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PNEUMATIC STRETCHER

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2 Sheets-Sheet 1

Fig. 1.

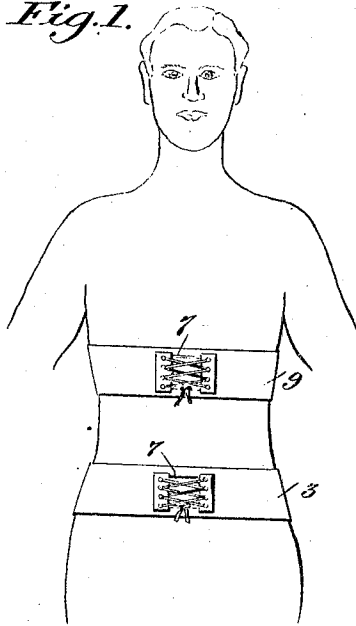


Fig. 2.

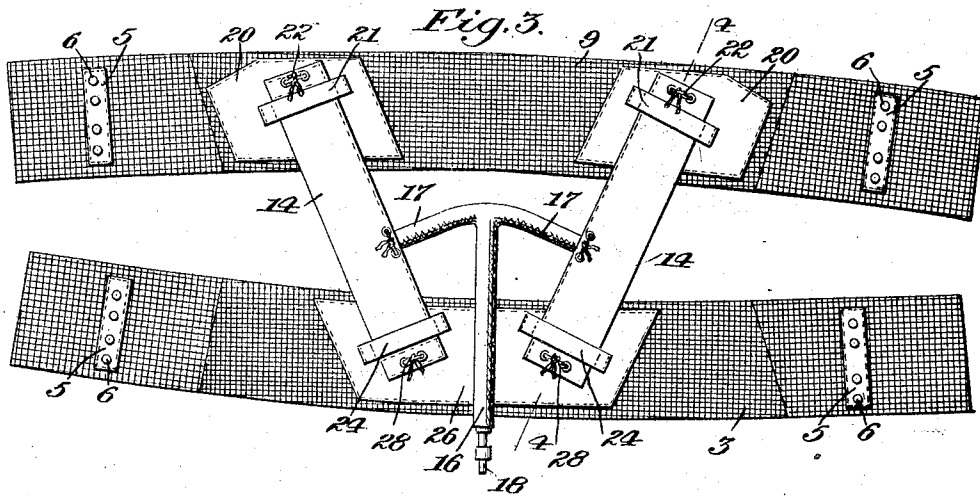
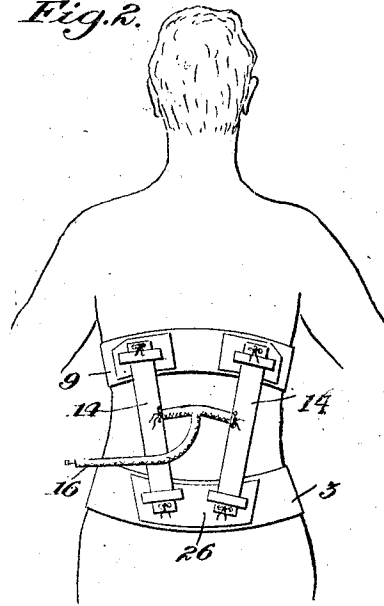


Fig. 4.

Fig. 4 is a side view of the pneumatic stretcher mechanism. It shows the two horizontal bands, labeled 14 and 12, which are connected by a central vertical strap, labeled 21. The bands are secured by buckles, labeled 14, which are attached to the central strap. The device is shown in a partially inflated state, with the bands being stretched out.

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UNITED STATES PATENT OFFICE.

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PNEUMATIC STRETCHER.

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This invention relates to apparatus for use in stretching the spinal column to remove congestion and contraction thereof.

An object of the invention is to provide a stretching apparatus which comprises, in its broadest aspect, means, applied to the body of the patient,—as belts which are applied at separated points, and means for moving the belts to stretch the spinal column.

In the embodiment of the invention herein illustrated by way of example, pneumatic pressure is applied for so moving the belts, and because of its yieldable and elastic qualities such means is preferable. It will be understood, however, that the invention is not necessarily confined to such means, but that other forces may be applied for separating or moving apart the belt to effect the longitudinal stretching of the spinal column. The stretching of the spinal column, in those cases where the spinal column has become contracted and the ligaments and cartilage pads compressed out of normal condition, by establishing a separation, so as to restore the vertebrae to normal condition, permits such expansion of the cartilage pads that the natural process of absorption of nourishing fluids in the spinal ligaments and cartilage pads is restored. Such reabsorption of fluids permits the expansion of the pads, thereby removing all pressure from the nerves and reviving the vital functions of the body.

The stretcher is located in the lumbar region and is thus most emphasized on account of the fact that this region is subject to more abuse than any other part of the body.

