

[54] **ORTHOPEDIC KNEE BRACE**

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[51] Int. Cl. **A61f 3/00**

[58] Field of Search..... 128/80 C, 80 R, 87, 165; 2/22, 24; 273/189 A

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[57] **ABSTRACT**

An orthopedic appliance for bracing the human knee or other similar joint and restraining the same against normal knee bending movement or genuflexion, or other knee movement such as lateral movement, comprises a sheet of resilient material contoured to fit the back of the leg in an area above and below the knee joint. Secured to the concave side of the resilient material is a longer sheet of padding material adapted to be wrapped about the leg, with an opening through which the patella may extend. On the convex side of the resilient member a plurality of straps are attached laterally for encircling the leg, securing the brace thereto. Securing the brace snugly to the leg with the straps causes the contour of the resilient member to increase, preventing flexure of the resilient member and providing a rigid brace which restrains lateral movement and genuflexion.

4 Claims, 8 Drawing Figures

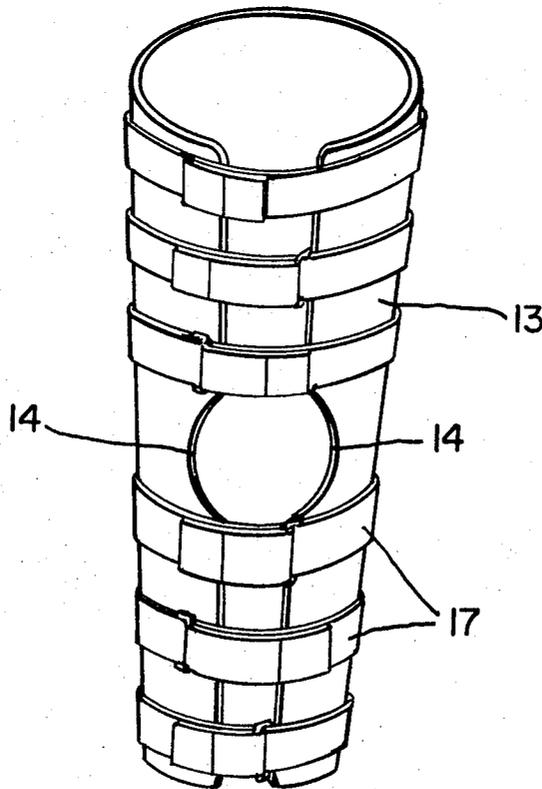


FIG _ 1

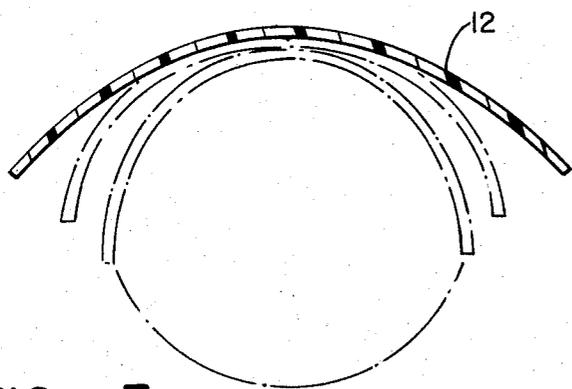
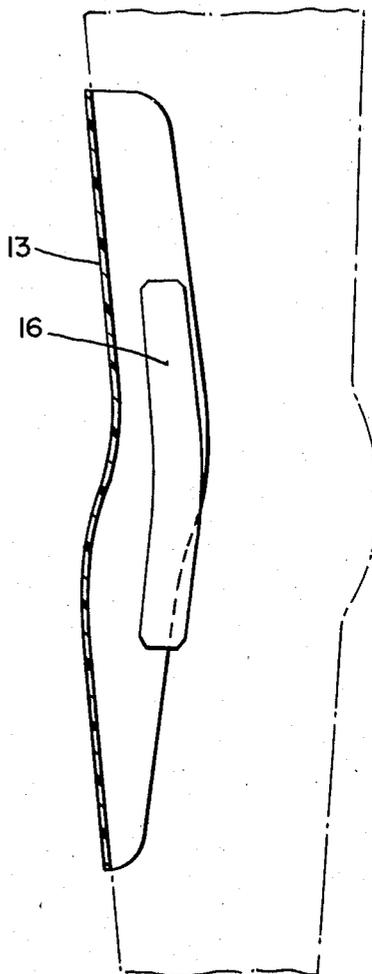
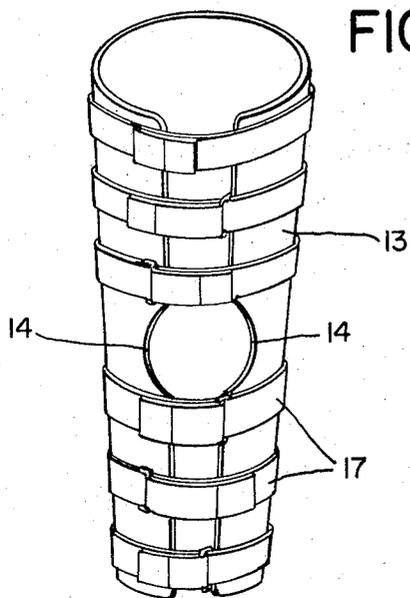


