

Nov. 7, 1967

F. L. STUTTLE
FLEXION BACK BRACE

3,351,053

Filed Nov. 13, 1962

4 Sheets-Sheet 1

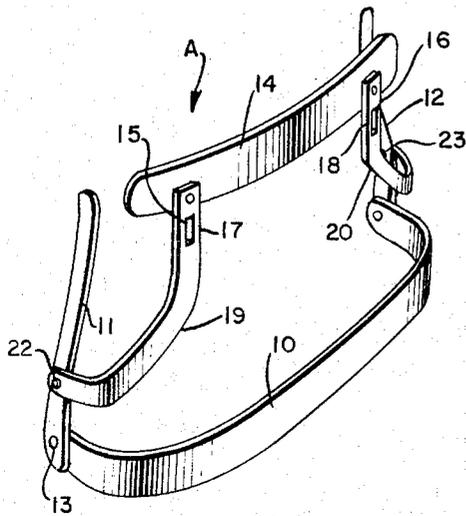


FIG. 3.

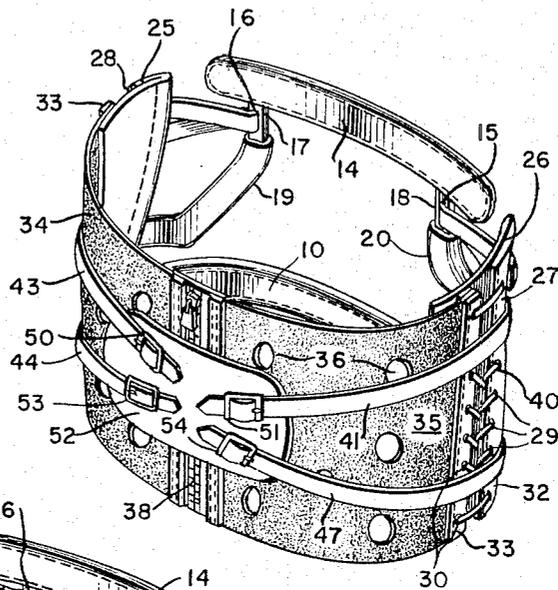


FIG. 2.

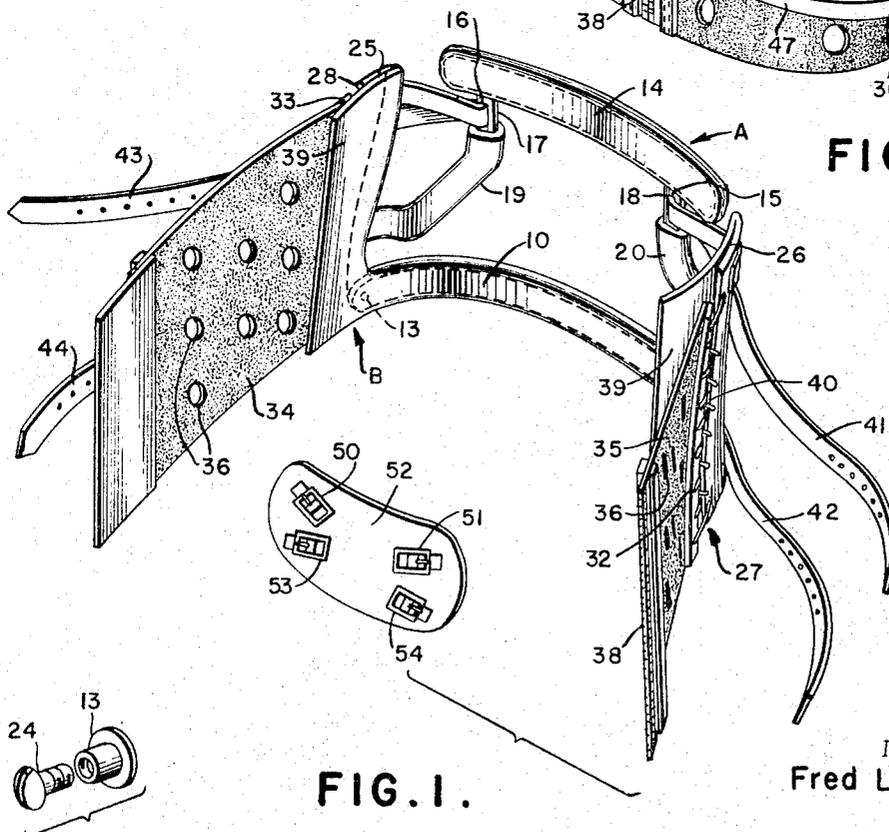


FIG. 1.

