that the coupling is adapted to allow the upper part to move longitudinally, laterally and rotationally with respect to the under part. This coupling allows the patient to move relatively freely even when wearing the corset according to the invention, improving the wearing comfort with the result that the willingness to actually wear the corset is positively influenced. This takes away the objections to wearing the corset also with lighter forms of scoliosis, thus allowing optimal exploitation of the efficacy of the corset's corrective action.

**[0011]** In a further embodiment of the invention the corset is equipped such that the lower part and the upper part are each provided with an adjustable springy element to enable the lower part and the upper part to apply a pressure force on the patient's body. The springy element may be an adjustable elastic band. This increases the efficacy and functionality of the corset because the forces the corset exerts on the patient's body are thus made independent of the extent of correction of scoliosis being realized at any given moment during wear of the corset. Especially this advantage of the corset according to the invention distinguishes it decisively from the known corset.

**[0012]** In a preferred embodiment, the corset according to the invention should then be executed such that the springy element of the lower part is provided at the point where during use the lower part rests on the patient's pelvis, and that the lower part further comprises a support plate coupled with the springy element, which support plate is preferably also a springy element, which in use rests at the height of the patient's lumbar region.

**[0013]** As mentioned, the support plate is located such that in use it is positioned at the height of the scoliotic complaint, in the lumbar region of the back. Due to its customary s-form, the scoliosis frequently spans the entire back. The scoliosis in the upper back often becomes visible through the development of a gibbus (deformation of the ribs). A kind of gibbus also often appears in the lumbar region, due to a slight protrusion of

the bundle of muscles at the convex side of the scoliosis. A corrective force is applied to both gibbuses. Even in the cases where the lumbar region does not exhibit any scoliosis, it is still necessary to apply a force to prevent that, as a result of correction of the upper region, a new curve develops in the lumbar region. The force exerted on the lumbar region has to prevent this.

**[0014]** Further, it is desirable that the springy element of the upper part is provided at the height of the scoliosis to be corrected and in use at the same side of the patient as the springy element of the lower part.

**[0015]** To properly distribute the forces to be applied to the patient's body, the upper part should preferably further be provided with a pressure plate under the patient's armpit at the side opposite the springy element of the upper part, which pressure plate during wear is located somewhat higher than said springy element.

**[0016]** Finally, the upper part is advantageously provided with at least one pressure plate which in use is located at the height of the patient's sternum.

**[0017]** The coupling comprises a bar-like part and a sleeve-like part, with the bar-like part being at least to some extent slidable in the sleeve-like part, and the bar-like part and the sleeve-like part being attached to the lower part and the upper part, without both being attached to the same part. This embodiment very simply allows the patient to move his chest in relation to the pelvis both lengthways and sideways. It also makes it possible to turn the thorax in relation to the lower part of the body. In a particularly effective manner said embodiment affords the patient a mobility and wearing comfort not much inferior to the situation in which the corset is not required. In addition it is desirable, that a flexible connection is provided, for instance a light chain, for coupling the upper part with the lower part to prevent the corset from falling apart when putting it on and taking it off.

**[0018]** In this respect the corset according to the invention is very effective if only one single coupling is provided at the height of the patient's side.

**[0019]** A relatively open and therefore easily wearable and inconspicuous embodiment of the corset is characterized in that both the lower part and the upper part are substantially formed by a brace which together with the springy element, can surround the patient's body.

**[0020]** With the corsets of the prior art the pressure plates are rigidly attached to the corset. In a further preferred embodiment of the corset the pressure plates are joined with the brace by means of a ball and socket joint, whereby said pressure plates at the side facing the brace are provided with a bulge fitting into a hollowing in a hinge element being a part of or being attached to the brace. The bulge may be attached to each pressure plate as separate part, or may be integrated by means of a local deformation of the pressure plate. Each pressure plate is kept in place by means of an O-ring. The O-ring ensures that after being relieved of pressure, the pressure plate returns to its original position. The con-

struction works as a restrictive ball and socket joint, so that the pressure plates follow the form of the patient. In this way the direction of the forces is always perpendicular to the skin. There are no shearing forces which could cause pain or even injuries. Furthermore, the construction is very flat to prevent the corset from being visible under the clothing.