FIG _ 3

FIG _ 4

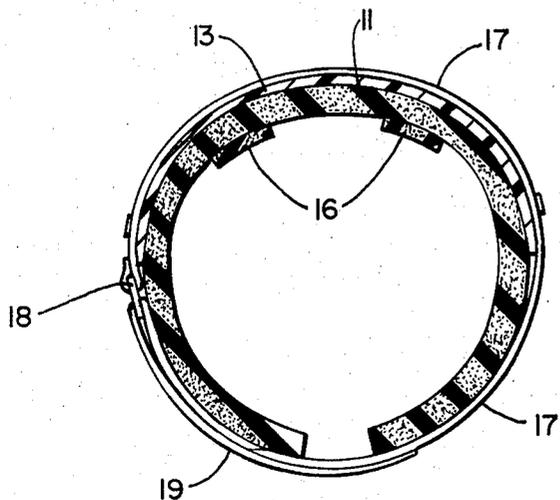


FIG _ 2

FIG _ 6

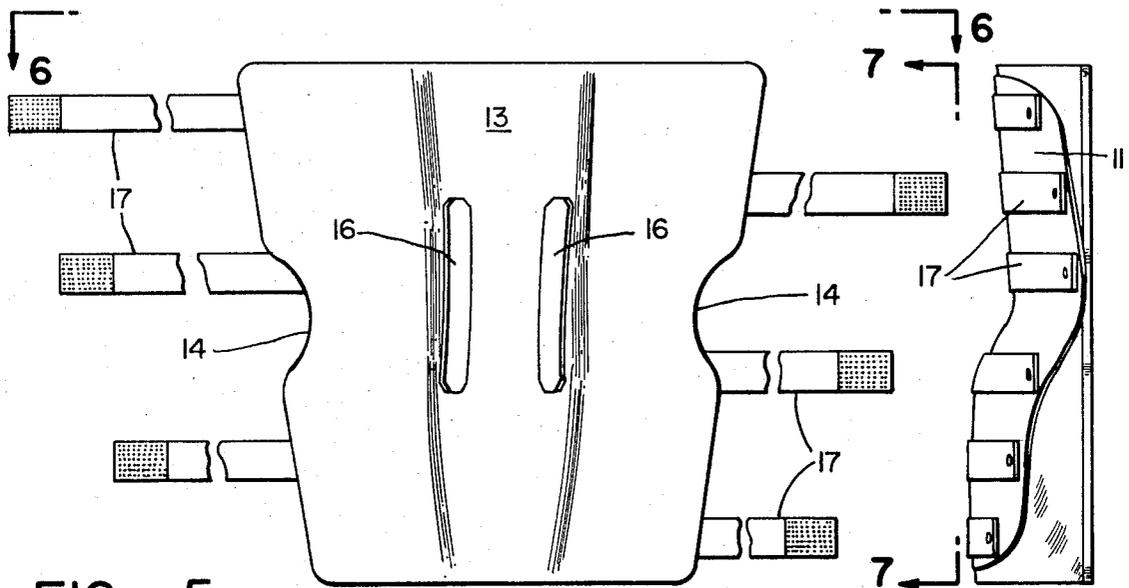
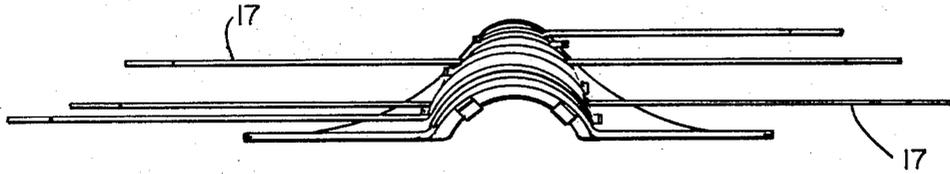


