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SURGICAL APPLIANCES

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Fig. 1.

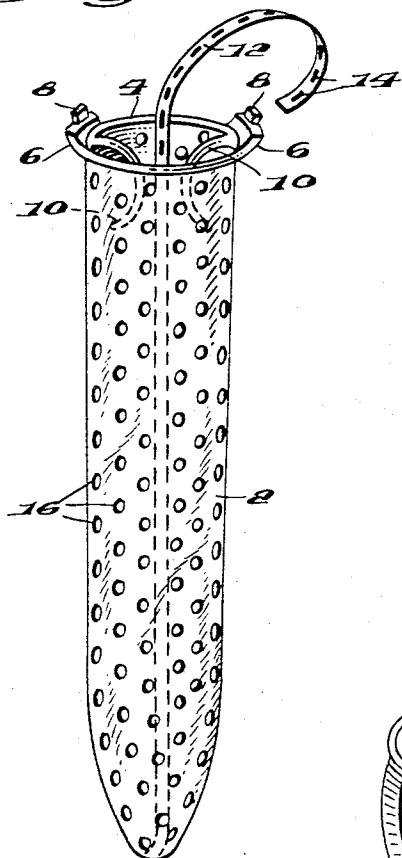


Fig. 2.

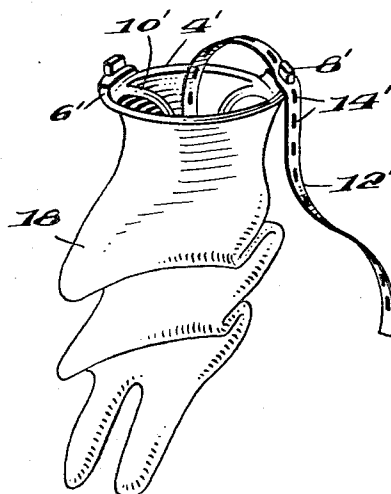
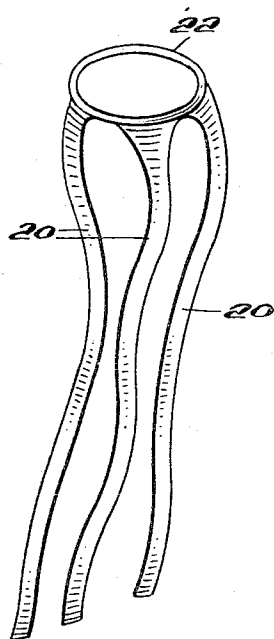


Fig. 3.



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SURGICAL APPLIANCES

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ABSTRACT OF THE DISCLOSURE

A surgical drain for conducting fluid from the interior of the body to the surface of the skin following surgery. The drain includes a ring and a sheet of thin flexible material which is attached around the periphery of the ring. The ring prevents the outer end of the flexible material from slipping into the patient's body and has hooks which grip the surface of the skin to prevent the drain from being accidentally dislodged during changing of the dressing. A flexible tape is attached to one end of the flexible material and passes through the ring. Periodically, the tape is pulled through the ring to shorten the effective length of the flexible material.

This invention relates to surgical appliances and more particularly to drains for body fluids following surgery.

After completion of most internal surgical operations, there is danger of leakage of certain body fluids which, if not drained properly, could cause an overwhelming peritonitis and death. An example of an operation in which this danger exists is the removal of a segment of the intestinal tract for cancer. After removal of any segment of the intestinal tract, such as the esophagus, stomach, small intestine, or colon, the ends remaining after removal of the segment must be joined together to reestablish continuity of the digestive tract. The point where the two segments are joined together is called the anastomosis. There is a danger that intestinal fluid, bile, or gastric juices will leak out of the intestinal tract at the anastomosis. Accordingly, it is common surgical procedure to place one end of a drain adjacent the anastomosis and to bring the other end of the drain out through a stab wound in the patient's abdomen. The drain extends between and around various organs. Preferably, the drain is formed of a flexible material so that it does not erode or tear vital structures as the patient moves about. After the drain has been in place for several days, the tissue will form a channel along the drain. Then, if a leak should occur, the fluid will follow the channel and pass out through the skin.

