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ORTHOPEDIC SPINAL BRACE

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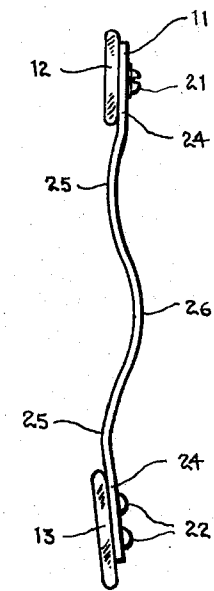


Fig. 1

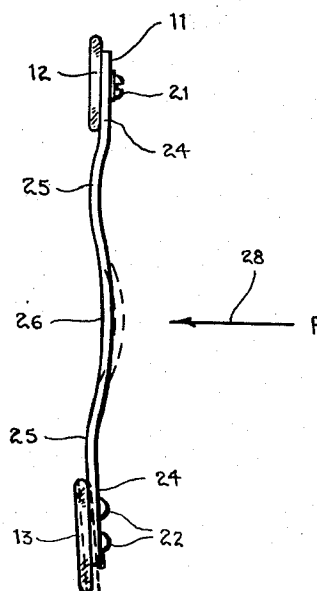


Fig. 2

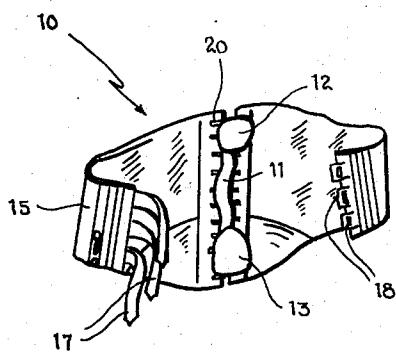


Fig. 3

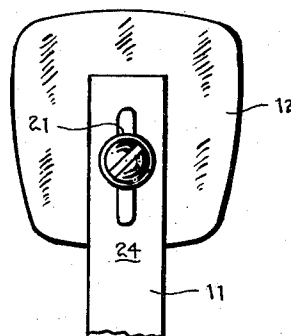


Fig. 4

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ORTHOPEDIC SPINAL BRACE

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4 Claims. (Cl. 128—78)

This invention relates generally to orthopedic braces, and has particular reference to an improved spinal brace adapted to effect a stretching or spreading action between spaced points on the spine of the wearer of the brace.

More specifically, the present invention is an improvement upon the spinal brace disclosed in U. S. Patent No. 2,160,709, issued May 30, 1939, to the applicant herein, and the fundamental purpose of the improved brace and the previously patented brace is the same. Thus, as is pointed out in the patent disclosure, the brace is adapted to exert pressure in opposite directions at two different locations on the spine to effect a stretching of the spine or a separation of the spinal segments, this treatment being known in medical science as a hyper extension or hyper flexion of the spine. As a result of this stretching or spreading of the spinal segments, abnormal pressures between contiguous vertebrae can be relieved and misaligned vertebrae are enabled to work back into their normal positions.

In the spinal brace disclosed in the above noted patent, the brace consists of an arched or concavo-convex spring having pads secured to its ends on the concave side thereof and a belt attached intermediate the pads overlying the convex side. When the pads are placed against the spine and the belt is tightened around the body of the wearer, the spring arch is flattened which causes the pads to spread farther apart and exert pressure in opposite directions on the spine. Unfortunately, however, at the time that Patent No. 2,160,709 was applied for it was thought by medical scientists that quite a marked separation of the vertebrae was required in order to give the desired relief and therefore a relatively heavy spring with quite a pronounced arch was employed in the brace. As a result of this construction, the belt cannot be tightened enough to completely flatten the spring (and still permit the brace to be worn), and the spring makes a noticeable bulge beneath the clothing so that many people will not use the brace in spite of the relief and beneficial treatment it affords.

Since the applicant's original spinal brace was patented in 1939, physicians, surgeons and neurologists have learned from many years of examination, X-ray studies and research that marked separation of the spinal segments or vertebrae is not possible, and is not necessary to produce the relief desired. Since it is now known that separation in terms of a hundredth of an inch or less can relieve abnormal pressures and enable realignment of misplaced vertebrae, the present invention contemplates and has as its primary object the provision of a greatly improved spinal brace wherein the spring member is constructed so as to effect the separation required for relief but will not cause an unsightly bulge beneath the clothing of the wearer.

Another important object of the invention is to provide an improved spinal brace of the above described type which permits a high degree of mobility and body comfort to the patient being treated.

A further important object of the invention is to pro-

vide an improved spinal brace of the above described type which is lightweight and compactly designed.

A still further important object of the invention is to provide an improved spinal brace of the above described type which is strong and durable and yet can be economically manufactured and sold.

A more specific object of the present invention is to provide a spinal brace of the above described type wherein the spring member for the brace is constructed in such a manner that the required spring action and resultant opposite pressures are obtained without the necessity of forming a pronounced arch in the spring, the spring being considerably flatter than any heretofore developed for this purpose so that when the belt for the brace is tightened around the body of the wearer there will be no unsightly bulge beneath the wearer's clothing.

Other objects and advantages of the invention will become apparent from the following detailed description thereof read in conjunction with the accompanying drawings which illustrate a representative embodiment of the invention for the purpose of disclosure.

In the drawings:

Figure 1 is a side elevation of an improved spring member construction embodying the invention, the spring member being shown in normal or unstressed condition;

Figure 2 is a side elevation corresponding to Figure 1, showing the conformation of the spring after pressure has been applied thereto by means of the belt for the brace;

Figure 3 is a diminutive perspective view of a complete spinal brace embodying the invention, showing the interrelationship of the spring member and body encircling belt; and

Figure 4 is a fragmentary side elevation of a portion of the spring member and the upper body engaging pad, showing the adjustable means for attaching the latter to the former.

