July 25, 1950 H. TURKEL 2,516,492

SKIN BIOPSY NEEDLE

Filed Feb. 9, 1950

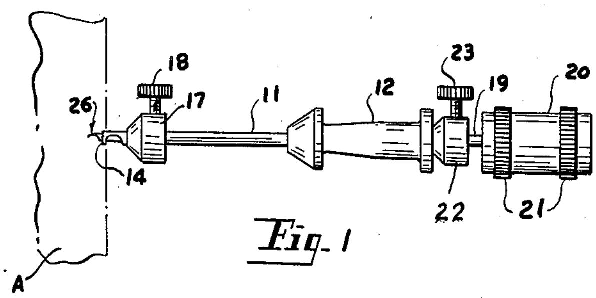


Fig. 1

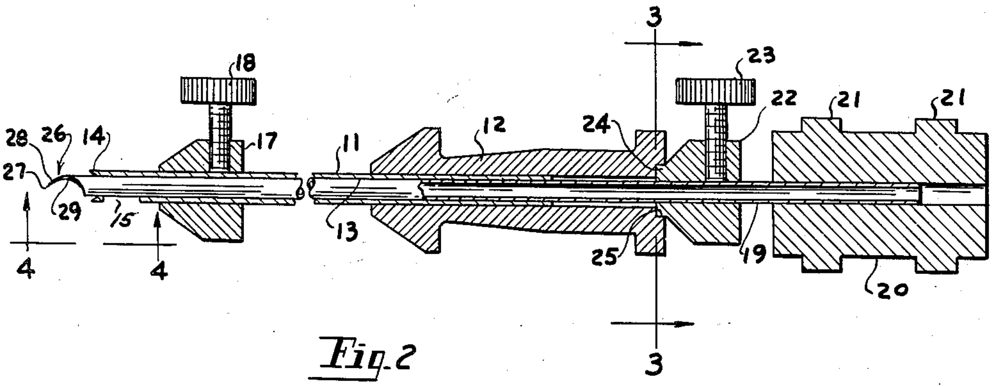


Fig. 2

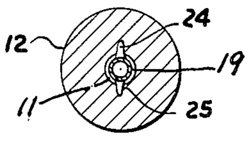


Fig. 3

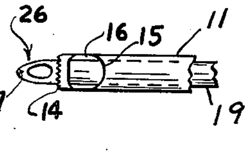


Fig. 4

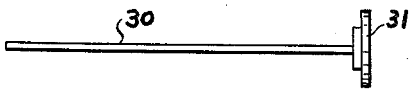
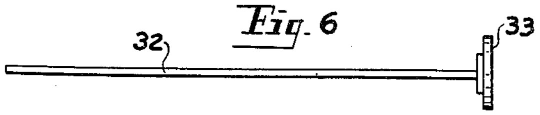


Fig. 5

Fig. 6



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2,516,492

SKIN BIOPSY NEEDLE

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Application February 9, 1950, Serial No. 143,308

10 Claims. (Cl. 128—2)

This invention relates to a biopsy needle, and more particularly to a device for obtaining a skin or superficial biopsy.

Heretofore there have been no practical cutting devices for removing very small samples of skin tissue for microscopic examination, and it is the principal object of this invention to provide a cutting needle, or combination of needles by which a skin biopsy may be obtained with a minimum of discomfort, and with the minimum injury to the tissue. These and other objects will be seen from the following specification and claims in conjunction with the appended drawing in which:

Fig. 1 is a side elevational view of applicant's biopsy needle set including an outer guide needle and an inner tissue severing needle.

Fig. 2 is an enlarged elevational section thereof.

Fig. 3 is a section on line 3—3 of Fig. 2.

Fig. 4 is a section on line 4—4 of Fig. 2.

Fig. 5 is a side view of the stylet for the guide needle; and

Fig. 6 is a side view of the stylet for the tissue severing needle.

It will be understood that the above drawing illustrates merely a preferred embodiment of the invention, and that other embodiments are contemplated within the scope of the claims hereafter set out.

Referring to the drawing, Fig. 1 illustrates the hollow tubular needle 11 with the integral handle 12, its internal bore being designated at 13 in Fig. 2. The outer end of said needle has formed therein a plurality of jagged saw-tooth like cutting elements 14 which are adapted upon manual rotation of said needle to cut out and define a circular opening in the skin such as designated at A in Fig. 1. Such circular opening thereby limits the extent of the skin abrasion from which the biopsy specimen will be removed.

