United States Patent

Plummer

[15] **3,682,163**

[45] **Aug. 8, 1972**

[54] SNAP-ON ORTHOPEDIC SPLINT

[72] Inventor: **Walter A. Plummer,** 3546 Crownridge Drive, Sherman Oaks, Calif. 63759

[22] Filed: **Sept. 18, 1970**

[21] Appl. No.: **73,370**

[52] **U.S. Cl.** .....**128/87 R,** 128/89 R

[51] **Int. Cl.**.....**A61f 5/04**

[58] **Field of Search**.....128/87, 89, 90; 24/201 C; 273/183 B, 189 R, 189 A, 54 B; 285/47

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Primary Examiner—Richard A. Gaudet
Assistant Examiner—J. Yasko
Attorney—Sellers and Brace

[57] **ABSTRACT**

A light-weight, semi-rigid, snap-on orthopedic splint having a flexible sheet plastic main body laminated to a thick spongy layer and equipped with long shallow channels for the insertion of flexible reinforcing splints. The edges of the main body are provided with a suitable adjustable fastener as one having a multiplicity of L-shaped ribs which interlock selectively in different overlapped positions as necessary to form a snug fit with a limb or any part of the body and notched crosswise of the ribs to adapt the splint for assembly about a tapering portion of the body as a limb.

1 Claim, 5 Drawing Figures

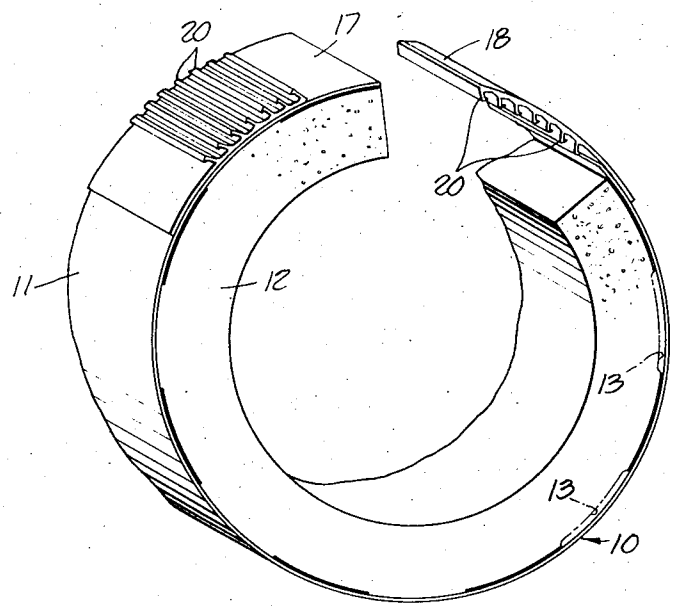


FIG. 1.

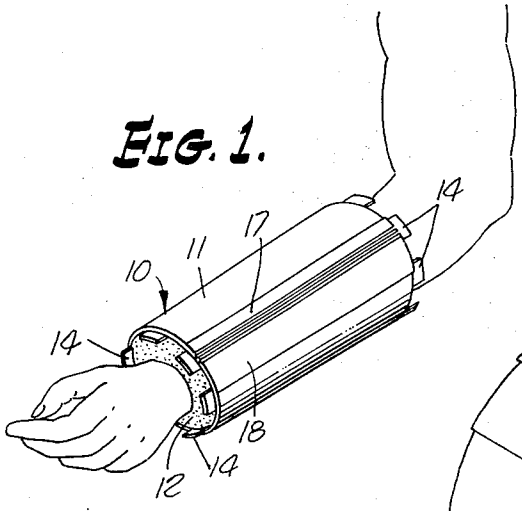
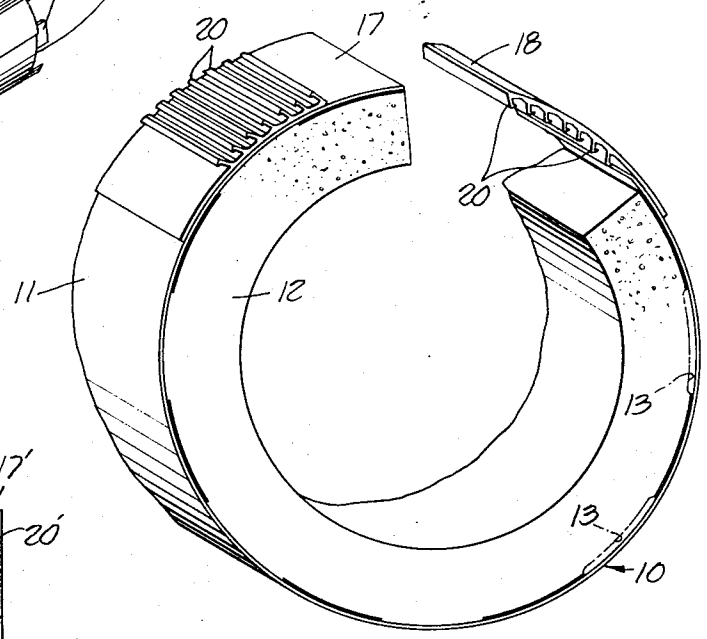


FIG. 2.