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FIG. 6.

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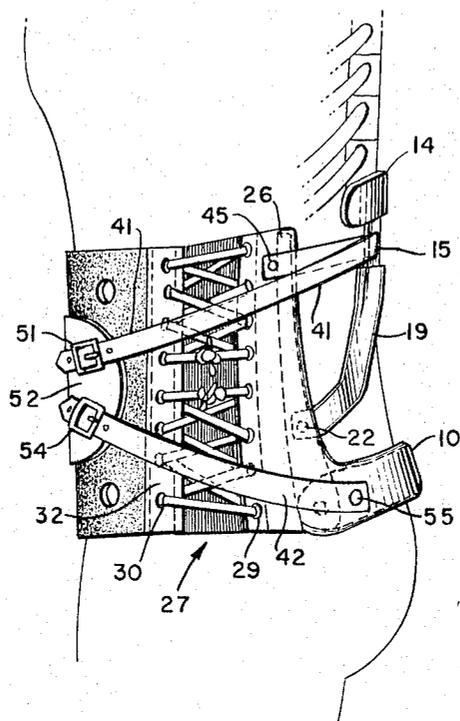


FIG. 4.

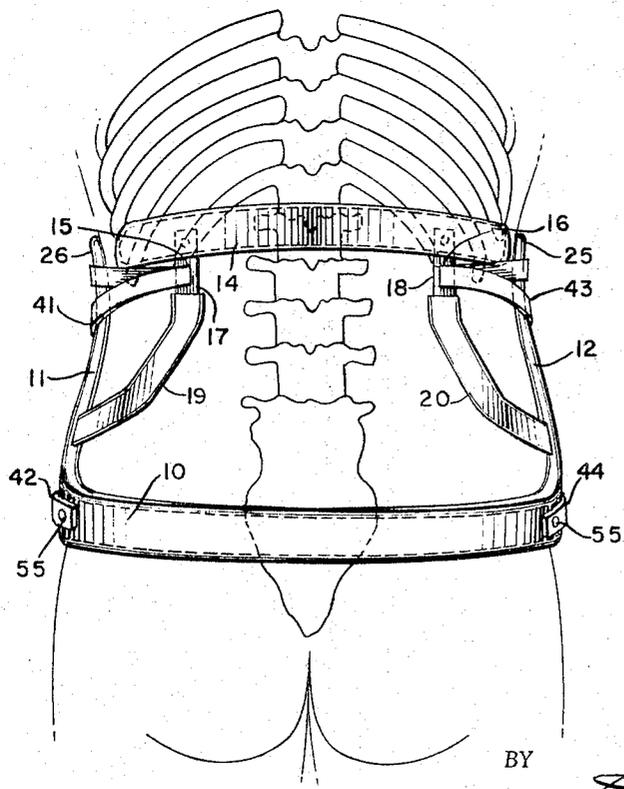


FIG. 5.

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4 Sheets-Sheet 3

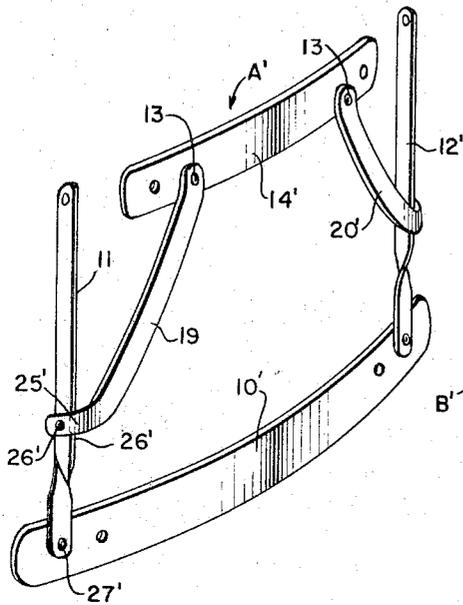


FIG. 9.

