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3,232,289

TEMPORARY SPLINT

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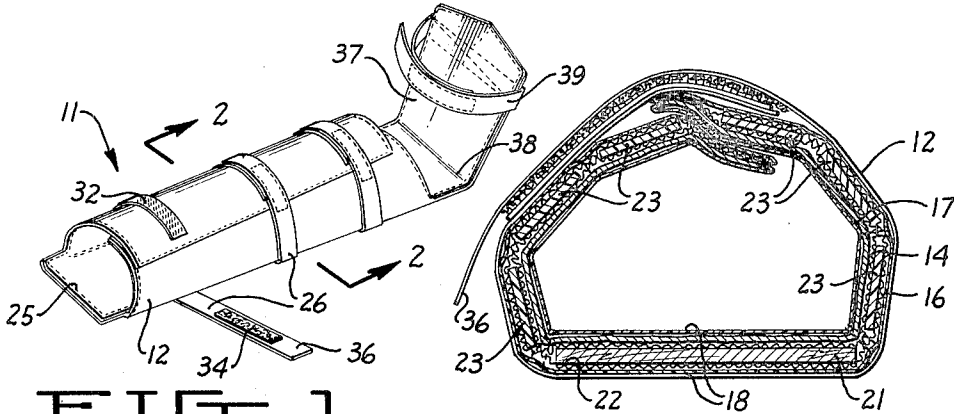


FIG. 1.

FIG. 2.

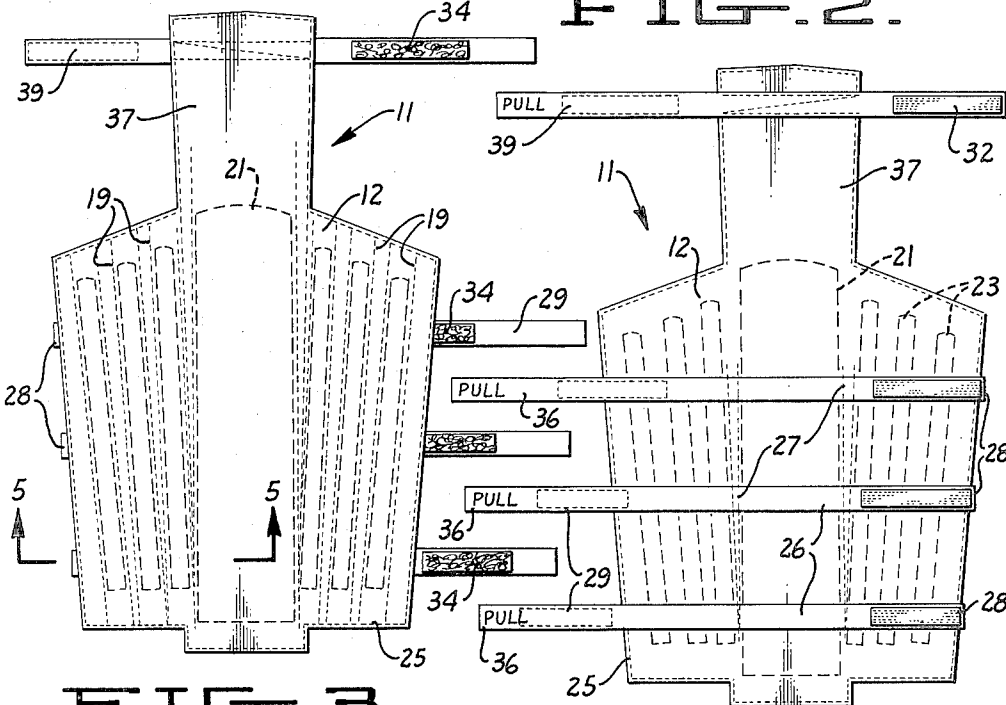


FIG. 3.

FIG. 4.

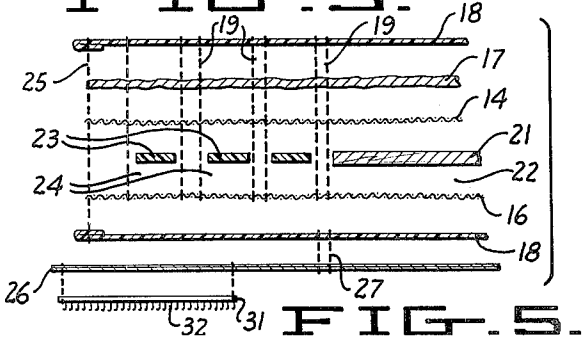


FIG. 5.

