

Feb. 9, 1954

K. A. KAPP
SURGICAL INSTRUMENT

2,668,537

Filed May 16, 1952

2 Sheets-Sheet 1

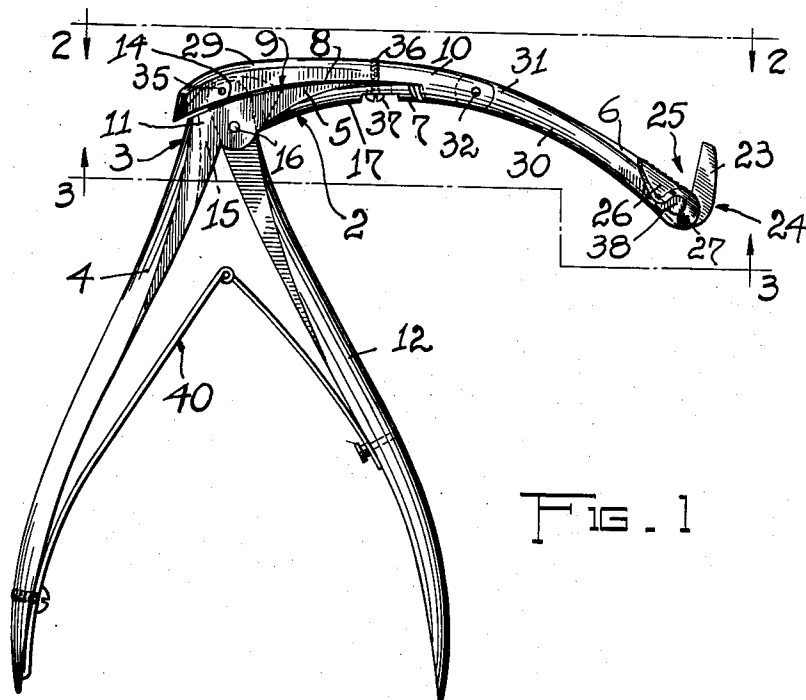


FIG. 1

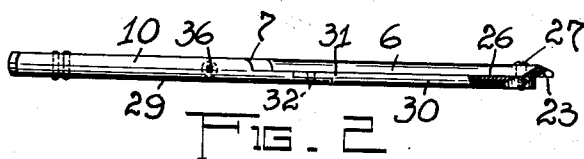


FIG. 2

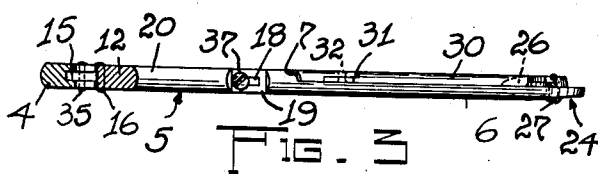


FIG. 3

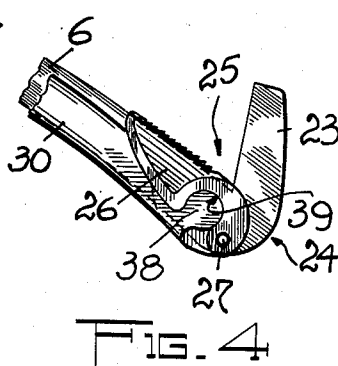


FIG. 4

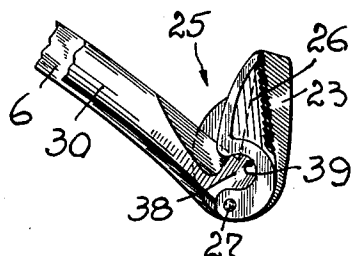


FIG. 5

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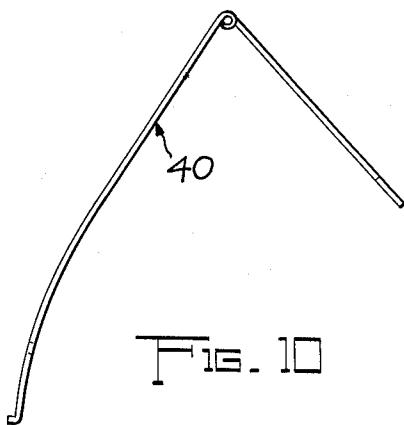
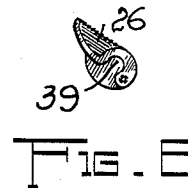
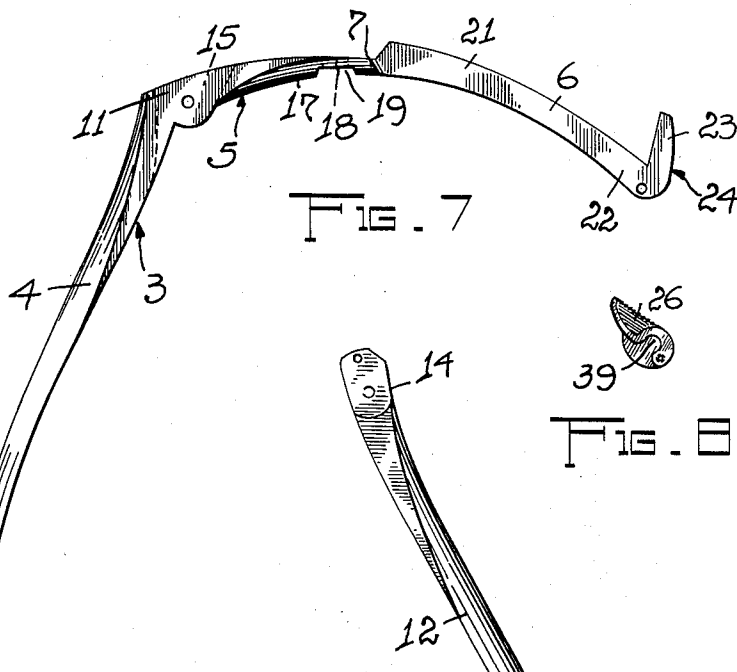
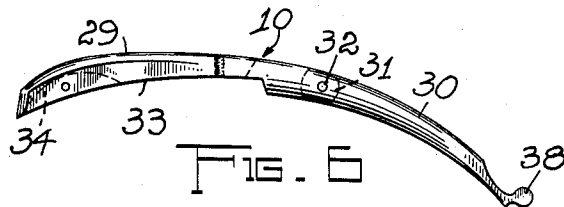
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SURGICAL INSTRUMENT

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5 Claims. (Cl. 128—318)

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This invention relates in general to surgical instruments and has particular reference to a new and improved surgical instrument to be employed in internal surgical procedures pertaining to mitral stenosis which causes hardening of the tissue of the mitral orifice and mitral valve guarding the mitral orifice or left auriculo-ventricular orifice of the heart and preventing blood fed into the ventricle from returning to the atrium. It has been ascertained that mitral stenosis can be minimized by slitting the hardened mitral orifice and mitral valve tissue with the aid of the instrument of this invention, in order to eliminate part of the cause of obstructions which effect malfunctioning and leakage of the mitral valve.

The primary object of this invention is the provision of a surgical instrument constructed to be advantageously employed in locating, slitting and cutting operations in internal surgical procedures.

Another object of the invention is the provision of a surgical instrument adapted to be readily inserted in the mitral orifice and properly located in the region of the mitral valve to effect with such instrument the desirable slitting and cutting operations in internal surgical procedures instituted to overcome well-known tissue hardening effects causing mitral stenosis.

A further object of the invention is the provision of a surgical instrument of the character indicated which is constructed to perform its intended functions in an effective and trouble-free manner.