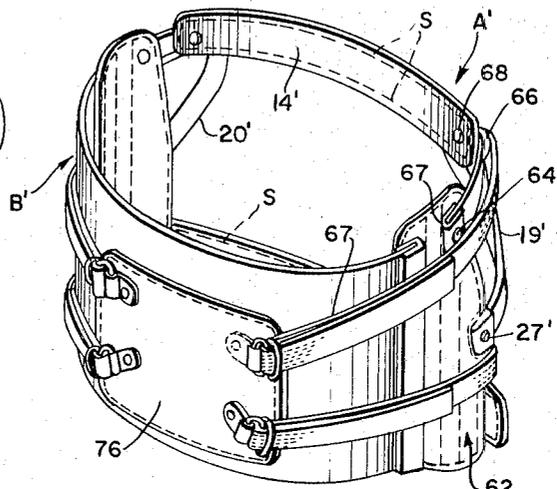


FIG. 8.

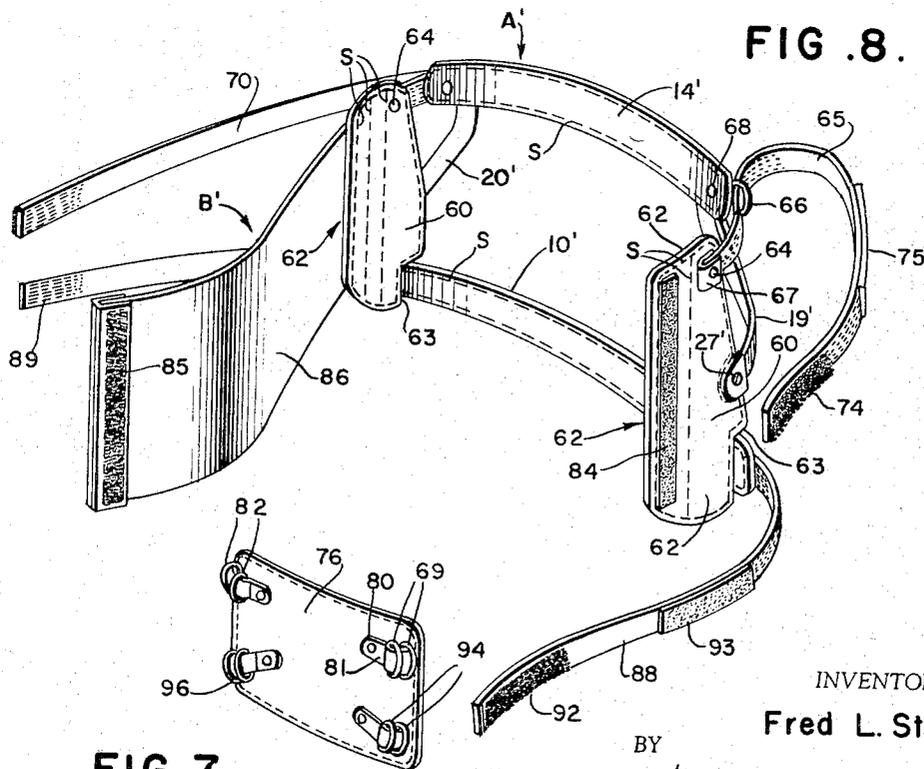


FIG. 7.

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4 Sheets-Sheet 4

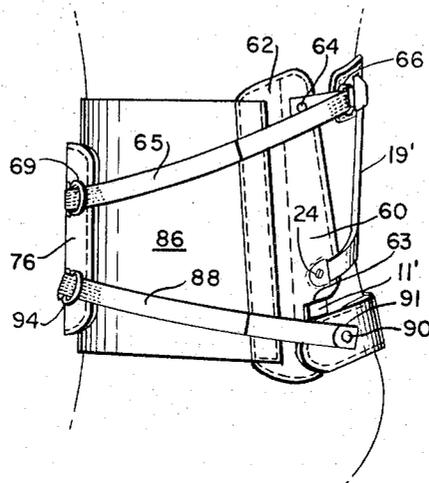


FIG. 10.

