Sept. 8, 1953 C. T. BERRY 2,651,302

SURGICAL SPLINT

Filed Nov. 13, 1951 2 Sheets-Sheet 1

FIG. 1

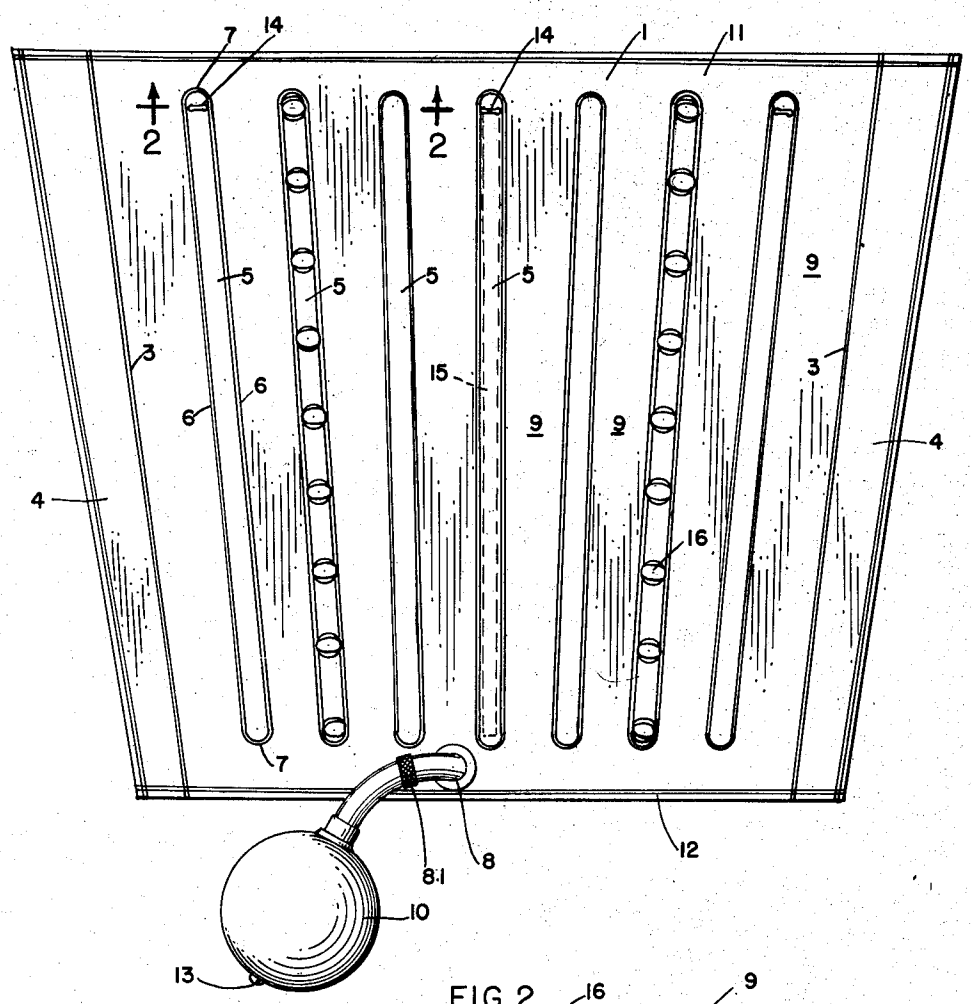


FIG. 2

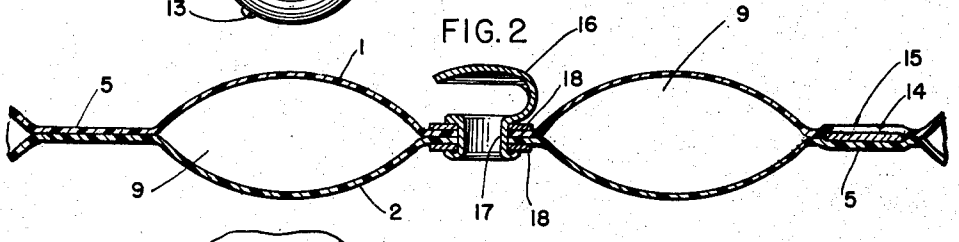
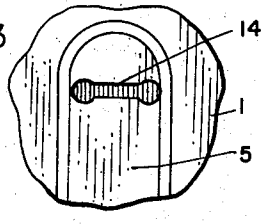