FIG _ 5

FIG _ 7

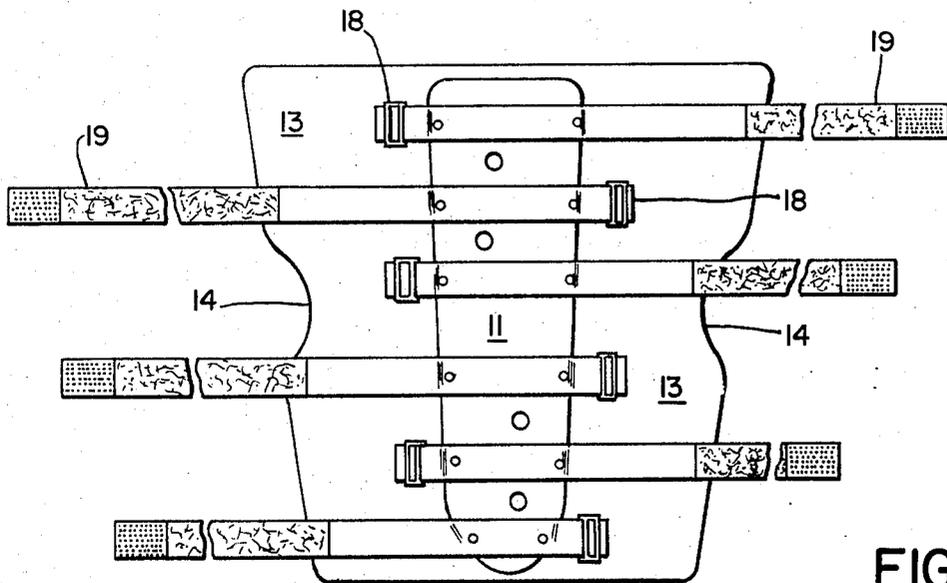


FIG _ 8

ORTHOPEDIC KNEE BRACE

BACKGROUND OF THE INVENTION

A variety of orthopedic appliances have been developed in the prior art for use as a brace for the human knee or elbow for restricting the normal bending movement of such a joint. These appliances are intended to be placed on or removed from the arm or leg of the patient by the patient himself or by a non-professional helper, not permanently secured to the arm or leg as is the traditional Plaster of Paris cast.

Orthopedic appliances of this type known in the prior art typically possess a number of notable short-comings or disadvantageous features. For example, many of the appliances are bulky, or heavy, or difficult to use. Others, which are produced in a variety of sizes and configurations to accommodate the varying musculature and bone structure of different patients, still must be specifically altered or bent to fit the patient, requiring the services of an attending physician or other trained medical person. And, despite the oft-required custom fitting, the appliance may still be uncomfortable for the patient to wear for an extended period of time, thereby compounding the pain of the joint injury with the discomfort of the brace.

It is accordingly an object of the present invention to provide an orthopedic appliance of the type described which overcomes the objectionable features and disadvantages of comparable prior art devices, and which may be easily placed on patients of differing physiques without custom alteration of the appliance. It is a further object of this invention to provide an orthopedic appliance which is resilient and flexible when not in use, but which is rigid when in place as a brace to prevent joint movement. It is also an object of the present invention to provide a joint brace which is comfortable to wear for extended periods.

THE DRAWING

FIG. 1 is a front perspective view of the appliance of the present invention in the closed or operative position.

FIG. 2 is a transverse cross-sectional view of the device in the position of FIG. 1.

FIG. 3 is a transverse plan view of the present invention.

FIG. 4 is a longitudinal cross-sectional view of the appliance placed on a patient.

FIG. 5 is a view of the inside of the present invention in the open or inoperative position.

