

Sept. 12, 1950

C. N. FLAGG

2,522,108

ASPIRATION BIOPSY

Filed Sept. 7, 1948

FIG. 1

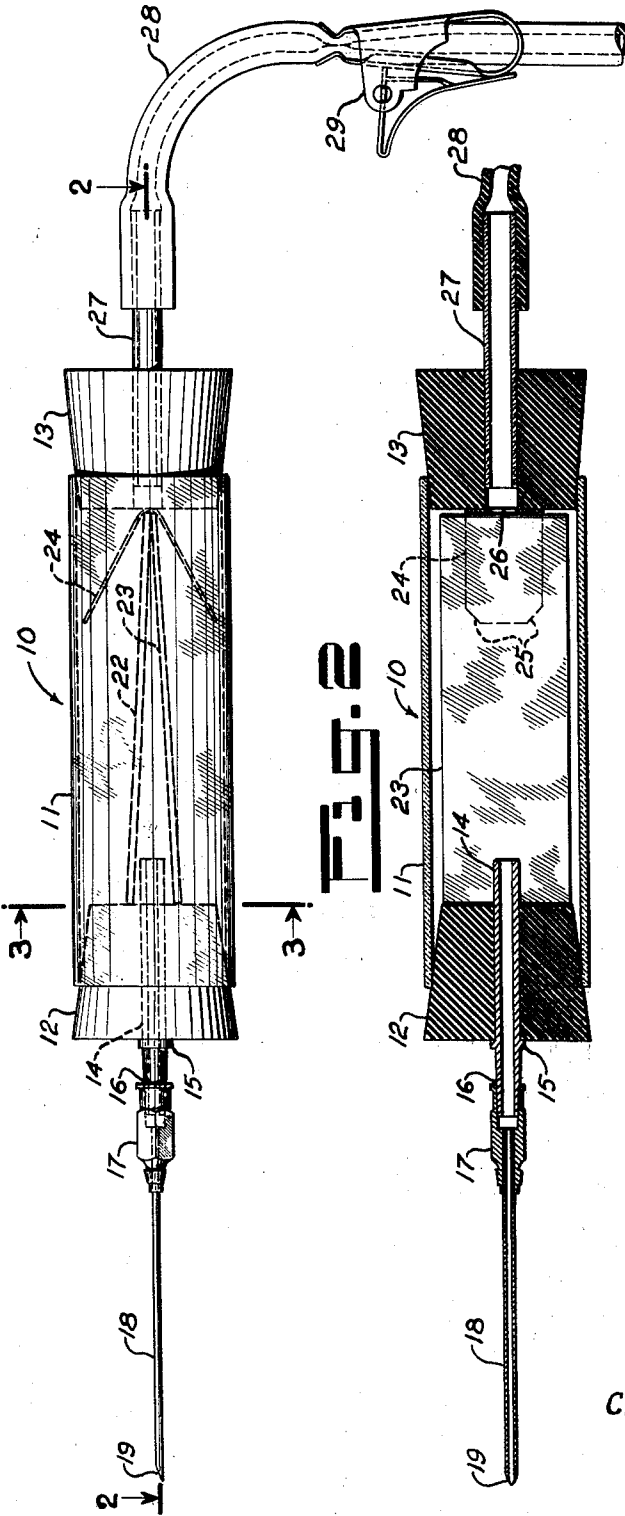


FIG. 2

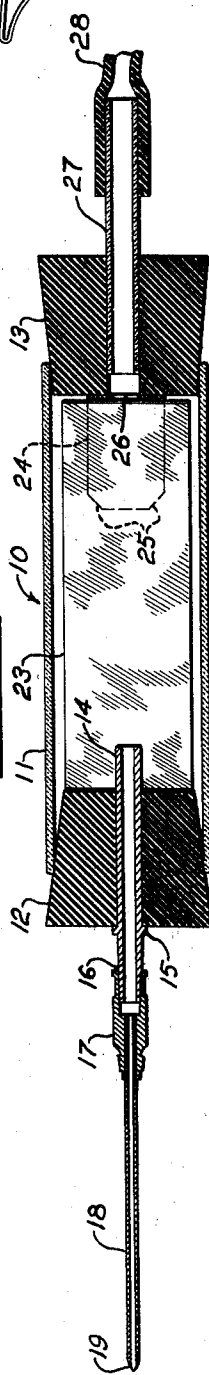


FIG. 3

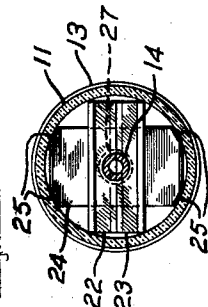
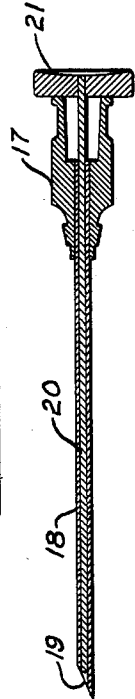


