This invention relates to suture containers and handling devices therefor and, more particularly, to a novel suture container in which a suture may be maintained in a sterilized condition and withdrawn therefrom as needed without danger of glass breakage and with facility of handling.

Sutures used in surgery are usually of catgut, silk thread, cotton thread or wire. The sutures must be maintained in a thoroughly sterilized and antisepctic condition right up until the time of actual use. For this purpose, the sterilized suture is stored in a sealed container or holder filled with an antisepctic liquid, or may be stored dry.

At the time of use, the suture is removed from the solution in the container, as by being withdrawn from the container as needed or by removal of a wound spool or bobbin of suture from the container. The containers are usually of glass, and care must be exercised to prevent breakage of the glass, particularly in the vicinity of a wound. The presently used containers present considerable difficulties with respect to handling the sutures at the time of use in surgery.

The present invention is directed to a suture containing ampule having a novel seal through which the suture may be withdrawn and including a hollow cap arranged to maintain the projecting end of the suture in antisepctic-soaked condition or dry, the hollow cap preventing exposure of the projecting end of the suture. To facilitate protective handling of the container and suture during surgery, particularly when the ampule is made of glass, a novel handle is provided having a grip and a projecting stem formed with a recess to receive the ampule, an open end of this recess being closed by the aforementioned hollow cap.

Preferably, the ampule is made of a suitable shatterproof substance such as plastic, and may be shaped to form a handle or grip.

The seal is in the form of a plug of compressible material, having a side slit receiving the suture and arranged to have a surgical needle pierced therethrough, inserted through a second slit, or placed between the plug and the inner surface of the ampule. The plug may be rubber or may be a suitable plastic such as "Telon" or "Neoprene," and is preferably cored or circumferentially ribbed, or both, for greater compressibility.

For an understanding of the invention principles, reference is made to the following description of typical embodiments thereof as illustrated in the accompanying drawings. In the drawing:

Fig. 1 is a side elevation view, partly in section, of a sealed ampule embodying the invention;
Fig. 2 is an end view of the ampule with the hollow cap removed;
Fig. 3 is an elevation view of the ampule handling device;
Fig. 4 is a sectional view of the handling device;
Fig. 5 is a view similar to Fig. 1 showing a surgical needle placed in the ampule;
Fig. 6 is a view similar to Fig. 2 showing the needle inserted through a second slit in the plug seal;
Fig. 7 is a side elevational view, partly in section, of another form of ampule embodying the invention;
Figs. 8, 9 and 10 are sectional views of still other forms of ampules embodying the invention;
Figs. 11, 12 and 13 are sectional views of plug seals embodying the invention;
Figs. 14, 15 and 16 are end elevation views of the plugs of Figs. 11, 12 and 13, respectively; and
Fig. 17 is an elevation view, partly in section, of an hermetically sealed ampule embodying the invention.

Referring to Figs. 1-4, an ampule 10, which may be of glass or plastic, is illustrated as an open ended container containing an antisepctic solution 11 for soaking a suture or ligature 12. The suture orligature is sealed in the container by a plug 15 of rubber 16 or plastic or other compressible material having a side slit 16 through which the suture is withdrawn leaving a projecting end 14. Beyond plug 15, the ampule is closed by a hollow cap 17 arranged to maintain a ligature or suture soaking liquid outwardly of plug 15 to soak suture end 14 and maintain it sterile. Cap 17 may be rubber or a suitable plastic to have a sealing fit with the end of ampule 10.

A handle 20 is provided to facilitate handling of ampule 10 and suture 12 without the risk of glass breakage as the suture is withdrawn for use in surgery. Handle 20 is formed of a suitable substantially shatter-proof material, which may be plastic, and has a grip portion 21 shaped to fit the closed fingers and a stem 25 projecting from the midportion of grip 21. Stem 25 has a recess 26 therein to receive ampule 10, the outer end of the recess having an opening 27 for passage of suture 12.

In use, cap 17 is removed from ampule 10 and the ampule is placed in recess 26 with plug 15 toward the bottom end of the recess, end 14 of suture 12 being passed outwardly through opening 27. Cap 17 is then set in the open end of recess 26, having a tight fit therein; and seats on a shoulder 28 adjacent the outer end of the recess. Thus, handle 20 with ampule 10 may be safely and firmly gripped in one hand as suture 12 is withdrawn through opening 27.

The provision of side slit 16 in plug seal 15 provides for ready passage of the suture through the plug without the awkward operation required to thread a suture through a hole in the plug. Furthermore, the sides of the slit close tightly on the suture as the plug is set into ampule 10, maintaining a tight seal. This seal is fully maintained as the suture is withdrawn through the slit.

A surgical needle 30 may be protectively mounted in ampule 10 either by piercing the needle through plug 15 (Fig. 5), inserting it between plug 15 and the inner surface of ampule 10, or placing the needle through a second slit 16 in plug 15 as shown in Fig. 6.

While a glass ampule may be safely used with handle 20, it is possible to provide an ampule which forms its own handle. Thus, in Fig. 7, the ampule 40 is formed from two elongated halves 41 and 42, of plastic, top 41 having an offset flange 43 fitting over the rim of bottom 44 and sealed thereto. Bottom 42 has a neck 46 in which is set plug 15 and which fits cap 17.

In Figs. 8, the ampule 10 is provided with a cap 50 through which extends a suture feedout seal 51 secured to the outer end of suture 12. Cap 50 thus need not be removed for withdrawal of suture 12. Seal 51 has a gripping end 52 which extends beyond ampule 10, so that suture 12 can be withdrawn by grasping end 52 of seal 51.

The ampule 60 of Fig. 9 resembles that of Fig. 1, but is formed of plastic and shaped to form a grip.

Fig. 10 illustrates a one-piece plastic ampule 65 having a neck 66 receiving a flattened seal 67 slit to receive
suture 12. The needle 30 may be contained in cap 68 fitting neck 66.

The plug seal may take various forms to improve its compressibility and sealing effect. Thus, in Figs. 11 and 14, plug 15A is cored as at 71 and 72. In Figs. 12 and 15, plug 15B is formed with ribs 73. Plug 15C of Figs. 13 and 16 has ribs 74 and is cored at 76 and 77.

The ampule 80 of Fig. 17 is initially in the general shape of a test tube having an open end 81 and formed with a score line 82 inwardly of the open end. After placing of suture 12 in the antiseptic liquid 11 in the ampule, plug 15, having the suture 12 placed in its side slit 16, is seated in the ampule inwardly of score line 82. Antiseptic liquid may be placed in the ampule above plug 15, and the open end 81 is sealed as by heating and deforming the open end to form a sealed closed outer end of the ampule. To use the ampule, the sealed outer end is broken off at score line 82 and discarded.

Suture 12 may be coiled loosely in the ampule or may be wound on one or more spools or bobbins therein. The suture may be maintained either dry or soaked in an antiseptic liquid.

While specific embodiments of the invention have been shown and described in detail to illustrate the application of the invention principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

An ampule adapted to protectively maintain a surgical suture dry or soaked in an antiseptic liquid, comprising, in combination, a container having an open end and arranged to receive the suture; and an otherwise imperforate plug of compressible material having a containing sealing fit in said container and formed with a side slit receiving the suture; whereby the suture may be withdrawn through said slit without destroying the sealing of the container; said container having a score line outwardly of said plug and the open end of the container being hermetically sealed after the suture, liquid and plug are inserted therein and an antiseptic liquid placed in the container outwardly of the plug; the hermetically sealed end being broken off at the score line to withdraw the suture through the plug.

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