United States Patent

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[54] **ADJUSTABLE RIB BELT**
6 Claims, 3 Drawing Figs.

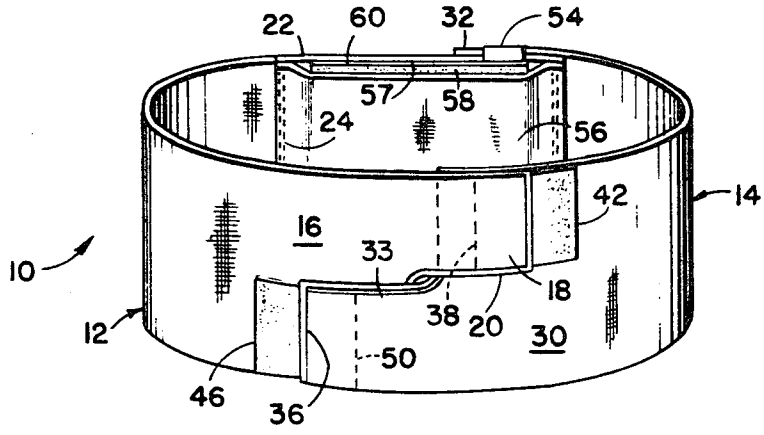
[52] **U.S. Cl.** **128/78,** 128/155
[51] **Int. Cl.** **A61f 5/02**
[50] **Field of Search** 128/78, 84, 96, 100, 171, 156, 157, 579, 578, 169, 155; 2/76, 100

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ABSTRACT: An adjustable two-piece rib belt made of elastic material and provided with fastening means for discrete circumferential size adjustment by overlapping connection of one end of one belt-piece member to one end of the other belt-piece member and a second circumferential size adjustment by overlapping textile adhesive connections of alternate flaps extending from the respective other side ends of the belt piece over the opposite belt piece. A removable back support pad is provided in a pouch arranged for positioning over the sacral or small-of-the-back region of the user.



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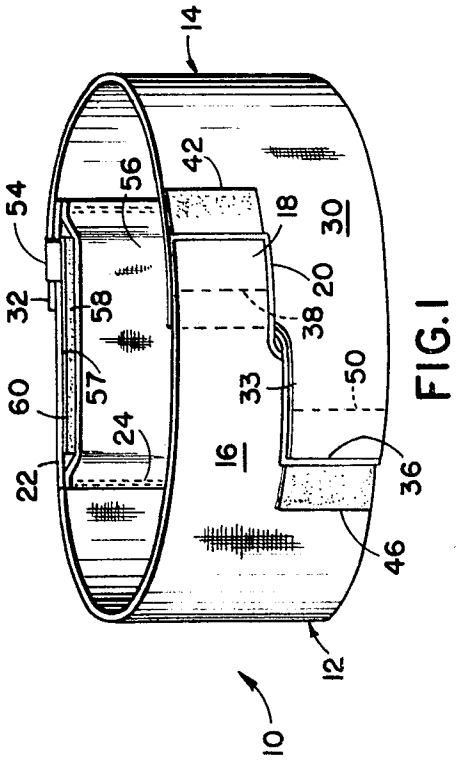


