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SURGICAL SPONGE OR LIKE ARTICLE

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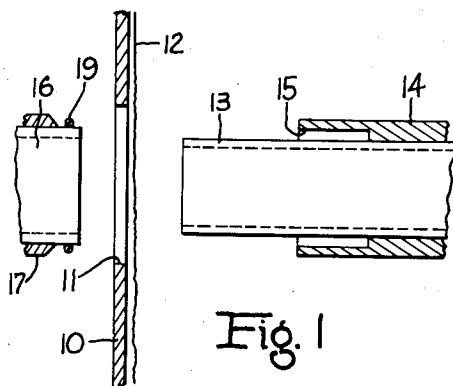


Fig. 1

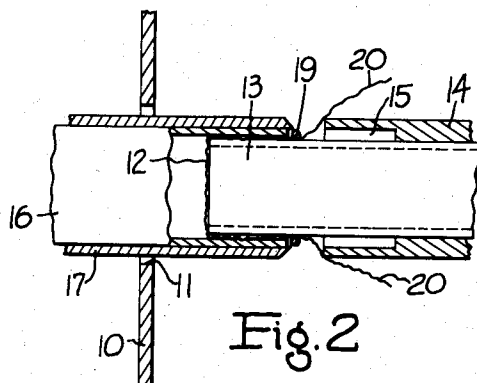


Fig. 2

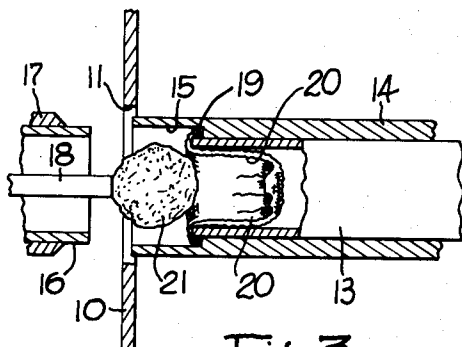


Fig. 3

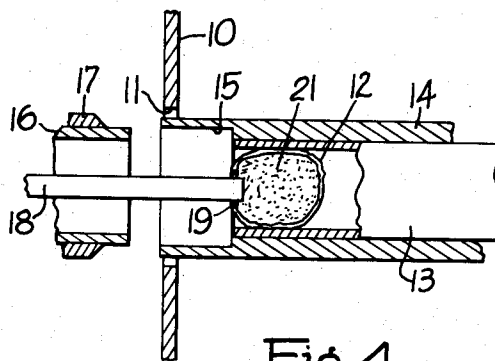


Fig. 4



Fig. 5

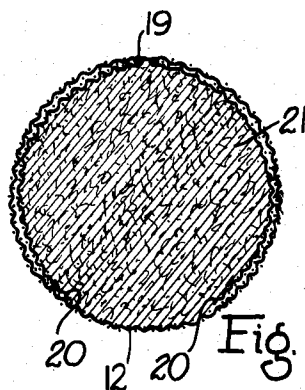


Fig. 6

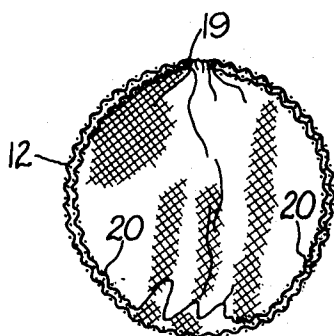


Fig. 7

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## SURGICAL SPONGE OR LIKE ARTICLE

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Continuation of abandoned application Serial No. 721,410, January 10, 1947. This application December 19, 1951, Serial No. 262,351

13 Claims. (Cl. 128—296)

This invention relates to absorbent elements known in the art as surgical sponges or tampons and used for the purpose of controlling hemorrhage or absorbing other fluids encountered by surgeons in the performance of surgical operations.

Surgical sponges of the type heretofore known were characterized by a construction that provides a sack or jacket of gauze or the like filled with a wad of surgical cotton or similar material which may be absorbent or nonabsorbent as desired. In one known instance such sponges were manufactured by a method which included the forming of jackets, the filling of the jackets and the sewing together of the open end of each jacket. Although a sponge made in this manner was generally satisfactory in that it could be produced inexpensively in quantity and was adaptable for most purposes, it is found highly objectionable for use in abdominal operations, because such sponge in its completed form included a seam having projecting ends.

