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B. F. McEVOY

3,515,128

SKIN BIOPSY PUNCH

Filed Dec. 11, 1967

FIG. 1

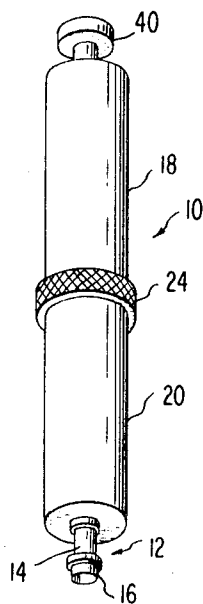


FIG. 2

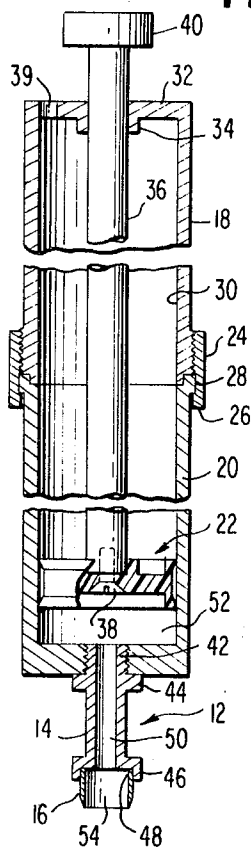


FIG. 3

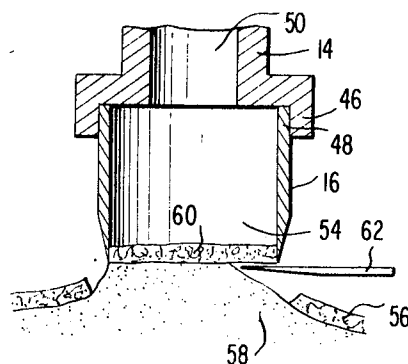
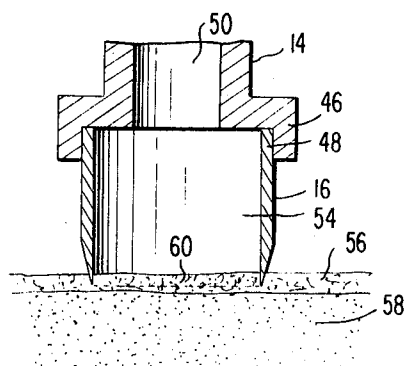


FIG. 5

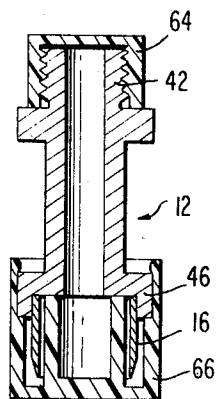


FIG. 4

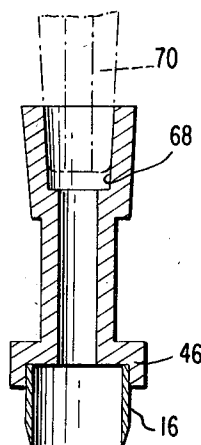


FIG. 6

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SKIN BIOPSY PUNCH

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2 Claims

ABSTRACT OF THE DISCLOSURE

A disposable knife assembly for a biopsy punch operating in conjunction with a piston and cylinder body assembly to hold the skin specimen by pressure differential while being severed from the attaching fatty tissue, so to avoid damage to the specimen incidental to its being lifted and held during the severing operation.

BACKGROUND OF THE INVENTION

The usual procedure for obtaining a skin tissue specimen for microscopic or other dermatological examination involves the use of a biopsy knife to cut a small circular patch of skin which is then gently lifted by forceps to expose the underlying fatty tissue to which the skin layers are attached. The exposed fatty tissue is severed by a scalpel or scissors to free the skin specimen. Regardless of the care exercised in grasping and lifting the skin specimen to expose the underlying fatty tissue to which it is attached, a greater or lesser degree of crushing or damage is inflicted upon the specimen so that its usefulness for subsequent examination is at least partially destroyed.

Moreover, conventional biopsy knives are expensive and when dull must carefully be sharpened to restore them to original condition.

BRIEF SUMMARY OF THE INVENTION

The above disadvantages are overcome in the present invention by employing first a biopsy knife assembly which does not require the specimen separately to be grasped for lifting it to expose the underlying fatty tissue, and second by providing a novel biopsy knife member which is sufficiently economical in construction as to allow it to be disposed of after use.

The biopsy knife assembly of the present invention comprises a body having the knife attached thereto. The body is constructed to include a piston and cylinder arrangement and the knife is constructed to present a chamber in communication with the cylinder and closed by the skin patch to allow pressure differential caused by manipulation of the piston to hold the specimen, without damage thereto, while the specimen is lifted and the fatty tissue severed. The specimen may then be expelled by piston manipulation thus to provide a complete operation in which the specimen minimally is handled to assure pristine condition thereof.