**[0021]** The corset according to the invention will now be explained in more detail with the aid of a single, non-limiting exemplary embodiment and with reference to the appended drawing in which

Fig. 1 shows the corset according to a preferred embodiment of the invention; and

Fig. 2 shows a detailed view of the attachment of a pressure plate to the brace of the corset.

**[0022]** Fig. 1 shows the corset comprising a lower part 2 and an upper part 3. The lower part 2 is provided with a springy element 4 intended to be placed against the patient's pelvis, and with a support plate 5 which is connected to the springy element 4 by means of brace bars 6. The lower part is coupled to the upper part by means of a hinge coupling comprising a bar-like part 7 and a sleeve-like part 8. The Figure shows the embodiment such that the sleeve-like part 8 is coupled with the upper part 3, and the bar-like part 7 is coupled with the lower part 2. However, this configuration is interchangeable. The bar-like part is slidably inserted in the sleeve-like part 8 such as to allow the lower part 2 and the upper part 3 to move longitudinally in relation to each other, as well as allowing the upper part 3 to make a lateral movement and a rotational movement in relation to the lower part 2. The upper part 3 is also provided with a springy element 9. Both the springy element 4 of the lower part 2 and the springy element 9 of the upper part 3 are provided with adjustment means. In the case shown, this is a Velcro fastening, which is in itself known and which with respect to springy element 4 of the lower part 2 is indicated by reference number 10. As illustrated, the springy element 9 of the upper part 3 is provided at the height of the gibbus to be corrected, in the upper part of the patient's back. Since it is believed that in addition to the lateral corrective movement of the respective section of the spinal column, the correction of a scoliosis also requires a rotational movement, the springy element 9 is placed such that the pressure force it exerts on the patient's back comes slightly obliquely from the side. To complete the play of forces, the upper part 3 is further provided with a pressure plate 11 which is positioned opposite but higher than the springy element 9 of the upper part 3 at the patient's side under the arm pits. The upper part 3 finally is also provided with at least one pressure plate 12 at the height of the patient's sternum, as well as pressure plates 13 placed at the patient's front.

**[0023]** Fig. 1 clearly shows that both the lower part 2 and the upper part 3 are substantially formed by a brace,

which together with the springy element 4 and 9 respectively can surround the patient's body. To prevent the corset from slipping down it may be provided with shoulder straps 14. The lower part and the upper part are coupled by means of a light chain (not shown) so as to keep them together when putting the corset on and taking it off.

**[0024]** Fig. 2 is a cross-sectional view of the attachment of a pressure plate 13 to the brace 15. Said attachment is effectuated by means of a ball and socket joint 16 which in the case illustrated, is formed by a bulge 17 being an integral part of the pressure plate, and bulging out away from the side intended to fit against the patient. This bulge 17 may also be a separate element attached to the pressure plate; in both embodiments said bulge fits into a corresponding hollowing of a hinge element 18 placed on the brace and attached thereto by means of, for instance, gluing. Further an O-ring 19 is applied, by means of which the pressure plate 13 is pulled against the brace 15. To this end the O-ring 19 is drawn through the holes in the pressure plate 13. In the embodiment where the bulge is part of the pressure plate, the O-ring is positioned in the hollowing at the side of the pressure plate intended to fit against the patient.

**[0025]** It will be understood by the person skilled in the art that the embodiment discussed above is one of many possible embodiments, and that many variations are possible on this embodiment, which are all deemed to be within the scope of the appended claims.