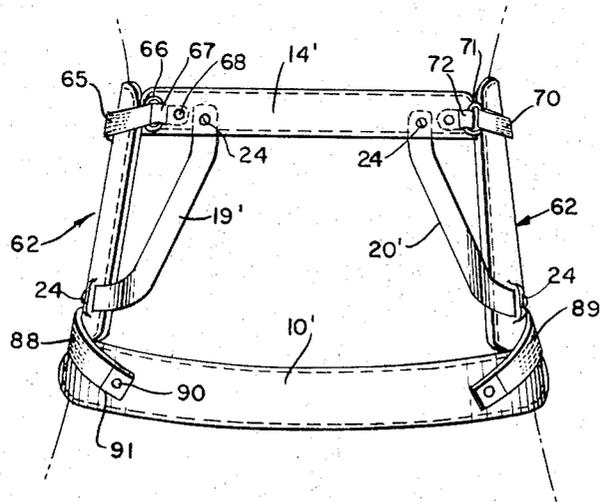


FIG. 11.

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3,351,053

FLEXION BACK BRACE

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 Filed Nov. 13, 1962, Ser. No. 236,924
 7 Claims. (Cl. 128-78)

The present invention relates to a flexion back brace. An object of this invention is to provide a flexion back brace adapted to accurately follow the changed contours of the lower body as it follows a corrected flat back position of the lower body.

Another object is to provide a flexion back brace having arcs of brace motion when applied to the patient's back corresponding to the motions of the various parts of the back engaging in the change of position.

Another object is to provide a back brace having a low floating pivot point near the lumbosacral area which beneficially floats backward to follow rearward displacement of the flattening lumbosacral area and follow similar non-bending relation of the back dynamic brace parts as an active flat back is developed from a lordotic low back.

Yet another object is to provide a flexion back brace of high clinical value combined with comfort to the patient.

Another object is to provide a more simple construction made up of interchangeable prefabricated parts adapted to be easily and quickly assembled as a complete unit.

With these and other objects in view which will become apparent as the invention is fully understood, the same resides in the novelty of construction, combination and arrangement of parts hereinafter described in detail and distinctly claimed in the appended claims.

The description should be read in conjunction with the accompanying drawings wherein:

FIGURE 1 is a perspective view of one embodiment of the present invention spread open for application to the body of a patient;

FIGURE 2 is a view of the device secured together;

FIGURE 3 shows the back brace section and the low floating pivot point thereof removed from the main supporting portions of the brace;

FIGURE 4 is a side view in elevation of the present invention applied to the body in proper position with respect to the upper and lower lumbosacral areas;

FIGURE 5 is a rear view in elevation of the lower band or bar of the brace positioned at the lower sacral level with the bottom edge near the "tail bone" level and of the top band or bar at approximately the tenth thoracic vertebra, which curves down at each end to slightly underlie the fixed ribs of the wearer's body for maximum comfort and clinical value;

FIGURE 6 is a detailed view of one of the pivot connections of the respective brace frame elements;

FIGURE 7 is a perspective view of another embodiment of the present invention spread apart and positioned for application to the body of a patient;

FIGURE 8 is a view of the device of FIGURE 7 secured together;

FIGURE 9 shows the back brace frame section removed from the covering therefor, showing the three pivot points of the frame at each side thereof;

FIGURE 10 is an side view in elevation of the embodiment of this invention illustrated in FIGURE 8; and

FIGURE 11 is a rear view in elevation of the embodiment of FIGURE 10

Referring in detail to the drawings and first with particular reference to FIGURES 1, 2, 3 and 6, the flexion back brace comprises a rear semi-rigid frame A and a front corset structure B. First with reference to the frame A, the same comprises a slightly bowed bottom band 10

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with upwardly extending body contoured arms 11 and 12, which are pivoted on internally threaded pivot bushings 13 mounted in aligned openings at the lower ends of the respective arms and fitted in each of the adjacent ends of the bottom band 10. The arm ends are locked on the pivot bushings by a headed screw 24. Vertically spaced above the bottom band 10 is a top slightly bowed band 14, which is connected adjacent each end by angularly positioned levers 19 and 20 pivoted similarly on bushing means as shown in FIGURE 6. The levers 19 and 20 are formed with offset lower ends each formed with a pivot point opening each for pivotal connection to their respective adjacent upright arm 11 and 12 just above the respective pivot points of the arms with the lower band 10 at pivot connections 22 and 23, also, these levers adjacent their respective upper ends 17 and 18 below the top band 14 are formed with strap slots 15 and 16.

