Jan. 4, 1938. L. R. O'DELL 2,104,699

SURGICAL APPLIANCE

Filed Aug. 3, 1936 3 Sheets-Sheet 1

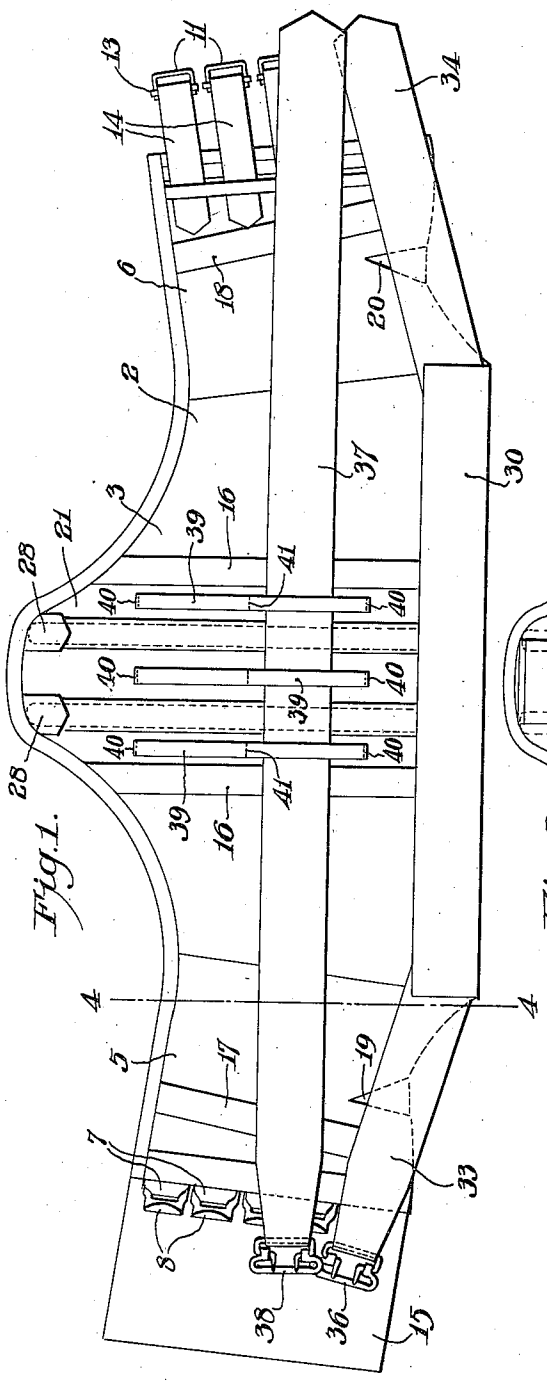

Fig. 1.

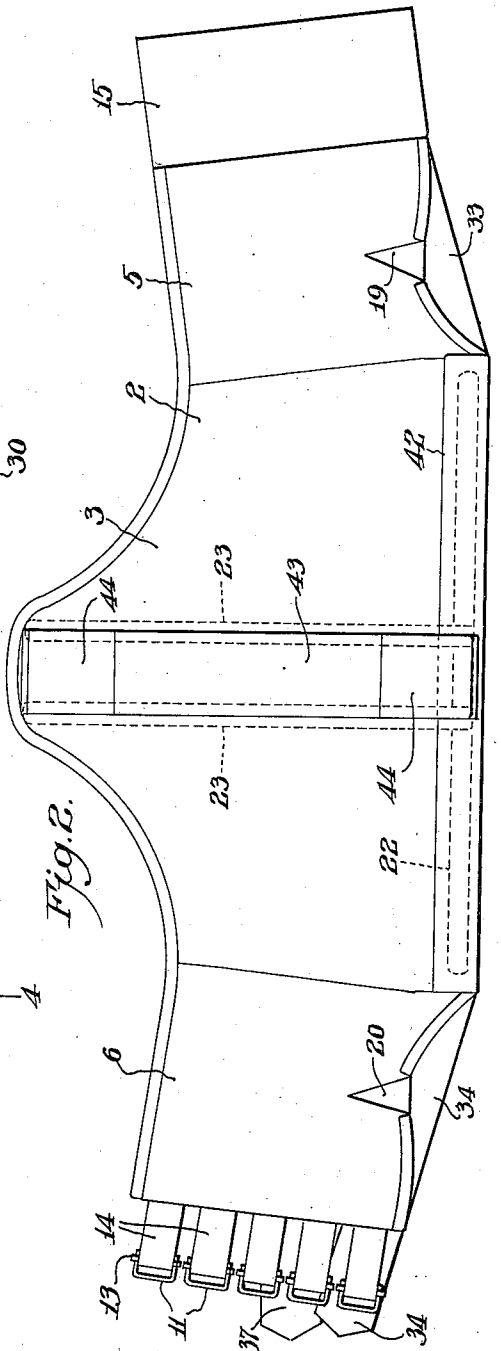

Fig. 2.

