

United States Patent

McFarlane

[15] 3,682,180

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[54] **DRAIN CLIP FOR SURGICAL DRAIN**

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[52] U.S. Cl. **128/350 R**, 24/30.5 RS, 24/255 RS, 128/346

[51] Int. Cl. ... **A61m 27/00**, A61b 17/06, A44b 21/00

[58] Field of Search. **24/30.5 RS**, 255 RS; 128/349 R, 128/350 R, 346; 285/340

[56] **References Cited**

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| 3,286,713 | 11/1966 | Kurtz et al. | 128/156 |
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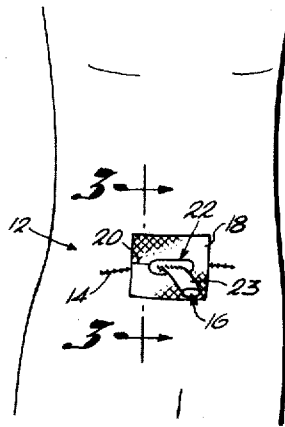
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| 684,419 | 4/1964 | Canada | 24/30.5 RS |
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Primary Examiner—Channing L. Pace
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[57] **ABSTRACT**

A drain clip and method for making a drain clip for use in circumposed relation about a surgical drain of tubular rubbery material. The clip has a) an elongate base of rigid material preferably in sheet form with a smooth main surface to be positioned in overlaying relation of an incision line and with a drain tube opening, and b) one-way gripping means on the base with a terminal surface extending into the opening and away from the smooth main surface which overlays the incision. The gripping means comprise a plurality of spaced shallow gripping teeth arranged in a pattern and defining a constricted drain passage between the teeth. When the clip is circumposed about a surgical drain extending from an incision, the drain is adapted to be advanced as the healing process takes place while retractive movement of the drain toward the incision will be resisted by the gripping means.