The several parts of the structure A are cushioned with a covering of leather or other suitable material and the arms 11 and 12 are housed between the folded portions 25 and 26 at each end of leather gusset portions 27 and 28 at each side of a securing corset B.

The gusset portions 27 and 28 are identical in structure and along their respective vertical edges are formed with lace eyelets 29, which eyelets are arranged to cooperate with similar oppositely arranged lace eyelets 30 in binding strips 32 and 33 sewed to each respective vertical edge of sheet rubber sheets 34 and 35. The sheets 34 and 35 are formed with ventilation openings 36 and are vertically secured at the navel portion of the corset B by a slide fastener 38, see FIGURES 1 and 2.

The corset B carries the rear brace portion A and the patient may position the assembled device around his body by closing the slide fastener 38 and then subsequently tightening the side lacings 40 at each side gusset portion 27 and 28. A protective under tongue 39 under the lacing at each side is also provided.

The brace assembly includes upper and lower leather straps or belts 41 and 42 and 43 and 44 on the opposite side, which are each attached in a predetermined manner. For example, belts 41 and 43 are suitably secured as by rivets 45, see FIGURE 4, adjacent to the upper ends of the folded portions 25 and 26, respectively, and are then looped through their respectively adjacent slots 15 and 16 adjacent the upper ends 17 and 18 of each of the levers 19 and 20 to the upper spaced apart angularly mounted buckles 50 and 51 secured to a leather apron 52 positioned centrally across the slide fastener 38.

The leather apron 52 has two similar lower buckles 53 and 54, each respective buckle being for connection with lower belts or straps 42 and 44, which are suitably secured adjacent the ends as by rivet means 55 to the lower brace band 10, see FIGURES 4 and 5.

To apply the belt after initial placement of the brace around the body, first buckle one of the bottom belts to the apron 52. Then fasten the loose bottom belt in front and position the bottom edge of the bottom brace band 10 in the rear so that the edge is at the lowermost part of the spine, that is, at the "tail bone" level as shown in FIGURE 5. Next, with the left thumb and index fingertips together, cross over in front and push backward on the top end 18 of the right, opposite side, loose upright lever arm 20, and pull this belt straight laterally from the body with the right hand, swing it around forward maintaining tension against the edge of the right slot 15 of the lever arm 20 and with the now freed left hand, insert the belt through the buckle 51 and cinch it up tightly. The same procedure is then followed on the opposite side.

In securing the unit to the body the top band 14 should be carefully set to a position so as to cross the spine at

approximately the T-10 level, that is, the tenth thoracic vertebra with the ends of the band curved downwardly, so that the top belts lie under the fixed ribs and thus leave these ribs free. Accordingly, considerable body side bend is permitted to provide comfort to the wearer.

The top band or bar 14 may have its ends curved downward slightly to conform to the body below the fixed ribs and this downward curve should be more pronounced for short-waisted individuals.

Also, for further comfort the lower belts do not have to be very tight. Their purpose is to control the level that the navel-level belts make with respect to the abdomen. This will lessen the pressure on the groin and for the final fitting and for change in body weight and final fitting occasioned by use, the lacings 40 on the side are provided with the protective under tongue 39.

Now referring to the embodiment of the invention illustrated in FIGURES 6 through 10, there is provided a flexion back brace construction, which is made up of a plurality of prefabricated units, namely, a back brace portion formed of a top band 14' and a bottom band 10'. These top and bottom bands are readily assembled by mechanically connecting upright arms 11' and 12' and angularly positioned levers 19' and 20' including a lower curved offset end 25'. The respective offset ends of the levers are pivoted to an intermediate point 26' just above the pivot point 27' of the respective lower ends of the upright arms 11' and 12' of the flexion frame A'. The upper ends of the angular levers 19' and 20' are formed with openings, not shown, for alignment with corresponding openings near each end of the top band 14' and are pivoted thereto by means, such as a bushing 13 and headed screw 24, as illustrated in FIGURE 6. Thus, each embodiment of this invention incorporates the same bushing and screw pivot construction, which makes it easy for the several parts of the entire brace frame A' to be assembled and materially simplifies mass production by such rapid assembly of the prefabricated brace parts.