The accompanying drawings illustrate two preferred forms of the invention, in which:—

Fig. 1 is a front elevation of a preferred form of the device applied;

Fig. 2 is a rear elevation thereof;

Fig. 3 is an enlarged view, in elevation, of the device before being applied;

Fig. 4 is a section on the line 4—4, Fig. 3;

Fig. 5 is a rear elevation of a modified construction, showing the thoracic rest;

Fig. 6 is an enlarged view of the same device, before application thereof, and

Fig. 7 illustrates a further modification.

Referring first to Figs. 1 to 4, the lumbar rest consists of a belt 3, which may be made

of a suitable number of plies of canvas, or other material, well padded on the inside and provided at points near its ends with strips of reinforcing material, as leather, 5, having fastening devices, as lacing hooks 6, thereon, whereby by lacings 7, or other means, the belt may be fastened over the hips; and a belt 9, provided with strips 5, hooks 6 and lacings 7, therefor, which is to be fastened over the lower ribs. The belt 3 will be referred to as the "hip belt", and the belt 9 as the "rib belt".

The back part of the hip and rib belts should be stiffened with suitable material, such as leather. Between these two belts run rubber air-conducting tubes 12, (see Fig. 4) which are preferably incased in protecting leather, silk, or other coverings 14, and an air filling tube 16, having branches 17, 17, which are connected with the tubes 12, provides for filling the latter with air under pressure from a suitable source of compressed air. The outer end of the air tube 16 has an air valve 18, which may, and preferably will be, like the inflation valve of an ordinary pneumatic tire. The air tubes may also be telescoping tubes made of light metal.

The leather casings 14, for the air tubes 12 are, as herein shown, attached to reinforcing leather or metal pads 20, which latter are secured by stitches, or the like to the rib belt 9, loops 21 on the pads 20 receiving the ends of the air tube casings, 14. The loops may also be omitted. Said ends are firmly secured to the pads 20 by lacings 22, or other means. The opposite ends of the casings 14 pass through loops 24, which are fastened to the outer face of a reinforcing leather pad 26, the latter being secured to the central portion of the hip belt 3. The pads 20, 20, and 26 serve to stiffen the belts and additionally provide means for attachment of the air tube casings carrying the air tubes 12. The ends of said casings which are applied to the pad 26 may be secured thereto by lacings 28, as shown, or other mechanical means.

The air tubes 12 are made strong and able to withstand the expansion of the air therein by the protecting casings 14, but said tubes are easily collapsible when the confined air is permitted to escape therefrom.

By the application of air pressure to the

air tube 16 through its inflating valve 18, when the device is applied to a patient, as shown in Figs. 1 and 2, it will be apparent that a stretching action is set up between the rib belt and the hip belt, which is applied to the patient in the lumbar region, thereby stretching the spinal column, expanding the cartilage pads between the vertebrae, and thus removing all pressure from the nerves and serving to revive all the vital functions of the body.

Figs. 5 and 6 illustrate what I term the "thoracic rest" and to which, in addition to a hip belt 3 and a rib belt 9, a thoracic belt 30, which is located in under the arms, is added to the apparatus. This device also employs a head rest, which comprises a pad 32 of suitably stiffened material to be applied to the back of the neck, as shown in Fig. 5, and has attached thereto straps 33 to pass around the chin, and straps 34 to pass over the head, the free ends of said straps being suitably fastened together to maintain the head rest in position. Three air filling tubes 16^a, 16^b and 16^c communicate, respectively, with branch air tubes 18^a, 18^b and 18^c which connect the lower or hip belt 3, with the rib belt 9, the thoracic belt 30, and the head rest 32, whereby these several rests may be stretched apart when air under pressure is admitted to the tubes 16^a, 16^b and 16^c. Leather reinforcing members 17^a, 17^b and 17^c, establish communication between the several air inlet tubes and the branch air tubes, and constitute fulcrums, or points from which the pressure may be applied through said branch air tubes to the two upper belts and head rest. These "fulcrums" are slightly and gradually elevated by additional padding in the belt 3, and the stretching in the thoracic belt and the head rest is regulated by the height of these "fulcrums".

The lower belt 3, in the modification being described, is provided with a reinforcing pad 28 of leather, or other suitable material, to which the "fulcrums" are secured and the thoracic belt 30 is provided at the arm pits with well padded, stiff reinforcing members 39, which may be of leather or other suitable material, and are curved to fit beneath the arms.

The several air tubes, 18^a, 18^b, and 18^c pass through loops 21, which may be of metal, leather or any other sufficiently stiff material and serve to hold the air tubes in position. It will be observed that air tubes 18^a, and 18^b are outwardly inclined from their points of connection with the hip belt 28 to their points of connection with the belts 9 and 30, while the air tubes 18^c rise in a straight line from the belt 28 to the head rest 32. In using this stretching device air pressure may be admitted to the several air inlet tubes 18^a, 18^b and 18^c, to more or less

stretch apart the three belts and the head rest, thereby stretching the spinal column.