FIG. 4



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ASPIRATION BIOPSY

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Application September 7, 1948, Serial No. 48,065

8 Claims. (Cl. 128—2)

1

This invention relates to aspiration biopsy apparatus, and more particularly to an apparatus having a hypodermic needle for obtaining specimens of human or animal tissue which are to be examined under a microscope.

One object of this invention is to provide an apparatus of the above nature in which a specimen of tissue aspirated by the needle will be impinged directly upon a microscope slide, whereby no further handling of the specimen will be required.

Another object is to provide an apparatus of the above nature in which the specimen will be projected from the needle between a pair of microscope slides.

Another object is to provide an apparatus of the above nature which includes an improved means for holding the microscope slides, whereby the removal of said slides will be facilitated.

A further object is to provide an improved method for obtaining specimens of tissue for use in a biopsy.

A further object is to provide an apparatus of the above nature which will be simple in construction, inexpensive to manufacture, easy to use and manipulate, compact, ornamental in appearance, and very efficient and durable in use.

With these and other objects in view, there has been illustrated on the accompanying drawing one form in which the invention may conveniently be embodied in practice.

In the drawings,

Fig. 1 is a side view of the improved biopsy apparatus.

Fig. 2 is a longitudinal sectional view, taken on the line 2—2 of Fig. 1.

Fig. 3 is a cross sectional view, taken on the line 3—3 of Fig. 1.

Fig. 4 is a longitudinal sectional view on an enlarged scale of the hypodermic needle and the obturator therein.

Referring now to the drawing in which like reference numerals denote corresponding parts throughout the several views, the numeral 10 indicates generally a trap receptacle which comprises a length of strong glass tube 11, and front and rear apertured stoppers 12, 13 of soft rubber or other suitable resilient impervious material.

The front stopper 12 frictionally retains a metallic inlet tube 14 which projects inwardly thereof and has an intermediate flange 15 abutting the outer surface of said stopper.

The outer end of the inlet tube 14 is tapered at 16 to provide a nipple which is adapted to receive and frictionally hold a socketed base 17

2

of a hypodermic needle 18 having a sharp bevelled outer end 19. It will be understood that in use, the operator may choose a needle 18 of any desired size.

In practice, a needle diameter of .060" has generally been found satisfactory, and the needle 18 may be as long as six inches, depending upon the location of the tissue of which the operator wishes to obtain a specimen for microscopic examination.

Provision is also made of an obturator 20 in the form of a length of wire which is adapted to closely fit within the bore of the needle 18 and which is provided with a rear knob 21 adapted to abut the end of the needle base 17, as will be further described hereinafter.

The interior of the trap receptacle 10 is of suitable dimensions to receive a pair of rectangular glass microscope slides 22, 23 in convergent relation.

The separated front ends of the microscope slides 22, 23 will normally be held in place by frictional engagement with the inner surface of the front stopper 12 on opposite sides of the inwardly-projecting end of the inlet tube 14 which is disposed between said slides 22, 23 and will prevent them from accidentally falling together. The outward movement of the front ends of the slides 22, 23 will be limited by the engagement of the corners of the slides with the inner surface of the glass tube 11, as shown in Fig. 3.

The rear ends of the slides 22, 23 are embraced and held together, in a position centered in the tube 11, by a V-shaped stainless steel clip 24 having bevelled corners which resiliently engage the inner surface of the tube 11. The apex of the V-shaped clip 24 engages the rear stopper 13 and said apex is made sufficiently narrow as to avoid obstruction of the aperture of said stopper. However, a central aperture 26 is provided in the clip 24 in order to assure free communication between the interior of the glass tube 11 and the aperture of the rear stopper 13.

In order to permit a high vacuum to be established in the receptacle 10, the apertured rear stopper 13 carries a suction tube 27 which is preferably of a larger diameter than the inlet tube 14 and is connected to a strong flexible elastic tube 28 leading to any suitable source of high vacuum. The vacuum applied to the receptacle 10 may be controlled by means of a manually-operable clamp 29 upon the flexible tube 28, whereby said tube may be clamped shut or allowed to open at will.

