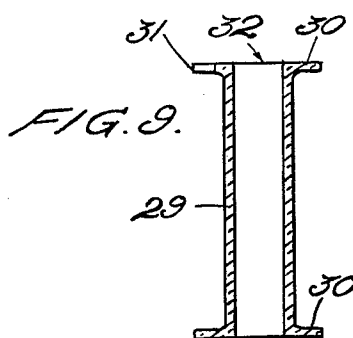
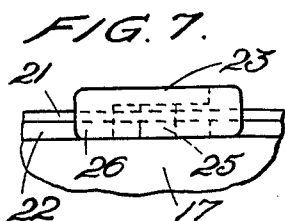
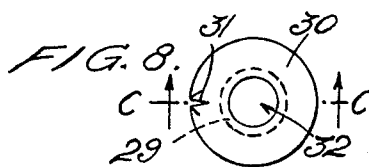
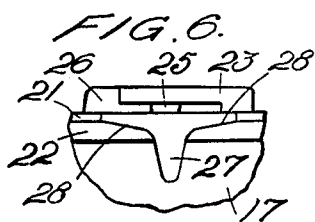
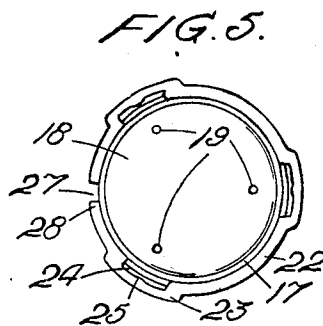
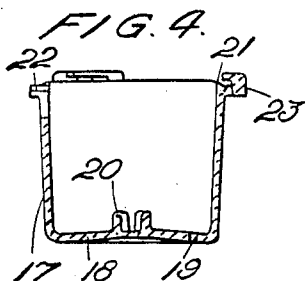
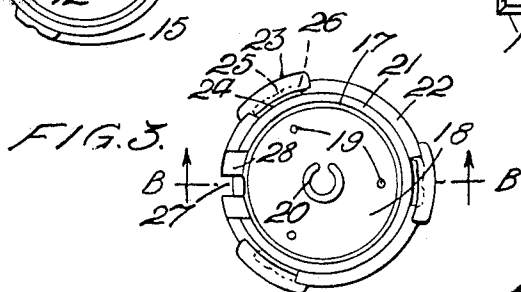
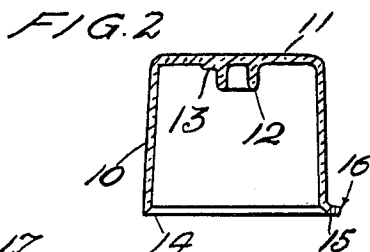
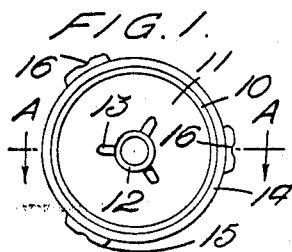


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R. J. EDGORTH
STERILIZABLE CONTAINER
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3,481,690



INVENTOR
RAYMOND JOHN EDGORTH
BY *Carl C. Batz*
ATTORNEY

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3,481,690

STERILIZABLE CONTAINER

Raymond John Edgworth, Eastbourne, England, assignor to Armour Pharmaceutical Company, Chicago, Ill., a corporation of Delaware

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U.S. Cl. 21—83

5 Claims

This invention relates to sterilizable containers, particularly for the packaging and repeated sterilization of Non-Absorbable Surgical Sutures. Wet sterilization conditions vary from boiling water or flowing steam at 100° C. to conventional steam sterilization at 115° C. or 120° C. and high vacuum steam sterilization techniques at 136° C. Such variations have hitherto tended to discourage the use of thermoplastic materials for sterilizable containers.

Preparatory to surgical use, unsterile non-absorbable surgical sutures, such as linen, monofilament nylon, plaited nylon, silk or terylene, twisted silk and stainless steel may be sterilized immediately before use in a metal device known as a ligature egg. The ligature egg is divided into two parts by means of a screw thread, and has a number of holes bored all over its surface. The required length of suture thread is wound on to a spool which is placed in one part of the egg and the thread end is passed through one of the holes. The other part of the egg is screwed on and the egg, spool and suture is then wet sterilized.