The top and bottom bands are each slightly bowed to be body conforming and are padded and leather covered. For example, in making these bands the padding is positioned on the body adjacent sides thereof and the leather cover of band 14' is secured by edge to edge stitchings S through the leather lapped edges and the lapped edges of the leather enclosed padding. The back of the top band 14' has the leather cover "slotted" to accommodate the end adjacent portions of the levers 19' and 20' and the bottom band leather cover is slotted on each exterior end to accommodate the lower ends of the upright arms 11' and 12'. These slots in the leather cover are of predetermined length to permit the respective levers and arms to swing laterally on their respective pivots.

Thus each side of the frame A' includes three pivots, which arrangement permits the brace portion to float backward to follow rearward displacement of the flattening lumbosacral area as an active flat back develops from a lordotic low back condition.

The back engaging frame portion A' is combined with a front corset portion B' and differs from the corset portion B of the first embodiment by the elimination of the more complex side laced gusset portions and the front slide fastener, whereby the construction is simplified and is more economically manufactured. For example, the upright arms 11' and 12' are each sheathed in elongated pockets 60 along the rear vertical longitudinal edge of a prefabricated unit, namely a two-ply padded section 62. This padded section is rounded at the top edge and has a cut away portion 63 at the bottom edge adjacent the bottom band 10' of the back frame A'. The section 62 is secured to the upper end of its respective upright arm 11; or 12; by a rivet 64, which rivet likewise securely anchors the end of a flexible strap 65, which loops through a strap loop or belt ring 66 held by suitable means, such as the strap loop 67, which is held by suitable means, such as a rivet 68 adjacent the end of the top band 14' on the

rear face thereof. The strap 65 from loop 66 connects through securing strap rings 69 secured to the apron 76 in the upper right corner thereof. This arrangement is duplicated at each upper side of the frame A'. Thus the opposite side includes a similar strap 70, belt ring 71 and strap loop 72 for connecting with the belt ring and for reeving through the ring 71 to belt or strap rings 82 held by a riveted strap loop on the upper left corner of the leather apron 76.

Each strap 65 and 70 may be made of woven nylon tape or the like and they are each formed on one side thereof with spaced apart hooked pile fabric fastener sections 74 and 75. These hooked pile fabric sections are arranged to secure together when either of the straps are reversed upon themselves in face-to-face contact after being passed through strap securing rings. For example, strap 70 passes through ring 69 suitable secured as by a rivet 80 and strap loop 81 to the upper right corner of the leather apron 76 at the abdominal or front portion of the corset B'. Typical hook pile fastener means are well-known, for example, see Patent Number 2,717,437, which is representative of the pile fabric fastener structure.

Each two-ply padded section 62 along its longitudinal front body exterior edge has secured thereto a coating raised hook pile fastener strip 84, which is placed to coact with a similar hook pile fastener strip 85 along the body interior edge of an abdominal band 86. This band is a prefabricated unit and may be of any suitable material, such as lastex or stretchable rubber and is preferably formed with air openings to provide the breathing of air to and from the wearer's body. The band 86 is made identical at each free transverse edge and is reinforced at each edge by a two-ply folded strip of leather sewed thereto along with the respective fastener strip 85.

When the patient is to apply the back brace and corset combination to his body, the same is applied by positioning the top band 14' so as to cross at approximately the T-10 level, that is, the tenth thoracic vertebra with the ends of the top band curved downwardly, so that the top straps when secured will be under the fixed ribs and thus leave the ribs free. However, before the top straps are fastened, the abdominal band 86 is pulled across the abdomen and each hook pile fabric fastener 85 is pushed into face-to-face fastening connection, with the coating fastener 84 on the longitudinal edge of the side members 62. Thus the entire flexion body brace is held in position for a final strap tightening through the strap rings riveted by the respective leather loops on the four corners at the front of the rectangular apron 76.

The bottom band 10' has fastener straps 88 and 89 secured thereto adjacent each end inside the pivot points of each upright arm 11' and 12', by suitable means such as a rivet 90 and a reinforcement ply of leather 91. These straps are each provided with spaced hook pile fastener units 92 and 93 and are adapted to be reeved through strap loops on rings 94 and 96 arranged at the opposite lower corners and then reversed upon themselves so as to provide face-to-face contact of the hook pile fastener units.