8 Claims, 8 Drawing Figures



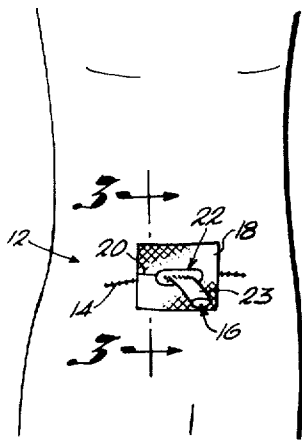


Fig. 1

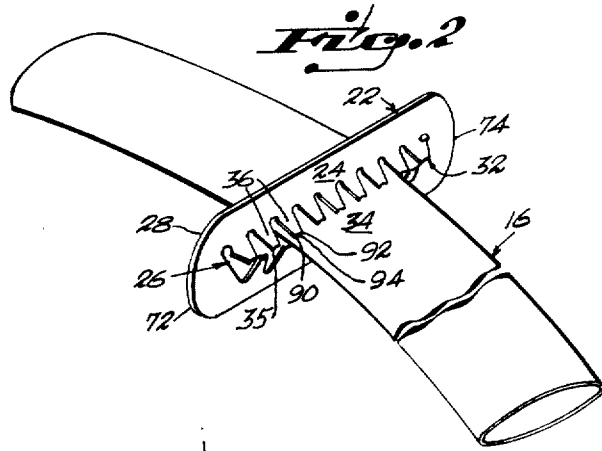


Fig. 2

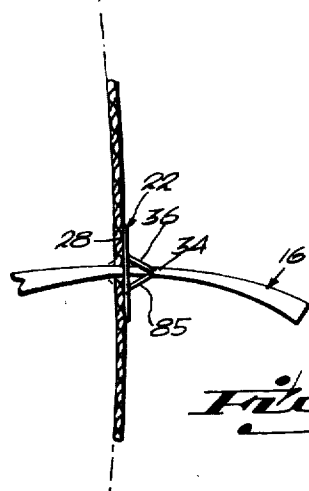


Fig. 3

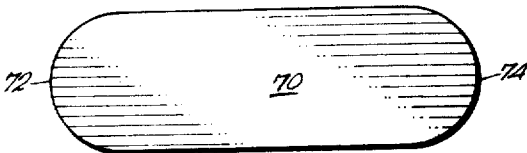


Fig. 4

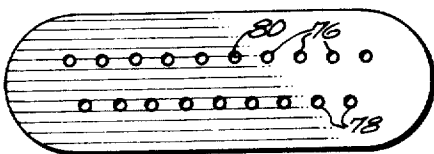


Fig. 5

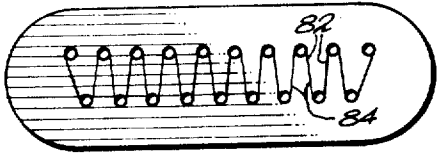


Fig. 6

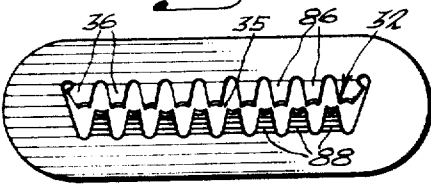


Fig. 7

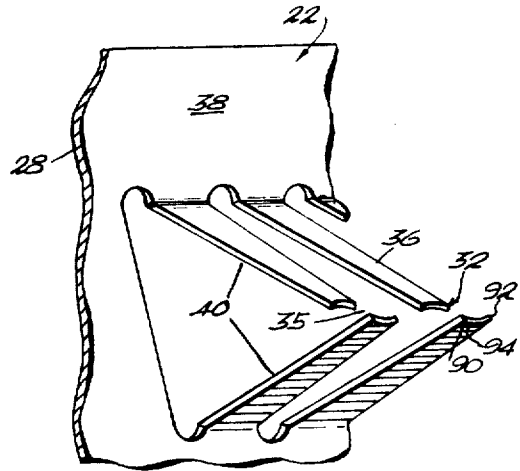


Fig. 8

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DRAIN CLIP FOR SURGICAL DRAIN

As is perhaps well known, in connection with various surgical operations, such as those involving the gall bladder or other organs in the stomach area or a colon operation, it is often desirable or necessary to provide a drain leading from the vicinity of the operation area to the exterior of the body. This is for the purpose of draining noxious fluids to the outside rather than allowing them to remain inside and cause peritonitis or inflammation. Such drains are placed within the abdomen and brought through the main operation incision or another small incision, called a "stab wound," so that drainage will take place. Customarily, such drains remain as initially applied for a period of time following an operation and then gradually are withdrawn through the incision opening, or "advanced." Because of varying differentials in pressure and other factors, there is a tendency for such drains to be drawn back into the human body and become lost inside, requiring a search to locate it and a disturbance of the wounded area to remove it. To aid in the event such a search is necessary, such drains are ordinarily made of a material which is opaque to X-rays; however, as will be readily appreciated, notwithstanding this, it is desirable that means be provided to resist entry of the drains into the body.

Customarily, in the past, to prevent the drain from slipping back inside and also to identify it by X-rays if it does slip back inside, a safety pin has been used on the exterior pendant portion of the drain, which is of rubbery tubular material. In practice, a safety pin is inserted through the drain and closed, with the pin being aligned against the opposite sides of the incision. When the drain is to be advanced, the safety pin is opened and discarded, the drain is advanced, and a new pin is installed. While safety pins are inexpensive, it will be readily appreciated that sterile safety pins should be used in view of the nature of the use and they should be applied with sterile gloves or sterile instruments. Since this takes place several days after the operation in the patient's assigned hospital room, this requires delivery of a supply of such pins, gloves and instruments to the hospital surgical ward and subsequent distribution to the room for availability when the doctor makes his rounds, inspects the patient, and decides to advance the drain, which is usually an advance of an inch or two as the healing process gradually progresses. While preserving sterile conditions, it is difficult and somewhat time consuming to remove the pin using the gloves and instruments, advance the drain, open a package to remove a sterile safety pin and install the new pin, which pins are otherwise ordinarily inexpensive, but because of special packaging requirements to preserve their sterile condition, are relatively expensive. Because of these factors, what at first appears to be a seemingly routine task is in reality a somewhat expensive annoyance to all concerned.