According to the present invention it is proposed to provide a surgical sponge or the like in which the finished product is preferably substantially spherical in shape, has no projecting or ragged end portions and which is surgically acceptable in all instances in which surgical sponges are used. The sponge provided according to the present invention is further characterized by simplicity of construction and economy in manufacture.

Further objects and features of the invention will become apparent to those skilled in the art as the disclosure is more fully made. In the following description reference will be made to construction of a surgical sponge or tampon, and the method of making the same will be similarly described. It should be understood, of course, that the expressions are used merely for the purpose of description and the disclosure should be taken as illustrative and not limiting, since the principles of the invention have wide application.

In the drawing, Figs. 1 to 4 illustrate successive steps in the making of the sponge; Fig. 5 is an enlarged view of the completed sponge; Fig. 6 is a transverse sectional view through a sponge comprising a jacket or sack filled with surgical cotton; and Fig. 7 is a transverse sectional view through a similar sponge in which the filling material comprises portions of the sack itself.

In Figs. 1 to 4 the reference character 10 designates a guide plate provided with an opening 11 therein. A piece of surgical gauze or like material, designated diagrammatically at 12, is fed into position so that it lies along the guide plate 10. The gauze is preferably square; although, it may be circular or rectangular or any other suitable shape. A tube 13 is placed in the position shown in Fig. 1, with its axis on the axis of the opening 11 in the plate 10. The tube 13 and the other tubular members to be presently described are preferably cylindrical in cross section but may be supplanted with elements of other shapes and sizes. A second tube 14 is mounted on the tube 13 and is axially slidable thereon. For the purposes of the present disclosure the tube 13 will be de-

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scribed as being held stationary while the tube 14 is movable thereon. It will be understood, of course, that the tube 14 may be held and the tube 13 moved. Similar reversals of motion will be obvious in connection with other steps in the method to be set forth.

The tube 14 is provided at its front end with a counterbore 15, the purpose of which will presently appear.

A third tube 16 is mounted in axial alignment with and at the opposite side of the plate 10 from the tubes 13 and 14. The tube 16 is capable of movement toward the tube 13 and its inside diameter is of such size that it has a loose telescopic fit over the tube 13. The tube 16 carries a collar 17 and the relationship between the tube 16 and collar 17 is such that the latter is axially slidable on the former.

In a preferred form of the method for making the sponges or tampons there may be provided a filling element or rammer 18 (Figs. 3 and 4).

In the initial position of the elements as shown in Fig. 1, the gauze 12 is placed as aforesaid. An annular element such as an elastic band 19 is stretched over the tube 16 and is placed somewhere near the end thereof. The gauze 12 and the tube 13 are moved relative to each other so that the gauze is placed over the end of the tube 13. This movement may be accomplished by moving the guide plate 10 toward the tube 13 or by moving the tube 13 toward the plate 10. In the drawing the plate 10 is assumed to be mounted for movement toward and away from the tube 13 and in Figs. 2, 3 and 4 will be assumed to have been moved toward and away from the tube so that the gauze is placed in position over the end of the tube 13.

Since the area of the gauze 12 is considerably greater than the area of the circle comprising the outside diameter of the tube 13, substantially large portions of the gauze will be caused to lie along the outside of the tube 13 as at 20 in Fig. 2.

After the gauze has been positioned on the tube 13 as just described, the tube 16 and collar 17, together with the elastic band 19, are moved through the opening 11 in the plate 10 and over the gauze-encased end of the tube 13 until the end of the tube 16 is spaced an appreciable distance from the end of the tube 13. The collar 17 is then moved toward the end of the tube 16 so that the elastic band 19 is dislodged therefrom. The band 19 will, of course, snap into place about the gauze on the tube 13 (Fig. 2). The tube 16 and collar 17 may now be returned to starting position.

The tube 14 is now moved toward the end of the tube 13, the counterbore 15 accommodating the elastic band 19. The forward marginal edge of the counterbore 15 will engage the extending portions 20 of the gauze in such manner as to fold these portions back over the band 19 and toward the end of the tube 13. The tube 14 is moved on the tube 13 to the position shown in Fig. 3, wherein it will be seen that the elastic band secures the gauze 12 temporarily to the end of the tube 13. When the gauze and band have been moved to this position, the heretofore relatively small portion of the gauze that was stretched across the open end of the tube is augmented by portions of the gauze that were initially disposed between the end of the tube and the band 19, so that the gauze will now billow out to form a sack or bag. In a preferred form of the invention vacuum is applied to the right-hand end of the tube 13 so that the sack formed in the gauze is immediately drawn into the tube 13, as shown in Fig. 3. Similarly the free end or edge portions 20 of the gauze will be drawn within the sack, these portions having been moved toward the end of the tube 13 as aforesaid by the marginal edge of the counterbore 15.

