

[54] **TRACTION STRIP**
[75] Inventor: **Henry A. Quello, Warsaw, Ind.**
[73] Assignee: **Zimmer Manufacturing Company, Warsaw, Ind.**
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[52] U.S. Cl. **128/169, 128/156, 161/159, 128/75**
[51] Int. Cl. **A61f 13/00**
[58] Field of Search..... **128/75, 155, 156, 128/157, 169, 84; 161/159, 160, 161**

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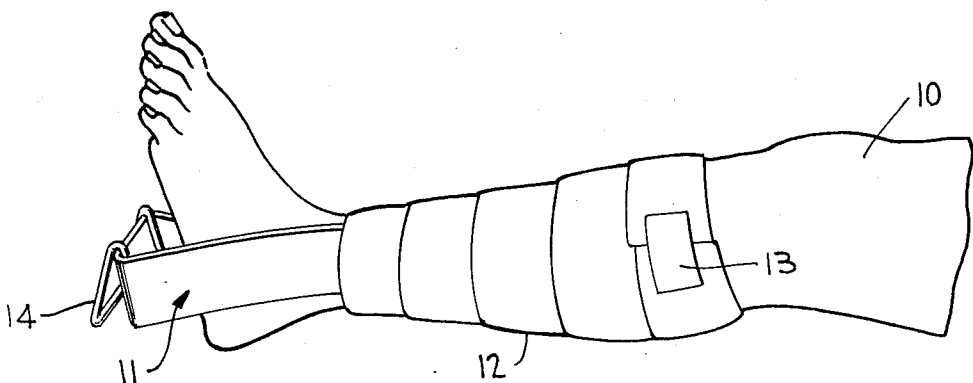
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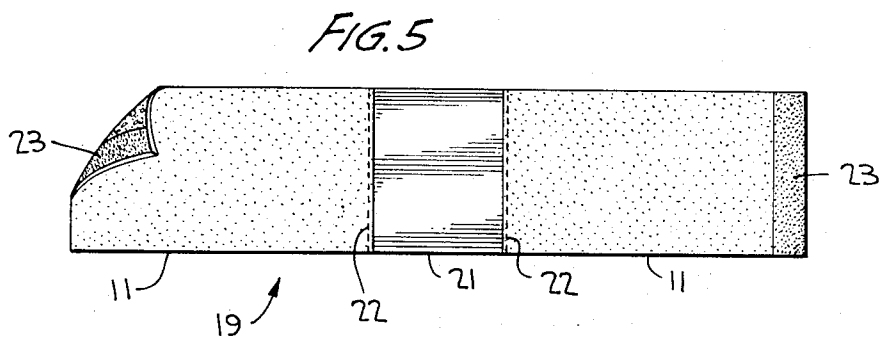
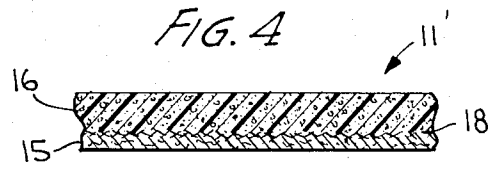
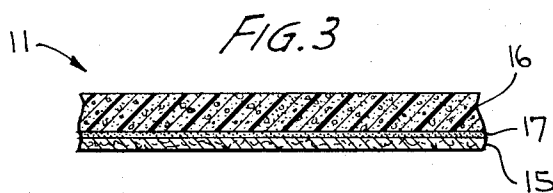
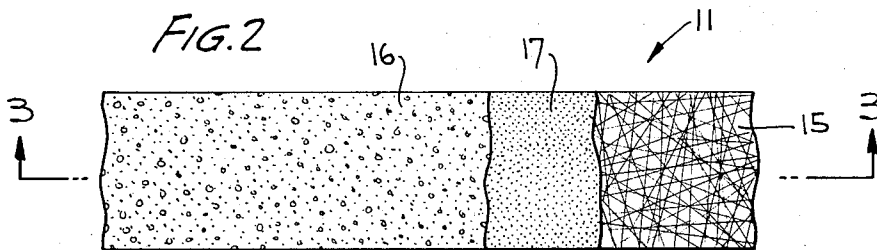
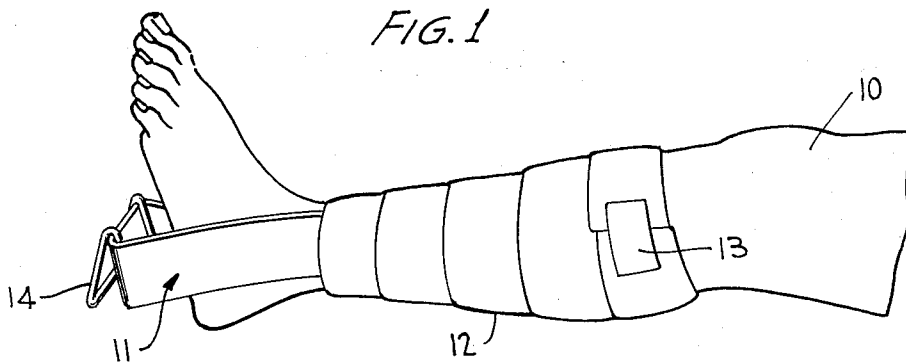
Primary Examiner—Richard A. Gaudet
Assistant Examiner—J. Yasko
Attorney—Watson, Cole, Grindle & Watson