This invention relates to an improved clip to be applied at the time the drain is applied and which is adapted to be easily advanced without the problems attendant to the heretofore described safety pin technique. In the past a need for a device to hold drains has been realized, and efforts have been made directed to this problem. U.S. Pat. No. 3,487,837 to Petersen, Jan. 6, 1970, is such a device and relates to a bell-

shaped elastic body with an elastic axial hole through which a drain is passed with the enlarged portion or bell mouth being adhesively applied in circumposed relation about the incision opening through which the drain passes.

This invention is of an improved drain clip which is disposable and inexpensive to manufacture, which is easily installed and manipulated when the drain is advanced and which includes an abutment surface to overlay the opposite margins of the incision or stab wound and having a plurality of outwardly facing gripping surfaces, preferably in the form of fingers spaced in staggered opposed relation along the opposite sides of the incision with teeth on their respective terminal ends. The teeth are arranged so as not to interfere with the drainage of noxious fluids, which takes place on the surface of the drain tube in a capillary type action. The teeth extend outwardly away from the body of the patient and define a snug drain passage to grip the drain tube and resist any retractive forces tending to suck or draw the drain back into the body while readily yielding to forces tending to advance the drain, whereby the drain may be advanced in a routine and inexpensive manner.

In accordance with these and other objects which will become apparent hereinafter, the instant invention will now be described with reference to the accompanying drawings in which:

FIG. 1 is a plan view of a drain and drain clip applied at an incision;

FIG. 2 is a perspective view of the drain and drain clip;

FIG. 3 is a view in cross section taken along the plane indicated by the line 3—3 of FIG. 1 and looking in the direction of the arrows;

FIGS. 4, 5, 6 and 7 are plan views of the clip illustrating the preferred steps generally of its manufacture; and

FIG. 8 is an enlarged partial perspective view of the drain clip.

Referring to the drawings, wherein like reference characters designate like or corresponding parts throughout the several views, the numeral 12 designates what is often termed the field within which an incision 14 of the type referred to herein has been made in connection with an operation of the type which calls for a drain 16. The incision is closed except for the opening for the drain which extends outwardly in the manner indicated. A piece of gauze 18 is slit as at 20 or otherwise suitably cut and preferably arranged about the drain in the manner illustrated. The drain clip 22 in circumposed relation about the extending or pendant end 23 of the tube or drain is adjusted to rest over the field at the incision site.

Referring more particularly to FIGS. 2 and 3, it is seen that the clip 22 includes a generally elongate base 24 which is characterized by a major and minor dimension and has an elongate opening 26 through which the drain extends. One side 28 of the base, the body side, is smooth and may be flat or slightly contoured to rest over the relevant surface of the flesh about the incision with the longitudinal center line of the drain, the drain opening and the incision line being generally coplanar. In general, the surface of the body side constitutes an abutment or load distributing surface on the opposite sides of the wound line.

In the opening 26 through which the drain passes, gripping means are provided to resist longitudinal retractive movement of the drain into the body of the patient. In the preferred embodiment, see FIG. 7, the gripping means comprise an elongate central gripping region defined by a pattern of spaced gripping teeth 32 extending into the opening and away from the smooth body side of the base to grip the drain at a constricted medial zone or passage 34. The teeth are spaced from one another to permit capillary flow along the drain. As shown, the gripping teeth are preferably on the terminal ends of a plurality of fingers 36 each of a common length which extends outwardly of the outer side 38 of the body side 28 of the base and converge in an open work throat section 40 to the plane of passage.

