

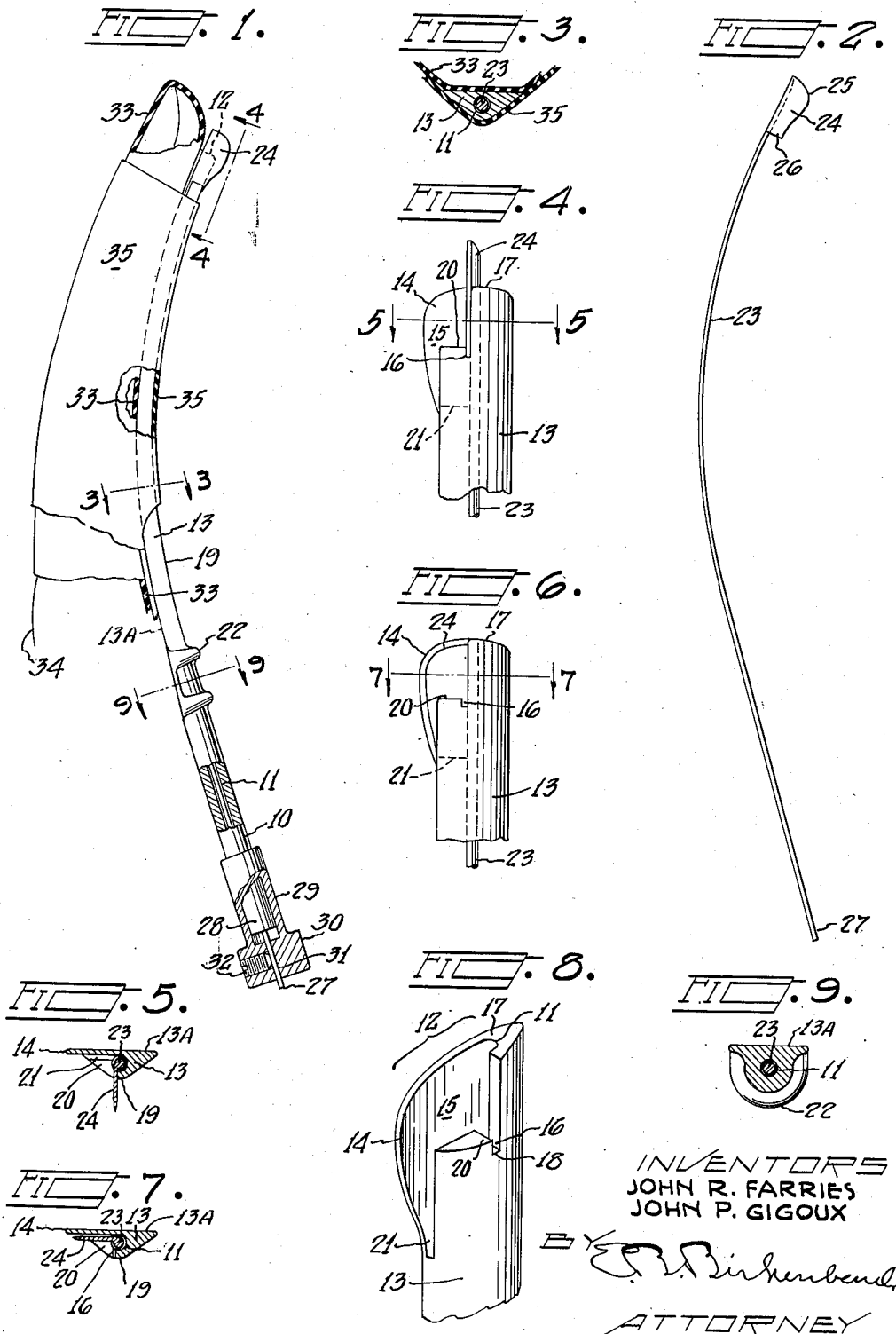
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INSTRUMENT FOR OPERATING ON THE MITRAL VALVES

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INSTRUMENT FOR OPERATING ON MITRAL VALVES

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4 Claims. (Cl. 128—305)

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This invention relates generally to surgical instruments and particularly to an instrument for operating on the mitral valve.

The main object of this invention is to assist in performing the surgical operation known as mitral commissurotomy.

The second object is to provide an instrument which will fit the palm and index finger of the surgeon's hand and encloses a blade that, in its retracted position, can be inserted and removed from the heart without danger to the patient.

The third object is to so construct the instrument that after its insertion into the heart it can be moved to and from a cutting position by the operation of a simple control by the surgeon or by an attendant.

The fourth object is to assist the surgeon in conducting his operation entirely by the sense of feeling without the possibility of visibly watching the operation.

The fifth object is to enable the surgeon to work more accurately and that all danger is eliminated as the direction of cutting is under the complete control of the index finger while the operativeness of the blade is determined by an outside manual control.

We accomplish these and other objects in the manner set forth in the following specification as illustrated in the accompanying drawing, in which

Fig. 1 is a side elevation of the instrument and a portion of the index finger with various portions of the instrument and the rubber glove broken away in section.

Fig. 2 is a side elevation of the knife and the stem to which it is attached.

Fig. 3 is a fragmentary section taken along the line 3—3 in Fig. 1.

Fig. 4 is a fragmentary front elevation of the knife end of the instrument with the knife in a cutting position.