[57] **ABSTRACT**

A traction strip comprising an outer layer of a spun bonded polyester and an inner layer selected from the group consisting of a cellular hydrophobic and a cellular hydrophilic sponge material bonded to one surface of the outer layer thereby forming a laminate.

10 Claims, 8 Drawing Figures





INVENTOR,
HENRY A. QUELLO
BY *Watson, Cole, Grindle & Watson*
ATTORNEYS

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FIG. 6

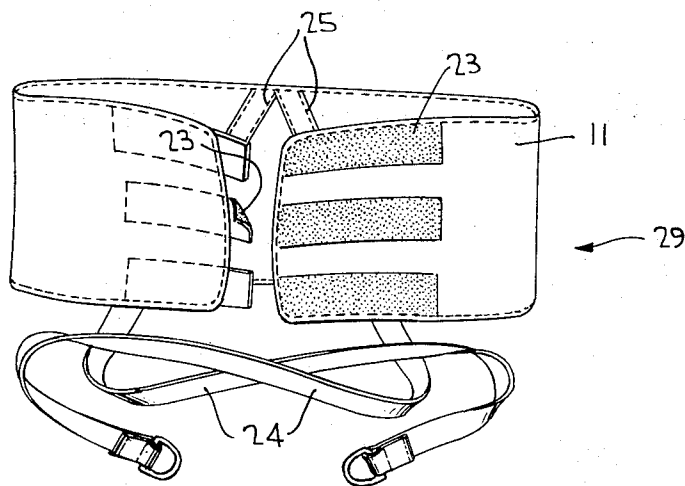


FIG. 7

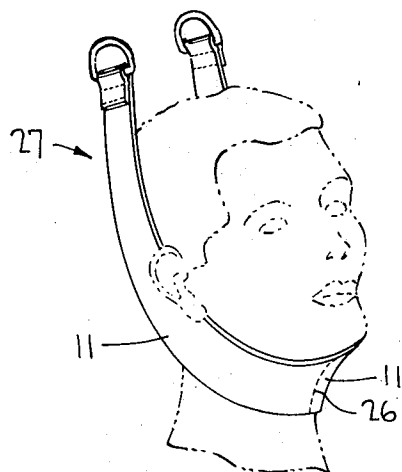
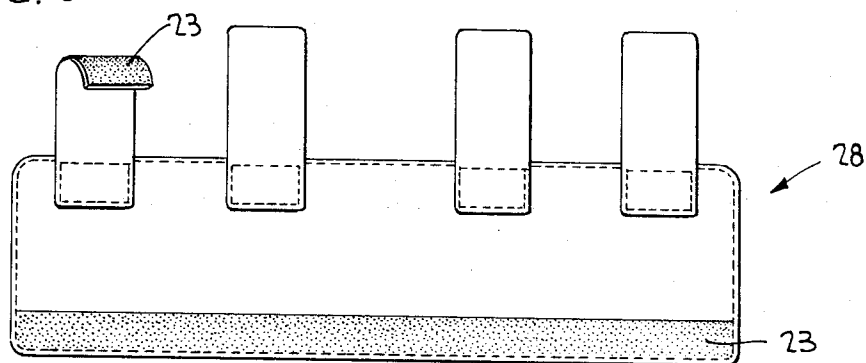


FIG. 8



INVENTOR,
HENRY A. QUELLO

BY *Watson, Cole, Grindle & Watson*
ATTORNEYS

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TRACTION STRIP

This application is a Continuation-In-Part of copending U.S. application Ser. No. 811,087 filed Mar. 27, 1969, now U.S. Pat. No. 3,536,072.

