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G. M. RANDALL

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SUTURE CONTAINER AND SPOOL

Filed Nov. 10, 1930

Fig. 1.

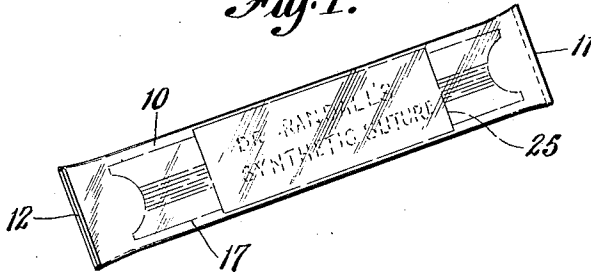


Fig. 2.

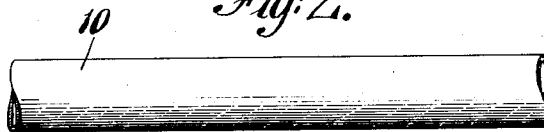


Fig. 3.

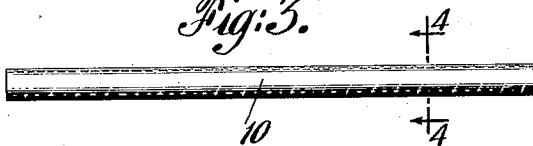


Fig. 4.



Fig. 5.

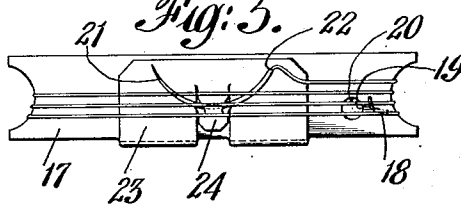
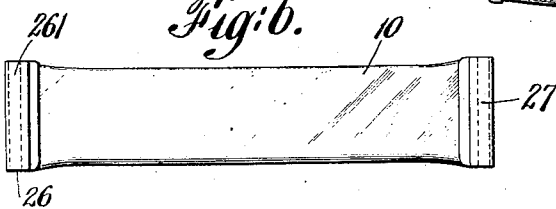


Fig. 7.



Fig. 6.



INVENTOR
GEORGE M. RANDALL
BY
H. C. Kline
ATTORNEY

UNITED STATES PATENT OFFICE

GEORGE M. RANDALL, OF DAYTONA BEACH, FLORIDA, ASSIGNOR TO PLASTIC PRODUCTS, INC., OF DAYTONA BEACH, FLORIDA, A CORPORATION OF FLORIDA.

SUTURE CONTAINER AND SPOOL

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This invention relates to containers for surgical sutures and to spools or similar means for retaining sutures in proper condition within the containers.

5 Heretofore it has been the common practice to package individual sutures in small glass tubes of circular cross section and either straight or bent in form, depending upon the nature of the needle usually included with the suture. These containers are formed as unitary members adapted to hold a suitable liquid in which the suture is held immersed for the purpose of properly preserving the ligaments or gut of which it is formed and to maintain the suture in a properly sterilized condition. When it is desired to make use of the suture it is necessary to break the glass container by wrapping it in a towel or handkerchief and snapping it with the fingers or striking it against some solid object. There is always the danger that a piece of the glass may pierce the handkerchief and cut the fingers and in any event the handkerchief or the like which must be perfectly clean becomes saturated with the solution from the container and is thus soiled. While containers of this sort are frequently provided with a line around the periphery at which it is intended to break them the breakage invariably requires considerable force in view of the necessity of making the containers strong enough to withstand the normal strains of shipment and handling.

35 It has been a primary object of the present invention to provide a suture container or capsule of suitable form and construction to permit easy handling and shipment of the same and to permit breakage or opening of the same without danger of cutting ones hands and without the necessity of soiling a handkerchief or towel or the like. In the attainment of these ends it is contemplated that the container should be formed as a flat but broad member capable of receiving a bent needle in addition to the suture and also, if desired, a suitable label identifying the contents and the source of the goods. It is further contemplated that the container shall be produced from a material capable

of resisting action by any of the usual solutions in which sutures are carried and one which is not brittle and fragile but may be readily broken or cut or otherwise opened without danger of harming the party seeking to use the suture. The material is also preferably transparent so that the contents of the capsule may be readily noted.