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Jan. 4, 1938. L. R. O'DELL 2,104,699

SURGICAL APPLIANCE

Filed Aug. 3, 1936 3 Sheets-Sheet 2

Fig. 3.

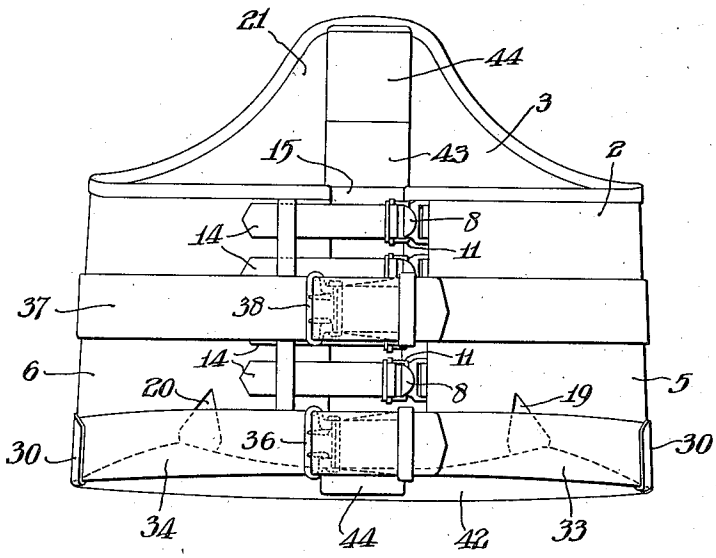


Fig. 4.

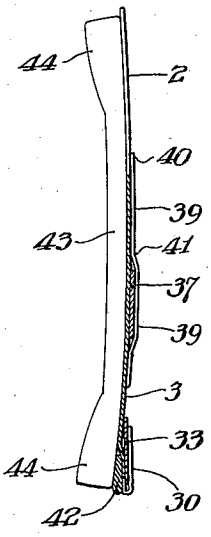


Fig. 5.

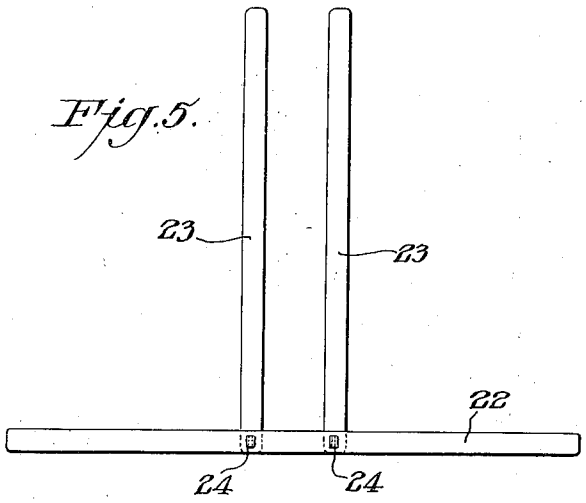


Fig. 6.

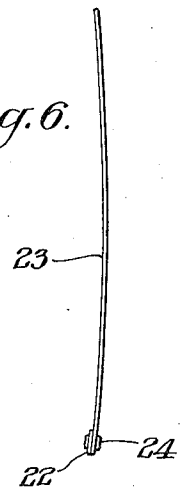
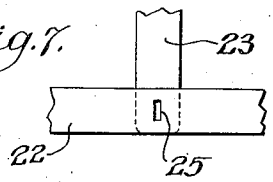


Fig. 7.