This invention relates generally to a band or strip useable as a hospital or clinical supply item for application to various parts of the patient's body, and more particularly to a traction strip useable to facilitate attachments of traction means to the limb of a patient, and also useable, for example, as a wrap or pressure band to be worn about some portion of the patient's body.

In the above referred-to application, a traction strip material is disclosed as comprising an outer layer of a spun bonded polyester and an inner layer of polyester urethane foam adhered to one surface of the outer layer, the other surface of the foam having a layer of pressure-sensitive adhesive thereon for permitting the traction band to be easily applied and removed from the patient's limb. Such a traction strip material is disclosed therein as having the properties of avoiding unraveling or fraying in any direction, as having a higher break elongation, as having a high-tensile strength in all directions, and as having a higher tear stress during use thereof with pointed fasteners inserted through the traction band. Although such traction strip material may be used effectively for adhesively securing it to a fractured limb for attachment of the tension-applying apparatus without producing any allergic reactions to the patient's skin and assuring adequate cushioning for the comfort of the user at all times, this traction strip is somewhat limited in its use for other clinical or hospital applications. It has been therefore found that without the provision of a pressure-sensitive layer on the foam, such a strip may be also used as a pelvic belt, a rib belt, an arm sling or arm support, a chin strap and any number of other applications wherein it becomes undesirable to adhesively secure the strip to some portion of the patient's body.

It is therefore the principal object of the present invention to provide a traction strip comprising an outer layer of a spun bonded polyester having a high tensile strength in all directions and a flexible inner layer selected from the group consisting of cellular hydrophobic and cellular hydrophillic sponge material bonded to one surface of the outer layer thereby forming a laminate.

Another object of this invention is to provide such a strip wherein the bond between the inner and outer layers comprises a layer of the sponge material itself, which is softened in the presence of heat.

A further object of this invention is to provide such a strip wherein the bond between the inner and outer layers comprises a layer of adhesive.

A still further object of this invention is to provide a rib belt composed of two strips, each comprising a laminate as mentioned above and elastic center panel, one end of each strip being fastened to opposite ends of the center panel and fastening means being provided at the free ends of each strip, e.g. the "Velcro" type fastener, so as to facilitate fastening together the free ends of each strip to form a closed loop of the rib belt.

A still further object of this invention is to provide a traction strip comprising a laminate as aforementioned and having fastening means, e.g. of the "Velcro" type, to retain the strip around a portion of the wearer's body.

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A still further object of this invention is to provide a traction strip including webbing means secured thereto so as to facilitate use thereof as a pelvic traction or similar type belt.

5 A still further object of this invention is to provide a traction strip comprising two panels of the aforementioned laminate secured together end-to-end and being slightly contoured so as to facilitate its use as a chin belt or head halter during traction applications.

10 Other objects, advantages and novel features of the invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings wherein:

FIG. 1 is a side elevational view of a traction strip in accordance with the present invention applied in a typical manner to the patient's limb as shown fragmentarily;

FIG. 2 is a plan view showing a portion of the strip material with parts broken away so as to more clearly show the various layers thereof;

FIG. 3 is a sectional view taken substantially along the line 3—3 of FIG. 2;

FIG. 4 is a view similar to FIG. 3 but showing an alternative manner of bonding together the inner and outer layers forming the laminate;

FIG. 5 is a plan view showing a pair of the laminate strips and an elastic center panel joined at opposite ends to each strip with fastening means at the free end of each strip;

FIG. 6 is a plan view of a pelvic traction belt constructed of the traction strip laminate material in accordance with the present invention;

FIG. 7 is an elevational view of the traction strip laminate material useable as a head halter during traction; and

FIG. 8 is a plan view of the traction strip laminate having fastening means at opposite ends thereof.