FIG. 1

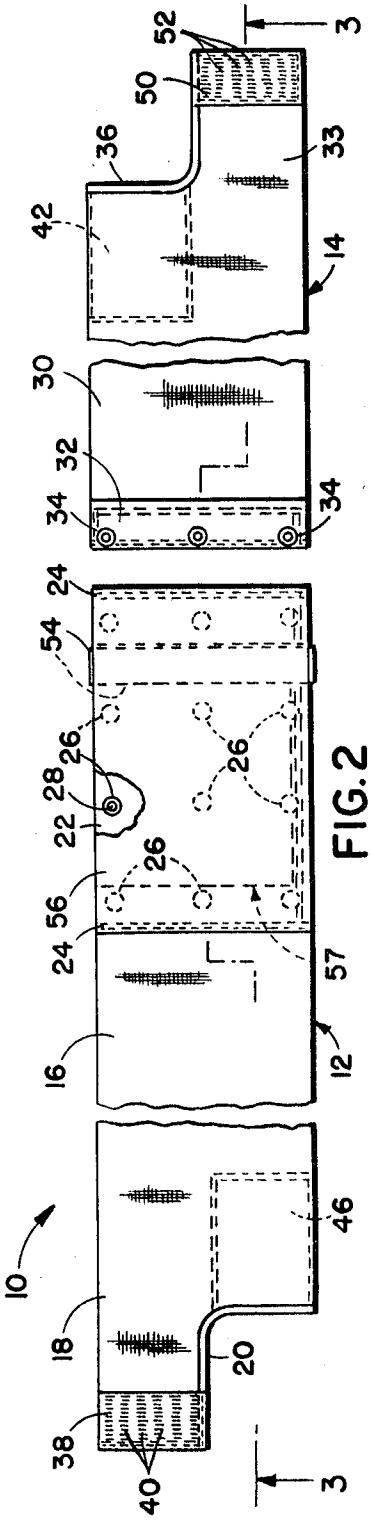


FIG. 2

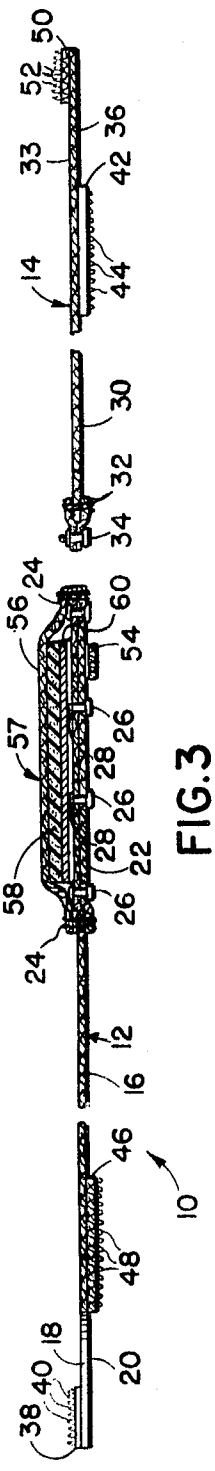


FIG. 3

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ADJUSTABLE RIB BELT

This application is a continuation-in-part of U.S. Ser. No. 762,292, filed Sept. 16, 1968, for the same inventor.

This invention relates to an orthopedic appliance and more particularly to a rib belt for use about the human torso in the region of the ribs, the sacral region or the "small-of-the-back" that is adapted to be adjusted to a wide range of sizes.

Orthopedic appliances for support to the human torso about the waist are known and comprise a wide variety of forms and shapes for adjustment to the body and adjustment to the shape and size of the user. The more specialized the use of the appliance, the more limited the use and adjustability becomes.

In order to provide a satisfactory appliance that can be satisfactorily used for the many sizes required, manufacturers and retailers of such appliances have found it necessary to make and store a large plurality of different sizes ranging, for example, from 34 to 50, which generally covers the entire range of human sizes.

In the attempt to reduce the number of different size garments that may be needed for a manufacturer or retailer, designs have been proposed heretofore arranging for adjustment of sizes by the use of belts, buckles, straps, as well as textile adhesive closures known in the trade as the "Velcro" fastener or closure. Nevertheless, such designs heretofore have been unsatisfactory in that they are either complicated to manufacture or use, or are economically unattractive.

It is a general object of this invention to provide an orthopedic appliance that is adjustable for the entire range of sizes normally needed.

A further object of this invention is to provide an orthopedic appliance that is easily adjustable by the user during the original application of the appliance to the body, or for making minor adjustments during the wearing period as to provide for more refined adjustments in size.

It is a further object of the invention to provide an appliance that is simple and economical to manufacture and yet is durable.

According to the invention, there is provided a two-piece belt, made in part of elastic material extensible in the circumferential direction of the wearer, that is, longitudinal of the belt. Fastening means are provided for initially connecting the two pieces of the belt together in any of a large possible variety of sizes, i.e. the discrete fastening or adjusting of the belt.

The fastening means are preferably in the form of snap buttons arranged in columns and rows mounted on a nonelastic cloth suitably attached to the elastic portion of the belt.