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SURGICAL APPLIANCE

Filed Aug. 3, 1936 3 Sheets-Sheet 3

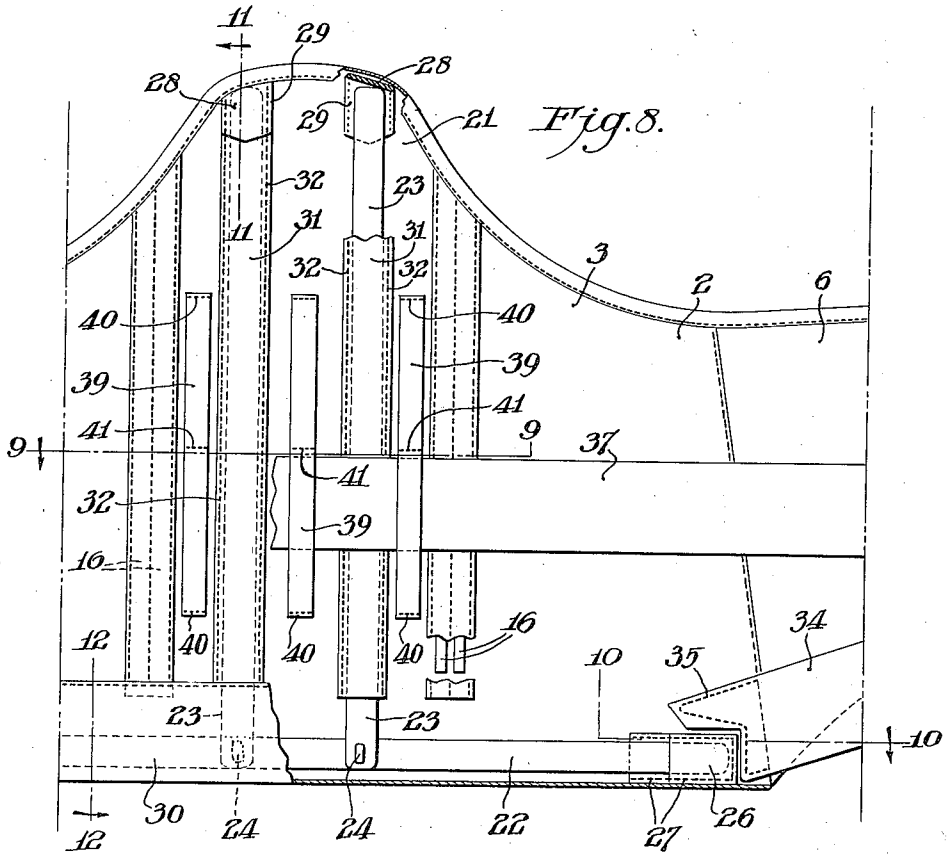


Fig. 8.

Fig. 9.

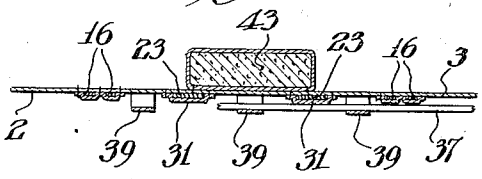
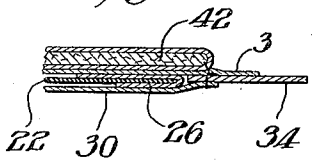


Fig. 10.



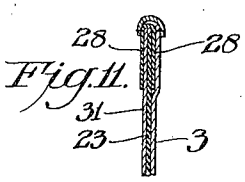


Fig. 11.

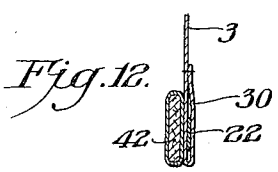


Fig. 12.

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UNITED STATES PATENT OFFICE

2,104,699

SURGICAL APPLIANCE

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Application August 3, 1936, Serial No. 93,951

4 Claims. (Cl. 128—78)

This invention relates to surgical appliances, and the object of the invention is to provide an appliance of novel and advantageous construction which is well adapted for use in the treatment of disorders of the spine and of other bony and muscular parts and associated nerves of the human body, which are located in the region of or are affected by the condition of the spine.

Among the many such disorders which may be treated by the use of the appliance are fractured vertebrae, dislocated vertebrae, spinal curvature, tuberculosis of the vertebrae and associated parts, fracture of the sternum and fracture of the pelvis.

The invention resides in the novel construction, combination and arrangement of the several elements of the appliance, as will be hereinafter described and claimed.

In the accompanying drawings, illustrating the invention,

Figure 1 is an outside view of the improved appliance in an open or flattened condition.

Figure 2 is an inside view thereof in the same condition.

Figure 3 is a front view of the appliance, showing the relation of the parts thereof after the ends of the body belt and the ends of the pressure belt have been brought together and connected to close the appliance.

Figure 4 is a section through the appliance, on line 4—4 of Fig. 1.

Figure 5 is a front view of the connected resilient metal members of the appliance.

Figure 6 is a side view of the members shown in Fig. 5.