## Claims

1. A corset for the treatment of a patient suffering from a back complaint, such as scoliosis, comprising
  - a lower part (2) to be supported by the hip and positioned to exert a corrective force in a lateral direction on the lumbar gibbus of the scoliosis, and
  - an upper part (3) to be fitted around the patient's chest and positioned to exert a corrective force in a lateral direction on the thoracal gibbus of the scoliosis,
  - wherein a coupling is provided to connect the lower part and the upper part, **characterized in that** said coupling a bar-like part (7) and a sleeve-like part (8), with the bar-like part being at least to some extent slidable accommodated in the sleeve-like part, and the bar-like part and the sleeve-like part being attached to the lower part and the upper part, without both being attached to the same part and wherein
    - the coupling is adapted to allow the upper part to move longitudinally, laterally and rotationally with respect to the lower part.
2. A corset according to claim 1, **characterized in that** both the lower part (2) and the upper part (3) are each provided with an adjustable springy element (4,9) to enable the lower part and the upper part to apply a pressure force on the patient's body.
3. A corset according to claim 2, **characterized in that** the springy element (4) of the lower part (2) is provided at the point where in use the lower part rests on the patient's pelvis, and wherein the lower part (2) further comprises a support plate (5) coupled with the springy element at the height of the patient's lumbar region.
4. A corset according to claim 2 or 3, **characterized in that** the springy element (9) of the upper part (3) is provided to be located in use at the height of the scoliosis to be corrected and at the same side as the springy element of the lower part.
5. A corset according to claim 2, 3 or 4, **characterized in that** the upper part (3) is provided with a pressure plate (11) which is adapted to be placed under the patient's armpit at the side opposite but higher than the springy element (9) of the upper part.
6. A corset according to one of the claims 2-5, **characterized in that** the upper part (3) is provided with at least one pressure plate adapted to be placed (12) at the height of the patient's sternum.
7. A corset according to one of the claims 1-6, **characterized in that** only one single coupling is provided adapted to be placed at the height of the patient's side under the armpits.
8. A corset according to one of the claims 2 to 7, **characterized in that** both the lower part and the upper part are substantially formed by a brace which together with the springy element, adapted to surround the patient's body.
9. A corset according to claim 8 when depending on claims 5 or 6, **characterized in that** the pressure plates (13) are joined with the brace by means of a ball and socket joint (16), whereby said pressure plates at the side facing the brace are provided with a bulge fitting (17) into a hollowing in a hinge element being a part of or being attached to the brace.
10. A corset according to claim 9, **characterized in that** the pressure plates are adjustably positioned on the brace by using an O-ring (19) which pulls the pressure plates against the brace.
11. A corset according to claim 9 or 10, **characterized in that** the O-ring is partially positioned in the hollowing at the side of the pressure plate facing the patient's side.
12. A corset according to claim 11, **characterized in**

that the hollowing of the pressure plates is positioned on the reverse side and opposite the bulge.

