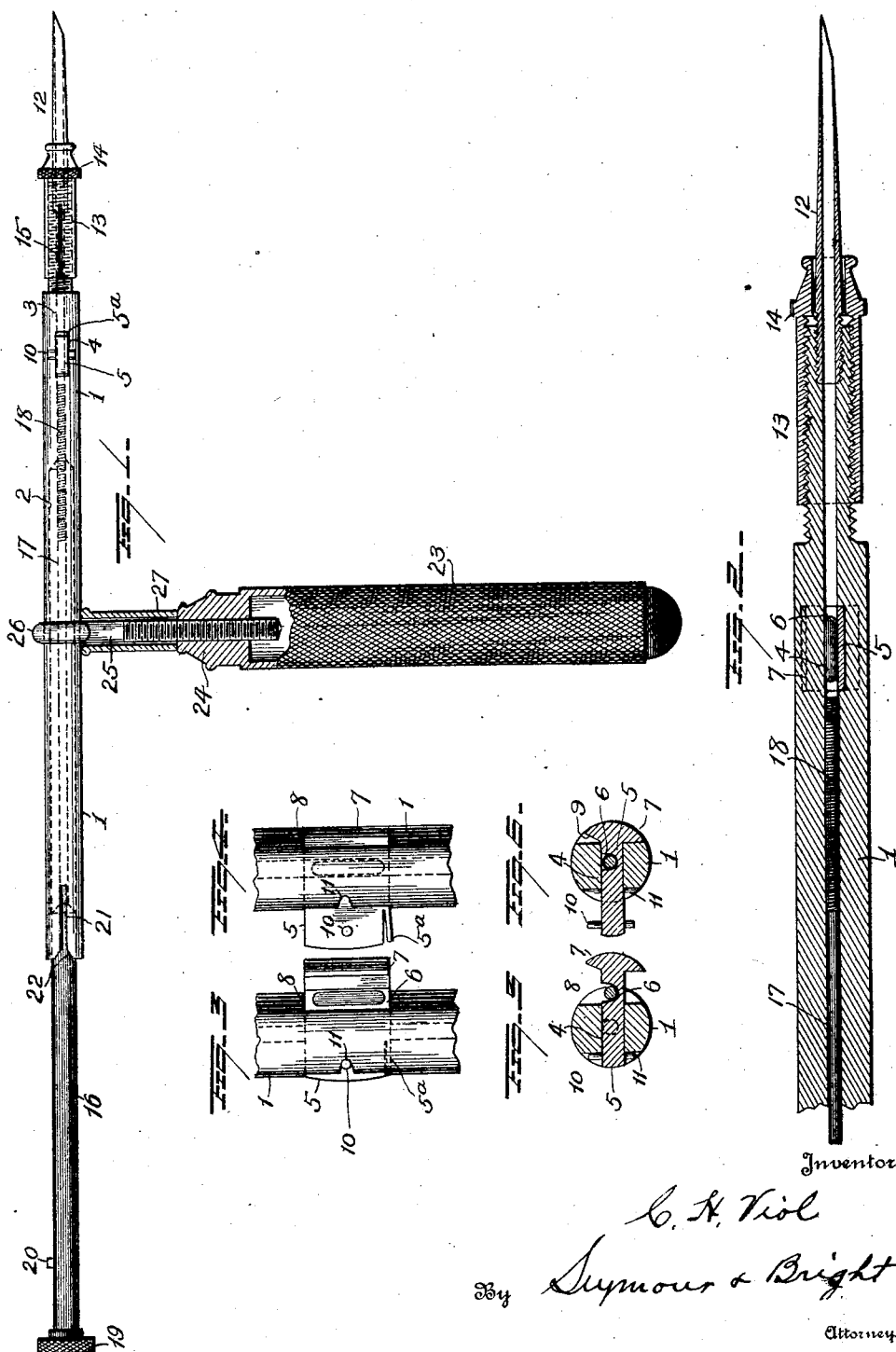


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SURGICAL INSTRUMENT
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UNITED STATES PATENT OFFICE.