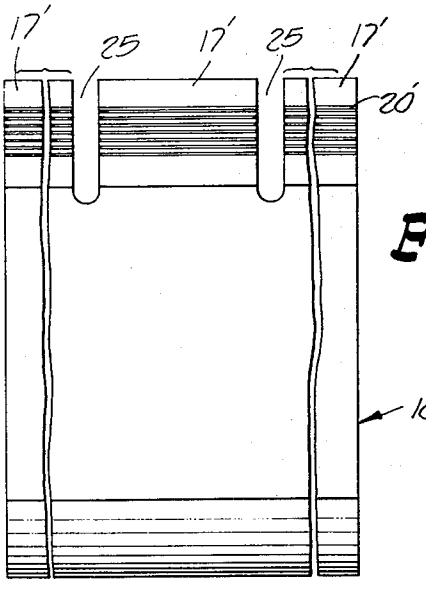


FIG. 4.

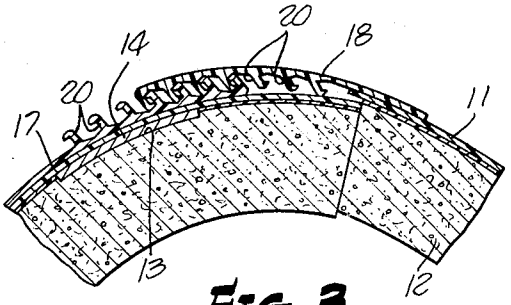


FIG. 3.

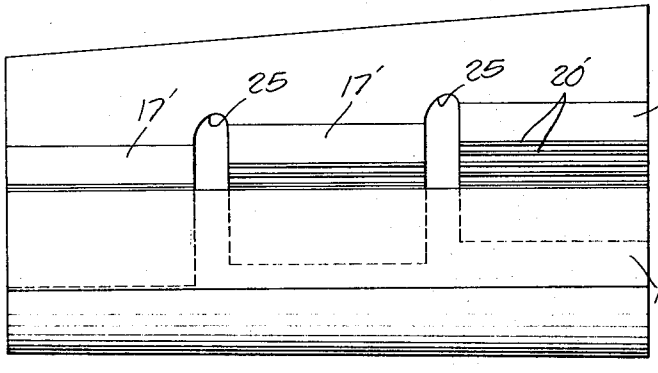


FIG. 5.

INVENTOR
WALTER A. PLUMMER
BY
ATTORNEYS

SNAP-ON ORTHOPEDIC SPLINT

This invention relates to orthopedic splints, and more particularly to an improved light-weight, highly versatile construction equipped with a multiplicity of means designed for selective snap assembly in different overlapped positions.

Various proposals have been made heretofore for orthopedic type splints affording the requisite degree of rigidity for damaged muscles or bones while mending following an accident and capable of being assembled to a limb or any other part of the body and removed therefrom quickly and without need for tools or destroying any part of the assembly. Of laminated construction, the splint includes a thick, porous, resilient, spongy inner layer permanently attached to a thin, flexible sheet of thermoplastic equipped along its lateral edges with seam forming tapes having a multiplicity of parts adapted to be engaged in any of a wide number of different positions as necessary to provide a snug semi-rigid assembly about a particular part of a patient's body or limb. The construction includes a number of parallel passages beneath the thermoplastic main body to receive semi-rigid reinforcing splints to provide greater rigidity when and if needed. Desirably, one or both of the seam forming strips are notched at intervals and these may be offset in echelon to facilitate assembly about a non-cylindrical limb with all parts of the splint stressed substantially uniformly circumferentially.

Among the numerous other advantages of the invention is its high permeability to X-rays and the ease with which its smooth surface can be cleaned and maintained in a sanitary condition. Additionally, the physician may cut a window through the splint while in place with ease and without risk to the patient thereby permitting an unobstructed view of the injury while the general environment of the injury remains supported and protected.

Accordingly it is a primary object of this invention to provide an improved, inexpensive, highly versatile orthopedic type splint adapted to be installed, removed and re-installed if necessary.

Another object of the invention is the provision of a semi-rigid body support adapted to embrace an injured area of the body to provide resilient support and readily accommodating pronounced swelling and contraction without material change in comfort or support and including provision for adjustment if needed.

Another object of the invention is the provision of a body support splint having provision for limited ventilation for greater comfort, the escape of perspiration and the flow of oxygen to enhance and promote more rapid healing.

Another object of the invention is the provision of a snap-on orthopedic splint having a seam extending lengthwise thereof and engageably selective in different overlapped positions to provide a desired degree of snugness for the area encased and enshrouded thereby and including a plurality of passages distributed thereabout for the insertion of reinforcing splints.

Another object of the invention is the provision of a snap-on orthopedic splint readily assembled about a non-cylindrical portion of the patient's body or limb and including a plurality of pairs of seam forming members arranged in echelon and individually adjustable to provide a desired degree of support.

These and other more specific objects will appear upon reading the following specification and claims and upon considering in connection therewith the attached drawing to which they relate.