Figure 7 is a detail, enlarged, showing a part of the horizontal resilient member and the lower end portion of one of the vertical resilient members before the application thereto of the rivet which secures them together.

Figure 8 is an outside view, enlarged, of a portion of the appliance, showing certain parts thereof in section and showing certain parts thereof broken away to expose other parts.

Figure 9 is a section on line 9—9 of Fig. 8, showing details of construction.

Figure 10 is a section on line 10—10 of Fig. 8, showing details of construction.

Figure 11 is a section on line 11—11 of Fig. 8, showing details of construction.

Figure 12 is a section on line 12—12 of Fig. 8, showing details of construction.

Referring to the drawings, 2 designates a body belt which constitutes the foundation of the appliance and which, as generally stated comprises a centrally disposed back portion 3 whose respective ends are joined to front portions 5 and 6. The front portions 5 and 6 form continuations of the ends of the back portion 3 and the free ends of the front portions constitute the free ends of the belt.

The free end of the front portion 5 of the body belt is provided with short tabs 7 carrying hooks 8 which are adapted to receive the loops 11 of buckles or fastening devices 13 adjustably carried by straps 14 which are connected to and extend from the free end of the front portion 6 of the body belt. The hooks 8 and loops 11 thus provide a suitable means for detachably connecting the ends of the body belt after it has been placed around the body of the patient or user of the appliance. A suitable flap 15 is provided to extend from the free end of the front portion 5 of the belt and lie between the body of the patient and the hooks 8 and loops 11 to protect the patient's body therefrom.

The parts 3, 5 and 6 of the body belt 2 are formed of cloth or other suitable flexible material, and they are provided with freely flexible and resilient stiffening stays 16, 17 and 18, respectively. The lower portions of the parts 5 and 6 have gussets 19 and 20 of freely stretchable elastic fabric inserted therein, respectively to provide ease and comfort in wearing the appliance.

The bottom of the back portion 3 of the belt 2 is made straight, and the central portion thereof is provided with an upwardly projecting extension 21, and the front portions 5 and 6 thereof are inclined upwardly from the ends of the back portions 3, as clearly shown in Figs. 1 and 2.

The body belt 2 is constructed to be placed around the body of the patient or user of the appliance with the inside thereof, as shown in Fig. 2, facing the patient's body, with the ends of the bottom of the back portion 3 in the region of or resting upon the patient's hips, and with the front portions 5 and 6 forwardly of the patient's abdomen. When the belt 3 has been so placed, the hooks 8 are engaged with the loops 11 to connect the ends of the belt and hold it in firm surrounding engagement with the patient's body. When the belt 2 is thus applied to the patient's body the central part of the back portion 3, with the upwardly extending extension 21 thereof, occupy a position directly back of the patient's spinal column and extend vertically over a large area thereof.

The back portion 3 of the body belt 2 carries a horizontally-extending, resilient, sheet metal member 22 and two vertically-extending, resilient, sheet metal members 23, 23. These members are shown detached from the body belt in Fig. 5. The vertical members 23, 23 are arranged in lateral, spaced relation and the lower ends thereof are rigidly connected to the horizontal member 22 on the respective sides of the center thereof by means of rivets 24 having shanks which are oblong in cross section and which extend through corresponding slots 25,

Fig. 7, in the members. This connecting means holds the vertical members 23, 23 firmly in parallel relation at right angles to the horizontal member 22 at all times, by preventing the vertical members from working loose and turning on the shanks of the rivets when the appliance is in service.

The relation of the members 22 and 23, 23 to the back portion 3 of the belt is shown by dotted lines in Fig. 2 and by dotted lines and full lines in Fig. 8. The horizontal member 22 extends along the back portion 3 near its bottom, substantially the full length thereof, and the vertical members 23, 23 extend substantially throughout the vertical dimensions of the back portion 3 on the respective sides of the vertical center thereof.

The free end portions of the horizontal member 22 are seated in pockets formed by strips of leather 26 which are folded around the ends of the member and secured to the belt 2 by suitable stitching 27; and the free upper ends of the vertical members 23, 23 are seated in pockets formed by strips of leather 28 which are folded around the ends of the members and secured to the belt 2 by suitable stitching 29.

The entire horizontal member 22 and the lower end portions of the vertical members 23, 23 are confined within a hem 30 which is formed on the bottom of the back portion 3 of the belt 2; and the parts of the vertical members 23, 23, between the hem 30 and the leather strips 28, are confined within enclosures which are formed by the main body of the belt 2 and strips of cloth or tape 31 which have their lateral edges secured to the body of the belt by suitable stitching 32 outwardly of the lateral edges of the members, as clearly shown in Fig. 8.