Having reference now to the drawings, wherein like reference numbers designate the same parts in each of the views, 10 generally indicates the spinal brace which comprises a spring member 11, a pair of pads 12, 13 secured to the ends of the spring member, and a fabric belt 15 overlying the outer side of the spring member and adapted to encircle the body of the patient or wearer. The spring member is preferably provided with a fabric covering (not shown) which is secured by any suitable method to the fabric of the belt. The belt itself is provided with a plurality of front straps 17 which are adjustably engageable with hook connections 18 to secure the belt in position on the body of the wearer, the belt also being provided with a back lacing 20 to further enable the brace to be comfortably adjusted to and tightened on the body of the wearer to apply the required force on the spring member 11.

The pads 12, 13 are preferably in the form of metal plates which are cushioned with sponge rubber or the like on the side of the wearer and covered with fabric. The upper pad 12 is adjustably secured to spring member 11 as by a screw and slot connection 21, and the lower pad 13 is fixed to the member as by a pair of screws or rivets 22.

The spring member 11 is preferably in the form of an elongated metal strip having a length equal to four or more human vertebrae. As best shown in the side elevation or profile view of Figure 1, the spring member is formed with substantially flat end portions 24 to which the pads 12, 13 are secured and a generally sinusoidal portion intermediate the flat end portions. Thus, directly adjacent the pads, the member is curved inwardly towards the planes of the pads as at 25 and then is curved outwardly to form an oppositely extending sine loop or arch approximately midway between the pads as at 26.

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In accordance with the present invention, the sinusoidal conformation of the spring as above described eliminates the large spring arch previously thought necessary and consequently reduces the widthwise displacement of the spring. By tightening the belt 15 about the body of the wearer, a force F is applied to the spring as indicated by the arrow 23 in Figure 2, and this force acts to flatten the centrally disposed arch or sine loop 26 which in turn causes the pads 12, 13 to be spread further apart. The pads in this manner exert opposite pressures upon the spine and even though the increased separation of the pads as effected by the application of the force to the arch or loop 26 is relatively small, the pressures applied are relatively strong and effect as much of a separation of the vertebrae as is now known to be possible.

In actual practice, the lower pad 13 is in most cases positioned against the sacrum, or base of the spine, while the upper pad engages the spine at the four or fifth vertebrae. The lower pad in effect thus becomes a fixed point with the upper pad being raised slightly to effect a lifting action when the belt is tightened. This aids in the correction of abnormal pressures between the vertebrae due to faulty weight bearing thereon as above mentioned.

In addition to reducing the size of the spring arch 26 in the present invention, the widthwise displacement of the brace is materially reduced by the provision of the inwardly extending loops 25 so that the spring arch is brought more nearly in line with the planes of the pads. Furthermore, when the belt 15 is tightened to flatten out the arch, as is shown by the solid lines of Figure 2, practically no bulge is left in the spring, and the brace can be worn unobtrusively beneath the clothing. The invention thus allows relief without embarrassment and, as a result, many people who would not wear this type of a brace before will now take advantage of beneficial treatment afforded thereby.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The embodiment disclosed is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims.

What is claimed is:

1. In a spinal brace, a vertebrae separator comprising a resilient strip member having a pair of pad elements connected to the same side of the member adjacent the ends thereof, said member being curved towards the planes of said pad elements directly adjacent the elements and then being curved in the opposite direction to form an arch on the opposite side of the member from the pad elements approximately midway therebetween, and a belt member attached to said resilient strip member and adapted when tightened around the body of the wearer of the brace to flatten out said arch and separate said pad elements.

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2. In a spinal brace, a vertebrae separator comprising an elongated spring member of generally sinusoidal shape in profile, a pair of pad elements respectively secured to the ends of said member on the same side thereof, one of the sinusoidal loops formed in said member being located approximately midway between said pad elements and extending outwardly on the opposite side of the member from the pad elements, and a belt attached to said spring member on the opposite side thereof from said pad elements, said belt being adapted to be tightened about the body of the wearer of the brace to exert an inward force on said centrally located, outwardly extending sinusoidal loop and thereby effect a further separation of said pad elements.

3. In a spinal brace, a spring strip member having a length equal to that of a plurality of human vertebrae, a pair of pad elements connected to the same side of said member adjacent the ends thereof, one of said pad elements being fixedly secured to said member and the other said element being adjustably secured thereto, the side of said member having said pad elements being the inner side thereof adapted to confront the back of the wearer, said strip member being curved inwardly directly adjacent said pad elements and then outwardly to form an outwardly projecting arch approximately midway therebetween, and a fabric belt attached to said strip member on the outer side thereof, said belt being adapted when tightened around the body of the wearer of the brace to flatten out said arch and separate said pad elements.

4. In a spinal brace, a spring strip member having a length equal to that of a plurality of human vertebrae, said member in profile having flat end portions and a generally sinusoidal portion intermediate said end portions, a pair of substantially flat pads connected to the same side of said member at the flat end portions thereof, one of said pads being adjustably secured to said member, the side of said member having said pads being the inner side thereof with the pads being adapted to engage the spine of the wearer at spaced points thereon, the sinusoidal portion of said member having a pair of inwardly extending loops respectively adjacent said pads and an outwardly extending loop intermediate said pair of loops, and an adjustable fabric belt attached to said strip member in overlying relation to the outer side thereof, said belt being adapted when tightened around the body of the wearer of the brace to flatten said outwardly extending loop and separate said pads thereby separating the vertebrae between the pads.

References Cited in the file of this patent

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