The knife proper is formed as a length of thin-walled tube suitably sharpened at one end and preferably attached at one end of a hollow mounting stem detachably secured to the aforementioned body. The stem may be made of synthetic resinous material and it, together with the tubular blade, may be disposable. Alternatively, the blade only may be disposable and may be attached to the remainder of the assembly by simple frictional engagement.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a complete skin biopsy punch constructed according to this invention;

FIG. 2 is an enlarged longitudinal section through the assembly shown in FIG. 1;

FIG. 3 is an enlarged section showing the blade in the process of cutting through the skin layers;

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FIG. 4 is a view similar to FIG. 3 but showing the specimen in lifted condition during the process of severing the attaching fatty tissue;

FIG. 5 is an enlarged section of a disposable knife assembly; and

FIG. 6 is a view similar to FIG. 5 but showing a modification of the knife assembly for use with a conventional syringe.

DETAILED DESCRIPTION OF THE INVENTION

The biopsy punch as shown in FIG. 1 comprises a body assembly 10 and a knife assembly 12, the latter of which includes a hollow adaptor stem 14 carrying a tubular blade 16 at its lower end. The body is divided into upper and lower halves 18 and 20 which, as may be seen more clearly in FIG. 2, cooperatively define a cylinder receiving a piston 22. The two halves are removably held together by means of the threaded collar 24 having a flange 26 bearing against the annular shoulder 28 on the body half 20 and a threaded portion engaging the threads on the body half 18. In this manner, the body assembly easily may be separated for cleansing and sterilization.

The piston 22 may take any conventional form and may be constructed of suitable synthetic resinous material assuring good sealing contact with the inner surface 30 of the body cylinder. The end wall 32 of the upper half 18 includes a boss 34 which guides and slidably receives the plunger 36 to the lower end of which the piston 22 is attached as by a suitable fastener 38. The end wall is also provided with a pressure relief passage 39. The plunger is provided with an enlarged head 40 or other means to aid in operating it in the fashion hereinafter described.

The adaptor 14 of the knife assembly 12 may have a threaded nipple portion 42 adjacent the stop shoulder 44 so that it is detachably secured to the body assembly, and is provided at its lower end with mounting cup portion 46 defining a recess frictionally receiving the upper end 48 of the tubular blade 16. The adaptor presents a passage 50 which communicates the chamber 52 beneath the piston 22 with the region 54 enclosed by the tubular blade 16.

In use, the blade is pressed against the skin 56 as shown in FIG. 3 and the assembly rotated as conventional to cut through the skin layers to the underlying fatty tissue 58. The plug or patch 60 of skin specimen thus closes the lower end of the chamber 50, 52, 54 so that retraction of the plunger 36 will create a negative pressure therewithin, allowing the entire assembly to be lifted while retaining the specimen plug 60 within the blade, as is shown in FIG. 4. A cutting instrument such as the scalpel blade 62 may now be used to sever the specimen plug 60 from the fatty tissue 58, freeing the specimen for subsequent examination. The specimen plug easily may be expelled or ejected by simply ramming the plunger 36 home literally to blow the specimen from the blade 16.

It is possible so to construct the adaptor and blade that disposal thereof subsequent to use is feasible. The blade may be cut as lengths from tubular stock of very thin wall section and one end thereof ground to provide a sharp edge. The adaptor on the other hand may be pressure molded of synthetic resinous material so that the entire knife assembly is of very economical construction. Alternatively, only the blade portion may be made disposable. A disposable blade and adaptor assembly is shown in FIG. 5 fitted with end caps 64 and 66 for protection against damage and soiling.

A disposable adaptor and blade also may be constructed to operate with a conventional hypodermic syringe, as shown in FIG. 6. In this case, the adaptor is provided with a tapered inner surface 68 at its upper ends to frictionally fit to the tapered nose 70 of any conventional

syringe such as the throw-away types commonly in use contemporarily.

Obviously, many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. In an assembly for performing biopsies which includes a piston and cylinder assembly having an end portion provided with a passage, a plunger connected to said piston and extending from said cylinder for external manipulation so as to subject said passage to negative pressure, the improvement comprising:

a removable cutter attachment for said assembly, said attachment comprising an elongate hollow adaptor stem having a proximal end portion removably attached to said one end portion of said assembly and effecting a continuation of said passage, said adaptor stem having a distal end presenting a mounting cup portion, said mounting cup portion having a cylindrical recess concentric with said continuation of said passage and in communication therewith, and a disposable biopsy blade, said blade being of right cylindrical tubular form having one end removably seated in said recess and a sharp end edge for cutting through skin and enclosing a space subjected to negative pressure by manipulation of said plunger to hold a skin specimen severed by the blade within the confines thereof, the axial length of said blade being substantially greater than the depth of said recess where-

by said sharp end edge of the blade and a substantial portion of said blade are fully exposed.

2. In an assembly as defined in claim 1 wherein said proximal end of the adaptor is provided with a tapered recess removably receiving said one end portion of the piston and cylinder assembly.

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