It will be noted that the glass tube 11 of the

3

trap receptacle 10 has an internal diameter which is sufficiently large to allow the free passage of air around the edges of the slides 22, 23 so that a vacuum created in the suction tube 27 will be effective throughout the receptacle 10, the inlet tube 14 and the hypodermic needle 18.

Operation

After suitable sterilization of the tissue and all parts of the apparatus, the obturator 20 will be inserted into the needle 18 as shown in Fig. 4, and then inserted with the needle into the flesh to the desired depth by pressing on the knob 21. It will be understood that the needle 18 will be inserted in such a manner that the bevelled end 19 will pierce the tissue at the location of the desired specimen.

The obturator 20 will then be withdrawn from the hypodermic needle 18 and the nipple 16 of the apparatus firmly connected to the needle base 17, after which the clamp 29 will be released. The high vacuum in the flexible tube 28 will then cause a specimen of the tissue to be withdrawn very rapidly through the needle 18 and the inlet tube 14, and to impinge upon the facing surfaces of the microscope slides 22, 23.

The needle 18 may then be withdrawn from the tissue, after which the rear stopper 13 will be removed from the tube 11 and the slides 22, 23 removed therefrom with the specimen of tissue between them, ready for examination under a microscope.

The apparatus herein disclosed will be found especially useful for aiding in the examination of tissue which is suspected of being malignant, especially when such tissue occurs in breasts, necks, or glands.

One advantage of the apparatus herein disclosed is that it will enable tissue to be excised with a minimum of discomfort to the patient.

Another advantage is that the apparatus permits two specimens of the tissue to be obtained simultaneously and rapidly with a minimum of handling.

While there has been disclosed in this specification one form in which the invention may be embodied, it is to be understood that this form is shown for the purpose of illustration only, and that the invention is not to be limited to its specific disclosure, but may be modified and embodied in various other forms without departing from its spirit. In short, the invention includes all the modifications coming within the scope of the following claims.

Having thus fully described the invention, what is claimed as new, and for which it is desired to secure Letters Patent, is:

1. In a biopsy apparatus, a receptacle having an inlet tube, a hypodermic needle detachably connected to the outer end of said tube, a microscope slide supported in said receptacle in a position adjacent said inlet tube, and means for connecting the interior of said receptacle to a source of vacuum, whereby a specimen of tissue may be drawn through the needle and caused to impinge directly upon the surface of said slide.

2. The invention as defined in claim 1, in which a pair of microscope slides are provided, said slides being supported in convergent relation with said inlet tube directed therebetween, whereby

4

tissue may be impinged upon the facing surfaces of both of said slides.

3. The invention as defined in claim 2, in which said inlet tube extends between adjacent end portions of said slides and further including a clip for holding the opposite end portions thereof together, whereby the slides will be held against accidental displacement.

4. In a biopsy apparatus, a receptacle, a pair of microscope slides, means in said receptacle for holding said microscope slides in convergent relation, said receptacle having an outer nipple adapted to carry a hypodermic needle and a duct in communication with said nipple, said duct being directed toward the space between said slides, and means for connecting the interior of said receptacle with a source of vacuum, whereby tissue may be drawn through the needle and impinged upon the slides.

5. The invention as defined in claim 4, in which said receptacle is tubular and is wider than said microscope slides in order to accommodate adjacent separated ends thereof, said slide holding means comprising a clip engaged with the opposite ends of said slides for holding said opposite ends centered within said receptacle.

6. The invention as defined in claim 4, wherein said duct is provided by an inlet tube which extends between the separated ends of said slides, whereby said separated ends are prevented from falling together.

7. In a biopsy apparatus, a receptacle comprising a tube, and apertured front and rear stoppers in the respective ends of said tube, said front stopper having therein an inlet tube adapted for connection to a hypodermic needle, the aperture of said rear stopper being connected to a source of vacuum, a pair of microscope slides in said receptacle, the front ends of said slides being disposed at opposite sides of said inlet tube and the rear ends of said slides being embraced and held together by a V-shaped clip frictionally engaged in said receptacle, whereby removal of said rear stopper will permit said slides and a specimen of tissue therebetween to be easily removed from said receptacle.

8. A method of preparing a microscopic slide for biopsopic examination of living tissues which comprises penetrating tissue to form a bore, withdrawing a specimen by applying suction to said bore, and impinging said specimen immediately and directly upon a microscopic slide which is in the path of movement of said aspirated specimen.

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