#### Patentansprüche

1. Korsett für die Behandlung eines Patienten, der an einem Rückenleiden, wie Skoliose, leidet, umfassend ein unteres Teil (2), das durch die Hüfte abgestützt ist und positioniert ist, um eine korrigierende Kraft in einer seitlichen bzw. lateralen Richtung auf den Lendenbuckel der Skoliose auszuüben, und ein oberes Teil (3), das um die Brust eines Patienten festzulegen ist und positioniert ist, um eine korrigierende Kraft in einer seitlichen Richtung auf den Brustkorbbuckel bzw. Thoraxbuckel der Skoliose auszuüben, worin eine Kopplung zur Verfügung gestellt ist, um das untere Teil mit dem oberen Teil zu verbinden, **dadurch gekennzeichnet, daß** die Kopplung ein stabartiges Teil (7) und ein hülsenartiges Teil (8) ist, wobei das stabartige Teil zumindest in einem gewissen Ausmaß gleitbar in dem hülsenartigen Teil aufgenommen ist und das stabartige Teil und das hülsenartige Teil an dem unteren Teil und dem oberen Teil festgelegt sind, ohne daß sie beide an demselben Teil festgelegt sind, und wobei die Kopplung adaptiert ist, um es dem oberen Teil zu ermöglichen, sich in Längsrichtung, seitlich und in Rotationsrichtung in bezug auf das untere Teil zu bewegen.
2. Korsett nach Anspruch 1, **dadurch gekennzeichnet, daß** sowohl das untere Teil (2) als auch das obere Teil (3) jeweils mit einem einstellbaren, federnden Element (4, 9) versehen sind, um es dem unteren Teil und dem oberen Teil zu ermöglichen, eine Druckkraft auf den Patientenkörper auszuüben.
3. Korsett nach Anspruch 2, **dadurch gekennzeichnet, daß** das federnde Element (4) des unteren Teils (2) an dem Punkt vorgesehen ist, wo in der Verwendung das untere Teil auf dem Becken des Patienten aufruhet, und wobei das untere Teil (2) weiters eine Abstütz- bzw. Supportplatte (5) umfaßt, die mit dem federnden Element gekoppelt ist, das in der Verwendung auf der Höhe des Lendenbereichs des Patienten angeordnet ist.
4. Korsett nach Anspruch 2 oder 3, **dadurch gekennzeichnet, daß** das federnde Element (9) des oberen Teils (3) vorgesehen ist, um in der Verwendung auf der Höhe der zu korrigierenden Skoliose und an derselben Seite wie das federnde Element des unteren Teils angeordnet zu sein.

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5. Korsett nach Anspruch 2, 3 oder 4, **dadurch gekennzeichnet, daß** das obere Teil (3) mit einer Druckplatte (11) versehen ist, welche adaptiert ist, um unter der Achselhöhle des Patienten an der Seite gegenüberliegend, jedoch höher als das federnde Element (9) des oberen Teils angeordnet zu sein.
6. Korsett nach einem der Ansprüche 2 - 5, **dadurch gekennzeichnet, daß** das obere Teil (3) mit wenigstens einer Druckplatte (12) versehen ist, die adaptiert ist, um auf der Höhe des Brustbeins des Patienten angeordnet zu sein.
7. Korsett nach einem der Ansprüche 1 - 6, **dadurch gekennzeichnet, daß** nur eine einzige Kopplung vorgesehen ist, die adaptiert ist, um auf der Höhe der Seite unter den Achselhöhlen des Patienten angeordnet zu sein.
8. Korsett nach einem der Ansprüche 2 bis 7, **dadurch gekennzeichnet, daß** sowohl das untere Teil als auch das obere Teil im wesentlichen durch eine Klammer gebildet sind, welche gemeinsam mit dem federnden Element adaptiert ist, den Patientenkörper zu umgeben.
9. Korsett nach Anspruch 8, wenn er von Anspruch 5 oder 6 abhängt, **dadurch gekennzeichnet, daß** die Druckplatten (13) mit der Klammer mittels einer Kugel und Lagerverbindung (16) verbunden sind, wobei die Druckplatten an der Seite, die zu der Klammer schaut, mit einem ausgebauchten bzw. gewölbten Fitting bzw. Paßstück (17) in einen Hohlraum in einem Gelenkelement versehen sind, das ein Teil der Klammer ist oder an dieser festgelegt ist.
10. Korsett nach Anspruch 9, **dadurch gekennzeichnet, daß** die Druckplatten einstellbar an der Klammer unter Verwendung eines O-Rings (19) positioniert sind, welcher die Druckplatten gegen die Klammer zieht.
11. Korsett nach Anspruch 9 oder 10, **dadurch gekennzeichnet, daß** der O-Ring teilweise in dem Hohlraum an der Seite der Druckplatte positioniert ist, die zu der Patientenseite schaut.
12. Korsett nach Anspruch 11, **dadurch gekennzeichnet, daß** der Hohlraum der Druckplatten an der Rückseite und gegenüberliegend der Ausbauchung positioniert ist.

