No. 693,138. Patented Feb. 11, 1902.

R. W. JOHNSON.

METHOD OF PREPARING AND INCLOSING SURGICAL LIGATURES.

(Application filed Nov. 5, 1897.)

(No Model.)

Fig. 1.

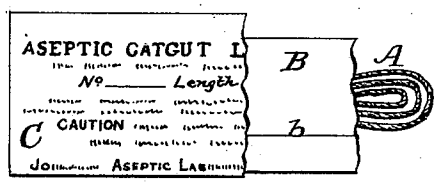


Fig. 2.

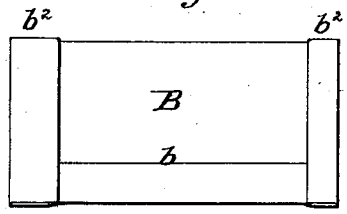


Fig. 4.

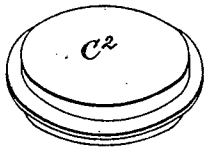


Fig. 3.

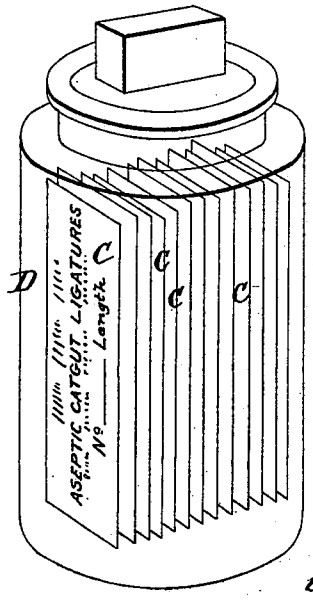
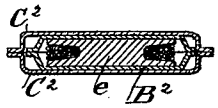


Fig. 5



WITNESSES

A. B. Diggs

L. D. Heinicke

INVENTOR

Robert W. Johnson

by E. E. Masson, Attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ROBERT W. JOHNSON, OF NEW BRUNSWICK, NEW JERSEY.

METHOD OF PREPARING AND INCLOSING SURGICAL LIGATURES.

SPECIFICATION forming part of Letters Patent No. 693,138, dated February 11, 1902.

Application filed November 5, 1897. Serial No. 657,558. (No specimens.)

To all whom it may concern:

Be it known that I, ROBERT W. JOHNSON, a citizen of the United States, residing at New Brunswick, in the county of Middlesex and State of New Jersey, have invented certain new and useful Improvements in Methods of Preparing and Inclosing Surgical Ligatures, of which the following is a specification, reference being had therein to the accompanying drawings.

The object of this invention is to sterilize and preserve in a dry state, free from all contamination, in suitable flexible paper envelops catgut ligatures adapted for use in surgery; and it consists of the method hereinafter described.

In all surgical operations where it becomes necessary to employ a catgut ligature in dressing wounds it is essential to the health of the patient that the ligature employed be entirely free from all disease-germs. In the process of sterilizing the ligature it is important that its structure be not destroyed and that it be entirely free from all contamination by handling. My invention not only materially reduces the cost of the prepared ligature, but accomplishes a complete sterilization while inclosed in a flexible filtering-envelop, partly by liquids passed therethrough, without touching the ligature with the hands. In brief, the ligatures are sterilized while inside a protecting-envelop that allows the sterilizing agents to penetrate, but prevents the operator from touching the gut. The ligatures reach the surgeon in the same filtering-envelop, which is also protected by an outer impermeable but not brittle envelop. When the surgeon has purified his hands and is ready to use the ligature, the envelops can be easily cut open with a knife or with scissors or even be torn open without danger of coming in contact with broken glass, as might happen if the ligatures were directly inclosed in glass tubes or bottles that had to be broken to open them.

In the accompanying drawings, Figure 1 represents a paper package consisting of an outer envelop having one end torn away, an inner envelop of porous filter-paper having also one end torn away, and a portion of a coil or hank of catgut ligature projecting from the inner envelop. Fig. 2 represents the inner envelop closed and sealed. Fig. 3 represents a glass jar closed with a stopper and containing a series of the doubly-sealed ligature-envelops. Fig. 4 represents a duplex envelop of round form. Fig. 5 is a cross-section of the same.

In preparing the ligatures a series of steps or processes are employed. The exterior of the catgut string is first cleansed by scrubbing it with benzin or other liquid to remove as much as possible of the blood, fat, and impurities thereon. The string A, about thirty inches long, is then wound in a coil or hank and placed in a small envelop B, made of paper similar in texture and quality to the German or Swedish filter-paper. It is of such a texture that the solutions used after to complete the sterilization of the catgut will pass through the pores, but when dry is bacteria-proof. The envelop B is made in such a manner that there are no open corners by taking a strip of said paper, forming therefrom a tube by having its two long edges overlapping each other, as at b, and uniting them with waterproof cement or with a cement that is not soluble in cumol or other antiseptic used, then folding and sealing one end upon the body of the envelop, leaving the opposite end open for the reception of the catgut ligature. After having placed the hank of catgut or of silk ligature within the envelop said open end is folded and sealed, as at b^3, upon the body of said envelop with the waterproof cement. The envelops containing the ligatures are next subjected to successive percolations with solvents, as naphtha or alcohol, to remove the oil, fat, and impurities within a portion of the tissues of the gut, said solvents being also destructive to germ life. The ligature, still sealed within the envelop, is further sterilized by boiling in a solution of cumol compound (consisting of a mixture of cumol and mineral glycerin) at a temperature of 320° to 340° Fahrenheit. The excess of the cumol solution is then removed by rinsing in naphtha or by drying. Each envelop B is then placed in a close-texture paper envelop C and sealed therein. Upon the envelop C can be printed information indicating the nature of the aseptic ligature, its length, size, &c. A dozen or more of the doubly-sealed ligatures and envelops are

finally packed in sterilized jars D, of glass or of other material, that are also closed and sealed. The ligatures therefore cannot become infected by handling their inclosures, and one or more ligatures can be removed without endangering the remaining strings.

If it is preferred to have the catgut ligatures in the form of a coil, either plain or wound upon a flat spool *e*, said coil is first placed in a dished disk B^2, closed by a similar cover, both of filter-paper, and sealed together and then boiled in a sterilizing solution, as above described. Each round envelop is then dried and inclosed in a similarly-dished envelop C^2, of close-texture paper, and sealed therein.

Having now fully described my invention, I claim—

The process of preparing a surgical ligature, which consists, in closing the ligature in an absorbent-paper envelop, sealing it therein, placing the filled paper envelop in antiseptic liquids which will not soften the ligature therein, and are adapted to pass through the pores of the paper and reach the ligature therein, removing the filled envelop from said liquids, drying it, and inclosing it in a close-texture paper envelop, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT W. JOHNSON.

Witnesses:
HELEN C. GREENWOOD,
SAMUEL W. MCGANN.