Such a procedure has several disadvantages. Winding a length of thread on to a spool each time it is required is time consuming, and the sharp inner edge of the drilled ventilation/thread holes may damage the thread. With many ventilation holes, there is a possibility of micro-organisms getting into the egg and contaminating the contents between sterilization and use. The egg is frequently heavy and difficult to hold firmly; and if the end of the thread is lost, the egg must be unscrewed and the end re-threaded through one of the ventilation holes.

Alternatively, a length of suture may, prior to use, be wound on a metal or fiber former which is placed in a glass or metal container for sterilization. This procedure is laborious and inconvenient in use. Furthermore, it is difficult to indelibly identify by means of labelling the type and size of suture thread in the ligature egg or other container to be subjected to wet heat sterilization.

The present invention provides a sterilizable suture container made of polyacetal resin, having at least one small hole for removing condensed water, and an aperture for the removal of portions of the suture and to permit the access of water or steam and comprising two inter-engaging parts readily separable by twisting one relative to the other to give free access to the interior of the container.

A range of polyacetal resins is sold by Du Pont under the trade name Delrin, and the general purpose material Delrin 500 may conveniently be used for this invention. Imperial Chemical Industries Ltd. also market a polyacetal resin under the trade name Alkon. Reported properties for typical resin are a melting point (crystalline) of 347° F. a flow temperature (ASTM No. D-569) of 363° F., and a flammability (ASTM No. D-635) of 1.1 in./min.

Each of the two inter-engaging parts may comprise approximately half the container. In a preferred embodiment each part is substantially cylindrical and closed at one end (except for at least one small hole for removing condensed water), a first part having a plurality of outreaching notched flanges disposed peripherally at its open end, and a second part having a plurality of C-shaped flanges disposed peripherally at its open end including a locking head for engaging a notch on a flange of the first

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part so as to lock the first and second parts together. The first and second parts may be tapered so that the container is barrel shaped, and at least one small hole for removing condensed water may be provided in the closed end of one of the parts.

The aperture for the removal of portions of the suture thread and to permit access by water or steam may be provided between the first and second parts when they are inter-engaged. Each of the two parts may be provided with a centrally-placed boss inside its closed end, the two bosses being positioned to co-act, when the parts are inter-engaged, to support a spool for rotation relative thereto. One boss may be C-shaped to permit the drainage of condensed water. The spool is preferably made of the same material as the container.

The following description illustrates the invention, and refers to the accompanying drawings in which:

FIG. 1 is an end view of a first part of a container;

FIG. 2 is a sectional side elevation of the first part on

A—A of FIG. 1;

FIG. 3 is a plan view of a second part of the container;

FIG. 4 is a sectional side elevation of the second part on B—B of FIG. 3;

FIG. 5 is an end view in the opposite direction to FIG. 3;

FIG. 6 is an enlarged view of a slot in the second part; FIG. 7 is an enlarged view of a catch in the second part;

FIG. 8 is a sectional plan view of a spool, and

FIG. 9 is a sectional side elevation on C—C of FIG. 8.

The first part of the container comprises a substantially cylindrical wall 10 tapering slightly towards a closed end 11. The inner face of the closed end 11 is formed with a central tubular boss 12 and three shorter projections 13 extending radially from it, but stopping short of the wall 10. The open end of the cylindrical wall 10 is chamfered inwardly at 14 and carries three equidistant outreaching flanges 15 which are notched at 16.

The second part of the container comprises a substantially cylindrical wall 17, tapering slightly towards a closed end 18, and generally similar to the cylindrical wall 10 of the first part. The closed end 18 has three small holes 19 bored in it, and is formed with a central C-shaped boss 20 on its inner face. The closed end 18 is slightly domed inwards. The open end of the cylindrical wall 17 is chamfered outwardly at 21 so as to mate with the inwardly chamfered face 14 of the first part, and is formed with a continuous outwardly extending peripheral flange 22 which is not chamfered.