FIG. 3



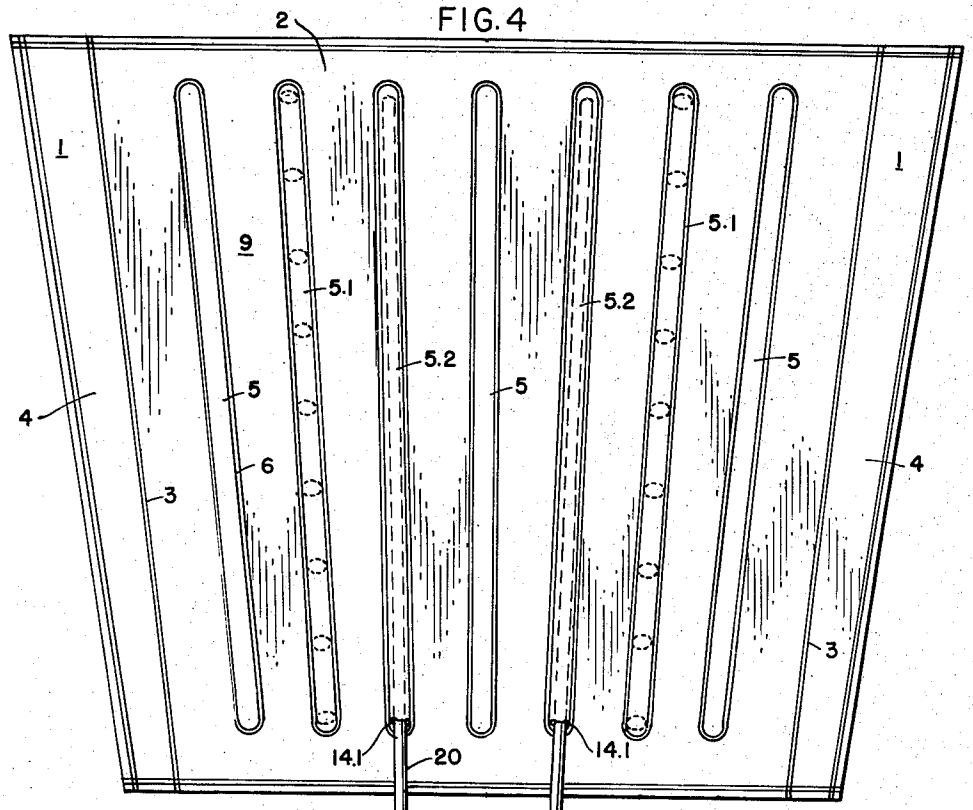
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Filed Nov. 13, 1951 2 Sheets-Sheet 2

FIG. 4



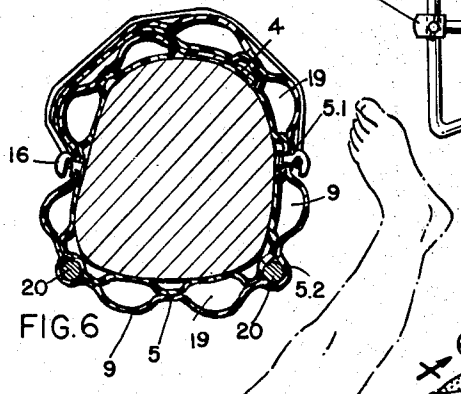


FIG. 6

FIG. 5

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SURGICAL SPLINT

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Application November 13, 1951, Serial No. 256,089

4 Claims. (Cl. 128—87)

1

This invention relates to splints and particularly such as are used for immobilizing broken bones.

The main objects of this invention are to provide an improved form of splint bandage, which can be folded into very compact form when not in use and which, when applied to an injury, can be inflated to produce the required support for immobilizing the part of a human or animal body to which it is applied; to provide a structure of this kind that can be readily reinforced by the application of stiffening members in the nature of battens that are readily removable and so applied as to offer no interference with the inflating of the bandage; and to provide improved means for securing such inflatable splint in place about a wounded part.

A specific embodiment of this invention is shown in the accompanying drawings in which:

Figure 1 is a plan view of the outer face of a splint constructed according to this invention and laid flat, as it might appear when not in use.

Fig. 2 is a fragmentary, sectional view of the same taken on the line 2—2 of Fig. 1 showing the air cells in a partly inflated condition.

Fig. 3 is a fragmentary enlargement of a portion of Fig. 1, to illustrate an appropriate form of slit for the insertion and removal of battens in the pockets that are provided therefor.

Fig. 4 is an inside view of a splint of the same structure as is shown in Fig. 1, showing the same equipped with a foot immobilizing brace.

Fig. 5 is a perspective view illustrating the manner in which the splint is wrapped about the leg of a person with the foot immobilizing brace in place.

Fig. 6 is a section taken on the line 6—6 of Fig. 5.

In the form shown, the body portion of the splint comprises two sheets of airtight, non-resilient and waterproof, flexible fabric, as for example, vinyl plastic, which are laid one upon the other and sealed together along certain lines. In the form illustrated, these sheets are of like form, being made of sheeting sufficiently heavy for the purpose and being sealed in airtight connection to each other along certain lines, as for example, by application of heat and pressure by means of an appropriate die. The isosceles trapezoidal form with its parallel sides transverse to its longitudinal dimension as shown in Fig. 1 is appropriate for wrapping the device about a person's arm or leg, as will be understood.

In the form shown in Fig. 1, the upper or outer sheet 1 is of the same external contour as the

2

inner sheet 2 and the two sheets are attached to each other in airtight relation along all marginal edges and also along certain longitudinal lines. The longitudinal sealing lines 3 isolate the central inflatable area from the non-inflated flexible marginal side areas 4. Intermediate and symmetrically arranged between these marginal side areas and preferably in uniformly spaced relation to each other are a series of uninflated flexible strips 5 bounded by parallel sealing lines 6 that are connected in pairs at their ends 7 so as to isolate them from adjacent inflatable spaces or cells 9.

