

1,371,668.

Patented Mar. 15, 1921.

Fig. 2.

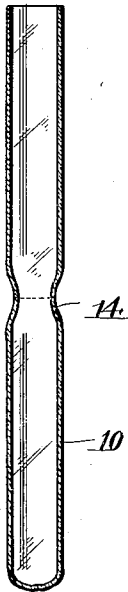


Fig. 3.

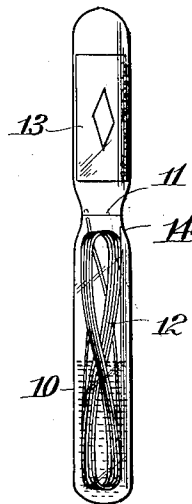


Fig. 1.

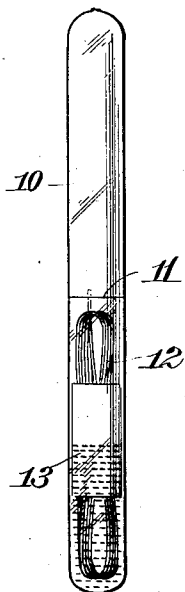


Fig. 4.

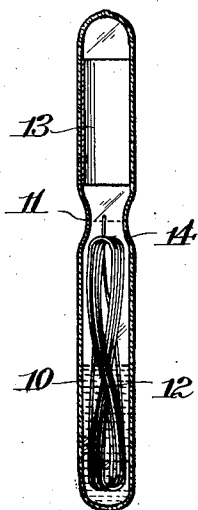
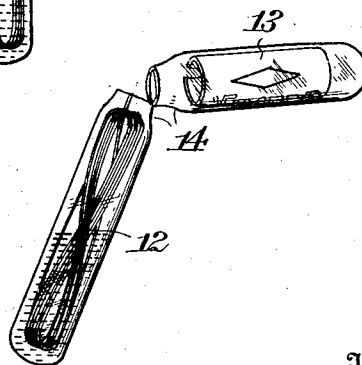


Fig. 5.



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UNITED STATES PATENT OFFICE.

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SUTURE-PACKAGE.

1,371,668.

Specification of Letters Patent.

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Application filed November 28, 1917. Serial No. 204,332.

To all whom it may concern:

Be it known that I, CHARLES T. DAVIS, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Suture-Packages, of which the following is a specification.

This invention relates to the art of packaging sutures or the like, pertaining more particularly to the production of a suture package or unit in which the suture is maintained at maximum efficiency within the package, and the package is of such form as to provide for ready preparation for use while reducing liability of suture contamination to a minimum.

Suture packages, as now generally produced for commercial purposes, are in the form of a glass tube, sealed at its opposite ends, and generally having a weakened line to provide for breakage. The tube contains a preserving fluid into which the suture extends, the latter generally being more or less coiled, a simple arrangement having the suture wound and the coil flattened—generally producing a twist—to permit ready insertion into the tube. In practice, the tube is generally twice the length of the inserted coil, this length being employed to permit the vaporization or other treatment to be had after the tube has been sealed and before it is broken to expose the suture.

Packages of this type have several objectionable features heretofore considered unavoidable. For instance, the tubes are generally of uniform diameter with the weakened line intermediate the ends of the tube. This permits the contained suture shifting its position lengthwise, the suture oftentimes extending across such line. If the tube be broken on such line while the suture is in such position, suture contamination is practically unavoidable. This can be partially obviated by violently shaking the tube before breaking to shift the suture toward its proper end, but this is more or less difficult due to the liquid contents and the tendency of the suture to stick to the tube surface. Hence, this precaution is oftentimes omitted, especially on occasions where haste is essential, or through inexperience on the part of the nurse.

Another feature is the practical requirement that the package production be by hand, due somewhat to the container for-

mation. Where a label is introduced, it passes into the tube with the suture or is passed into proximity to the coil, where the twist of the latter tends to twist the label, giving the appearance of a hastily-produced package and leaving the suture open to suspicion for this reason. Where the treatment of the suture is in stages, requiring elimination of one solution before introducing another, the treatment must either be external of the tube or made by extremely careful and tedious manipulation in order that the suture be not thrown out of the tube or contaminated by contact with foreign substances. The tube must be capable of ready breaking with minimum liability of splintering, so that thin stock is used, making the container fragile in character, materially increasing liability of breakage during transit or when undergoing heat treatment previous to placing the suture in service.