Adjacent the outer cutting end 14 guide needle 11 there is formed therein the substantially elliptical cut-away portion or slot 15 which extends downwardly to approximately one-half the diameter of said guide needle as at 16, and in some instances will extend slightly further to provide a lateral opening in said guide needle from which the biopsy specimen may be manually removed after withdrawal of said guide needle and the inner severing needle hereafter described.

Cylindrical collar 17 with set screw 18 is slidably and adjustably mounted adjacent the outer end of guide needle 11 with the forward portion thereof cooperatively engageable with the skin to thereby limit the extent of penetration of said guide needle into the skin or body.

The severing needle which is adapted for removable insertion within the guide needle 11 consists of the preferably hollow tubular shaft 19 to which is secured the operating handle 20 at one end, including the knurled portions 21 to facilitate rotary manipulation of said shaft.

Cylindrical collar 22 with set screw 23 is adjustably mounted upon shaft 19 for limiting the inward movement thereof relative to handle 12 of the guide needle, and at the same time thereby limiting the extent to which the outer severing portion on said shaft projects beyond the cutting end 14 of said guide needle.

Oppositely arranged tongues 24 extending from the forwardly extended portion of collar 22 cooperatively project within correspondingly shaped oppositely arranged slots 25 formed within handle 12, whereby manual rotation of handle 20 of the inner needle will effect a corresponding simultaneous rotation of the outer guide needle 11.

Arcuate tissue severing knife 26 with substantially pointed end 27 and sharpened upper and lower edges 28 and 29 respectively, projects from the lower end of tubular shaft 19 as shown in Figure 2.

This arcuate severing portion is substantially semi-circular in shape as shown in Figure 2 with its pointed end 27 extending to or slightly beyond the central longitudinal axis of said shaft, whereby rotation of said shaft, with said severing knife embedded within the tissue, as in Figure 1, will sever a biopsy specimen from the surrounding tissue.

It will be noted that the tissue severing knife 26, 27, 28, 29 is adapted to project beyond the outer cutting end 14 of guide needle 11, and the extent of this projection is limited by the adjusted positioning of collar 22 upon shaft 19. Furthermore, in operation, the severing knife is first moved inwardly of the tissue A by inwardly projecting the point 27 substantially at right angles thereto, and thereafter swinging the shaft around until it is substantially normal to the surface of the tissue, or skin, from which a biopsy specimen is to be cut and severed.

It will be noted from Fig. 1 that the collar 17 limits the inward projection of the knife and guide needle 11 with respect to the surface of the skin A.

The biopsy is performed by a manual rotation of the handle 20 which causes a rotation of the circular saw-tooth shaped cutting end 14 of guide needle 11, and this defines the dimension transversely of the skin biopsy specimen to be removed inasmuch as said cutting end 14 by its shearing action performs a circular cut.

At the same time, the simultaneous rotation of shaft 19 rotates the severing knife 26 so that upon one revolution thereof, or more if desired, the substantially cylindrically shaped skin specimen will be completely cut and severed from the surrounding tissue.

After the cutting and severing operation the guide needle and the inner severing needle are simultaneously withdrawn from the skin A, the severing knife portion **26** carrying therewith the small substantially cylindrically shaped skin specimen.

After withdrawal, the severing blade **26** is manually withdrawn a short distance into the interior of guide needle **11** so that the open portion of severing blade **26** is in substantial alignment with the lateral recess **15**—**16** formed adjacent to the end of guide needle **11**. In this position the specimen may be manually removed from said severing knife and withdrawn or knocked out through said lateral recess.

Figure 5 illustrates a stylet **30** with handle **31** which is adapted for removable insertion within the guide needle **11** for cleaning the same, or displacing therefrom any particles of matter which may remain. Furthermore, if desired, said guide needle may be stored with its stylet inserted therethrough.

Figure 6 illustrates a stylet **32** of cylindrical shape with a handle **33** at one end, being adapted for removable insertion through the handle **20** and the tubular portion **19** of the inner severing needle, for discharging any accumulation of matter therein. Or the stylet may be left within said severing needle during storage.

While the present biopsy needle set is primarily for obtaining skin biopsy specimens, it is contemplated also that the same may also be employed for a superficial biopsy, such as from an internal body organ.

In addition, to the cutting function of the teeth **14** of guide needle **11**, said teeth are also adapted to hold the tissue during the severing operation.

It is also contemplated herein that the severing needle may be used without the guide needle if desired.