FIG. 6 is a top perspective view of the appliance in the open or inoperative position, taken along plane 6-6 of FIG. 5.

FIG. 7 is a side view of the appliance in use, taken along plane 7-7 of FIG. 5.

FIG. 8 is a front plan view of the outside of the appliance in the open position.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The appliance of the present invention, as best illustrated in FIGS. 5 and 8 of the accompanying drawings, comprises a support member 11 which is formed of flexible, resilient material and contoured to accommodate the longitudinal configuration of the back of the leg above and below the knee joint, as shown in FIG. 7. In the lateral direction the support member 11 is

formed with a curve much more open than the curve of the leg, as depicted in solid line 12 in FIG. 3. A flexible sheet 13 of padding material of uniform thickness is secured within the support member by means of adhesive or the like. The sheet 13, of trapezoidal configuration, includes recesses 14 in the opposed oblique sides which define, in the closed or operative position, an opening through which the patella may extend. Affixed to the middle of the sheet 13 are two longitudinal pads 16 which contact, support and cushion the popliteal area of the knee joint.

Secured to the exterior of the support member are a plurality of straps 17, each strap including a buckle 18 at one end, and a hook-and-pile fastener 19 at the other end. Such fabric fasteners are available under the registered trademark VELCRO, although it should be noted that snaps, zippers or other fastening means may be employed. The straps, with the buckle end secured to the support member, alternate longitudinally in extending laterally of the appliance, as shown in FIG. 8. To secure the appliance to either leg of a patient, it is placed at the back of the leg with the longitudinal pads 16 contacting the popliteal area, the upper portion engaging the femoral area and the lower portion engaging the tibial area of the leg. The fastening ends of the straps are then snugly wrapped about the leg, passed through their respective buckles 18 and fastened with fasteners 19. Engagement of the straps also wraps the sheet 13 about the leg to cushion the flesh beneath the straps, the opposed oblique sides nearly meeting at the front of the leg, as shown in FIG. 2.

It should be noted that the support member 11 is flexible and resilient when the appliance is in the open position. However, securing the appliance to the leg of the wearer and tightening the straps causes the support member to increase its concavity in the lateral direction as it conforms to the back of the leg, due to the tension of the straps, as shown in phantom in FIG. 3. This increased concavity increases the structural rigidity of the support member, so that in the closed or operative position the appliance braces the knee joint to effectively prevent genuflexion or lateral movement of the joint.

Furthermore, the flexible nature of the support member in the open position permits the support member to be drawn into the proper contour in the lateral direction to accommodate the lateral curves of the leg of the wearer as the straps are tightened. Thus applying and securing the appliance of the present invention to the leg of the wearer at the same times conforms the appliance to the leg, obviating the need for custom fitting of the appliance. Furthermore, one appliance may fit legs of different sizes, so that a production and labelling of appliances in differing sizes is not required.

It should be emphasized that although the preferred embodiment has been described in relation to a knee joint, it is within the scope of the present invention to provide an orthopedic appliance of the disclosed construction for other similar joints, such as but not limited to the elbow joint.

I claim:

1. An orthopedic appliance for immobilizing a joint of a human limb, comprising a semi-rigid resilient support panel adapted to extend above and below the fossa region of the joint and contoured to partially encompass same,

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means for altering said contour of said panel to increase the rigidity of said resilient support panel, said means for altering said contour of said panel including a plurality of lateral straps spaced longitudinally along said panel, and fastening means for adjustably and releasably securing said straps about the limb, and a sheet of padding material secured within said contour of said resilient support panel and extending laterally therefrom, said sheet of padding material being tapered in the lateral dimension from above the fossa region to below the same.

2. The orthopedic appliance of claim 1; further including a plurality of longitudinal pads secured medially to said padding sheet for engaging and cushioning

the joint area of a limb.

3. The orthopedic appliance of claim 1, wherein said sheet of padding material includes opposed longitudinal edges, and a pair of opposed concave indentations disposed in said edges.

4. The orthopedic appliance of claim 1, wherein said resilient support panel includes a first contoured portion receiving the limb above the joint, a second contoured portion offset from said first portion and adapted to receive the limb below the joint, and a third contoured portion extending obliquely between said first portion and said second portion and adapted for receiving the fossa region of the joint.

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