Heretofore, Penrose drains have been used for directing leakage fluid through the skin. Penrose drains are soft, flexible, tubular drains, which are usually made of rubber. These drains have to be sewn to the patient's skin to keep the drain from slipping into the patient's body, or to prevent the drains from being pulled out when the dressing is changed. When the drain is shortened, it is necessary to cut the retaining threads and to pull out the amount of drain required. A large safety pin is then stuck through the protruding end of the drain to keep it from slipping back into the patient. However, the drain is frequently pulled out inadvertently when the dressings are removed, because the pin and drain adhere to the under-surface of the dressing.

Accordingly, it is an object of this invention to provide an improved surgical drain.

It is a further object of this invention to provide a surgical drain which cannot inadvertently slip into or out of the patient's body.

It is another object of this invention to provide a surgical drain which does not need to be anchored to the patient's

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skin with sutures, and which may be shortened without physically removing a portion of the drain.

It is still another object of this invention to provide a surgical drain which is capable of draining multiple sites within a body cavity through a single stab wound.

These objects are accomplished in accordance with certain preferred embodiments of this invention by a resilient ring having a relatively long flexible strip extending outwardly therefrom. Such flexible strips can be in many configurations including tubular (hollow), flat (solid), perforated, nonperforated, single and multiple. The ring portion, which is always larger than the stab wound through which it is placed, may be either self-retaining or nonself-retaining. As an example, one form of the drain may include a flexible thin walled tube having the ring secured to one end of the tube substantially aligned with the central axis of the tube. In another form of the invention, a plurality of strips of thin flexible material may be secured at one end around the periphery of the ring. The flexible ring may also include hooks projecting outwardly on one side of the ring for engaging opposite sides of the incision in the patient's skin for retaining the ring in position. Also, a flexible tape may be secured to the distal end of the tubular type drain for the purpose of shortening the tube by pulling on the tape.

These preferred embodiments are illustrated in the accompanying drawings in which:

FIG. 1 is a perspective view of the tubular form of the drain of this invention;

FIG. 2 is a perspective view of a modified form of the tubular drain showing the tube shortened by means of the tape; and

FIG. 3 is a perspective view of a second modified form of the drain having a plurality of thin flexible strips secured to the ring.

The form of the invention shown in FIG. 1 includes a thin walled flexible tube 2 having one end closed and a ring 4 secured to the opposite end of the tube. The ring 4 is preferably circular and the tube 2 is secured around the periphery of the ring 4. The ring 4 is resilient, so that it may be compressed transversely into an elliptical shape, and when released the ring returns to its original circular shape. A pair of handles 6 are formed on the ring 4 and each of the handles has an upright pin 8. Hooks 10 project inwardly from the handles 6 and are curved into the interior of the tube 2.

A tape 12 is secured at one end to the closed end of the tube 2. The tape 12 extends throughout the length of the tube 2 and through the ring 4. A plurality of slots 14 are formed in the tape for receiving one of the pins 8 on the handles 6. The tape is spread laterally to widen one of the slots 14 sufficiently for it to be inserted on one of the pins 8. The length of the tube may be adjusted by pulling the loose end of the tape outwardly through the ring 4 until the tube 2 has the desired length. An appropriate slot 14 on the tape 12 may then be aligned with one of the pins 8 and inserted on the pin to keep the tube 2 from being extended.

The tube 2 may be perforated with a plurality of holes 16 as shown in FIG. 1, or the drain may be fabricated with an unperforated tube 18, as shown in FIG. 2. The ring 4' has substantially the same structure as the ring 4 shown in FIG. 1. The tube 18 has a tape 12' with a plurality of slots 14'. The tape in FIG. 2 is shown after a length of the tape has been pulled through the ring 4' and secured on a pin 8' on a handle 6'. One important advantage of the perforated drain shown in FIG. 1 is that it can be used as a shield for inserting a sump drain or shielded suction drain appliance. The appliance is inserted through the ring into the tube 2 where it follows the tract already established by the drain tube. The

perforations allow fluids to pass freely into the interior of the tube where they are received in the sump or shielded drain appliance. In this manner, the perforated drain of this invention permits the removal of highly irritating fluids which arise from spontaneous fistulae of the gastro intestinal tract.