It will now be understood that the resilient metal members 22 and 23, 23 will be retained at all times substantially in the positions shown in the drawings with relation to the parts of the belt 2, while sufficient relative movement between the members and the body of the belt may take place to permit the necessary longitudinal and transverse flexing of the belt without any buckling of the parts, when the appliance is in service. It will also be understood that the pockets formed by the leather strips 26 and 28 provide strong and durable anchors for the free ends of the metal members and prevent them from wearing or cutting their way through the adjacent parts of the cloth which forms the body of the belt, when the appliance is subjected to the natural wear attendant upon its use.

The hem 30 not only provides an enclosure for the metal member 22, but it also strengthens or reinforces the bottom part of the back portion 3 of the belt 2. This reinforced bottom part of the back portion 3 is provided with strong side straps 33 and 34 which extend from the respective ends of the hem 30 and form, in effect, continuations of the hem and the metal member 22 enclosed therein. The attached ends of the straps 33 and 34 extend into and are enclosed by the end portions of the hem 30 and they are secured to the body of the belt and to the hem by stitching 35, as shown in Fig. 8. The side strap 33 is provided with a suitable buckle 36 which is adapted to be adjustably engaged by the strap 34, as shown in Fig. 3, to detachably connect the straps when the appliance is in use.

The appliance is provided with a strong, strap-like pressure belt 37 having a suitable buckle 38 on one end portion thereof adapted to be adjustably engaged by the other end portion of the belt, as shown in Fig. 3, to detachably connect the end portions of the pressure belt at the front of the appliance.

The pressure belt 37 is much narrower than the body belt 2 and it is arranged on the outside thereof and crosses the vertical metal members 23, 23 in spaced relation to the ends thereof, and in spaced relation to the upper and lower edges of the body belt. To maintain such relationship at the back of the appliance, I provide vertically extending strips of cloth or tape 39 on the respective sides of the members 22, 22 and secure such strips to the body belt 2 by stitching 40 at the upper and lower ends thereof, and by stitching 41 at the central portions thereof, thus providing openings between the strips 39 and the body belt 2 both above and below the central stitching 41 through either of which the belt 37 may be laced or extended to be held in place by the strips 39. In the drawings I have shown the belt 37 extended through openings provided by the strips below the central stitching 41, and it will be understood that the belt may be extended through the openings provided above the central stitching 41 when and if it should be desirable to raise the back of the pressure belt with relation to the back of the body belt and the vertical metal members 23, 23 confined within parts thereof.

To protect the patient or user of the appliance from the hard pressure of the metal members 22 and 23, 23, I provide suitable, relatively soft cushioning pads 42 and 43. The pad 42 is located inwardly of the member 22 and extends throughout the full length thereof and is secured to the inside of the body belt 2. The pad 43 is located inwardly of the members 23, 23 and crosses the space between them and is provided with inwardly projecting, enlarged end portions or protuberances 44, 44 which are located inwardly of the upper and lower end portions of the members 23, 23.

The members 22 and 23, 23 are made of suitable sheet metal, such for example as phosphor-bronze, which is sufficiently resilient to return to its normal or set condition after it has been flexed and released during the use of the appliance, and which is bendable beyond its elastic limit to change the normal shape or configuration thereof without destroying its resilient character, for purposes presently appearing.

When the appliance is in service, the body belt 2 is placed around the body of the patient or user, as previously explained. This places the end portions of the hem 30 and the end portions of the horizontal metal member 22 therein directly over the hips of patient. The hooks 8 are connected to the loops 11 of the fastening devices 13 at the front of the belt, and the devices 13 are properly adjusted to retain the body of the belt around the body of the patient with suitable tightness for comfort and the proper functioning of the parts of the appliance.

After the application of the main body of the belt 2 to the patient, as just described, the side strap 34 is engaged with the buckle 36 of the side strap 33, and the side straps are tightened at the front of the appliance in a manner to flex the horizontal metal member 22 around the back and sides of the patient and hold it firmly in place. This firm holding in place of the member 22 causes it to support and retain the vertical metal members 23, 23 in their proper position directly back of the patient's spinal

column on the respective sides of the vertical center thereof.