#### Revendications

1. Corset destiné au traitement d'un patient souffrant d'une maladie du dos, telle qu'une scoliose,

comprenant :

une partie inférieure (2) destinée à être supportée par la hanche et positionnée de manière à exercer un effort de correction dans une direction latérale sur la déformation lombaire de la scoliose, et

une partie supérieure (3) destinée à être assemblée autour de la poitrine du patient et positionnée de manière à exercer un effort de correction dans une direction latérale sur la déformation thoracique de la scoliose,

dans lequel un couplage est assuré afin de relier la partie inférieure et la partie supérieure, **caractérisé en ce que** :

ledit couplage comporte une partie en barre (7) et une partie en manchon (8), la partie en forme de barre étant, au moins dans une certaine mesure, reçue de manière à pouvoir coulisser dans la partie en manchon, et la partie en barre et la partie en manchon étant fixées sur la partie inférieure et la partie supérieure, sans être fixées toutes les deux sur la même partie et dans lequel :

le couplage est adapté de manière à permettre à la partie supérieure de se déplacer longitudinalement, latéralement et en rotation par rapport à la partie inférieure.

2. Corset selon la revendication 1, **caractérisé en ce qu'**à la fois la partie inférieure (2) et la partie supérieure (3) comportent chacune un élément élastique réglable (4, 9) afin de permettre à la partie inférieure et à la partie supérieure d'appliquer un effort de pression sur le corps du patient.
3. Corset selon la revendication 2, **caractérisé en ce que** l'élément élastique (4) de la partie inférieure (2) est agencé au point où, en utilisation, la partie inférieure repose sur le bassin du patient et dans lequel la partie inférieure (2) comprend, en outre, une plaque support (5), couplée à l'élément élastique, située en utilisation à la hauteur de la zone lombaire du patient.
4. Corset selon la revendication 2 ou 3, **caractérisé en ce que** l'élément élastique (9) de la partie supérieure (3) est agencé de manière à être situé, en utilisation, à la hauteur de la scoliose à corriger et du même côté que l'élément élastique de la partie inférieure.
5. Corset selon la revendication 2, 3 ou 4, **caractérisé en ce que** la partie supérieure (3) comporte une plaque de pression (11) qui est adaptée de manière

à être placée au-dessous de l'aisselle du patient du côté opposé mais plus haut que l'élément élastique (9) de la partie supérieure.