The drains shown in FIGS. 1 and 2 are inserted through a stab wound in the patient's skin and extend around the various organs in the abdomen to the anastomosis or other point of potential leakage. The ring 4 or 4' depending upon which type of drain is used, is grasped by the surgeon at the handles 6. The handles are pressed toward each other to move the hooks 10 toward each other and the hooks are inserted into the incision in the skin. When the ring is compressed in this manner, the shape of the ring changes from circular to elliptical with the minor axis extending between the handles. When the handles 6 are released, the resilient ring 4 or 4' returns to its original circular shape, thereby displacing the hooks outwardly until they tightly grip the abdominal wall on opposite sides of the incision. The ring has a larger diameter than the length of the incision in order to prevent the ring from being drawn into the incision. If the length of the tube 2 or 18 needs to be shortened, the surgeon merely pulls on the end of the tape 12 or 12' to draw the closed end of the tube toward the ring. The tape is then secured on the pin 8 or 8'. The hooks 10 or 10' securely fasten the ring to the surface of the patient's abdominal wall and the drain cannot be accidentally dislodged from the body when the dressings are changed.

Another preferred embodiment of the invention is illustrated in FIG. 3. In this form of the invention, there are a plurality of thin flexible strips 20 secured to the periphery of a ring 22. Although three strips are shown in FIG. 3, any number of strips may be employed. The strips 20 may be formed of a flexible plastic material.

The drain is applied by bringing the strips 20 through an incision having a length shorter than the diameter of the ring 22. The strips 20 may have their free end positioned adjacent a different point of potential leakage and the advantage of using multiple strips is that only a single incision is required in the patient's skin for the drain. Since the ring 22 has a larger diameter than the length of the incision, there is no danger of the ring slipping into the patient's body accidentally. Furthermore, there are no projections or pins on the ring 20 to catch on dressings that may be applied over the drain. Reasonably careful attention at the time of the changing of the dressings will prevent inadvertent removal of the drain. If it is very important that the drain not be removed inadvertently, the self-retaining ring drain that is shown in FIGS. 1 and 2, may be employed.

The drains of this invention are readily applied by the surgeon and do not require cumbersome procedures for securing the drains in place. The rings to which the flexible drain material is secured prevent the drains from slipping into the patient's body and yet the rings are readily secured to the patient's abdominal wall by means of the spring biased hooks 10 or 10'. Furthermore, the use of the tape 12 permits the surgeon to readily adjust the length of the drain without having to cut the sutures which anchor the drain to the skin edge, and pull out and cut off a portion of the drain, as is the conventional practice.

Although this invention is illustrated and described in several embodiments, it is recognized that variations and changes may be made therein without departing from the invention as set forth in the claims.

I claim:

1. A surgical drain for insertion in an incision in a patient's body to conduct body fluid from the interior of the body to the skin surface comprising a circular ring, an elongated sheet of thin flexible material, said material being secured at one end around the periphery of said ring, a thin flexible tape secured at one end to the opposite end of said sheet material, said tape extending longitudinally of said sheet material and passing through said ring, and means for attaching said tape to said ring, whereby the flexible material provides a passage for body fluid drainage from the interior of the body to the skin surface when placed in a surgical wound, and the length of the flexible material may be selectively shortened by means of the tape.

2. A surgical drain according to claim 1 wherein said sheet material is in the form of a hollow flexible tube and said tape extends through the interior of said tube.

3. A surgical drain according to claim 2 wherein said tube is perforated.

4. A surgical drain according to claim 2 wherein said ring has means for securing the ring to a patient's skin.

5. A surgical drain comprising a circular ring, elongated sheet material, said material being secured at one end to the periphery of said ring and said material being flexible and relatively thin, said sheet material being in the form of a hollow flexible tube, said ring having means for securing the ring to a patient's skin, said securing means including hooks on opposite sides of the said ring, said hooks and said tube extending on the same side of the plane of the ring, said ring being resilient, whereby the ring may be compressed to draw the hooks together and when released, the hooks move apart.

6. A surgical drain according to claim 5 including means for selectively shortening the length of said tube.

7. A surgical drain according to claim 6 wherein said shortening means includes a tape having one end secured to said tube at the end opposite said ring, and means for attaching an intermediate portion of said tape to said ring.

8. A surgical drain according to claim 7 wherein said ring has a pin thereon, said tape having a plurality of openings spaced lengthwise thereof, whereby an opening of said tape may be applied over the pin for shortening the tube.

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