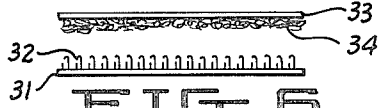


FIG. 6.

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3,232,289

TEMPORARY SPLINT

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4 Claims. (Cl. 128—87)

The present invention relates to improvements in a temporary splint, and more particularly to a temporary splint adapted for reuse over and over again.

Temporary splints are well known and are used in first aid situations to hold broken bones while the patient is being transported from the site of injury to the hospital. In addition, temporary splints are used in the hospital for preliminary treatment to hold the bones in place until the swelling goes down sufficiently to apply a permanent splint or cast. Accordingly, it is desirable to provide a surgical splint which is capable of providing a firm support regardless of the size of the limb and yet which is rapidly and easily applied. Other features are also important such as the ability to make X-ray examinations through the splint without removal of same, and to provide a method of tightening the splint or loosening same so that changes in swelling conditions or the like may be accommodated without removal of the splint. In view of the fact that a temporary splint requires considerable structure in order to provide all the above-mentioned advantages, it is also important to provide a splint capable of being washed, sterilized and reused time after time.

Accordingly, it is a primary object of this invention to provide a splint of the character described in which all of the above-mentioned advantages are obtained so as to provide the patient with a splint which is capable of protecting a fracture or the like from the moment of first aid treatment up until the time a permanent cast may be applied to prevent compounding of simple fractures or aggravation of compound fractures.

Another object of the invention is to provide a splint which is fastened by straps containing pressure sensitive textile fastening means capable of giving accurately adjusted grips which hold positively against inadvertent loosening but which may be unfastened and readjusted at will or reused without injury to the textile fastening means.

A further object of the invention is to provide a temporary splint of the character described in which padding is provided which is completely enclosed in a water-impervious plastic so as to prevent internal soiling by blood or the like and render the unit easily washed and sterilized for reuse.

A still further object of the invention is the provision of a splint of the character described in which an extension of the splint is provided which does not contain stiffening members and is foldable over an elbow joint or the like and equipped with its own strap so as to fasten the splint in an angular manner that prevents longitudinal movement thereof.

Further objects and advantages of my invention will appear as the specification proceeds, and the new and useful features of my temporary splint will be fully defined in the claims attached hereto.

The preferred form of my invention is illustrated in the accompanying drawing, forming a part of the specification, in which:

FIGURE 1 is a perspective view of a typical splint constructed according to the invention shown in position as it appears when applied to a forearm;

FIGURE 2, a cross-sectional view of the splint shown in FIGURE 1 taken substantially in the plane of line 2—2 thereof;

FIGURE 3, a plan view of the splint shown in FIG-

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URE 1 with the splint being laid out in a flat position; FIGURE 4, a bottom view of the splint of this invention as it is laid out in a flat condition illustrating the underside thereof;

5 FIGURE 5, an exploded cross-sectional view taken in the plane of line 5—5 of FIGURE 3; and

FIGURE 6, a cross-sectional view illustrating the pressure-sensitive textile fastening means utilized in the splint of this invention.

10 While I have shown only the preferred form of my invention, it should be understood that various changes or modifications may be made within the scope of the claims hereto attached without departing from the spirit of the invention.

15 Referring to the drawing in greater detail, there is shown in FIGURE 1 a temporary splint 11 comprising a flexible body portion 12 adapted to be wrapped around a limb such as an arm. The body portion is constructed basically from a pair of sheets of unbleached muslin or similar material 14 and 16 (see FIGURE 5) having a padding 17 constructed from cotton or the like, all of which is encased in plastic sheets 18 constructed of flexible water-impervious plastic such as white vinyl.

20 As best seen in FIGURES 3 and 5, the pieces of muslin 14 and 16 are stitched together longitudinally to each other and to the top piece of plastic sheet 18 through pad 17 with longitudinal stitching 19. In this way, pockets are formed between the sheets 14 and 16 and these pockets are adapted to carry elongated stiffening members. In the embodiment of the invention shown, two types of stiffening members are utilized, one of which is a flat board 21 adapted to fit into the large central pocket 22 and provide basic support for the limb to be held. Typi- 30 cally, this board is a flat piece of boxwood or the like which has sufficient strength and stiffness to protect the break and hold the entire splint longitudinally in rigid fashion.