The snap buttons are arranged so that the mating members are respectively separated on the two pieces, one piece having the buttons appropriately spaced for the variety of sizes to which it can be adjusted, and the other piece being provided with at least one column of three or more other mating button portion which can be selectively connected over columns of the other piece corresponding to a given size.

Instead of the snap buttons described above, other fastening means may be used for the discrete size adjustment of the belt. For example, parallel rows of eyes may be positioned on one belt piece and on the other end a row of corresponding hooks. Similarly a series of rectangular metal loops may be spaced in rows on one belt end and corresponding rectangular mating hooks on the other end.

Especially preferred, however, is the application to this discrete adjusting, or fastening means, of the fabric fastening means which is known as "Velcro" closures. This fastening means comprises on one surface, say the top surface of one belt piece end, an area of woven-in fabric loops and on the bottom surface of the other belt piece end an area of knops or loops that have been cut so as to form miniature hooks. When these two areas are placed one on top of the other and pressed gently together they adhere firmly one to another and resist very strongly to relative sliding or horizontal motion. However, the two areas may be quickly and simply parted by exerting a vertical force, on one area, i.e. by pulling them apart by the application of force in a vertical plane. Thus using this type of discrete adjusting or fastening means, the number of sizes is almost infinite; at least there is a multitude of possible size adjustments.

The belt is provided with flaps displaced so that each will overlap the other end portion of the belt velcro closures or textile adhesive strips are provided on each flap and a portion of the belt upon which the opposing flap will overlie. Tightening of the belt ky the user by tensioning the ends of each flap will allow for the most comfortable and yet tight adjustment of the belt about the user. Easy pressure on the flap against the belt carrying the mating textile adhesive material causes an effective connection between the overlying adhesive portions which is maintained in place until it is desired to disconnect the belt by the simple act of lifting the flap from the body portion of the belt.

An additional feature of the invention provides for a replaceable reinforcement or back support disposed in a sack or pouch in the portion of the belt facing the sacral or small-of-the-back portion of the user. The reinforcement is preferably composed resilient foam material reinforced with a rigid backing member sufficient to give the rigidity needed for such purpose.

Other objects and advantages will be readily apparent from the following detailed description of an embodiment of the invention and the drawing appended hereto, wherein:

FIG. 1 is a perspective view showing, in assembled form, a rib belt embodying one form of the invention;

FIG. 2 is a plan view of the inner face of the rib belt in its separated parts; and

FIG. 3 is a sectional view of the rib belt as shown along the viewing line indicated at 3–3 of FIG. 2.

Referring now to the drawing, the belt **10**, comprises two separable portions, a relatively longer portion **12** and a relatively shorter portion **14**.

The member **12** is a substantially rectangular panel **16** of elastically extensive material having warp threads running in the longer or longitudinal direction of the panel made of synthetic material, such as nylon thread, while the weft threads or nonelastic threads may be made of cotton. Any suitable material, of course, may be used. A flap portion **18** extends longitudinally beyond the edge of the panel **16** and is edged with an elastic binder **20** to prevent fraying, and to strengthen the ends.

A panel **22** of nonelastic cloth, such as muslin or the like, is attached to the panel **16** at connection **24**, as by stitching. A plurality of buttons **26**, of a snap-button fastening means, are attached to the cloth panel **22** as by riveting or the like, and may be appropriately covered with cloth or other covering material **28** to prevent scratching of the skin of the user.

The other belt piece member **14** is similarly formed of a rectangular panel **30** of elastic material extending lengthwise of the panel appropriately connected as by stitching to a relatively short cloth panel **32** of nonelastic muslin or the like. One column of snaps **34** is mounted on the panel by riveting or the like, which snaps are suitably spaced so that they will be in alignment for respective connection to the buttons of any column of buttons disposed on panel **22**. A binder strip **36** is provided along the curved end of the member **14** to prevent fraying and to provide support to the end portion during the use of the belt.

It is also contemplated that instead of snaps **34** mating with buttons **26**, metal hooks at **34** cooperating with a series of metal eyes at **34** may be used. Or, similarly, snaps **34** may be replaced by a series of rectangular loops and buttons **26** by a series of rectangular loops to receive hooks **34**.

