

(No Model.)

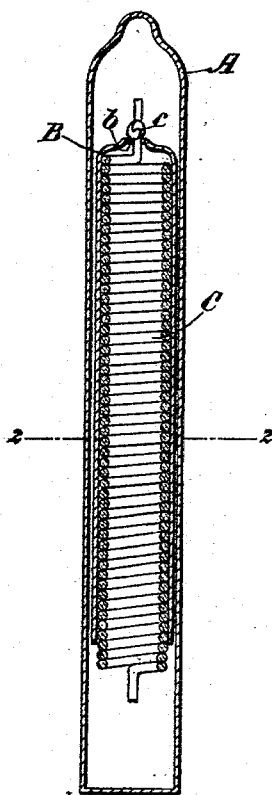
R. KNY.

SURGICAL LIGATURE PREPARATION AND INCLOSURE.

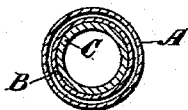
No. 514,558.

Patented Feb. 13, 1894.

*Fig. 1,*



*Fig. 2,*



WITNESSES:

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INVENTOR

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# UNITED STATES PATENT OFFICE.

RICHARD KNY, OF NEW YORK, N. Y.

## SURGICAL-LIGATURE PREPARATION AND INCLOSURE.

SPECIFICATION forming part of Letters Patent No. 514,558, dated February 13, 1894.

Application filed July 19, 1893. Serial No. 480,905. (No specimens.)

*To all whom it may concern:*

Be it known that I, RICHARD KNY, a citizen of the United States, residing in the city, county, and State of New York, have invented a new and useful Improvement in Methods of and Means for Preparing Surgical Sutures, of which the following is a specification.

The object of the invention is to sterilize and preserve in a dry state, sutures adapted for use in surgery, and it consists of the means and method hereinafter set forth.

In all surgical operations where it becomes necessary to employ a suture in dressing internal wounds, it is essential to the health of the patient that the suture employed be entirely freed from all disease germs. In the process of sterilizing the suture, it is highly important that its fiber structure be not destroyed, and it is equally important that the means for preserving the suture till ready for use, be such that the suture is not only kept entirely free from all contamination, but that its fiber structure be also kept in a perfect state of preservation.

My invention not only secures all these valuable results, but it also materially reduces the cost of the prepared suture and provides for putting it in the hands of the surgeon in a most convenient and compact form.

In the preferred manner of carrying out my invention I take a piece of ordinary string, preferably cat-gut, and extract all traces of fats or oils by subjecting it to a bath of benzine or ether for about forty-eight hours. I then put it in a bath of absolute alcohol for about twenty-four hours for the purpose of absorbing all traces of moisture that may inhere in the fiber. The suture is then wound upon a rod and the coils slid off into a tube, preferably of glass, open at both ends, and this tube with the inclosed suture is then put into a slightly larger tube open at one end. The tubes and contained suture are then put into an oven whose temperature is gradually raised from about 80° to 100° Celsius and left in the oven for about three hours. The tubes are then taken out of the oven and the outer one is closed at both ends. They are then again put into the oven and the temperature is raised to about 140° Celsius,

whereby the sterilization of the inclosed suture, the air surrounding it and the inclosing tubes is perfected. The suture and its preserving tubes are now ready for use. The opening at one end of the inner tube is preferably reduced to a size slightly larger than the cross-section of the suture, and the suture is drawn out at this end, being normally held, with one of its ends slightly protruding, by means of a knot.

The tubes which I prefer to employ are made of glass, and I preferably close the outer one by fusing the glass at its open end, but of course other suitable means for closing it may be employed which will keep the suture in sterilized condition. For instance, the tube might be closed by sterilized cotton which though not necessarily air tight would effectually prevent the entrance of all contaminating particles into the tube; or some other sterilized convenient substance may be used which would effectually exclude the outer air. When the outer tube is made of glass I generally cut a ring around it so that when the suture is to be used the tube may be readily broken along this line.

I have described the steps which I prefer to employ in carrying out my invention, but they may be considerably varied without materially departing from the broad spirit thereof. For instance, a single hot air bath of say 140° may take the place of the two hot air baths described, and the outer tube may be closed after this single heating, provided care is taken that no impurities be thereby admitted to the tubes. Moreover, a single tube could take the place of two tubes, but it is much safer to employ two tubes and I prefer to employ them. Again, while I have described my invention as applicable to sutures in general, it is of special value as applied to cat-gut sutures.

In the application of my invention to a suture in which there is little or no trace of oils or moisture, such as silk, the hot air bath at a high temperature would be sufficient to kill all disease germs that might inhere in the silk fiber, and a special treatment to extract oils and moisture may be of course omitted without departing from my invention.

In the drawings, Figure 1 is a longitudinal section of the suture and inclosing casings, and Fig. 2 is a section on the line 2—2 of Fig. 1.

A is the outer casing sealed at both ends.

5 B is the inner casing open at both ends.

C is the suture having one end *c* knotted and protruding through the small open end *b* of the tube B.

What I claim, and desire to secure by Letters Patent, is—

1. The combination of a dry sterilized tube so closed as to prevent the entrance therein of contaminating particles and a sterilized tube inclosed in said first mentioned tube, for the preservation of a surgical suture in a dry state, substantially as set forth.

2. The combination of a hermetically sealed sterilized glass tube and a sterilized glass tube open at both ends inclosed therein for the preservation of a surgical suture in a dry state, substantially as set forth.

3. The combination of a hermetically sealed sterilized tube and a sterilized tube inclosed

therein for the preservation of a surgical suture in a dry state, and a dry sterilized suture inclosed in said inner tube, substantially as set forth.

4. The combination of a hermetically sealed sterilized glass tube, a sterilized glass tube open at both ends inclosed therein for the preservation of a surgical suture in a dry state, and a dry sterilized suture inclosed in said inner tube, substantially as set forth.

5. The process of preparing a surgical suture which comprises, inclosing a suitable string in a suitable open casing, inclosing said casing and string in an outer open casing, sterilizing said string and casings by heat and finally closing said outer casing by means of a suitable closure whereby the tubes and suture are preserved in a dry sterilized condition, substantially as set forth.

RICHARD KNY.

Witnesses:

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