The prior practice of producing packages practically requires hand or manual treatment, providing for high cost of manufacture due to low capacity of production.

The present invention is designed to overcome these and other objectionable features by employing a container which will permit the various sterilization and preservation treatments to be had without liability of contamination; which will prevent shifting of the suture over the breaking line; which will permit ready introduction of suture and label, if used; which will permit of the use of heavier stock and shorter length; and which will permit many of the packaging manipulations to be provided mechanically, tending to decrease cost of manufacture.

To these and other ends, the nature of which will be readily understood as the invention is hereinafter disclosed, said invention consists in the improved construction and combination of parts hereinafter fully described, illustrated in the accompanying drawings and more particularly pointed out in the appended claims.

In the accompanying drawings, in which similar reference characters indicate similar parts in each of the views:

Figure 1 is a view in elevation showing the general form of package heretofore in general use.

Fig. 2 is a longitudinal sectional view of a

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preferred form of container prior to introduction of the contents and sealing of the tube.

Fig. 3 is an elevation of the completed package.

Fig. 4 is a longitudinal sectional view of the same.

Fig. 5 is a perspective view showing the package broken to expose the suture.

As shown in Fig. 1, the tube of the commercial type of suture package is of equal diameter throughout its length, permitting the tube to be sealed at one end prior to insertion of the contents, the suture, label and preserving solution being inserted through the open end. The tube 10 is generally of a length approximately twice the length of the suture coil and is generally provided with a weakened line 11 to tend to force breakage at a predetermined point. Inasmuch as the strength of such tube against breakage is that provided by the section at the weakened line, the tube section is made thin in order to reduce the variation in thickness as far as possible and yet provide for the forced location of the break under pressure. As a result, the package requires careful handling in transit and during subsequent treatment.

The uniform diameter of the tube of Fig. 1 permits ready insertion of the suture 12 and label 13, but practically requires that these be inserted together in order that the label will be more or less supported in position by the suture. Where the label is inserted after the suture, shifting movements of the latter may tend to double or otherwise affect the appearance of the label. By locating the label on the suture coil in advance, the relative movements tending to double or crease the label are more or less eliminated reducing liability of suspicion against the quality of the package. This does not totally avoid this possibility, since the twist action of the coil may affect the label appearance. However, the more serious factor in this respect is the necessity for introducing the suture and label by hand, not only making contamination possible during handling, but increasing the cost by reason of low capacity and labor cost.

An additional factor is the difficulty of treating the suture, especially where the treatment is of the stage type. Any manipulation which would tend to force the suture out of the open end of the tube, is of course, objectionable, so that the cost factor is increased by the necessity of careful handling during this operation.

The more serious factor of shifting of the suture over the breaking line, heretofore referred to, is of prime importance. Contamination is practically inevitable if the coil be permitted to remain in this position when the break is had.

The present invention meets these objec-

tionable features by changing the configuration of the container in such manner that the two parts of the container on opposite sides of the weakened line are practically individual compartments, although in open communication to permit vapor expansion, etc., during the heat treatment placed on the package preliminary to breaking on the weakened line, thus avoiding liability of shattering the container during such treatment.

The compartment formation is provided by producing a neck-like configuration adjacent to or within which the weakened line is located, a configuration which, when the tube is broken on such line, will give the open end of one or both sections the appearance of a mouth or neck differing in configuration or in size or area from that of the normal cross-section of the tube without, however, so closing the mouth or neck as to prevent ready removal of the contents of the section or compartment.

This result can be obtained in different ways, the embodiment shown in the drawings producing the result by forming an annular depression 14 within which the weakened line is located, the depression being of suitable length so as to provide a contracted neck portion to each section. Obviously, other configurations may be employed. This neck-forming configuration is preferably provided in advance of the packaging operation, the container, in form to begin such operation being illustrated in Fig. 2, one end of the tube being sealed, the other open. The depression 14 is preferably located relatively to the sealed end, the compartment between the neck and sealed end being adapted to receive the suture which is wound in elongated coil formation, the neck being preferably so positioned as to locate the coil entirely below the neck when in normal position, the neck having an internal configuration which will permit the coil to be passed therethrough. This arrangement permits the coil to be readily inserted by the use of a suitable instrument—tweezers, for instance—thus reducing liability of contamination.