FIGS. 4, 5, 6 and 7 illustrate the preferred steps of manufacture of the clip. From a sheet of thin, relatively rigid material, such as stainless steel, aluminum alloy or plastic having somewhat resilient quality, the clip blanks 70 are stamped, a suitable thickness being about 0.025 inches when aluminum stock is used. Preferably, the transverse edges 72 and 74 are rounded so that no sharp corners are presented. The blanks are pierced in a pair of rows, a first row 76 and a second row 78 of equi-spaced circular openings such as 80 with the rows being parallel, equi-distant from the longitudinal center line and extending generally across the base between the rounded transverse ends. The openings of the rows are not in direct opposition to one another, but, rather, are staggered as shown and one of the rows 76 is provided with an additional hole so that it is somewhat longer than the other row. A plurality of slits 82 are provided which tangentially connect each side of each of the holes of the shorter second row 78 tangentially with the near side of the most closely adjacent holes of the longer row 76 to define the lace type ladder appearance 84 characteristic of FIG. 6. The material of the blank between the rows 76 and 78 are bent outwardly of the main plane of the blank in a common direction and each at an angle 85 of about 60° forming a plurality of converging fingers in staggered opposing rows such as 86 and 88, each of a common length which converge toward one another defining the open work convergent throat section 40 terminating at a constricted and toothed, irregular or undulating drain passage or open mouth 35. In the preferred embodiment, each finger has a pair of peaks 90 and 92 thus formed with a relieved portion 94 therebetween to provide a shallow serrated type gripping means spaced from the main plane of the clip and bounding the drain passage which do not substantially interfere with the drainage by capillary type action. The blank may be slightly contoured so that the body side of the abutment surface of the base is to be slightly dished, concave or arcuate as seen in a side elevation view, the radius of curvature not being shown because it is relatively large and in the order of about five feet. The last step may be blanking.

The drain tube is of an X-ray, opaque, thin-walled rubbery material and is often referred to as a Penrose drain; it is a conventional drain of medical grade rubber. It may be circular in cross section or somewhat elliptical or oval and of any suitable size selected by the surgeon within the range customarily used, such as one-fourth inch round or one-half inch oval. The drain may be inserted through the throat and passage by an obtu-

rator and packaged in a sterile condition for use as required by the surgeon. Once the drain is installed the snugly embracing clip gripping means is adapted to hold the drain and to overlie the incision line and be readjusted by sliding axially as the drain is advanced. The abutment surfaces distribute the load and avoid undesirable eroding of the skin along the margins of the incision and rubbing action over the skin surface. The opening in the clip of the drain passage is sized to embrace the flattened walls of conventional drains with the configuration of the passage being in the configuration shown in the accompanying embodiment. A 1½ size depiction of a suitable drain clip is illustrated in the drawing, but the dimensions may be of any design to suit the need and use set forth herein.

What is claimed is:

1. A disposable, adjustable, one-piece surgical drain clip having an opening for use circumposed about a surgical drain of tubular rubbery material having an inner and an outer surface comprising a drain surface and extending through a surgical incision opening in an incision line,

said clip comprising,

an elongate base of relatively rigid material in thin sheet form having a major and a minor axis and having a smooth main surface,

said base being adapted to overlie the incision line with the smooth main surface confronting the line and the longitudinal margins of the incision and with the major axis parallel to said incision line,

said base having a through drain opening generally symmetrical with respect to the major axis and extending substantially across said base aligned with the incision line and with the minor axis transverse of the incision line,

one-way gripping means on the base extending into the opening and away from the base and from the surface opposite to that of said smooth main surface,

said gripping means comprising a plurality of spaced elongated gripping members arranged in opposed sets interdigitated in a gripping pattern spaced from the said opposite surface and defining a constricted drain passage between the members to permit capillary flow of fluid along the drain surface,

whereby when the clip is circumposed about a surgical drain, the drain may be advanced away from the incision line while retractive movement of the drain toward the incision line will be resisted by the gripping means.

2. A drain clip as set forth in claim 1 including an open work throat section intermediate the drain passage and the base.

3. The device as set forth in claim 2 wherein the throat section is defined by said members comprising a plurality of fingers extending in converging relation opening in staggered opposed relation from opposite sides of said opening.

4. The device as set forth in claim 3 wherein the terminal ends of the fingers are provided with gripping teeth.

5. The device as set forth in claim 4 wherein the terminal ends of the fingers are truncated along an arcuate line depthwise across the terminal end of the fingers

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providing shallow peaks with a dished relieved portion therebetween.

6. The device as set forth in claim 5 wherein the transverse edges of the base are rounded to merge and blend with the longitudinal edges of said base.

7. The device as set forth in claim 6 wherein the

proximal ends of the fingers are interconnected to one another along an arcuate curve at the juncture with the base.

8. The device as set forth in claim 7 wherein the base is contoured.

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