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SURGICAL INSTRUMENT.

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This invention relates to improvements in surgical instruments and more particularly to such as are adaptable for use in applying radium treatment.

5 In the use of radium for the treatment of diseases, the more recent practice has been the employment of radium emanation gas sealed in minute tubes. Since about one one-millionth of a gram of such gas is produced per day from a gram of radium, the contents of the minute tubes is very valuable and said tubes must be handled with the greatest care to avoid loss and to insure the proper insertion of minute bare or naked tubes or radium emanation into tumor mass or tissue. The reason for the use of radium emanation gas rather than applying a radioactive substance, is that such gas may be implanted directly in the tumor mass in bare or naked tubes and better results have thus been produced.

15 The minute tubes in which the radium emanation gas is contained are each about three millimeters in length and 0.3 millimeters in diameter, and the charged tubes may well be referred to as "seed". In handling such seed, preparatory to implanting the same in a tumor, it has been the practice for the operator to pick up a seed or tube with suitable forceps and place it into the point-end of a hollow needle. After inserting the tube into the tissue and then slightly withdrawing it, the charged seed or emanation tube was expelled from the needle into the tissue with the use of a stylet mounted in the needle shaft,—after which the needle was withdrawn, leaving the emanation seed or tube implanted.

20 An object of my invention is to overcome defects and inconveniences incident to instruments heretofore used for handling and implanting radium emanation seeds or tubes in affected tissues, and to provide an instrument into which the minute tubes or seeds may be easily inserted, and an instrument which may be readily and accurately manipulated with the employment of one hand to implant a radium emanation tube or seed at a predetermined depth in a tumor or diseased tissues.

25 A further object is to so construct the instrument that straight or curved needles of various sizes or lengths may be used interchangeably.

With these and other objects in view, the invention consists in certain novel features of construction and combinations of parts as hereinafter set forth and pointed out in the claims.

In the accompanying drawings:—

Figure 1 is a view in elevation showing an embodiment of my invention;

Figure 2 is a longitudinal sectional view;

Figures 3 and 4 are exaggerated detail views illustrating the inserting or feeding device;

Figures 5 and 6 are transverse sectional views of the structure shown in Figures 3 and 4.

A needle shaft is represented at 1 and is made tubular, having a bore 2 extending from its rear end partially through its length and a forward bore 3 contracted in size and communicating with the bore 2. The shaft 1 is provided, preferably near its forward end, with a transverse slot 4 which intersects the smaller bore 3 of the shaft, and through this slot, a feed slide or drawer 5 is movable. The slide 5 is provided with an intermediate recess or pocket 6 and at one end with a head or enlargement 7 adapted to enter a recess 8 in the shaft when the parts are in the position shown in Figure 6, and the head 7 may be cut away to provide a shoulder 9 to facilitate operation of the slide. Near its other end the slide is provided with a pin 10 to enter a recess 11 in the shaft and limit movement of the slide with the parts in the position indicated in Figure 5. When the slide is in the position shown in Figure 5, a minute emanation tube or "seed" may readily be placed in the seat or pocket 6. The slide may then be moved to carry the tube or seed into the shaft, the parts being so proportioned that the seat or pocket will be caused to accurately align with the bore 3 in the shaft and properly position the tube or seed in the shaft to be afterwards expelled with the use of stylet as hereinafter described. To retain the slide in position to which it may be moved, a friction spring 5^a may be provided and may, if desired, be made integral with the slide.

The forward portion of the needle shaft is internally threaded for the reception of the externally threaded rear portion of a tubular needle 12. Needles of various

lengths and either straight or curved may be used interchangeably as may be needed for the particular case in hand.

