

[54] **SURGICAL DEVICE FOR HOLDING AND RETRACTING SKIN OR BONE**

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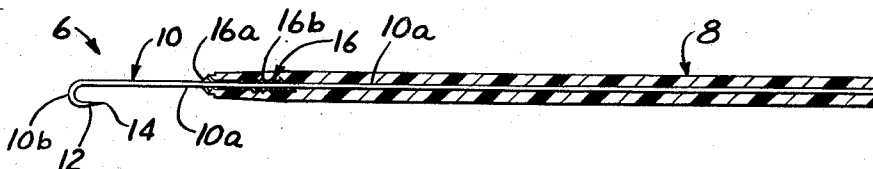
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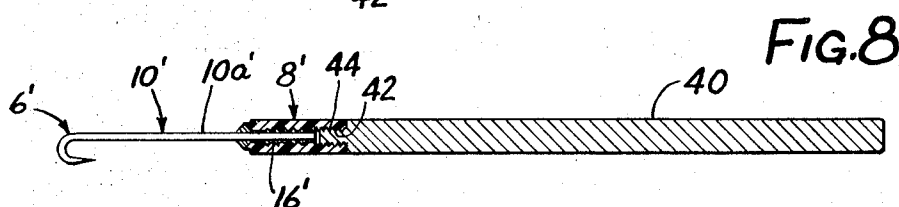
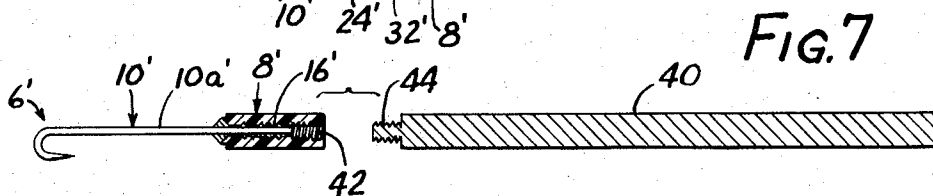
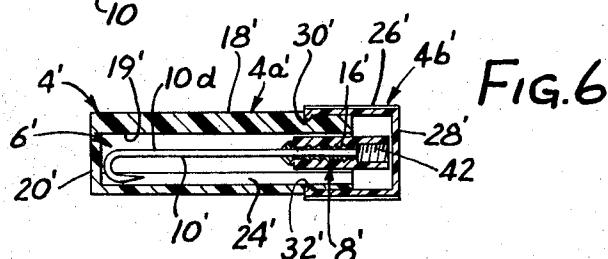
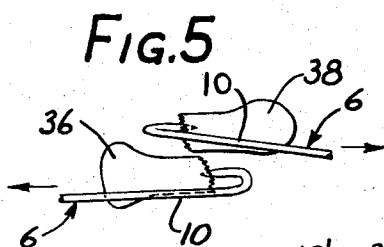
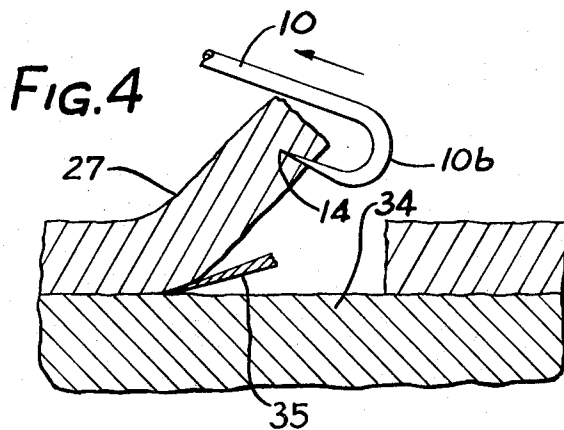
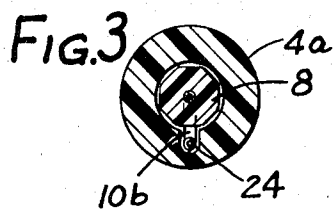
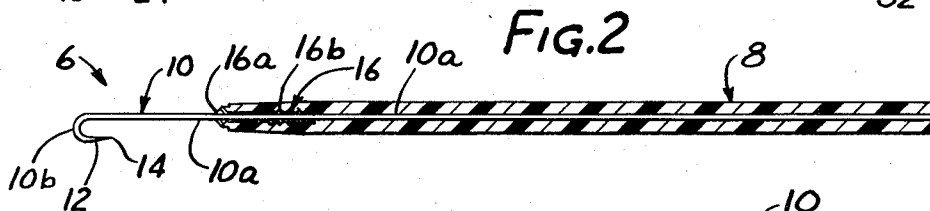
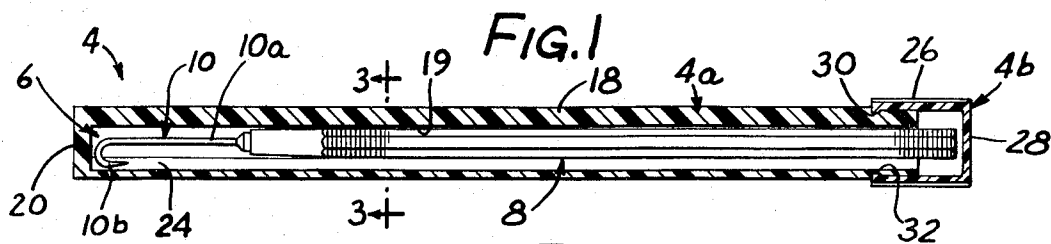
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[57] **ABSTRACT**