Having described my invention, reference should now be had to the claims which follow for determining the scope thereof.

I claim:

1. A skin biopsy device consisting of a hollow guide needle, a tissue cutting circular edge at its outer end, a tubular shaft slidably disposed within said guide needle, and a pointed arcuate tissue severing knife on the corresponding outer end of said shaft, projecting beyond said cutting edge, and adapted upon rotation to sever a cylindrical skin biopsy specimen from the surrounding tissue, said needle and shaft being adapted for rotation in unison, said knife extending in a substantial semi-circle with its upper and lower edges being sharpened.

2. A skin biopsy device consisting of a hollow guide needle, a tissue cutting circular edge at its outer end, a tubular shaft slidably disposed within said guide needle, and an arcuate tissue severing knife on the corresponding outer end of said shaft, projecting beyond said cutting edge, and adapted upon rotation to sever a cylindrical skin biopsy specimen from the surrounding tissue, said knife extending in a substantial semi-circle with its outer end projecting transversely slightly beyond the central axis of said tubular shaft.

3. A skin biopsy device consisting of a hollow guide needle, a tissue cutting circular edge at its outer end, a tubular shaft slidably disposed within said guide needle, and an arcuate tissue severing knife on the corresponding outer end of said shaft, projecting beyond said cutting edge, and adapted upon rotation to sever a cylindrical skin biopsy specimen from the surrounding tissue, said knife extending in a substantial semi-circle with its outer end projecting transversely slightly

beyond the central axis of said tubular shaft, the upper and lower edges of said knife being sharpened.

4. A skin biopsy device consisting of a hollow guide needle, a tissue cutting circular edge at its outer end, a tubular shaft slidably disposed within said guide needle, and an arcuate tissue severing knife on the corresponding outer end of said shaft, projecting beyond said cutting edge, and adapted upon rotation to sever a cylindrical skin biopsy specimen from the surrounding tissue, said knife extending in a substantial semi-circle with its outer end projecting transversely slightly beyond the central axis of said tubular shaft, a hollow handle on said guide needle, and a handle upon said shaft for manipulating the same.

5. A skin biopsy device consisting of a hollow guide needle, a tissue cutting circular edge at its outer end, a tubular shaft slidably disposed within said guide needle, and an arcuate tissue severing knife on the corresponding outer end of said shaft, projecting beyond said cutting edge, and adapted upon rotation to sever a cylindrical skin biopsy specimen from the surrounding tissue, said knife extending in a substantial semi-circle with its outer end projecting transversely slightly beyond the central axis of said tubular shaft, a collar adjustably secured upon said guide needle adjacent its cutting end to limit its penetration into the object from which a biopsy specimen is sought.

6. A skin biopsy device consisting of a hollow guide needle, a tissue cutting circular edge at its outer end, a tubular shaft slidably disposed within said guide needle, and an arcuate tissue severing knife on the corresponding outer end of said shaft, projecting beyond said cutting edge, and adapted upon rotation to sever a cylindrical skin biopsy specimen from the surrounding tissue, said knife extending in a substantial semi-circle with its outer end projecting transversely slightly beyond the central axis of said tubular shaft, a hollow handle on said guide needle, a collar adjustably secured upon said shaft adjacent said handle for limiting the extension of said severing knife beyond the end of said guide needle.

7. A skin biopsy device consisting of a hollow guide needle, a tissue cutting circular edge at its outer end, a tubular shaft slidably disposed within said guide needle, and an arcuate tissue severing knife on the corresponding outer end of said shaft, projecting beyond said cutting edge, and adapted upon rotation to sever a cylindrical skin biopsy specimen from the surrounding tissue, said knife extending in a substantial semi-circle with its outer end projecting transversely slightly beyond the central axis of said tubular shaft, a hollow handle on said guide needle, a collar adjustably secured upon said shaft adjacent said handle for limiting the extension of said knife beyond the end of said guide needle, the inner end of said handle having a transverse groove formed therein, and a correspondingly shaped tongue on said collar cooperatively projecting into said groove, whereby rotation of said shaft will effect corresponding rotation of the cutting edge of said guide needle.

8. A biopsy device consisting of a shaft, and a pointed arcuate tissue severing knife on the outer end of such shaft, adapted upon rotation to sever a cylindrical biopsy specimen from the surrounding tissue, said knife extending in a substantial semi-circle with its upper and lower edges being sharpened.

9. A biopsy device consisting of a shaft, and an