An appropriate air-supply nipple 8 is mounted through the outer sheet 1. A valve 8.1 and a rubber pumping bulb 10 are shown by way of example of well-known means for inflating the communicating air cells formed within the area bounded by the side lines 3 and the top and bottom sealing lines 11 and 12 respectively. The pump bulb 10 has the usual valved air inlet 13.

Certain of the flexible strips 5 serve as batten pockets and are provided with slots 14 adjacent their upper ends to permit stays or battens 15 of suitable material, such as hard wood or metal, to be inserted or removed from the pockets. As shown the slots 14 are cut only in the upper sheet 1.

Two of the flexible strips 5.1, suitably located with respect to each other and to the side margins of the splint, are equipped with lacing hooks 16 which may be attached to the strip by eyelet rivets 17 bearing against washers 18, as illustrated in Fig. 2.

A pair of flexible strips 5.2 having openings 14.1 at their lower ends, preferably on the inside face of the splint to receive the arms 20 of a stiff U-shaped wire frame 21 in the manner shown in Fig. 4. Slidably mounted on this frame is a foot brace 22 of U-shape that can be fastened in various positions of adjustment along the arms 20 by set screws 23. This brace permits the foot of the patient to be strapped to the member 22 so as to immobilize the foot of the leg of the patient that is wrapped with the splint, as shown in Fig. 5.

The operation of the device shown is as follows:

The wounded limb of the patient is first appropriately bandaged. The splint in uninflated or partly inflated form is then wrapped around the limb with its flexible marginal portions 4 overlapping so as to completely enclose the limb. The device is now secured in place by lacing cords 19 passing back and forth over the overlapped edges of the splint between the rows of hooks 16

and finally tied together, as will be understood from Fig. 5.

When the foot brace is required for immobilizing the patient's foot, the arms **20** of the brace are inserted through openings **14.1** into the pockets formed in the strips **5.2**, as shown in Fig. 4, before the splint is wrapped about the patient's leg; and after the splint is in position, the brace **22** is then adjusted into place and the patient's foot is secured thereto by tapes **24**.

After the splint with its uninflated or partly inflated air cells has been applied to the patient's leg, as shown in Figs. 5 and 6, the cells are further inflated, according to the physician's judgment, to a desired pressure against the surface of the bandages on the patient's leg. After the splint is properly inflated to immobilize the part that is enclosed by the wrapper, the pump or bulb **10** may be detached from the nipple **8** so as to be out of the way.

The sealing lines **3**, **6** and **7** are continuous and sufficiently impervious to air flow to assure that the flexible strips **5** and the marginal areas **4** are non-inflatable.

Although but one specific embodiment of this invention is herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of the invention as defined by the following claims.

I claim:

1. A surgical splint, comprising a pair of sheets of flexible and airtight fabric, sealed together on all sides to form an inflatable body, means for inflating said body, said sheets being sealed together on a series of laterally spaced pairs of parallel longitudinal lines defining long narrow batten pockets extending throughout the major part of the length of the splint, said sheets being further sealed together between said parallel lines to close the ends of said batten pockets against communication with the inflatable portion of the splint and certain ones of said batten pockets having external openings at one end for insertion and removal of battens.

2. A surgical splint, comprising a flexible wrapper of trapezoidal form having thereon a plurality of longitudinally disposed inflatable tubes spaced apart side by side in symmetrical relation to the inclined sides of the wrapper with non-inflatable strips between them, and a pair of longitudinal rows of lacing hooks on individually separate ones of said strips.

3. A surgical splint, comprising a flexible wrapper having a plurality of longitudinally disposed inflatable tubes spaced apart side by side with non-inflatable tubular strips between them, rows of lacing cord attaching devices attached along a spaced pair of said non-inflatable strips for lacing them together at points along the splint, and a foot immobilizing brace comprising a pair of longitudinally disposed supporting arms, a pair of said non-inflatable strips symmetrically located between the longitudinal margins of said wrapper and being formed and adapted to receive and secure the respective arms of said foot brace.

4. A surgical splint, comprising an inner flexible sheet of airtight waterproof fabric of substantially isosceles trapezoidal form, having its parallel sides transverse to its long dimension, an outer flexible sheet attached to said inner sheet and forming therewith a plurality of communicating inflatable tubular cells extending longitudinally of said sheets and symmetrically spaced side by side between the inclined sides of the trapezoid, a foot immobilizing brace comprising a pair of substantially parallel supporting arms, said sheets having non-inflatable longitudinal marginal flaps and having non-inflatable strips separating said inflatable cells, one pair of said non-inflatable strips that are symmetrically located with respect to the side margins of said sheets being tubular and adapted to receive and secure the respective arms of said foot brace, and a pair of longitudinal rows of lacing cord hooks attached to respective said non-inflatable strips located between said one pair of non-inflatable strips and said marginal flaps for securing said sheet when wrapped around a person's leg.

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