- 5 6. Corset selon l'une quelconque des revendications 2 à 5, **caractérisé en ce que** la partie supérieure (3) comporte au moins une plaque de pression (12) adaptée de manière à être placée à la hauteur du sternum du patient.
- 10 7. Corset selon l'une des revendications 1 à 6, **caractérisé en ce qu'**un seul couplage unique est prévu, adapté de manière à être placé à la hauteur du côté au-dessous des aisselles du patient.
- 15 8. Corset selon l'une des revendications 2 à 7, **caractérisé en ce qu'**à la fois la partie inférieure et la partie supérieure sont formées sensiblement par un étrier qui, ensemble avec l'élément élastique, est adapté de manière à entourer le corps du patient.
- 20 9. Corset selon la revendication 8, lorsqu'elle dépend des revendications 5 ou 6, **caractérisé en ce que** les plaques de pression (13) sont reliées à l'étrier au moyen d'une articulation sphérique (16), de telle sorte que lesdites plaques de pression du côté orienté face à l'étrier comportent avec un assemblage saillant (17) dans un renforcement d'un élément formant charnière constituant une partie de l'étrier ou étant fixé sur celui-ci.
- 25 10. Corset selon la revendication 9, **caractérisé en ce que** les plaques de pression sont positionnées de manière à pouvoir être réglées sur l'étrier en utilisant une bague torique (19) qui tire les plaques de pression contre l'étrier.
- 30 11. Corset selon la revendication 9 ou 10, **caractérisé en ce que** la bague torique est positionnée partiellement dans le renforcement du côté de la plaque de pression orientée face au côté du patient.
- 35 12. Corset selon la revendication 11, **caractérisé en ce que** le renforcement des plaques de pression est positionné du côté inverse et à l'opposé de la partie saillante.
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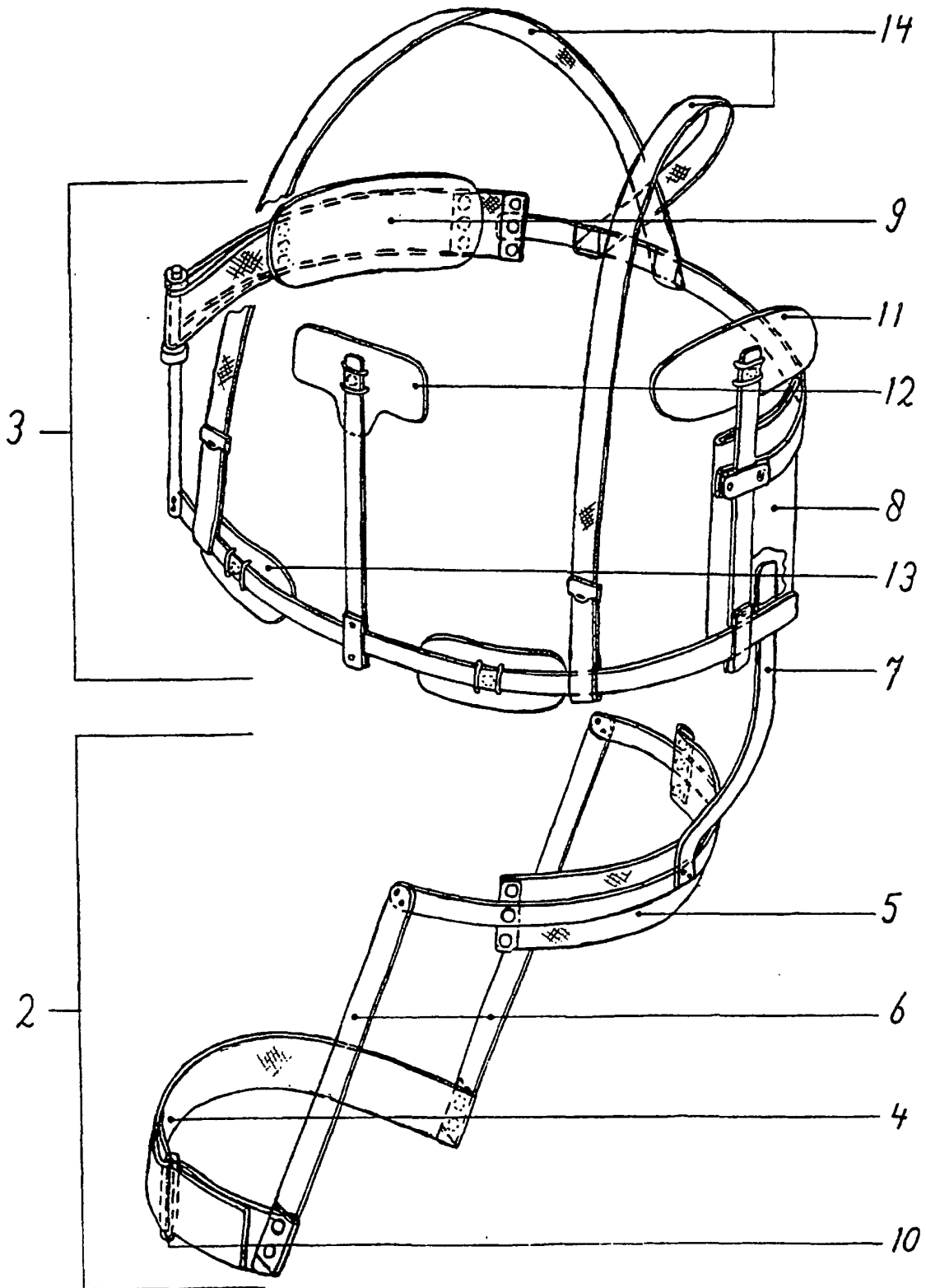