For the preservation and sterilization of sutures formed of or containing ligaments, tendons and the like, they are normally kept immersed in a liquid such as xylol or toluol, or similar hydrocarbons or the like. These liquids react with ordinary forms of celluloid and similar transparent cellulose materials which would in other respects be well suited for the purpose in view. However, it has been discovered that certain special forms of celluloid such as those known as macolite, kodakoid, and kodaloid are not soluble in nor attacked by the usual suture preservatives and these substances have all of the desired characteristics for the making of suitable containers. These forms of celluloid are produced by the addition to the cellulose base material, preferably cellulose acetate or tri-acetate, a form of plasticizer other than camphor which is employed when ordinary types of celluloid are produced. Some form of plasticizer is required in order to render the material workable and to avoid making the final product too brittle. However, camphor, which is the plasticizer most commonly employed, is soluble in or affected by the usual suture preservative liquids so that celluloid produced with this ingredient is unsuited for the use contemplated by the present invention. Other plasticizers which are not soluble in nor attacked by the preservative liquids are employed in the special forms of celluloid mentioned. Suitable plasticizers for the purpose may consist of or include diethylene-glycol, monoethyl-ether, or diethylene oxide. Celluloids which are produced by the use of these other forms of plasticizers in lieu of camphor are well suited for the purposes of this invention. They have the further advantage of not drying out and becoming brittle with age

as is the case with ordinary forms of celluloid.

In the drawing, which illustrates one suitable form that the improved container or capsule and spool may assume:

Figure 1 is a perspective view of the illustrative form of container.

Figure 2 is a view of the container material at an intermediate stage of the manufacture of the container.

Figure 3 is a view of the material at a further stage in the production of the container.

Figure 4 is a cross sectional view along line 4—4 of Figure 3.

Figure 5 is a face view of a spool on which the suture may be wound before inserting in the container.

Figure 6 is a face view of a modified form of container; and

Figure 7 is a side view of the container shown in Figure 6.

Referring now to the drawing the container is preferably formed as a single tubular member 10 having its ends 11 and 12 flattened and pinched together to form a hermetically sealed capsule. It should be produced from a material having the properties mentioned. For this purpose the special forms of celluloid or cellulose base products already mentioned are particularly well adapted. The capsule may be made from this material in various ways so as to produce a liquid and air tight unit. One method which may be employed is to extrude a tubular section of the material, such as shown in Figure 2, having a desired wall thickness of say one to three hundredths of an inch and having a circular cross sectional form while the material is in a plastic or semi-plastic state due to its temperature or the presence of a limited quantity of a suitable solvent. The round tubing thus formed may be immersed in a bath of hot water or may be made adaptable to a change in form in any other suitable way and is then flattened to produce the desired cross-sectional form. This flattening operation may be effected by the passage of a swab or die of suitable form through the tube or by a molding pressure applied to the outside of the tube. The resulting flattened tubular members having the form illustrated in Figure 3 may be cut to the proper lengths and one end of each section may be sealed by pinching together the still plastic or pliable material at the end and by dipping this end in acetone or some other solvent which thus causes the opposite walls of the flattened tube to become cemented firmly together.

Subsequently the tubes may be filled by the introduction of the suture and associated needle, mounted on a suitable spool if desired, and by the further introduction of the xylol, toluiol, or the like to a suitable

level, and the insertion of a label of desired form. The upper ends of the tubes may then be pinched together and hermetically sealed by applying a coating of acetone or other solvent across the ends by means of a brush or the like. In lieu of extruding the tubes they may, if desired, be molded into the desired form while in a plastic state or they may be formed out of sheet material properly cemented together along the seams.

In its final form the container is preferably made relatively broad and thin and of the usual length. For example it may be provided with two flat faces 13 and 14 approximately one inch wide and it may have a total thickness of about one quarter or three eighths of an inch, while its length may be approximately four inches. The sides 15 and 16 are preferably rounded as indicated in Figure 4, as will naturally result from the extrusion and flattening process mentioned. This form has various advantages over the cylindrical types now commonly employed. It is more easily handled and packed for shipment and when it is desired to include a bent needle it is not necessary to provide a bend in the container as is necessary with the cylindrical types. Furthermore the flat form of container enables the introduction of a suitable spool and needle holder, such as will be presently described, and it allows for the insertion of a relatively large label which may always be read with little difficulty. The danger of prematurely breaking the container by virtue of its rolling off of a table or the like onto the floor is obviated both by the flat form of the capsule and by the nature of the material of which it is produced.

While the suture may be simply coiled and inserted in the container without the use of a holder or spool it is deemed preferable to provide a suitable spool. This may, for example, be in the form of a flat member 17 having its ends concave or otherwise provided with retaining edges to prevent accidental displacement of the suture 18 which is wrapped around the member in a lengthwise direction. The inner end of the suture may be caught in a slit 19 cut from the edge of a small opening 20 adjacent one end of the member 17. A suitable number of turns of the suture are wrapped lengthwise of the spool and the free end of the suture is attached to a needle 21 either by threading through an eye provided in the latter or by clamping of the end 22 of the needle around the end portion of the suture. For the purpose of conveniently retaining the needle the spool may be provided with an extension 23 formed integral with one side of the member 17 and turned over the latter in the manner indicated. A small tab 24 may be struck up from the extension 23 and the needle may be inserted beneath this tab.