A disposable skin-impaling and retracting or bone holding and retracting device comprises a support member from which is supported and extends a skin-impaling or bone-holding member most advantageously formed of cannulated needle stock the end portion of which is bent to form a skin-impaling or bone-holding hook, the tip end of which is beveled to form a relatively sharp point. The cannulated needle stock is bent preferably so the bevel is on the outside of the bend therein. The support member may form a handle which is grasped during the manipulation of the device in a surgical procedure, or the support member may form a hub adapted removably to receive a separate handle member. The disposable device is packaged in a container which seals the same from the atmosphere, and is pre-sterilized so as to be ready for immediate use when the container is opened.

11 Claims, 8 Drawing Figures





SURGICAL DEVICE FOR HOLDING AND RETRACTING SKIN OR BONE

BACKGROUND OF THE INVENTION

Surgical devices for grasping skin and retracting the same to expose tissues underneath have heretofore generally been expensive reusable stainless steel devices comprising a handle portion and an end portion consisting of one or more skin-impaling hooks. These surgical devices, which have been heretofore referred to as "skin hooks", must be sterilized prior to each use. Being constructed with a relatively delicate end, the hooks are frequently bent out of shape and/or lose their sharpness. Costly repairs or replacement are then necessary. When skin hooks are not available, surgeons have occasionally improvised similar devices by bending the pointed end of a safety pin into a hook. Since safety pins are very stiff, hard to bend and require time-consuming sterilization, they have been rarely used in this manner. One surgeon has proposed improvising skin hooks from 25 gauge (0.200 inch diameter) hypodermic needle units (see PLASTIC AND RECONSTRUCTIVE SURGERY, Volume 43, page 386 of the 1968 Edition). The skin hooks were formed by bending the end portions of the needles into hooks. Handles were added by stuffing the cotton containing end of a cotton-tipped applicator into the hollow hubs of the needle units. Such a skin hook made of 25 gauge needle stock readily tears through the skin tissue and does not, therefore, act as an effective skin-grasping means. Also, a handle fashioned by forcing a cotton applicator into the hub of a hypodermic needle unit is too flexible and wobbly, breaks easily and often pulls out.

SUMMARY OF THE INVENTION

The present invention overcomes the disadvantages of the prior art, namely the relatively high cost, the need for washing and sterilization at the hospital and frequent repair or replacement of the reusable skin hooks, and the aforementioned difficulties with the improvised skin hooks, by providing an inexpensive disposable skin hook which is packaged in a sterilized condition for immediate use in emergency or operating rooms.

In accordance with one of the features of the invention, the skin hook device comprises a support member from which is supported and extends a skin hook member made of a relatively inexpensive thin metal stock whose end portion is bent into a hook. The surgical device is placed in a suitable package-forming container which seals the same from the surrounding atmosphere, and is pre-sterilized in the container which is openable to make it immediately available for use. In one form of the invention, the support member is a short hub with means for removably receiving a reusable stainless steel handle or the like. In another form of the invention, the support member forms a relatively long integral handle so that the device is ready for immediate use when removed from the sealed container.

