

- [54] COMBINATION NEUROSURGICAL
SPONGE
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- [22] Filed: Nov. 20, 1972
- [21] Appl. No.: 307,884

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- [52] U.S. Cl. 128/296
- [51] Int. Cl. A61f 13/00
- [58] Field of Search..... 128/285, 290, 296

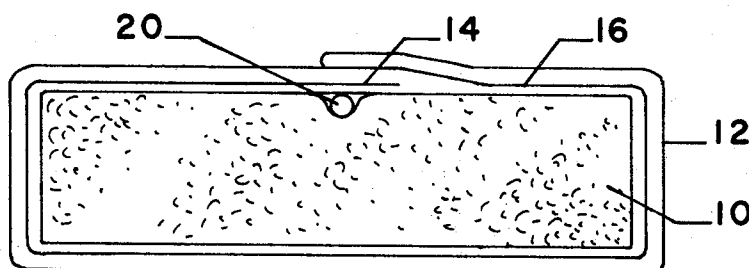
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[57] **ABSTRACT**

A neurosurgical sponge has an inner, highly absorbent nonwoven layer. A porous, nonwoven laminate is wrapped about the inner layer with the cut edges folded underneath the folded end. A piece of x-ray detectable material is inserted between the two layers and the layers are stitched or heat sealed together.