If desired, the air tube instead of being incased in a protective cover 14, in either form of the invention, may be without a covering and of course in this case must be made of sufficiently strong rubber to resist the strains due to the stretching operation.

The ends of the air tube casings may also be attached to separate freely moving plates 40 which plates are attached to the belts at the stiffened pads with springs or elastics 42 (strong bands of rubber) and steadied in such fashion that their movement is only up and down. When the air tubes are inflated or deflated the springs or elastics 42 are expanded (or contracted) and work with steady stretching pressure. This modification of the construction of the hip belt is shown in Fig. 7, 41 being a metal frame provided with guiding grooves and 40 a metal plate sliding vertically in said grooves inside of the frame and attached by springs 42, or other elastic means, to the upper horizontal member of the frame. Air tubes 14^a, 14^b are attached to the plate 40 by strips 24 such as shown in Fig. 3, or other suitable means. The stretching pressure applied to the plate 40 will be transmitted through the springs 42 yieldingly. Any suitable number of frames 41 with sliding plates 40, may be applied to the belt.

The lumbar stretcher can also be made of a series of belts with horizontal air tubes in between. Instead of the fulcrums in the hip belts the portions of all the belts into which the ends of the air tube casings are attached may be made in such fashion that the tubes can be attached higher or lower to adjust the stretcher.

Other changes may be made in the form, arrangement, or details of construction of the several parts without departing from the spirit of the invention.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. In an apparatus of the class described, means constructed for attachment at separated points to the body in the lumbar region, and air tubes connecting said means, and devices for applying compressed air thereto for forcing the first-named means apart for applying stretching force to the spinal column in a longitudinal direction.

2. In an apparatus of the class described, the combination of belts arranged for attachment to the body at points to include between them a portion of the lumbar region, and air tubes extending between said belts, and means for supplying air under pressure to said tubes for longitudinally stretching the spinal column.

3. In an apparatus of the class described the combination of belts constructed to be

applied to the body at the hips, and at the lower ribs, and air tubes between said belts whereby air under pressure may be introduced between said belts for applying a force to said belts for stretching the spinal column longitudinally for the purpose described.

4. In an apparatus for removing congestion and contraction of the spinal column, the combination of a belt to be applied to the body in the region of the hips, a belt to be applied to the body in the region of the lower ribs, and air tubes between said belts for applying through air under pressure a force to said belts in a direction to separate said belts.

5. In an apparatus of the class described, a belt adapted for application about the hips, a belt adapted for application about the lower ribs, pneumatic tubes connecting said belts, and means for supplying fluid under pressure to said tubes.

6. In an apparatus of the class described, the combination of a belt to be applied about the hips, a belt to be applied about the lower ribs, reinforcing members at the back portions of said belts, pneumatic tubes extending between said belts and arranged to diverge upwardly, and air supplying means for said pneumatic tubes.

7. The combination of a belt to be applied to the hips, a second belt to be applied to the lower ribs, a third belt to be applied to the chest and arranged for location beneath the arm pits, and air conduits extending between said belts, and means for supplying air under pressure to said conduits for forcing said belts apart to apply a stretching force to the spinal column.

8. The combination with a hip belt, a lower rib belt, and a thoracic belt, of a head rest, pneumatic tubes extending from the hip belt to the rib belt, the thoracic belt and

the head rest, and means for supplying fluid under pressure as desired to said tubes.

9. In an apparatus of the class described, the combination with a hip belt, of a rib belt, a thoracic belt, and a head rest, air-receiving devices applied to said hip belt and located at different heights thereon and constituting fulcrums, and pneumatic tubes extending from said fulcrums to said rib belt, thoracic belt, and head rest, respectively, and means for supplying compressed air separately to each of said air-receiving devices.

10. In an apparatus of the class described, the combination with three belts which are arranged, respectively, to be fastened to the body at the hips, the lower ribs and the thorax, and a head rest, of means for separately supplying compressed air to said hip and thoracic belts, and to said head rest, said means comprising a plurality of air-receiving chambers located on said hip belt at different altitudes, and pairs of pneumatic tubes extending from said air-receiving chambers, respectively, to said rib belt, thoracic belt, and head rest, and means on said belts and head rest for retaining the air tubes in position and preventing their lateral displacement.

11. A hip belt for use as described, comprising a frame, a sliding plate therein, yielding means connecting said plate and frame and a belt applied in the region of the ribs in combination with pneumatic tubes secured to said plate and extending from said plate to the last-named belt and means for supplying fluid under pressure to said tubes.

In testimony whereof I have hereunto set my hand this 12th day of November, A. D. 1924.

KARL H. VARTIA.