There is thus provided with this embodiment a finally assembled flexion back brace, wherein the several parts are each made in prefabricated mass lots so that they may be assembled easily and quickly with a minimum of effort to provide greater economy in production.

Without further description it is believed that the advantages of the present invention over the prior art is apparent and while only two embodiments of the same are illustrated, it is to be expressly understood that the invention is not limited thereto as various changes may be made in the combination and arrangement of the parts illustrated, as will now likely appear to others and those skilled in the art. For a definition of the scope or limits of the invention, reference should be had to the appended claims.

What is claimed is:

1. A flexion back brace for treating the lumbosacral area to change a lordotic back to an active flat back comprising a semi-rigid rear brace portion and front adjustable corset portion secured at the rear to said rear brace portion and having strap securing means on the front thereof, said rear brace portion comprising an upper contoured band adapted to provide a rest across the upper lumbosacral area, said upper band having pivoted lever means at each end, a lower contoured band adapted to provide a rest across the lower lumbosacral area, upright arms from said bottom band, said lever means being offset at their respective lower ends and extending angularly upward from the lower portion of each of the said upright arms, said lever means having pivot means secured to each of said upright arms adjacent their respective lower ends and secured to each opposite end of the said upper band, and a flexible strap means operatively associated with each of said pivoted lever means adjacent each end of the said upper band, said straps being secured at one end to a side of said corset portion and at the other end to said strap securing means on the front of said corset portion.

2. A flexion back brace for treating the lumbosacral area to change a lordotic back to an active flat back comprising a semi-rigid rear brace portion and front adjustable corset portion secured at the rear to said rear brace portion and having strap securing means on the front thereof as described in claim 1, wherein said strap securing means comprises an apron, said apron having spaced pairs of strap securing means for adjustably securing said flexible strap means.

3. A flexion back brace for treating the lumbosacral area to change a lordotic back to an active flat back comprising a semi-rigid rear brace portion and front adjustable corset portion secured at the rear to said rear brace portion and having strap securing means on the front thereof as described in claim 1, wherein the pivot points of said lever means secured to each opposite end of said upper band are floating pivots and move rearwardly from the patient's body progressively in response to changes from a lordotic back to a flat back.

4. A flexion back brace for treating the lumbosacral area to change a lordotic back to an active flat back comprising a semi-rigid rear brace portion and front adjustable corset portion secured at the rear to said rear brace portion and having strap securing means on the front thereof as described in claim 1, wherein said adjustable corset portion includes preformed side means with elongated pockets on each side for connecting with said upright arms from the lower band of said rear brace portion.

5. A back brace construction having back engaging portions and an abdomen embracing portion, said back engaging portions having rigid upright means secured in

said abdomen portion, a dynamic top band on said brace, a bottom band movable with respect to said top band pivotally connected with said upright means adapted to provide a rest across the tail bone of the spine, said upright means having inwardly offset lever arms pivoted thereto above the level of said bottom band, said ends of the lever arms being pivoted to said dynamic top band of the brace, and flexible straps reeved through means secured on each end of said top band.

6. A flexion back brace construction as described in claim 5, wherein said abdomen embracing portion of said brace comprises padded leather side portions with an elongated vertically extending pocket for confining and securing said spaced apart upright arms therein, each of said padded leather side portions being formed along the exterior vertical edge thereof with a section of hook pile fabric, and an elastic abdominal sheet having a section of hook pile fabric along each opposite interior vertical edge thereof for face-to-face engagement each with one of the hook pile fabric sections on a respectively adjacent padded leather side, whereby said back brace may be secured around the body of a wearer.

7. A flexion back brace construction as described in claim 5, wherein said abdomen portion of said brace comprises padded leather side portions with an elongated vertically extending pocket for confining and securing said spaced apart upright arms therein, each of said padded leather side portions being formed along the exterior vertical edge thereof with a section of hook pile fabric, and an elastic abdominal sheet having a section of hook pile fabric along each opposite interior vertical edge thereof for face-to-face engagement each with one of the hook pile fabric sections on a respectively adjacent padded leather side, whereby said back brace may be secured around the body of a wearer, an apron retained over elastic abdominal sheet, said apron including flexible strap securing means, and flexible straps connected with each end of said top and bottom bands, said straps each having spaced apart hook pile fabric fastener means for adjustably securing said straps in position after attachment to said apron.

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