It is also contemplated that cloth panel **22** may be replaced with a rectangular area of textile adhesive such as a woven-in, pliable hooks which may be formed by cutting open the loops or knops of woven-in thermoplastic threads of a synthetic material such as nylon. Panel **32**, in this instance, is of a similar

adhesive textile with the loops or knops longer and uncut. Thus when panel **32** is pressed against panel **22** the hooks and loops intermesh resulting in a fastening which is very resistant to the application of horizontal force, and also providing much greater variation in discrete adjustment.

Textile adhesive connecting strips are used to make a rapid connection of the ends of the belt. To that end there is provided a panel **38** of textile hooks **40** sewed or otherwise suitably attached to the tab **18** facing outwardly as seen in FIG. **2**. The mating textile adhesive material is in the form of loops **44** mounted on a panel **42** which is attached to the belt piece member **14** on a portion inwardly of the tab **33** and laterally displaced towards the other edge. A similar pair of textile adhesive strips are attached to the lower half of the belt members as shown at **40** for carrying loops **48** and at **50** for carrying the hooks **52**.

The preferred textile adhesive strips **38**, **46**, **42** and **50** are known as "Velcro" closures, such as described above. These fasteners or closures are provided in two parts, one of which is provided on one side with woven-in pliable hooks which, for example, may be formed by the cut-open knops or loops of woven-in thermostatic threads of synthetic material, for example, comprised of nylon. The other part of the adhesive fastener may be provided on the contact side also, with such woven-in hooks, or even with longer knops lying close to each other and made of woven-in resistant threads, for example, of nylon. When these two parts are brought into contact with each other the pliable hooks of one part catch in the hooks or knops of the other part. A relatively slight tug or force in the direction opposing the connection will separate the closure or fastener. Longitudinal or lateral forces applied to the closed members are strongly resisted substantially preventing any opening of a closure of the textile adhesive fasteners.

It should be noted that the curved design of the ends of the belt comprising the flaps **18** and **33** allows for suggestive easy tightening or intermediate adjustment by the user first pulling flap **18** under the portion **42** of the belt and then touching the two Velcro fasteners portions **38** and **42** together at the desired location. The flap **33** is then pulled for tightening under fastener portion **46** and then touching those two Velcro fastener portions together. A mere patting force is enough to assume a firm connection of Velcro fasteners. The connected belt with the overlapping-flap connection serves to distribute the strain of the holding forces of the belt about the body of the user.

A pouch or pocket **56** may be advantageously provided on the inner face of the belt connected by stitching to panel **22**. A pad **57** is generally rectangular and includes a compressible resilient material **58** such as foam rubber and the like attached to a relatively rigid fiberboard or metallic backing member **60**.

It is thus seen that the objects of the invention have been accomplished. The belt of the invention serves to make available in a single appliance a plurality of size adjustments in both relatively large steps, discrete adjustment, or in very small increments, intermediate adjustment. A removable back-support pad serves to render the appliance suitable for various types of therapeutic treatment for a patient when the back-support pad is needed only for limited times yet the appliance, it should be understood, may be used without such a pouch and pad.

It will be understood that the foregoing description of but one embodiment of the invention is not to be construed in any way to limit the invention but that modifications may be made thereto without departing from the scope of the invention as set forth in the following claims.

What I claim is:

1. An orthopedic appliance adjustable to any of a wide range of sizes about the human torso providing localized support in the sacral and rib regions comprising in combination:

a. a back panel carrying a plurality of first component parts of adhesive fastening means arranged to provide a plurality of longitudinally spaced positions corresponding to a selected range of sizes;

b. a substantially rectangular first panel of elastic material attached to said back panel and having upper and lower edges with a flap extending from the free end thereof and from one edge to substantially the medial portion of the panel;

c. a substantially rectangular second panel of elastic material having upper and lower edges and having a flap extending from one end thereof and from a medial portion of said panel to an edge opposite to the edge from which said first flap extends whereby said flaps are in vertically displaced relation to each other when said first and second panels are arranged about a human torso in abutting or overlapping relation, said second panel carrying second component parts of adhesive fastening means for detachable connection to the said first component parts of said fastening means on said back panel;

d. a first adhesive strip on one face of each of said flaps of each of said panels;

e. a second adhesive strip on the other face of each of said first and second panels and at least a portion offset from said flaps in such position to provide a quick-detachable connection to the corresponding first adhesive strip on the face of each flap;

f. whereby said first and second panels are detachably connected in overlying relation to a desired size by connecting a selected group of fastening components on one panel with those on the other panel and said flaps are detachably connected to the other free ends of said panels by overlying and connecting said adhesive strips in desired location.