12 Claims, 5 Drawing Figures



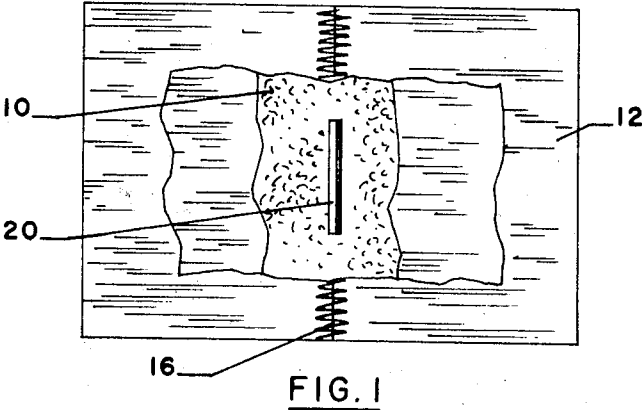


FIG. 1

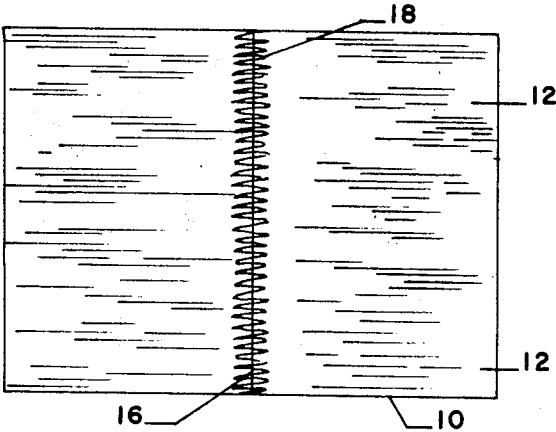


FIG. 2

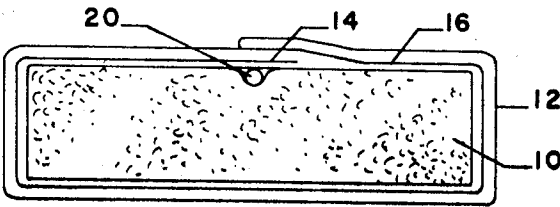


FIG. 3

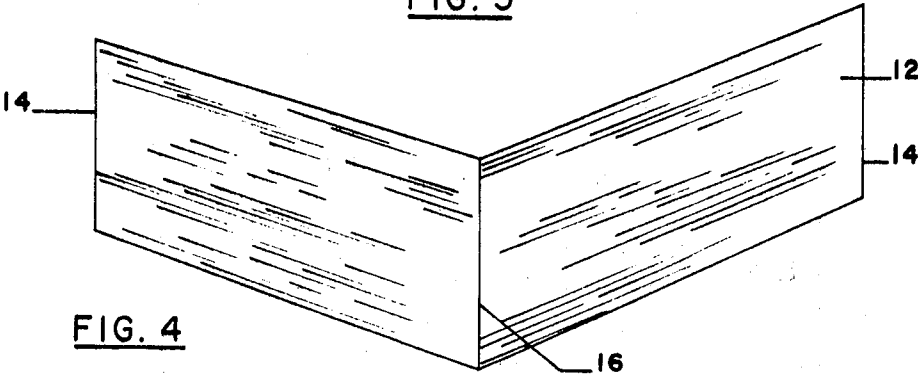


FIG. 4

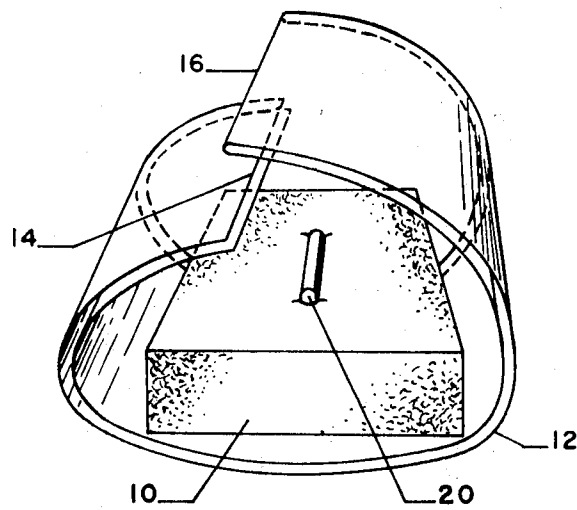


FIG. 5

COMBINATION NEUROSURGICAL SPONGE

BACKGROUND OF THE INVENTION

The present invention relates to surgical sponges particularly for use in neurosurgery.

Absorbent sponges are well-known in neurosurgical operations. Since the surgeon is working in extremely confined areas these sponges have generally been quite diminutive but at the same time capable of large amounts of fluid absorption.

Present art sponges generally comprise a block of absorbent material which is inserted into the surgical opening. Some embodiments incorporate the block material as a tampon for ease of insertion and removal. Yet others are associated with threads which are used to pull out the sponge once its absorptive facilities are spent.

The major problem presented with the prior art sponges is their tendency to shred. This is quite a serious problem, particularly in neurosurgery since a sliver, fiber or particle of the material may go undetected and remain in the surgical wound once it is closed. As such it becomes a foreign body lodged in very delicate areas, a situation which is to be avoided if at all possible. A very serious possibility is that the cerebral spinal fluid can carry such particles to the base of the brain and from there to other parts of the head, and induce fibrosis, that is an abnormal formation of fibrous tissue, or other undesired body and tissue reactions which can prove fatal.

The instant invention contemplates a novel surgical sponge which is completely safe for neurosurgery and other delicate operations. The use of a relatively strong, fluid pervious outer covering prevents shredding and the attendant complications therefrom. The instant sponge is inexpensive, simply constructed and most effective in its intended environment.

SUMMARY OF THE INVENTION

The primary object of the instant invention is the provision of a superior surgical sponge especially adapted for neurosurgery.

Yet another object of the present invention is the provision of a surgical sponge which will maintain structural security during an operation.

A further object of the present invention is the provision of a surgical sponge which is simply constructed and inexpensive to manufacture.

In accordance with the above designs the present invention is preferably embodied in a structure comprising a block of absorbent material encased within a double thick layer of porous generally nonabsorbent material. The outer layer is made from a single sheet of the porous material and folded to produce the double thick layer. The cut edges are placed under the folded edge and the outer and inner layers are suitably joined, as by heat sealing or sewing with a surgical thread. Prior to encasing the block of sponge material, a piece of x-ray detectable material, such as barium sulphate is placed on the block, which indicator is sewn within the sandwich.

In the manufacture of the sponges, several can be produced at one time. The outer layer is initially twice the width of the folded layer and of substantial length to cover several blocks. The outer layer is then folded in half, lengthwise, and the blocks are then placed centrally along the length of the outer layer. The outer

layer is then folded about the blocks such that the cut edges of the outer layers are placed under the folded edge. The various sponges are then suitably joined as by sewing and the individual sponges are then cut from the single manufactured unit.

The above, and other objects will be apparent as the description continues, and when read in conjunction with the drawings.

DESCRIPTION OF THE DRAWINGS

FIG. 1, is a partially cut-away plan view of a preferred embodiment of the present invention;

FIG. 2, is a plan view of the preferred embodiment;

FIG. 3, is a side view of the embodiment of FIG. 2;

FIG. 4, is a perspective view of the outer layer prior to its being folded;

FIG. 5, is a perspective view of the outer layer as it appears during the folding about the block.

DETAILED DESCRIPTION

With continued reference to the various views of the drawings the absorptive characteristics are provided by the block, or inner layer 10 of highly absorbent sponge material. The layer 10 is preferably made of a nonwoven cotton or other suitable material. An example of suitable material is that commercially known by the name Webril 2801 R which is an all cotton block.