The open end of the cylindrical wall 17 is formed with three equidistant peripherally disposed C-shaped flanges 23. The peripheral flange 22 is cut away at 24 over part of the length of the C-shaped flanges 23. The C-shaped flanges 23 include a locking head 25 for engaging a notch 16 on a flange 15 of the first part, and a stop 26 for preventing rotation of the first part beyond the locking position.

Midway between two C-shaped flanges 23, a V-notch 27 is cut through the peripheral flange 22, the chamfered end 21 of the cylindrical wall 17 and a short distance into the wall 17 itself. The composite face, formed by the chamfered end 21 of the cylindrical wall and the top of the peripheral flange 22, is itself chamfered towards the V-notch 27 for a short distance on either side of it at 28 to provide means of securing the projecting end of the suture thread.

The spool comprises a cylindrical part 29 for the thread, and two ends 30, in one of which a V-notch 31 is cut to receive and grip an end of the thread to prevent unwinding of the thread on the spool prior to the initial use. A cylindrical hole 32 in each end 30 fits loosely over a boss 12 or 20 in one or other part of the container.

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In use, a suitable length of suture thread, for example 25 yards is wound on to the spool and one end 30 of the spool is placed on the C-shaped boss 20 of the second part of the container with the ends of the thread passing through the V-notches 27 and 31. The first part of the container is placed on the second part with the outreaching flanges 15 in between the C-shaped flanges 23, so that the chamfered end 14 is in contact with the chamfered end 21. The first part is then pressed lightly against the second part and rotated clockwise until the notches 16 snap into engagement with the locking heads 25 and the outreaching flanges 15 come up against the stops 26. The container may be printed by heat impression and is then ready for sterilization.

After sterilization, the container may be easily held between the little finger and palm of the left hand, thus giving freedom of the fingers for suturing. Should the end of the suture thread be lost inside the container it may be rapidly retrieved without the necessity of threading it through a small hole.

The container is of sufficiently low cost to be used as a disposable packaging container for the supply of ready wound unsterile non-Absorbable Surgical Suture and can be sterilized on each occasion when a length of thread is required for surgical use.

A further advantage of the container is that it may be printed by conventional heat impression techniques to provide an indelible identification of its contents throughout the period of their use. When the whole of the contents of the container have been used the container is discarded.

The invention is not limited to the embodiment described above. For instance, the clip may be replaced by inter-engaging screw threads or by means of a pair of inclined faces for frictional engagement when the two parts are twisted together.

What I claim is:

1. A sterilizable and resterilizable container for sutures comprising a first and a second interengaging part, each of said parts being substantially cylindrical and closed at one end, each of said closed ends being domed inwardly to provide a high point at the center thereof and a low point at the edges thereof, said parts being readily engageable with one another to define a container, said container having an aperture defined therein for the removal of suture therefrom and the introduction of sterilizing fluid thereinto, each of said domed ends having a boss disposed in the center thereof and extending axially

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therefrom, each of said bosses being C-shaped to permit condensed water to drain therefrom to said low point and positioned to coact, when said first and second parts are engaged, to support and provide an axis of rotation for a spool disposed thereupon, said spool being adapted to support a continuous suture strand thereupon, each of said closed ends having at least one small hole for removing condensed water disposed at a low point of said domed closed end.

2. A sterilizable container according to claim 1 in which said first part has a plurality of outreaching notched flanges disposed peripherally at its open end, and said second part has a plurality of C-shaped flanges disposed peripherally at its open end including a locking head for engaging a notch on a flange of the first part so as to lock the first and second parts together.

3. A container according to claim 1 containing a spool disposed for rotation upon and relative to said bosses.

4. A container according to claim 3 wherein the spool carries a continuous suture strand, the end of which is extendable through said aperture.

5. A container according to claim 3 in which said container and said spool are made of polyacetal resin.

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MORRIS O. WOLK, Primary Examiner

B. S. RICHMAN, Assistant Examiner

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