Still other characterizing features and objects of my invention are the provision of a surgical instrument of the type referred to above, constructed to include forceps-control means at one end, combined hook and scissor means at the other end, and mechanism connecting the forceps-control means with the combined hook and scissor means to properly control the cutting operations thereof, the surgical instrument being assembled and constructed in unitary form for feasible manufacture, manipulation and insertion into the mitral orifice through a single small incision to be made in the wall of the atrium.

Additional and still further objects and novel features of construction, combination and relations of parts by which the objects in view have been attained, will appear and are set forth in detail in the course of the following specification.

The drawings accompanying and forming part of the specification illustrate a certain practical embodiment of the invention, but it will be ap-

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parent as the specification proceeds that the disclosed structure may be modified and changed in various ways without departure from the true spirit and broad scope of the invention.

In the drawings:

Fig. 1 is a side elevation of a surgical instrument constructed in accordance with the invention showing the combined hook and scissor means at the front end of the instrument in fully opened position;

Fig. 2 is a top view of the instrument shown in Fig. 1, taken from line 2—2 of said figure;

Fig. 3 is a sectional bottom view, partly in elevation, of the instrument shown in Fig. 1, the section being taken on line 3—3 of said figure;

Fig. 4 is an enlarged fragmentary side view of the combined hook and scissor-like means in fully opened position;

Fig. 5 is a view similar to Fig. 4 showing the combined hook and scissor-like means in fully closed position;

Figs. 6 through 10 are individual side views of parts of the surgical instrument, thus:

Fig. 6 is a side view of the shiftable scissor-blade operating member;

Fig. 7 is a side view of the body member;

Fig. 8 is a side view of the pivotally mounted scissor blade;

Fig. 9 is a side view of the handle member; and

Fig. 10 is a side view of the spring member yieldingly holding the surgical instrument in an opened-up position.

Referring now more in detail to the exemplified form of the invention shown in the drawings, reference numeral 2 denotes a surgical instrument which includes a body or supporting member 3 shaped to form a handle 4, a curved, elongated saddle portion 5, and a curved, hook-shaped guide and supporting arm 6 integrally extended from the front end 7 of saddle portion 5 and arranged in parallelly offset relation with respect to the longitudinal axis of the saddle portion (see Fig. 7). Saddle portion 5, which has substantially half-circularly shaped cross section and includes a top face 8 which forms an elongated seat 9 slidably mounting an elongated coupling member 10 later to be described, pivotally supports on rear portion 11 a handle member 12, the upper end 14 of which is extended through a slot 15 and pivoted to the saddle portion by a pin 16. In addition saddle portion 5 includes in central portion 17 a vertical, elongated slot 18 which extends at its lower end into an elongated recess 19 formed

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in the rounded bottom wall 20 of saddle portion 5.

The forwardly extended guide and supporting arm 6 which is integrally extended from the front end 7 of saddle portion 5 and has a half-circularly shaped cross section similar to the cross section of saddle portion 5 is laterally and angularly offset with respect to said saddle portion so that said guide and supporting arm has its guiding surface 21 arranged in a plane extended through the longitudinal axis of saddle portion 5 at a right angle to the top face 8 thereof to effect guiding of coupling member 10 in two planes rectangularly related to each other. In addition guide and supporting arm 6 includes at its free end 22 an angularly offset portion 23 which is shaped to form a cutting blade and integrally extended from the end 22 of guide and supporting arm 6 at an acute angle with respect to the longitudinal axis of said arm in the plane of the guiding surface 21 thereof. The described shape of the guide and supporting arm provides such arm at its end with a hook-shaped portion 24—usable for effecting, in internal surgical procedures to overcome mitral stenosis, proper location of the instrument in the atrium—and with a scissor-like cutting arrangement 25 formed by the cutting blade 23 and a pivotally supported blade 26, which cutting arrangement is usable in effecting by the instrument slitting and cutting operations on the tissue of the mitral valve and mitral orifices, when such tissue is hardened and has caused mitral stenosis. Blade 26 is pivotally mounted on supporting arm 6 by pivot pin 27 and is actuated by handle member 12 coupled with blade 26 by elongated coupling member 10 presently described. This coupling member embodies an elongated slide 29 of substantially half-circular cross section and an extension arm 30 pivoted at its end 31 to slide 29 by pin 32. Slide 29 engages with its sliding face 33 the top face 8 of saddle portion 5 and near its rear is formed with a recess 34 for the upper end 14 of handle member 12 extended into said recess and pivoted to member 29 by a pin 35. The central portion of the slide 29 is connected to the saddle portion 5 by a screw member 36 which extends through slot 18 and is threaded into the slide so that screw head 37 is positioned in recess 19 and limits shifting of slide 29 to predetermined positions.