Figs. 3 and 4 illustrate the method as including the step of filling the sack with a wad of surgical cotton or

equivalent material. The wad is herein indicated by the numeral 21 and is fed into the sack by means of the rammer 18. It will be noted that the band 19 is enclosed by the intumed portions 20 and that the cotton 21 is inserted into the sack so that it engages these portions 20 and presses them outwardly against the outer wall portions of the sack, thus confining the band 19 to the double wall structure provided at the mouth of the sack. As shown in Fig. 4, the wad 21 is maintained under compression by the rammer 18 so that it cannot escape from the sack. The tube 14 is moved still further beyond the end of the tube 13 to an extent sufficient to dislodge the gauze-encased band 19 from the end of the tube 13. The band 19 thus snaps to the position shown in Fig. 4. Although the almost complete sack is now momentarily held on the rammer 18 by the band 19, the sack may be stripped off the rammer by hand or by any suitable mechanism, after which the band will contract, closing the mouth of the sack and confining the cotton 21 there-within.

Fig. 5 illustrates the completed sponge or tampon. The band 19, being encased within the double wall structure at the mouth of the sack, completes the sponge in such manner that there are no edges projecting beyond the circumference or periphery of the generally spherical sponge. The band is of such size and construction that, although it is easily stretched for positioning on the tube 16, it is readily contractible to such an extent that it draws the mouth of the sack relatively tightly shut. The size of the opening remaining at the mouth of the sack will, of course, vary according to the characteristics of the elastic band.

The sectional view of the sponge illustrated in Fig. 6 shows more clearly the relationship between the outer wall of the sack, the now in-turned portions 20 and the encased cotton wad 21.

As a variation in the method and construction just described, the cotton wad 21 may be omitted. In this type of sponge, a sectional view of which is shown in Fig. 7, it is preferable that a larger piece of gauze 12 be used so that the projecting or extending portions 20 will be of increased length. Then, when these portions are folded and turned inside the sack in a manner corresponding to the illustration in Fig. 3, the portions themselves will serve to fill the sack and will accommodate the band 19 just as well in the double wall structure provided at the mouth of the sack or jacket. The mode of construction will depend, of course, upon the type of sponge desired. The method disclosed herein is claimed in my copending application Serial No. 41,798, filed July 31, 1948, a continuation of which is filed herewith and now abandoned.

It will be seen from the foregoing description that a novel surgical sponge or tampon is provided and that the method of accomplishing this construction is simple and inexpensive. Since these sponges are used in quantity, easy manufacture thereof is important. Since they are expendable, economical production thereof is desirable.

The sponge constructions and the methods disclosed herein are those that have been found preferable from the standpoint of accomplishing the features and objects of the invention. It will be understood, however, that various modifications and alterations may be made in the sponge construction on the basis of the general principles set forth, all of which may be effected without departing from the spirit and scope of the invention as set forth in the appended claims.

This application is a continuation of my copending application Serial No. 721,410, filed January 10, 1947, and now abandoned.

What is claimed is:

1. A surgical sponge comprising a core of textile material, a piece of moisture pervious material disposed in the form of a generally globular sack enclosing said core, portions of said material lying along a generally circular line being gathered together to form a closure for the sack, and portions of said material lying marginal to said circular line being folded inwardly and doubled back

against the inside wall of the sack outside of said core, and an annular resilient fastening element running through the fold formed by said doubled back portions and retaining said gathered portions in sack-forming core-enclosing relation.

2. An article of manufacture of the character of a tampon, surgical sponge and the like comprising a seamless pervious sheet material bounded by a single continuous perimetric edge, a portion of said sheet material providing the exterior wall of a seamless sack having a closed mouth, marginal portions of said sheet material including all said perimetric edge being infolded at said mouth into the sack within said exterior wall, a fastening element disposed within the sack encircling infolded marginal portions of said sheet material adjacent said mouth in encircling engagement against the surface of said sheet material which is a continuation of said seamless sack and maintaining the closure of said mouth, body-fluid-absorbent filling material within the sack, the integrity of said sack being dependent upon and maintained solely by said separate fastening element and the integrity of said seamless sheet material.