Turning now to the drawings wherein like reference characters refer to like and corresponding parts throughout the several views, there is shown in FIG. 1 a portion of the patient's leg 10 to which the traction band 11 is applied in a convenient manner as by an elastic bandage 12 after the fractured leg 10 has been set. A strip of ordinary adhesive tape 13, or similar type fastener, is used to secure the free end of the bandage onto the leg. As compared to the band forming the invention of the earlier-mentioned application, the present band 11 is not provided with a pressure-sensitive layer along its inner surface. Instead, the band 11 is simply applied to the limb longitudinally on both sides thereof so as to form a loop at the distal end of the foot for insertion of a spreader bar 14 whereafter the elastic bandage 12 is simply applied around the band over the patient's leg and is positively held in place by means of adhesive strip 13. As before, a conventional traction cord (not shown) may be tied to the bar 14 at one end and thereafter to a system of weights and pulleys at its other end.

In FIGS. 2 and 3, it can be seen that the traction band 11 comprises a laminate including a backup layer or strip 15 to which a spongy strip of cushioning material 16 is bonded as by means of adhesive layer 17. The layer 16 may comprise any hydrophobic or hydrophillic sponge material having intercommunicating cells in its structure so as to render it resilient and suitably flexible for cushioning the traction strip during periods of use. For example, a polyester urethane foam layer, a poly-

ether urethane foam and other like materials which will remain flexible and resilient may be used as the spongy material for carrying out the invention.

The backup layer 15 is bonded to one layer of the spongy layer 16 by means of adhesive layer 17 as clearly shown in FIG. 3. Layer 15, forming an outer layer of the traction strip laminate, may be comprised of a spun bonded polyester sold under the trademark REEMAY, manufactured by Dupont. Alternatively, the outer layer may be of any spun bonded material possessing comparable physical properties of spun bonded polyester. For example, a spun bonded nylon sold under the trademark CEREX, manufactured by Monsanto; a spun bonded olefin sold under the trademark TYVEK, manufactured by Dupont, or a spun bonded polypropylene sold under the trademark TYPAR, also manufactured by Dupont, may be used. Such material is known to possess a higher break-elongation property over other backup strips used in the traction band art. Furthermore, because this product involves an integrated process of spinning and bonding of the fibers, any tendency to unravel or fray in any direction is lessened so that the traction strip is not likely to deteriorate after long periods of use. Moreover, this type of backup layer affords a very high tensile strength for the traction strip laminate in all directions since it is substantially a sheet product of continuous filaments with its fibers randomly arranged, highly dispersed and bonded at the filament junctions. Also, with the use of pins or prongs inserted into the traction strip laminate the backup layer 15 is found to possess a higher tear strength as compared with most other materials used for this purpose.

In FIG. 4 it can be seen that an alternative embodiment of the strip shown at 11' is substantially the same in all respects as the strip 11 except that the bond between the layers 15 and 16 comprises a layer 18 of the cushioning layer 16 itself which has been melted or sufficiently softened during a flame process.

In FIG. 5 a rib belt 19 is disclosed as comprising a pair of strips 11 and an elastic center panel 21 joined at opposite ends to one end of each of the strips as by stitching 22. In order to facilitate fastening together of the belt's free ends, fastening means 23 are provided at the free ends of each strip 11 so that the belt may be wrapped around the rib cage, for example, of the wearer. Since the strips 11 are not stretchable in any direction, the center panel 21 provides better conformity to the user's body and permits a greater or lesser degree of pressure to be applied against the wearer's ribs. The fastening means 23 may be of the "Velcro" type wherein hook material or the like is provided along one free end of the strip and loop material is arranged along the free end of the other strip. In this way, the rib belt may be conveniently adjusted about the wearer's rib cage and thereby accommodate several sizes for a somewhat universal application as a rib belt.

In FIG. 6 a pelvic traction belt 23 is shown as comprising a strip 11 of the laminate aforedescribed with fastening means 23 also being provided along opposite ends of the strip 11. Again, such fastening means may be of the "Velcro" type wherein hook material is provided at one end of the strip and loop material on tabs sewn or otherwise secured to the other end of the strip are provided so as to produce a convenient size adjustment for the wearer. In addition, the pelvic traction belt 23 is provided with transverse straps or webbing 24

secured to the outer surface of the outer layer as by stitching 25. In this way the pelvic belt may be conveniently used during traction applications.

In FIG. 7 a pair of strips 11 are secured together as by stitching 26 so as to form a head halter 27 which is conveniently contoured to fit the wearer's chin and occiput (back of head) so as to provide hyperextension or flexion of the cervical region during traction. D-rings, adjustment buckles, webbing and any such other attachments may be combined with the head halter to effect proper traction applications.