Referring now to the drawing in which a preferred embodiment of the invention is illustrated:

FIG. **1** is a perspective view showing a preferred embodiment of the invention assembled by way of example about the forearm of a patient;

FIG. **2** is a fragmentary perspective view through one end of the splint in the process of being assembled;

FIG. **3** is a fragmentary cross-sectional view through the seam forming tape in assembled position;

FIG. **4** is a plan view of a second preferred embodiment of the invention in open, unassembled condition; and

FIG. **5** is a view of the FIG. **4** embodiment assembled about a tapering section of a limb, not shown.

Referring initially and more particularly to FIGS. **1** to **3**, there is shown one preferred embodiment of the snap-on orthopedic splint, designated generally **10**, having a main body **11** formed from sheet thermoplastic material such as polyvinyl chloride, polyethylene or the like flexible impervious material. Suitably laminated to portions of the inner surface of main body **11** is a thick, porous, spongy layer **12**. Preferably layer **12** is bonded or laminated to the main body only in certain areas to provide long shallow channels **13** open at their opposite ends and into which semi-rigid reinforcing strips or splints **14** can be inserted. Splints **14** may be formed of bone, plastic, flexible metal, flexible wood strips, or other slightly flexible material.

Splint **10** is held assembled by means of seam forming tapes **17, 18** extruded from flexible plastic or the like elastomeric material. Strips **17,18** are identical in cross-sectional shape and each includes a multiplicity of similar L-shaped ribs **20** running parallel to one another with their longer legs inclined acutely to a perpendicular to the surface of the strip. As is made clear by FIG. **3**, the L-shaped ribs are inclined oppositely and away from one another. Owing to this inclination, load stresses imposed tranversely of the seam acts to cam the ribs into the fully nested position shown in FIG. **3** with the result that the load on the individual ribs is transferred into the strip at the base of the ribs.

The manner of assembling splint **10** will be quite apparent from the foregoing description and the drawing. A selected splint of appropriate size for the limb to be encased is wrapped thereabout and the seam forming strips **17,18** are pulled into overlapping relation until the splint is in the desired state of compression whereupon ribs **20** are pressed into internesting engagement thereby locking the splint firmly assembled. If at any time it is desired to adjust the splint, either to increase or to slacken the compression of the spongy layer **12**, it is merely necessary to grasp one end corner of the outermost seam strip **18** and disengage it progressively from its locked condition. This operation is facilitated by compressing the splint about its girth to provide a slight amount of slack between the seam strips. In this connection it will be noted from FIG. **3** that the entrance gap between adjacent ribs is greater than the length of the shorter legs of the ribs with the result that the legs pass freely into and out of nested assembly.

The modified embodiment 10' shown in FIGS. 4 and 5 is constructed essentially in the same manner as the first described embodiment and differs primarily in that at least one of the seam strips, as 17', is provided at intervals with deep notches 25 in order that separate short lengths of tape 17' may be manipulated independently of the sections to either side thereof. Additionally, one or both edges of the main body may have its edges arranged in echelon as is best shown in FIG. 5. Whether seam strip 17' is straight or in echelon, the presence of notches 25 permits the splint seam to be assembled in stages about a frusto-conical section of the patient's limb to provide a completed assembly which is of greater girth in one zone than in another spaced axially therefrom. By this means it is possible to fit the splint snugly to a frusto-conical part of the limb with all parts of the splint substantially uniformly stressed in hoop tension.

While the particular snap-on orthopedic splint herein shown and disclosed in detail is fully capable of attaining the objects and providing the advantages hereinbefore stated, it is to be understood that it is merely illustrative of the presently preferred embodiment of the invention, and that no limitations are intended to the details of construction or design herein shown other than as defined in the appended claims.

I claim:

1. A snap-on readily-adjustable orthopedic splint comprising: a main body of flexible sheet material having a thick resilient spongy layer generally coextensive with and laminated to one face thereof and sized to embrace a broken limb, readily adjustable seam strip means secured along the opposite lateral edges of said main body, said seam strip means being formed of flexible extruded thermoplastic material of the same shape in cross section, at least one seam-carrying edge of said main body being deeply notched at spaced intervals therealong to separate the seam strip means attached thereto into a plurality of separate seam tabs individually manipulatable into a desired assembled position and degree of overlap with the mating seam strip means on the other lateral side of said main body, each of said seam strip means including a series of closely spaced oppositely facing parallel ribs of L-shape in cross section extending lengthwise of said strip means, the ribs of said separate seam tabs being adapted to interlock in any one of a number of different degrees of overlap with the adjacent portion of the other one of said seam strip means thereby to hold said splint assembled as a tube embracing a patient's limb in a desired degree of tautness circumferentially thereof, said resilient spongy layer, when compressed against a limb, being effective active to place said main body under light hoop tension and thereby aiding in holding the L-shaped ribs of said seam strip means locked closed, and a plurality of thin relatively wide pockets extending axially of and opening through the end of said main body in general parallelism with said seam strip means and including strip splints of a selected stiffness adapted to be placed in said pockets without need for opening said seam means or detaching said splint from its assembled position on a patient's limb.

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