35 In addition to this board, there is a plurality of stiffening members 23 fitting into narrower pockets 24 which are disposed to orient the members generally parallel to the long axis of the splint and the main stiffening board 21. These auxiliary stiffening members are preferably rather narrow and somewhat flexible. Preferably they are fabricated from a thermoplastic material such as polymethyl- 40 methacrylate. However, it will be appreciated that other plastic materials such as polystyrene and hard rubber might be used, if desired. The purpose of the auxiliary stiffening members is to provide additional protection so that the limb is protected by stiffening members all the way around. However, the auxiliary stiffening members are sufficiently flexible that they do not interfere with the tightening of the straps so that the splint may be tightened in a plurality of positions on the limb being treated.

45 With the stiffening members stitched in place in their pockets, the white vinyl outer plastic 18 is stitched all the way around the edges of the splint by stitching 25 so as to completely enclose the material within plastic and prevent blood or other liquid materials from entering the inside of the splint and soiling the padding or accumulating 50 therein to provide unsanitary conditions.

55 In order to secure the splint tightly in position on a limb, a plurality of straps 26 are provided which are stitched on to the back of the splint by stitching 27 at each side of the large central stiffening member 21. The straps 26 are constructed with one loose end extending to one side of the splint as shown at 28, and the other end 29 extending beyond the other side of the splint so that the straps will overlap when the splint is wrapped around a limb. These straps contain pressure-sensitive textile fastening means such as the fasteners sold under the trade name Velcro and fully described in United States Patents 2,717,437 and 3,009,235.

Basically, these fasteners contain a pair of pads of textile material; one pad containing a plurality of textile-like hooks which are adapted to engage in loops on the other pad of textile. Thus, as shown in FIGURE 6, the hook side or pad of the Velcro is illustrated in cross-section by fabric backing 31 containing hooks 32 which are constructed by cutting the loops in the material as shown.

The opposed fabric or pad 33 may contain ordinary woven cloth which catches the hooks 32, but preferably it contains loops 34 adapted to catch said hooks. Thus when the fabrics 31 and 33 are compressed together, the hooks 32 engage in the loops 34 and the two fabrics cannot be pulled apart by pulling the fabric axially apart. However, the two fabrics may be pulled apart by pulling one pad normal to the other in a peeling back operation so that only a few hooks at a time are subject to the pulling force and disengage.

The holding is accomplished by virtue of the fact that many thousands of hooks are in engagement and although each one provides a small amount of holding power, the sum total provides a tremendous holding power. Therefore, the straps cannot pull longitudinally apart when compressed in position. However, it is possible to peel them apart when desired to open the splint for adjustment of the straps or complete removal of the splint. In order to provide this peeling back, each end 29 contains a pull tab 36 which does not contain the Velcro fabric pad and hangs loose in order to be available for use at any time. In this way, the splint may be applied or removed rapidly and adjustments thereof are easily made.

The use of the Velcro fasteners is particularly important in providing a splint which is composed entirely of textile, plastic or related materials, because these materials present substantially no barrier to X-rays. In other words, the broken limb may be X-rayed through the temporary splint and protected during this operation. Prior splints which contain metal buckles could not be X-rayed without having the buckle or similar fastening device interfere with the X-ray. Such interference renders proper diagnosis of the fracture more difficult and should be avoided.

As another feature of the splint of this invention, means are provided to prevent longitudinal or axial shifting when the splint is applied to an arm or a leg or the like. These means include a flexible extension 37 which does not contain any padding and is constructed without any stiffening members. However, it will be appreciated that padding could be added, if desired, and that stiffening members could also be provided so long as they do not prevent the bend at 38, as shown in FIGURE 1. This extension is equipped with a strap 39 which is similar in construction to straps 26 and is also equipped with a strap 39 containing Velcro textile fastening means.

Referring again to FIGURE 1, it is seen that if the splint is applied with an elbow or knee at the bend 38, and the main body of the splint is applied over the break, the extension portion 37 may be strapped beyond the bend and hold the entire splint against axial shifting. This has the advantage of providing additional protection to the fracture. It should also be noted that the splint may be applied on either side of the elbow with the orientation being in either direction, if desired.

From the foregoing description, it is seen that I have provided a temporary splint which is easily cleaned and which contains plastic material resistant to alcohol or other sterilizing compounds so that the splint may be reused without contamination from prior usage. It is also seen that the splint is constructed of a plastic material which is resistant to liquids and fully protects the internal padding and the like from contamination. In addition, it is seen that I have provided a splint which is easily and rapidly applied, capable of being X-rayed, and capable of readjustment to accommodate varying conditions of swelling so that the splint may be used continuously from the

application thereof at the time of injury until the fracture is ready to be placed in a permanent cast.