In accordance with another feature of the invention, the skin hook portion of the device is made from cannulated needle stock, which is a very inexpensive and readily available material. However, to avoid the above-described problem where the skin hook readily tears through the skin tissue, a cannulated needle stock is used which is at least about 0.028 inches (22 gauge)

in diameter. Most advantageously, the cannulated needle stock is bent so that the bevel is placed on the outside of the bend, since if the bevel is on the inside of the bend the two sharp edges formed by the bevel can readily damage the skin tissue by cutting therethrough, and act as a means for catching tissue in the hollow of the needle, which damages the skin tissue when the skin hook device is removed upon completion of the surgical maneuver.

It was found that a surgical device like that described also has applications in surgical procedures where the ends of small bones or bone fragments are grasped to retract the same during a bone setting operation. In such case, where cannulated needle stock is used to form the hook member of the device, the diameter of the cannulated needle stock should be at least about 0.05 inches (i.e. at least about 18 gauge stock which is 0.049 inches in diameter).

The above described and other features and advantages of the invention will be apparent after making reference to the specification to follow and the drawings and claims.

DESCRIPTION OF DRAWINGS

FIG. 1 is a longitudinal sectional view through a sealed container housing a pre-sterilized, disposable skin or bone hook constructed in accordance with the most preferred form of the invention, wherein the skin or bone hook within the container includes a skin or bone-engaging member formed from cannulated needle stock attached to a relatively long handle;

FIG. 2 is a view of the skin or bone hook of FIG. 1 removed from the container, and shows the handle portion of the skin or bone hook in longitudinal section;

FIG. 3 is a greatly enlarged transverse sectional view through the assembly of the container and the skin or bone hook of FIG. 1, taken along section line 3—3 therein;

FIG. 4 illustrates the use of the skin hook form of the invention in the process of raising skin from the underlying tissue;

FIG. 5 illustrates a pair of bone hooks of the invention used to align a pair of severed bone sections;

FIG. 6 illustrates a longitudinal sectional view through a sealed container housing a modified form of a pre-sterilized, disposable skin or bone hook of the invention, wherein the skin or bone hook is packaged without a handle and is adapted to receive removably thereon a reusable handle;

FIG. 7 is a view of the skin or bone hook shown in FIG. 6 removed from the container and in juxtaposition to a reusable handle attached thereto; and

FIG. 8 is a view of the skin or bone hook and reusable handle of FIG. 6 when assembled, with the handle being shown in longitudinal section.

DESCRIPTION OF THE PREFERRED EMBODIMENT OF THE INVENTION

Referring now more particularly to the embodiment of the invention shown in FIGS. 1-3, a sealed container 4 is shown in which is supported a pre-sterilized disposable skin or bone hook unit generally identified by reference numeral 6. The skin or bone hook unit 6 includes a relatively long handle 8 which is most advantageously made of a suitable synthetic plastic material. Although it may have other shapes, the handle 8 is shown with a non-circular cross-section to present a

number of easily graspable longitudinal planes or the like. The handle also may be transversely indented to form closely spaced transverse serrations or ridges to provide with the longitudinal ridges a checkered rough surface to facilitate a firm grasp of the handle 8. The skin or bone hook unit 6 further includes a hook-forming member 10 which, in the most preferred form of the invention, is constructed of inexpensive cannulated needle stock having a main straight shank portion 10a extending longitudinally from one of the ends of the handle 8 acting as a support member for the hook-forming member 10, and an end portion 10b bent in the form of a hook. The cannulated needle stock forming the hook-forming member 10 is beveled at the exposed tip thereof at 12, the bevel being placed on the cannulated needle stock before it is bent into the hook shape as shown. The bevel is on the outside of the bend in the cannulated needle stock.

The shank portion 10a of the hook-forming member, in the case where the handle 8 is made of synthetic plastic material, most advantageously extends the full length of the handle 18 so it contributes to the strength and rigidity of the handle 8. However, the present invention envisions the shank portion 10a extending only a short distance within the handle 8. Where the handle 8 is made of synthetic plastic material, the handle may be molded in place around the hook-forming member 10. For best results, the position of the hook-forming member projecting from the handle 8 should have a length of at least about three-fourths to 1 inch.