Following the application of the body belt **2** to the patient and the tightening of the side straps **33** and **34**, the ends of the pressure belt **37** are connected by means of the buckle **38** at the front of the appliance and tightened sufficiently to produce the desired inward pressure against the resilient, vertical members **23, 23** between and spaced from the upper and lower ends thereof for the proper functioning of the members.

The vertical members **23, 23** may be bent into any desired shape or configuration suitable for producing pressure or pressures in the region or regions of the spine where pressure is desired for the correction of the dislocated vertebrae or the proper support of fractured vertebrae or for the treatment of any other disorder. The members **23, 23** may be shaped to properly support the spinal column as a whole, while the members and the other parts of the appliance give proper support to adjacent other parts of the patient's body for the treatment of disorders thereof.

The vertical members **23, 23** may be bowed more or less as shown in Figs. 4 and 6 of the drawings, and, when so bowed the end portions of the members and the enlarged end portions **44, 44** of the pad **43**, inwardly thereof, are not only pressed inwardly but they are also forced apart when the pressure belt **37** is tightened, thereby causing a spreading or separation of the vertebrae when such treatment is desired.

The vertical members **23, 23** may be bent to produce pressure and to preserve the same configuration or symmetry thereof when it is desired to localize pressure on each side of a part of the spinal column, or they may be independently bent into different forms to produce pressure at but one side of the spinal column or on opposite sides thereof at different levels, in accordance with the desired treatment.

The pad **43**, crossing the space between the members **23, 23** serves to produce pressure against the vertebrae between the members, in accordance with the configuration of the members. Thus it will be seen that many different pressures may be produced at various places on the patient's body for the correction and treatment of various disorders.

I claim as my invention:

1. In a surgical appliance, the combination of a wide body belt comprising a centrally disposed back portion and two front portions joined to the respective ends of the back portion and forming continuations thereof, a horizontal member formed of resilient metal and extending along the lower part of the back portion of the belt, said back portion having a bottom hem enclosing said member, two straps connected to the respective ends of said hem and forming continuations of said hem and said member, means for detachably connecting the free ends of said straps, means for detachably connecting the free ends of the front portions of said belt above said straps, a vertical member formed of resilient metal and connected to and extending upwardly from the central portion of said horizontal member, and means connecting said vertical member to the back portion of the belt above said hem.

2. In a surgical appliance, the combination of a wide body belt comprising a centrally disposed back portion and two front portions joined to the respective ends of the back portion and forming continuations thereof, a horizontal member formed of resilient metal and extending along the lower part of the back portion of the belt, said back portion having a bottom hem enclosing said member, two straps connected to the respective ends of said hem and forming continuations of said hem and said member, means for detachably connecting the free ends of said straps, means for detachably connecting the free ends of the front portions of said belt above said straps, a vertical member formed of resilient metal and connected to and extending upwardly from the central portion of said horizontal member, means connecting said vertical member to the back portion of the belt above said hem, a pressure belt outwardly of said vertical member and the body belt and narrower than the latter and provided with front end portions having means for detachably connecting them, and means to retain the pressure belt in spaced relation to the ends of the vertical member.

3. In a surgical appliance, the combination of a wide body belt comprising a centrally disposed back portion and two front portions joined to the respective ends of the back portion and forming continuations thereof, a horizontal member formed of resilient metal and extending along the lower part of the back portion of the belt, said back portion having a bottom hem enclosing said member, two straps connected to the respective ends of said hem and forming continuations of said hem and said member, means for detachably connecting the free ends of said straps, means for detachably connecting the free ends of the front portions of said belt above said straps, two vertical members formed of resilient metal and connected to and extending upwardly from the central portion of said horizontal member, and means connecting said vertical members to the back portion of the belt above said hem, the last named means maintaining the vertical members in lateral spaced relation.

4. In a surgical appliance, the combination of a wide body belt comprising a centrally disposed back portion and two front portions joined to the respective ends of the back portion and forming continuations thereof, a horizontal member formed of resilient metal and extending along the lower part of the back portion of the belt, said back portion having a bottom hem enclosing said member, two straps connected to the respective ends of said hem and forming continuations of said hem and said member, means for detachably connecting the free ends of said straps, means for detachably connecting the free ends of the front portions of said belt above said straps, two vertical members formed of resilient metal and connected to and extending upwardly from the central portion of said horizontal member, means connecting said vertical members to the back portion of the belt above said hem, the last named means maintaining the vertical members in lateral spaced relation, a pressure belt outwardly of said vertical members and the body belt and narrower than the latter and provided with front portions having means for detachably connecting them, and means to retain the pressure belt in spaced relation to the ends of the vertical members.

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