Due to the flat and relatively broad form of the spool a curved needle may be inserted as readily as a straight needle. The spool may be formed of any suitable material which is not soluble in nor adversely affected by the preserving liquid placed in the container; it may advantageously be formed of the same material as the container itself such as the special types of celluloid previously mentioned and it may be made either transparent or opaque as for example white, as desired.

In addition to the spool and its suture and needle there may be inserted in the container a label 25 of comparatively large size which may carry any desired advertising and identification matter. This label may be formed of paper of suitable texture which will not be attacked by the xylol, toluol or similar liquid contents of the capsule. The reading matter on the label may be readily noted without turning or twisting of the container between the fingers inasmuch as a broad flat surface is instantaneously exposed to the eye.

After the spool, label and liquid are placed in the main body of the capsule the upper end is pinched together and sealed by the application of acetone or the like in the manner previously set forth.

When the suture and needle are to be used the container may be opened by simply cutting off either end of the same by the use of a knife or scissors or the like. The liquid contents of the capsule may be dumped into a suitable receptacle and the spool readily removed.

In lieu of sealing the ends of the container by means of acetone or the like in the manner explained the ends may be sealed by the use of suitable metal clips 26 and 27 (Figures 6 and 7). One end of the tube may be pinched together and inserted in a suitable device for applying the clip 26 and folding or doubling over the end 261 of the same. After the capsule has been loaded the opposite end may be pinched together and the clip 27 applied and folded in a similar manner.

While an admirable form of container and a suitable co-related spool, have been disclosed in considerable detail it is to be understood that many changes may be made in the construction of the various elements without departing from the general spirit and scope of the invention. For example if desired, the capsule may be formed of two separate elements constituting a body portion and cap cemented together.

What I claim is:

1. As an article of manufacture a suture container formed of a transparent cellulose base product resistant to the action of xylol, toluol or similar preservative substances, and a suture and preservative therefor within

said container, said container being closed at its ends to retain said preservative.

2. As an article of manufacture a hermetically sealed suture container having a plurality of substantially flat sides and formed of a flexible transparent material resistant to the action of xylol, toluol or similar hydrocarbons, and a suture and preservative therefor within said container.

3. As an article of manufacture a hermetically sealed suture container having a plurality of substantially flat sides and formed of a transparent cellulose acetate product resistant to the action of the usual suture preserving liquids, and a suture and preservative therefor within said container.

4. As an article of manufacture a suture container which comprises a tubular member having its ends pinched and cemented together to form a hermetically sealed capsule, said member being formed of a transparent cellulose base product resistant to the action of the usual suture preserving liquids, and a suture and preservative therefor within said container.

5. As an article of manufacture a suture container which comprises a tubular member formed of a cellulose base product resistant to the action of preservative hydrocarbons, said member having its ends pinched and cemented together to produce a hermetically sealed capsule, and a suture and preservative therefor within said container.

6. As an article of manufacture a suture carrier which comprises a flat spool and a flat capsule formed of a transparent cellulose material resistant to the action of the usual suture preservative liquids, said spool being adapted to receive a suture and a needle associated therewith, and said capsule retaining said spool and a preservative liquid.

7. A suture carrier which comprises a hermetically sealed capsule formed of a transparent cellulose base product containing and resistant to the action of xylol, toluol or similar preservative substances, and a spool inserted in said capsule and adapted to support a suture and a needle associated therewith, said spool being formed of a material resistant to the preservative substances.

8. A suture spool which comprises a flat member formed of a cellulose base product resistant to the action of the usual suture preserving liquids said member being adapted to receive the windings of the suture, and an extension of one side of said member folded over the main body of the latter and having a tab adapted to receive a needle, said member having an opening therein with a slit extending therefrom adapted to receive and hold one end of the suture.

9. A suture container comprising a capsule formed of cellulose tri-acetate with a

plasticizer resistant to the action of the usual suture preservatives.

10. As an article of manufacture a suture container comprising a tubular member
5 formed of cellulose tri-acetate with a plasticizer resistant to the action of the usual suture preservatives and having its ends pinched together and hermetically sealed, and a suture and preservative therefor with-
10 in said container.

In testimony whereof, I have signed my name to this specification this 5th day of November, 1930.

GEORGE M. RANDALL.

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