The handle 8 forms a secure anchoring support for the hook-forming member 10. While the exact manner in which the hook-forming member 10 is anchored to the handle 8 may vary widely, as illustrated, the hook-forming member has applied thereto before the handle is molded thereover a coating 16 of a suitable material, which may be an epoxy or other synthetic plastic material, forming a bead portion 16a to be located at the inner end of the handle 8 and a grooved portion 16b to be located within the handle 8, to form anchoring grooves for the synthetic plastic material forming the handle 8.

The skin or bone hook 6 is sealed within the container 4, which may take a variety of forms other than that illustrated. For example, the container could be a paper package or, as illustrated, a container made of a synthetic plastic material, which can be easily opened to permit ready access to the skin or bone hook 6. As illustrated, the container 4 includes a main body portion 4a having cylindrical wall portion 18 defining a main cylindrical cavity 19 therein which is closed at one end by an end wall 20 and is opened at the other end. The cylindrical wall portion 18 of the main body portion 4a of the container 4 is most advantageously provided with a longitudinal groove or indentation 24 which forms a space for the hook end portion 10b of the hook-forming member 10. The handle 8 of the skin or bone hook 6 is slidably received within the cylindrical cavity 19, while the groove 24 provides clearance for the passage of the hook-forming member 10 into and out of the cavity 19 of the main body portion 4a of the container 4 as the skin or bone hook is placed in or removed from the container. When the skin or bone hook 6 is fully inserted within the main body portion 18 of the container 4, the outer end portion of the handle 8 preferably projects a distance of about one-quarter inch or more from the open end of the main body por-

tion 18, so such projecting end portion may be readily grasped by the user to remove the skin or bone hook 6 readily from the container.

The open end of the main body portion 18 of the container 4 is sealed by a suitable cap member 4b which is illustrated as being a cup-shaped member including a cylindrical side wall 26 and an end wall 28 at one end of the cylindrical side wall 26, the cylindrical side wall being modestly flexible and resilient and terminating at an open end of the cap member 4b in a continuous annular rib 30 or the like which snaps into a corresponding continuous annular groove 32 formed in the outer surface of the main body portion 18 of the container 4, to form a pressure seal which seals the interior of the container from the contaminating elements of the surrounding atmosphere. The frictional forces between the rib 30 and the groove 32 are such that the cap member 4b may be pulled from the main body portion 18 with a modest application of force. To facilitate the gripping of the cap member 4b, the surface of the cap member may be knurled.

FIGS. 4 and 5 respectively show the use of one or more skin or bone hooks 6 in the engagement and retraction of the skin 27 from the underlying tissue 34 as the skin 27 is being cut away from the underlying tissue 34 by a knife or scissors 35 and the retraction of a pair of broken small bone segments 36 and 38 into alignment during a bone setting operation. For the skin hook application of FIG. 4, as previously indicated, the hook-forming member 10 when made of beveled cannulated needle stock should have a diameter of at least about 0.028 inches, and when the hook-forming member 10 is used as a bone hook it should have a diameter of at least about 0.05 inches.

Refer now to FIGS. 6-9 which show another form of the invention where a skin or bone hook 6' is packaged without a handle so the packaged assembly becomes a more compact and inexpensive unit for use with a reusable handle 40 made of surgical stainless steel or the like. The support member 8' for the hook-forming member 10' of the skin or bone hook 6' is a relatively short hub member 8', which may be made of synthetic plastic material like the handle 8 previously described. The hub member 8', when made of synthetic plastic material, is molded around the inner end portion of the hook-forming member 10' of the skin or bone hook. As illustrated, the shank portion 10a' of the hook-forming member 10' has a coating 16' of an epoxy material or the like which is grooved and beaded to aid in making a secure connection between the hub member 8' and the hook-forming member 10'. In the most preferred form of the skin or bone hook 6', the shank portion 10a' of the hook-forming member 10' thereof terminates short of the end of the hub member 8', and beyond the end of the hook-forming member 10' the hub member is provided with an internally threaded socket 42 adapted to receive the externally threaded neck portion 44 of the reusable handle 40. FIG. 8 shows the reusable handle 40 attached to the skin or bone hook 6'.