2. An appliance according to claim **1** including a removable supporting pad for the back or sacral region comprising a body of compressible resilient material reinforced with a rigid member, a pouch for receiving said pad disposed on the inner face of said first panel and arranged to press against the sacral or back region of the user when said appliance is connected about the human torso.

3. An orthopedic appliance adjustable to any of a wide range of sizes about the human torso providing localized support in the sacral and rib regions comprising in combination:

a. a substantially rectangular cloth back panel carrying a plurality of first component parts of snap-fastener means arranged to provide a plurality of longitudinally spaced positions corresponding to a selected range of sizes;

b. a substantially rectangular first panel of elastic material attached to said back panel and having upper and lower edges with a flap extending from the free end thereof and from one edge to substantially the medial portion of the panel.

c. a substantially rectangular second panel of elastic material having upper and lower edges having a flap extending from one end thereof and from a medial portion of said panel to an edge opposite to the edge from which said first flap extends whereby said flaps are in vertically displaced relation to each other when said first and second panels are arranged about a human torso in abutting or overlapping relation, said second panel has a strip of cloth attached to the other end of said second panel carrying second component parts of snap-fastener means for detachable connection to the said first component parts of said snap-fastener means on said back panel;

d. a first adhesive strip on one face of each of said flaps of each of said panels;

e. a second adhesive strip on the other face of each of said first and second panels and at least a portion offset from said flaps in such position to provide a quick-detachable connection to the corresponding first adhesive strip on the face of each flap.

f. whereby said first and second panels are detachably connected in overlying relation to a desired size by connecting a selected group of snap-fasteners components on one panel with those on the other panel and said flaps are detachably connected to the other free ends of said

panels by overlying and connecting said adhesive strips in desired location.

4. An appliance according to claim 1 including a removable supporting pad for the back or sacral region comprising a body of compressible resilient material reinforced with a rigid member, a pouch for receiving said pad disposed on the inner face of said first panel and arranged to press against the sacral or back region of the user when said appliance is connected about the human torso.

5. An appliance according to claim 1 wherein the first component of said snap-fastening means is arranged on said first panel in longitudinal rows and vertical columns, and the second components of said snap fasteners are arranged on said second panel in at least one column, whereby each column on said first panel corresponds to a discrete size adjustment and said columns on said second panels are detachably connected to any desired snap-fastener component of said first panel columns.

6. An orthopedic appliance adjustable to an of a wide range of sizes about the human torso providing localized support in the sacral and rib regions comprising in combination:

a. a substantially rectangular cloth back panel carrying a plurality of first component parts of fastening means arranged to provide a plurality of longitudinally spaced positions corresponding to a selected range of sizes;

b. a substantially rectangular first panel of elastic material attached to said back panel and having upper and lower edges with a flap extending from the free end thereof and from one edge to substantially the medial portion of the panel;

c. a substantially rectangular second panel of elastic material having upper and lower edges having a flap extending from one end thereof and from a medial portion of said panel to an edge opposite to the edge from which said first flap extends whereby said flaps are in vertically displaced relation to each other when said first and second panels are arranged about a human torso in abutting or overlapping relation, said second panel has a strip of cloth attached to the other end of said second panel carrying second component parts of fastening means for detachable connection to the said first component parts of said fastening means on said back panel;

d. a first adhesive strip on one face of each of said flaps of each of said panels;

e. a second adhesive strip on the other face of each of said first and second panels and at least a portion offset from said flaps in such position to provide a quick-detachable connection to the corresponding first adhesive strip on the face of each flap;

f. whereby said first and second panels are detachably connected in overlying relation to a desired size by connecting a selected group of fastening components on one panel with those on the other panel and said flaps are detachably connected to the other free ends of said panels by overlying and connecting said adhesive strips in desired location.