Fig. 5 is a transverse section taken along the line 5—5 in Fig. 4.

Fig. 6 is similar to Fig. 4 but showing the knife in a retracted or inoperative position.

Fig. 7 is a transverse section taken along the line 7—7 in Fig. 6.

Fig. 8 is a perspective view of the knife-holding tip with the blade removed.

Fig. 9 is a section taken along the line 9—9 in Fig. 1.

Like numbers of reference refer to the same or similar parts throughout the several views.

Referring in detail to the drawing, there is

shown a round shank 10 through which is formed a central hole 11. The shank 10 curves tangentially from one end thereof to the tip 12 of the instrument. The curved portion 13 of the instrument has a flat convex side 13-A and the hole 11 follows close to the side 13-A. The side 13-A has a lateral extension 14 whose inner face 15 is tangent to the hole 11. A knife slot 16 extends from the extreme end 17 to the bottom end 18 which is near the middle of the concave side 19 of the curved portion 13. The metal on one side of the slot 16 is cut away leaving a short shoulder. A slot 21 is formed between the shoulder 20 and the face 15 of the extension 14, as shown in Fig. 8.

Transverse ribs 22 are provided on the shank 10 to give better control of the instrument.

In Fig. 2 is shown the wire stem 23 on one side of the end of which is mounted the cutting blade 24 which has a rounded outer end 25 and a tapering inner end 26. When the stem 23 is inserted through the hole 11, its end 27 projects from the end 28 of the shank 10.

Rotatable and slidable on the shank 10 is a sleeve 29 in whose head 30 is a hole 31 for the end 27 of the stem 23. A set screw 32 in the head 30 holds the end 27 against movement with relation to the head 30. It is desirable to place a rubber glove 33 over the index finger 34 and a tiptless finger stall around the gloved finger 34 and around the curved portion 13 of the instrument, thereby holding the flat side 13-A against the index finger 34.

The device described possesses several advantages over any previous instrument for this purpose in that it fits the palm and index finger of the surgeon's hand and has an enclosed cutting blade 24 which, in its retracted position, can be inserted and removed from the heart without danger to the patient.

After insertion in the heart, by the manipulation of a simple control 30 by the surgeon or an attendant, the blade 24 can be placed in the cutting position, and later retracted and sheathed by the same control 30. The knife end 26 is locked in either of the slots 21 or 16.

Since in this operation the work is all done by the surgeon's sense of feel, the work all being invisible, greater accuracy is possible and dangers inherent in previous types of instruments are obviated.

It will be noted that the cutting blade 24 in its working position is normal to the front plane of the surgeon's index finger and is in that plane and is longitudinal to that finger, allowing him

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to select his point of cut and guide the blade by the feel of the flow of tissue on each side of the finger.

In instruments now available and designed for this work, the instrument has protruded beyond the end of the finger, causing guesswork as to the exact position of the instrument in the mitral valve of the heart and the angle at which the cutting is being done. In using any previous instrument it has been impossible for the surgeon to determine whether or not he is accurately following the actual line of labial juncture.

We claim:

1. An instrument for operating on the mitral valve of the heart comprising a curved shank having one flat side adapted to engage the inner side of the index finger and palm and extend toward the finger tip, said shank having a pair of slots formed in the finger tip end thereof normal to each other, a knife mounted in said shank capable of occupying either of said slots, and a control wire extending through said shank attached to said knife whereby said knife may be selectively held in either of said slots.

2. An instrument for operating on the mitral valve of the heart comprising a curved shank having a transversely flat convex side and having a duct formed along the length thereof, a wire within said duct, one end of said shank having a rotatable, slidable sleeve attached to said wire, the other end of said shank having a knife mounted therein attached to said wire, the knife end of said shank having two longitudinal slots formed therein in planes normal to each other, one of said slots extending beyond the other in the direction of said sleeve, and having a portion of the metal between said slots cut away to leave a notch at the end of the shorter slot.

3. An instrument for operating on the mitral valve comprising a curved shank adapted to fit the inner side of the index finger and to extend

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a short distance from the finger tip, said shank having its convex side flat in a transverse direction, a finger stall for holding the flat shank side against the index finger, said shank having a cylindrical control end, a sleeve rotatably and slidably mounted on said control end, a wire attached to said sleeve and extending through said shank, a knife on the end of said wire, said shank having the end nearest the finger tip provided with a transverse slot extending to the center of the shank tip, and a second slot normal to the first slot extending along the median plane passing through said curved shank, one of said slots being longer than the other, said knife being capable of occupying either of said slots whereby it is concealed in the longer slot and in a cutting position in the shorter slot.

4. An instrument for operating on the mitral valve comprising a curved shank having a transversely flat convex side fitting the inner side of the index finger and having a wire extending therethrough, a control sleeve slidably and rotatably mounted on one end of said shank attached to said wire, a knife attached to the opposite end of said wire, the tip end of said shank having a lateral extension on its flat side, a slot in said tip end parallel to the flat side extending to said wire, a second slot normal to the first slot but of lesser length, the outer end of the metal between said slots being spaced a greater distance from the tip than is the metal on the opposite side of the shorter slot whereby there are formed in said tip two slots of unequal length from the end of said tip, in the longer of which said knife can be disposed in a concealed position and in the shorter of which said knife can be held in an extended cutting position.

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No references cited.