3. An article of manufacture as claimed in claim 2, wherein the fastening element is an endless elastic band.

4. An article of manufacture as claimed in claim 2, wherein the sheet material is an absorbent textile sheet material.

5. An article of manufacture of the character of an absorbent tampon, surgical sponge and the like comprising a pervious sheet material bounded by a single continuous perimetric cut edge, a portion of said sheet material providing the exterior wall of a sack having a closed mouth, a wad of absorbent cotton within said sack, marginal portions of said sheet material including all said cut edge being infolded at said mouth into the sack within said exterior wall outside of said wad, a fastening element disposed within the sack encircling infolded marginal portions of said sheet material adjacent said mouth and maintaining the closure of said mouth by encircling engagement against the surface of said sheet material which is a continuation of the inside surface of said sack, the integrity of said sack being dependent upon and maintained solely by said fastening element and the integrity of said sheet material.

6. A surgical sponge, comprising: a quantity of flexible material bounded by a single continuous perimetric edge accumulated into a sack-like structure having a mouth; filling material enveloped and contained within the structure as a permanent component thereof; portions of said flexible material surrounding the mouth being arranged in folded formation to establish a tunnel substantially coextensive with the mouth and presenting only the folds to the exterior of the structure with unfolded edges of said portions tucked within the structure between the exterior wall of the structure and said filling material; and a constricting element within the structure in encircling engagement against the surface of said flexible material which is a continuation of the inside surface of said structure and engaging a major portion of the tunnel for gathering said mouth portions together into a normally permanent closure retaining the sack-like form of the structure and confining the filling material within the body.

7. An article of the class described, comprising: a sack formed from sheet material which has a single continuous perimetric edge; means including an endless elastic band for closing the mouth of the sack; and means including portions integral with the sack and providing an annular tunnel inside and surrounding the mouth of the sack for enclosing the band, said portions having parts thereof folded inside the band and retained in tunnel form solely by said band by encircling engagement against the surface of said sheet which is a continuation of the inside surface of said sack.

8. An article of manufacture of the character of a

tampon, surgical sponge and the like consisting of a sheet of flat absorbent material, a portion of which sheet is formed into a sack having a mouth and the remainder of which sheet is infolded into the sack through said mouth to substantially fill the sack, and means for maintaining the said sack closed to retain the infolded portions of said sheet within the sack.

9. An article of manufacture as claimed in claim 8 wherein the flat absorbent material is a sheet of gauze.

10. An article of manufacture of the character of a tampon, surgical sponge and the like consisting of a sheet of flat absorbent material, a portion of which sheet is formed into a sack having a mouth and the remainder of which sheet is infolded into the sack through said mouth to substantially fill the sack, and an annular fastening element holding the material of the sheet gathered at said mouth to retain the sack form of the sheet, to close said mouth, and to retain the infolded portions of said sheet within the sack.

11. An article of manufacture of the character of an absorbent tampon, surgical sponge and the like comprising a sheet of woven gauze bounded by a single continuous perimetric cut edge, a portion of said gauze providing the exterior wall of a sack having a closed mouth, marginal portions of said gauze including all said cut edge, being infolded at said mouth into the sack within said exterior wall, gauze substantially filling said sack, a separate fastening element disposed within the said sack encircling infolded portions of said gauze sheet adjacent said mouth and maintaining the closure of said mouth by encircling engagement against the surface of said gauze

sheet which is a continuation of the inside gauze surface of said sack, the integrity of said sack being dependent upon and maintained solely by said fastening element and the integrity of said gauze sheet.

12. A surgical sponge consisting of a single sheet of flat gauze having a single continuous perimetric cut edge, a portion of which sheet is formed into a sack and other integral marginal portions of which sheet are infolded into the sack to substantially fill the sack and a fastening element for maintaining the sack form of the sponge, said fastening element being disposed within the sack, encircling the infolded portions and holding them in closely gathered relation adjacent the mouth of the sack and retaining the folds formed at the juncture between the infolded portions and the exterior portion of the sack, free ends of the infolded portions extending inwardly of the sack beyond said fastening element and substantially filling the sack.

13. A surgical sponge as claimed in claim 12 wherein the fastening element is an endless elastic band.

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