As shown in FIGS. 1, 3 and 5, the inner layer 10 is covered by a porous outer layer 12. That outer layer is fluid pervious, permitting blood and other fluids to be absorbed therethrough and into the sponge and is made from a fairly strong material such as a nonwoven polypropylene known commercially as Lenoweb 9101.

In assembling the outer layer 12 to the inner layer 10 the outer layer is first folded in half. The original width of the outer layer 12 is chosen to be slightly greater than twice the perimeter measurement of the inner layer so that there can be an overlap of the inner 14, and outer 16 edges. The cut or inner edges 14 are folded underneath the folded edge 16 prior to joinder of thereof. Thus, when the outer layer 12 is folded and joined to the inner layer 10, it is done with a double thick covering which completely protects the inner layer 10 from shredding. At the same time the outer layer is sufficiently porous that blood and other fluids are easily passed therethrough to be absorbed by the inner layer 10. The inner 10 and outer layers 12 are suitably joined as by zigzag stitching 18, heat or ultrasonic sealing. Upon joinder, the sponge is of sufficient structural security to be fully absorbent and yet resist dangerous shredding.

As indicated in FIG. 1, 3 and 5 a sliver of x-ray detectable indicator material 20 such as BaSO₄, wrapped in a piece of plastic, is sandwiched between the inner layer 10 and the cut edges 14.

While the foregoing has been limited to a sponge of a regular polygonal shape, it should be obvious that virtually any shape sponge can be produced having the inner 10 and outer 12 layers as described.

The manufacture of the above described sponges is simple and economic and designed to produce a plurality of sponges at a particular time. A rather long sheet of Lenoweb, of a width slightly greater than twice the perimeter of the inner layer 10 is placed in a folder (not shown) and folded in half length-wise. The inner layer

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10 is then placed in the center of the now folded outer layer 12. The inner layer 10 can be pre-cut into individual blocks, or be in strip form. The outer layer 12, as shown in FIG. 5 is then folded about the inner layer 10 such that the cut ends 14 overlie the BaSO₄ strip and the folded edge 16 overlies those cut edges. The elongated strip is now permanently joined, such as by sewing and then the individual sponges are cut from the sponge strip. In this manner there is no waste material of any consequence and many sponges can be manufactured at one time.

It has been seen that the surgical sponge embodying the principles of the present invention is structurally superior to those of the prior art. The sponge hereinbefore described provides adequate absorptive qualities while preventing dangerous shredding or material degeneration. Many changes may be made in the details of the instant invention without departing from the spirit and scope of the appended claims, which changes are intended to be embraced therewithin.

What is claimed is:

1. A surgical sponge which comprises an inner layer of highly absorbent nonwoven sponge material, an outer layer of fluid pervious porous nonwoven material wrapped about said inner layer, said outer layer being a double thick laminate fabricated from a single folded sheet, the cut edges of which are placed under the folded edge, and means to join said inner and outer layers.

2. The surgical sponge of claim 1 wherein said joining means comprises heat sealing the layers.

3. The sponge of claim 1 wherein said joining means comprises sewing the layers.

4. The sponge of claim 1 wherein said outer layer is fabricated from polypropylene.

5. The sponge of claim 1 wherein a piece of x-ray de-

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tor indicator material is included between the inner and outer layers.

6. A surgical sponge which comprises an inner layer of nonwoven, highly absorbent material such as cotton, an outer double thick laminate of nonwoven fluid pervious porous material such as polyethylene wrapped about said inner layer, said outer layer fabricated from a single folded sheet the cut edges of which are placed under the folded edge, said inner and outer layers being joined by zigzag stitch of surgical thread.

7. The surgical sponge of claim 6 wherein a piece of x-ray indicator material is included between the inner and outer layers.

8. A method of producing neurosurgical sponges including taking a layer of nonwoven highly absorbent surgical sponge material, taking a layer of nonwoven fluid pervious porous material, folding said porous layer, wrapping the folded porous layer about the sponge material layer with the cut edges of the porous layer inserted under the folded edge of the porous layer, and joining the layers in a manner acceptable for surgical uses.

9. The method of claim 8 wherein the step of joining comprises stitching with a surgical thread.

10. The method of claim 8 wherein the step of joining comprises heat sealing the layers.

11. In the method of claim 8 the step of inserting a piece of x-ray detectable material between the layers.

12. The method of claim 8 wherein the porous layers are run through a folder which folds it in half, running the folded layer through a second folder and simultaneously feeding the absorbent layer and x-ray detectable material such that the second folder wraps the porous layer about the absorbent layer.

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