FIG. 1

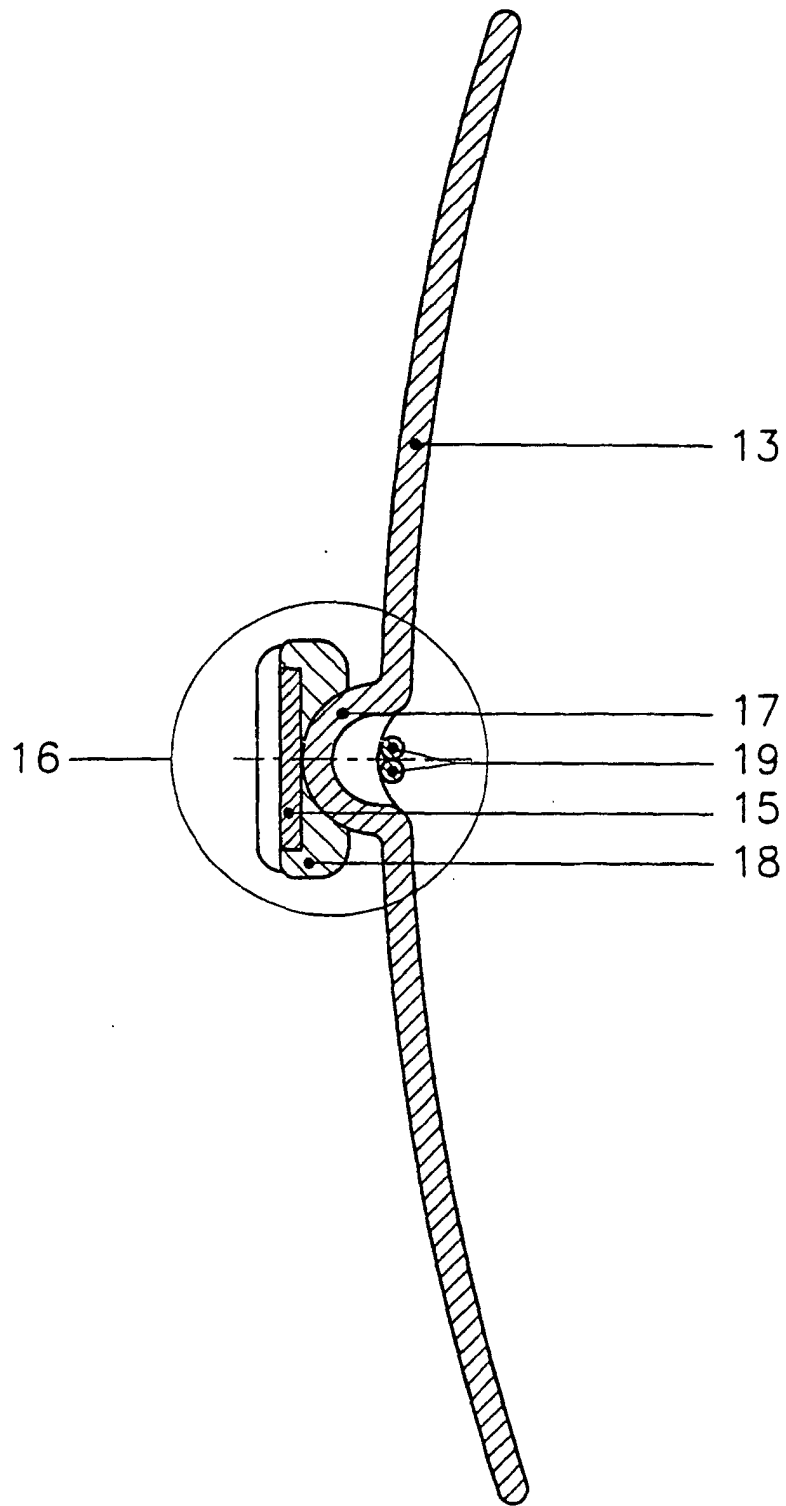


FIG. 2