It is a matter of importance that certainty of depth of penetration of the needle shall be controlled accurately. For this purpose I employ a stop or limiting sleeve 13 having a knurled flange 14,—said sleeve being screwed onto the exteriorly threaded forward portion of the needle shaft and in order that this stop or limiting sleeve shall be properly retained in the position to which it may be adjusted, said sleeve is split as at 15 so that it will clamp on the threaded portion of the needle shaft.

A stylet 16 passes through the needle shaft, the body portion of said stylet occupying the larger bore 2 of said shaft and the contracted portion 17 of said stylet being adapted to pass through the contracted portion 3 of the shaft and through the needle communicating therewith. In order to adapt the stylet or curved needles, it is necessary that at least a portion of the forward part of said stylet shall be flexible and this may be readily accomplished by constructing the forward end portion 18 of said stylet of coiled wire. The rear end of the stylet is provided with a knurled head 19 and forward of said head, a pin 20 projects from the body portion of the stylet and is movable in a slot 21 in the rear portion of the needle shaft. The rear end of this slot may have beveled walls 22 to facilitate the ready entrance of the pin 20 thereinto. The stylet may be withdrawn until the pin 20 passes the rear end of the needle shaft and then turned slightly to cause said pin to engage the end of said shaft. With such construction, the operator may manipulate the instrument with one hand as he can, after inserting the loaded needle into the tumor, turn the stylet head slightly with his finger to cause the pin to be in position to enter the elongated slot 21 and he may then press the stylet forwardly and effect the implanting of the emanation tube or seed in the tumor.

While in some cases, the operator might grasp the needle shaft, in most cases it is desirable to employ a handle disposed at right angles to said shaft. Such handle is indicated at 23 and provided at one end with a head 24 (which may be of conical shape) having a threaded bore to receive a threaded shank or rod 25,—the latter being provided at its outer end with an eye 26 and between said eye and the conical head 24, a loose sleeve 27 is located. The eye 26 of the handle structure is slipped over the needle shaft and may be located at any position between the ends thereof. When located in the desired position on the needle shaft, the

latter may be turned in a manner to cause the threaded shank to screw through the head 24, and the loose sleeve 27, engaging said head and the needle shaft passing through said eye, will cause the handle to be tightly clamped to the needle shaft.

The needle employed will preferably be of hard metal, such as tempered steel or iridium-platinum, for example.

Having fully described my invention what I claim as new and desire to secure by Letters-Patent, is:—

1. In an instrument of the character described, the combination of a tubular needle shaft having an open slot at its rear end, a tubular needle carried by the forward portion of said needle shaft and communicating with the bore of the latter, means carried by the needle shaft for feeding a tube or seed to the bore of said needle shaft, a longitudinally movable stylet mounted in said shaft and adapted to be projected through the tubular needle, a head on said stylet, and a pin projecting radially from said stylet forwardly of said head and adapted to abut the end of the shaft or enter the elongated slot in the tubular shaft.

2. In an instrument of the character described, the combination with a needle shaft having a bore, and ejecting means movable in said bore, of a feed slide movable in a rectilinear path transversely through the shaft and having a pocket to aline with the bore in said shaft, said slide provided with means to abut the shaft for limiting the movement of the slide in either direction.

3. In an instrument of the character described, the combination with a needle shaft having a bore, and ejecting means movable in said bore, of a feed slide movable transversely through the shaft and having a pocket to aline with the bore in said shaft, and a spring carried by the slide to engage the shaft and hold the slide in a set position.

4. In an instrument of the character described, the combination of a tubular needle shaft, a tubular needle secured on one end of said shaft, the shaft being constructed adjacent said end with a diametrical opening therethrough and recesses at the ends of said opening, ejecting mechanism mounted in the opposite end of the shaft, a slide mounted in said diametrical opening and having a seed pocket in its upper side to aline with the bore of the shaft, and stop elements on the slide at opposite sides of the shaft to engage in the recesses in the shaft.

In testimony whereof, I have signed this specification.

CHARLES H. VIOL.