I claim:

1. A unitary, sterilizable and reusable temporary splint composed of materials having substantially complete X-ray transmissibility in all portions thereof, comprising a transversely flexible body portion adapted to be wrapped about a limb, said body portion containing a pair of sheets of textile material sewed together by lines of longitudinal stitching to provide pockets therebetween, a plurality of elongated stiffening members permanently confined in said pockets of the body portion with the long axis of stiffening members held in parallel relation and extending in the direction of the long axis of the body, one of said stiffeners being in the form of a rigid board and the remainder of said stiffeners being in the form of flexible plastic strips, said rigid board stiffener being substantially larger transversely than the flexible plastic strips, a cotton padding covering substantially the entire inner side of said sheets and retained in place by such stitching, a sheath of nonabsorbent, liquid impervious, flexible, plastic material, completely and permanently enclosing and protecting the sheets and the padding and the stiffening members, a plurality of exteriorly located straps having the central portions thereof stitched onto the exterior face of the sheets, said straps being oriented to extend substantially at right angles to the long axis of the body portion and the stiffening members, each of said straps being of a length sufficient to have the ends overlap when the splint is wrapped around a limb with one of the overlapping strap surfaces containing a plurality of closely spaced inter-engageable textile hooking elements and the other surface containing a plurality of loops of textile material whereby the hooks and loops catch in engaging relation when the surfaces of said members are pressed toward one another in face-to-face relation, and a tab on one end of each of said straps free of engageable hooks and loops and providing a loose textile finger tab for peeling the hooks and loops apart to unfasten the strap.

2. A temporary splint composed of materials having substantially complete X-ray transmissibility in all portions thereof, comprising a transversely flexible body portion adapted to be wrapped about a limb, said body portion containing a pair of sheets of textile material sewed together by lines of longitudinal stitching to provide pockets therebetween, a plurality of elongated stiffening members carried in said pockets of the body portion with the long axis of each of the stiffening members held in a direction substantially parallel to each other and to the long axis of the body, a cotton padding covering substantially the entire inner side of said sheets and retained in place by said stitching, a sheath of non-absorbent, liquid impervious flexible plastic material completely and permanently enclosing and protecting the sheets and the padding and the stiffening members, said body portion being formed with an extension beyond said pockets foldable along a line perpendicular to said stiffening members, a plurality of exteriorly located straps having the central portions thereof stitched onto the exterior face of said sheath and being oriented to extend substantially at right angles to the long axis of the body portion and the stiffening members, a strap having a central portion thereof stitched onto the exterior face of the extension and oriented substantially at right angles to the axis of the extension, each of said straps being of a length sufficient to have the ends overlap when the splint is wrapped around a limb, with one of the overlapping strap surfaces containing a plurality of closely spaced inter-engageable textile hooking elements and the other surface containing a plurality of loops of textile material whereby the hooks and loops catch in engaging relation when the surfaces of said members are pressed toward one another in face-to-face relation, and a finger tab on one end of each of said straps free of engageable

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hooks and loops to provide a loose end for peeling the hooks and loops vertically apart to unfasten the strap.

3. A temporary splint composed of materials having substantially complete X-ray transmissibility in all portions thereof, comprising a transversely flexible body portion adapted to be wrapped about a limb, said body portion containing a pair of sheets of textile material sewed together by lines of longitudinal stitching to provide pockets therebetween, a plurality of elongated stiffening members carried in said pockets of the body portion with the long axis of each of the stiffening members held in a direction substantially parallel to each other and to the long axis of the body, a cotton padding covering substantially the entire inner side of said sheets and retained in place by said stitching, a sheath of non-absorbent, liquid impervious flexible plastic material completely and permanently enclosing and protecting the sheets and the padding and the stiffening members, said body portion being formed with an extension beyond said pockets foldable along a line perpendicular to said stiffening members, a plurality of exteriorly located straps having the central portions thereof stitched onto the exterior face of said sheath and being oriented to extend substantially at right angles to the long axis of the body portion and the stiffening members, a strap having a central portion thereof stitched onto the exterior face

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of the extension and oriented substantially at right angles to the axis of the extension, each of said straps being of a length sufficient to have the ends overlap when the splint is wrapped around a limb, and pressure sensitive textile fastening means carried on each strap for securing the straps in position.

4. The temporary splint defined in claim 3, in which a finger tab is provided on one end of each of said straps to provide a loose end for peeling the straps vertically apart and facilitate unfastening thereof.

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