The suture coil is thus located in one of the container compartments, as shown in Figs. 3 and 4, and the suture is firmly retained in its compartment against inadvertent displacement, even when the container is roughly handled, by cooperation of the neck and the form of the elongated coil, which has a considerable expansive tendency due to the nature of the suture and the manner in which it is coiled, and is usually placed under appreciable compression within its compartment. Hence, suture treatment can be had within the open tube, and, if desired, the container may be placed in a suitable centrifugal apparatus to free

the suture and container from solution, without affecting the position of the suture. The preserving solution can be readily placed in position through a simple filling operation.

If a label is to be inserted it is placed in the opposite compartment, the neck retaining it in the compartment. Owing to the fact that the insertion of the label is not complicated by the presence of the suture, or by the possibility of suture movements into the label-containing compartment, no material care is required and label insertion can be had by machine.

After label insertion, the open end of the tube is sealed, thus completing the package. Since no shifting of suture or label across the weakened line can take place in the completed package, the length of the label-receiving compartment may be decreased, thus shortening the length of the tube and package, permitting decrease in size of the transporting carrier. The length of the container is thus made independent of the necessity for providing a space on either side of the weakened line capable of receiving the suture, the length being sufficient to permit vaporization action without producing undue pressure on the tube, where heat treatment is had prior to breaking the container.

Since the contracted neck tends to aid in restricting the point of fracture when breaking the container on the weakened line, the tube may be of heavier stock, thus decreasing liability of breaking the container during transit or undergoing heat treatment.

The appearance of the package is not affected by manipulation of the package, since the label and suture do not come into contact.

The important factor of non-contamination at time of breaking of the package is had by reason of the fact that the suture is originally placed at one side of the weakened line and is retained in such portion of the container.

One end of the suture coil lies in proximity to the neck so that when the tube is broken, the surgeon or nurse can easily withdraw the suture by the use of tweezers or other instruments.

Heat treatment of the package can be had since the tube will permit vaporization to take place without providing undue pressure on the container itself, the neck permitting free passage of the vapors regardless of rapidity of formation.

As will be seen, the arrangement is such that each compartment is of substantially-uniform cross-section between its neck and its sealed end, thus enabling ready insertion of the suture and label, and at the same time providing for ease of manufacture, since the neck-forming configuration can be

readily produced in a tube of uniform cross-section, sealing of the tube ends being had in any well-known way.

From the above it will be understood that the packaging operation can be provided with rapidity and efficiency and at the same time with minimum liability of contamination of the suture, thus enabling material saving in the cost of production; the package is of a type permitting transportation and heat treatment with less likelihood of damage; and is of such character as to permit proper rupturing into sections without liability of contamination, certainty being had that the suture will be retained in the compartment of its section, after rupture is had, while permitting ready removal from such section when needed.

While I have herein shown and described one way in which the invention may be carried into effect, it will be readily understood that changes or modifications therein may be found desirable or necessary to meet the exigencies of use, and I desire to be understood as reserving the right to make any and all such changes as may be found necessary or desirable, in so far as the same may fall within the spirit and scope of the invention as expressed in the accompanying claims.

While I have shown the label as located in a different compartment from that in which the suture coil is located, an arrangement which is preferable as above indicated, it is to be understood, however, that the invention is not limited in this respect, since the label may be placed in the same compartment with the suture coil, since the two elements may have the relationship shown in Fig. 1 while within the suture-receiving compartment.

Having thus described my invention what I claim as new, is:

1. A suture package comprising a tube sealed at the ends and having a constricted portion intermediate the ends forming two connected tube compartments, and a suture in the form of an elongated coil retained in one of the compartments by coöperation of the constricted portion and form of the coil.

2. A suture package comprising a tube sealed at the ends and having a constricted portion intermediate the ends forming two connected tube compartments, and a suture in the form of an elongated coil retained in one of the compartments by coöperation of the constricted portion and form of the coil, the suture coil having an end projecting in the vicinity of the constricted tube portion so that it is readily accessible for grasping and withdrawal of the suture when the tube is broken at the constricted portion.

In testimony whereof I have hereunto set my hand.

CHARLES T. DAVIS,