In FIG. 8 an arm or leg strap 28 is shown as comprised of a strip 11 of the laminate above-described and as having fastening means 23 provided along opposite ends thereof. Again, such fastening means may take the form of "Velcro" material wherein hook material is provided as one portion of the fastening means whereas loop material is provided as the other portion thereof. Of course, buckles may be provided in lieu of the "Velcro" type fastener in this and in the other embodiments and the strap 28 may be useable, for example, as an abdominal binder, a sacral support, an arm sling, a wrist wrap, a forearm wrap, a splint, a clavicle strap, a heel protector, an elbow protector, a post-operative knee dressing or a post-operative knee support. The strap 28 as well as the remaining embodiments shown herein may also be applicable for other uses with or without buckles and straps or with a different ring or buckle location than as specifically disclosed.

From the foregoing, it can be seen that a traction strip has been devised which possesses all the advantages of the strip disclosed in the earlier referred-to application except that without use of the pressure-sensitive layer it enjoys wider application of uses in the clinical or hospital field. Because of the convenient fastening system used a few stock sizes of the pelvic belt and rib belt, for example, will fit all patients. In addition, inventory problems are simplified. The spongy cushion layer provides the comfort to the wearer while the backup strip permits longer life and high tensile strength for the strip during its use as compared to any other form of traction band.

Obviously many modifications and variations in the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practised otherwise than as specifically described.

What is claimed is:

1. A traction strip comprising an outer layer of a spun bonded polyester having a high tensile strength in all directions, and a flexible inner layer selected from the group consisting of a cellular hydrophobic and a cellular hydrophilic sponge material bonded to one surface of said outer layer thereby forming a laminate, and means cooperating with said laminate for retaining it on a portion of a wearer's body.

2. The strip according to claim 1 wherein the bond between said inner and outer layers comprises a layer of said sponge material which is softened in the presence of heat.

3. The strip according to claim 1 wherein the bond between said inner and outer layers comprises a layer of adhesive.

4. A rib belt composed of two strips each comprising an outer layer of a spun bonded polyester having a high tensile strength in all directions and a flexible inner layer selected from the group consisting of a cellular

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hydrophobic and a cellular hydrophillic sponge material bonded to one surface of said outer layer thereby forming a laminate, an elastic center panel, one end of each said strip being fastened to opposite ends of said center panel, and fastening means at the other end of each said strip to facilitate fastening together said other ends to form a closed loop of the rib belt.

5. A traction strip comprising an outer layer of spun bonded polyester having a high tensile strength in all directions, and a flexible inner layer selected from the group consisting of a cellular hydrophobic and a cellular hydrophillic sponge material bonded to one surface of said outer layer thereby forming a laminate, and fastening means at opposite ends of the strip to retain the strip around a portion of a wearer's body.

6. The strip according to claim 5 further including webbing means secured to the other surface of said outer layer to facilitate traction application of the strip.

7. A head halter composed of two strips each comprising an outer layer of spun bonded polyester having a high tensile strength in all directions and a flexible inner layer selected from the group consisting of a cellular hydrophobic and a cellular hydrophillic sponge material bonded to one surface of said outer layer thereby forming a laminate, the ends of each said strip being fastened together forming a contoured chin strip

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loop or an occiput (head) strap loop.

8. A traction strip comprising an outer layer of a spun bonded nylon having a high tensile strength in all directions, and a flexible inner layer selected from the group consisting of a cellular hydrophobic and a cellular hydrophillic sponge material bonded to one surface of said outer layer thereby forming a laminate, and means cooperating with said laminate for retaining it on a portion of a wearer's body.

9. A traction strip comprising an outer layer of a spun bonded olefin having a high tensile strength in all directions, and a flexible inner layer selected of the group consisting of a cellular hydrophobic and cellular hydrophillic sponge material bonded to one surface of said outer layer thereby forming a laminate, and means cooperating with said laminate for retaining it on a portion of a wearer's body.

10. A traction trip comprising an outer layer of a spun bonded polypropylene having a high tensile strength in all directions, and a flexible inner layer selected from the group consisting of a cellular hydrophobic and a cellular hydrophillic sponge material bonded to one surface of said outer layer thereby forming a laminate, and means cooperating with said laminate for retaining it on a portion of a wearer's body.

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