The front portion of slide member 29 is laterally and angularly offset in a manner similar to that of supporting arm 6 to properly contact said member with vertically arranged guiding face 21 of supporting arm 6. This front end pivotally supports the extension arm 30 which in turn is pivoted to blade 26 in laterally offset relation to its pivot axis to effect reciprocatory shifting movement of said blade when handle member 12 is shifted toward and away from handle 4. Pivotal connection of extension arm 30 with blade 26 is effected by a laterally offset rounded head portion 38 arranged at the outer end of extension arm 30, which head portion engages a rounded recess 39 in blade 26 and being laterally offset permits full retraction of blade 26 (see Fig. 4) and use of hook-shaped end portion 24 for locating and positioning surgical instrument prior to cutting operations.

The scissor-like cutting arrangement 25 of the surgical instrument 2 is yieldingly held in opened-up position by a compression leaf spring structure 40 arranged between handle 4 and handle member 12 to permit proper use of hook-

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shaped end portion 24 on guiding and supporting arm 6 in positioning and locating the surgical instrument prior to any desirable cutting operations with the scissor-like cutting arrangement 25 of the surgical instrument.

Having thus described my invention:

What I claim is:

1. In a surgical, scissor-like instrument an elongated, axially curved body member having integrally extended from its one end a downwardly extended handle and from its other end an upwardly extended cutting blade arrangement in acute angular relation with respect to the longitudinal axis of the body member to provide same with a hook-shaped end portion, a cutting blade pivoted to said body member near said other end for cooperative, scissor-like cutting action with said first cutting blade, and slidable actuating means coupled with said pivotally supported cutting blade and mounted on said body member to be guided thereby, said actuating means adapted to effect pivotal movement of the pivotally supported cutting blade toward and away from the upwardly extended cutting blade to permit use of the surgical instrument for locating and scissor-like cutting action.

2. A surgical instrument as described in claim 1, wherein the elongated, curved body member includes spaced supporting and guiding areas arranged at a right angle with respect to each other, wherein the actuating means include an elongated, curved slide having spaced, angularly related supporting and guiding areas arranged for cooperation with the supporting and guiding areas of the body member to properly guide said slide while sliding on said body member.

3. A surgical instrument as described in claim 2, wherein said slide is coupled with the body member for limited movement with respect thereto and includes an extension arm linking said slide to said pivotally supported cutting blade in axially offset relation with respect thereto.

4. A surgical instrument as described in claim 2, wherein said elongated, curved slide is coupled with the body member for limited movement with respect thereto and wherein said slide includes an extension arm pivoted to one end of the slide, said extension arm linking said slide to said pivotally supported blade in axially offset relation with respect thereto and being guided by one of the guiding areas of the body member.

5. In a surgical scissor-like instrument an elongated body member having integrally extended from its one end an upwardly extended cutting blade forming said body member with an openly extended hook-shaped locating end, a second cutting blade pivotally mounted on said body member in proximity to said first cutting blade for scissor-like cutting action therewith, and actuating means for pivoting the second cutting blade, said actuating means being slidably supported and guided by said body member in angularly related planes and pivotally connected to the second cutting blade in offset relation with respect to its pivot axis.

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