The skin or bone hook 6' may be sealed and sterilized within a container 4' similar to the container 4 shown in FIG. 1, container 4' being of only sufficient length to accommodate the shorter skin or bone hook 6'. (Corresponding elements of the containers 4 and 4' have been similarly numbered, except that a prime has been added to the reference numbers used to identify

parts of the container 4'.) The outer end portion of the hub member 8' projects a distance like at least about one-fourth inch beyond the end of the main body portion 4a' of the container 4', so that the skin or bone hook 6' may be readily grasped and removed from the main body portion 18' of the container 4'. The open end of the main body portion 18' of the container is sealed closed by a cap member 4b in a manner previously described in connection with the embodiment of the invention shown in FIG. 1.

The present invention has provided a skin or bone hook which represent a material improvement in skin or bone hooks heretofore utilized. Thus, the invention provides an inexpensive, disposable, pre-sterilized packaged skin or bone hook which, when the container in which it is sold is opened, is ready for immediate use without sterilization. In one disclosed form of the invention, the skin or bone hook includes the handle so that it can be immediately used without any attachment of any other parts thereto and in the other more compact and inexpensive form of the invention, the skin or bone hook is packaged without a handle, so when it is removed from the container it is attached to a handle.

As previously indicated, many variations may be made in the preferred forms of the invention described above without deviating from the broader aspects of the invention. For example, while the most preferred form of the invention utilizes a synthetic plastic support member for the hook-forming member, the support member may be a handle or hub member as described made of metal or other material. Also, while the hook-forming member is most advantageously made of cannulated needle stock, in the less preferred form thereof it can be made of a thin wire rod stock.

I claim:

1. A disposable surgical device for holding and retracting skin or small bones or bone fragments, said device including a sterilizable skin or bone-engaging hook member made of a thin metal stock and having a pointed hook-shaped end portion terminating in a shank portion, and a handle-forming member to be grasped during use of the device made of a sterilizable synthetic plastic material permanently integrally connected to said shank portion of the skin or bone-engaging member.

2. The disposable surgical device of claim 1 combined with a container removably holding the device in presterilized form and sealed from the surrounding atmosphere.

3. The disposable surgical device of claim 1 wherein said shank portion of said skin or bone-engaging hook member extends for substantially the full length of the handle-forming support member to give rigidity thereto.

4. The disposable surgical device of claim 1 wherein said handle-forming member is molded over said shank portion of the skin or bone-engaging hook member and said shank portion has anchoring means for anchoring the same to the handle-forming member molded thereover.

5. The combination of claim 2 wherein said handle-forming member has a length at least several times the length of the portion of the skin or bone-engaging hook member which extends therefrom.

6. A disposable skin-impaling device for grasping, holding and retracting skin away from underlying tissues, said device comprising a sterilizable support member from which is supported and extends a sterilizable skin-impaling member formed of cannulated needle stock of at least about 0.028 inches in diameter bent into a skin-impaling and retracting hook portion terminating in a shank portion secured to said support member, the tip end of said skin-impaling and retracting hook portion being beveled to form a sharp skin-piercing point, and the bevel of said skin-impaling and retracting hook portion being on the outside of the bend therein.

7. The disposable skin-impaling device of claim 6 wherein said support member is a handle to be grasped during use of the device and made of synthetic plastic material permanently integrally connected to said skin-impaling and retracting member.

8. The disposable skin-impaling device of claim 7 combined with a container removably holding the device in presterilized form and sealed from the surrounding atmosphere.

9. A disposable small bone or bone fragment holding and retracting device comprising a sterilizable support member from which is supported and extends a sterilizable bone holding and retracting member formed of cannulated needle stock of at least about 0.050 inches in diameter, the end of which is bent to form a bone holding and retracting hook portion terminating in a shank portion secured to said support member, the bevel of said bone holding and retracting hook portion being on the outside of the bend therein.

10. The disposable bone-holding and retracting device of claim 9 wherein said support member of said device is a handle to be grasped during use of the device and made of synthetic plastic material permanently integrally connected to said bone-holding and retracting member.

11. The disposable small bone or bone fragment holding and retracting device of claim 9 combined with a container removably holding the device in presterilized form and sealed from the surrounding atmosphere.

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