

No. 616,672.

Patented Dec. 27, 1898.

G. E. KELLING.
SURGICAL INSTRUMENT.

(Application filed Dec. 30, 1897.)

(No Model.)

2 Sheets—Sheet 1.

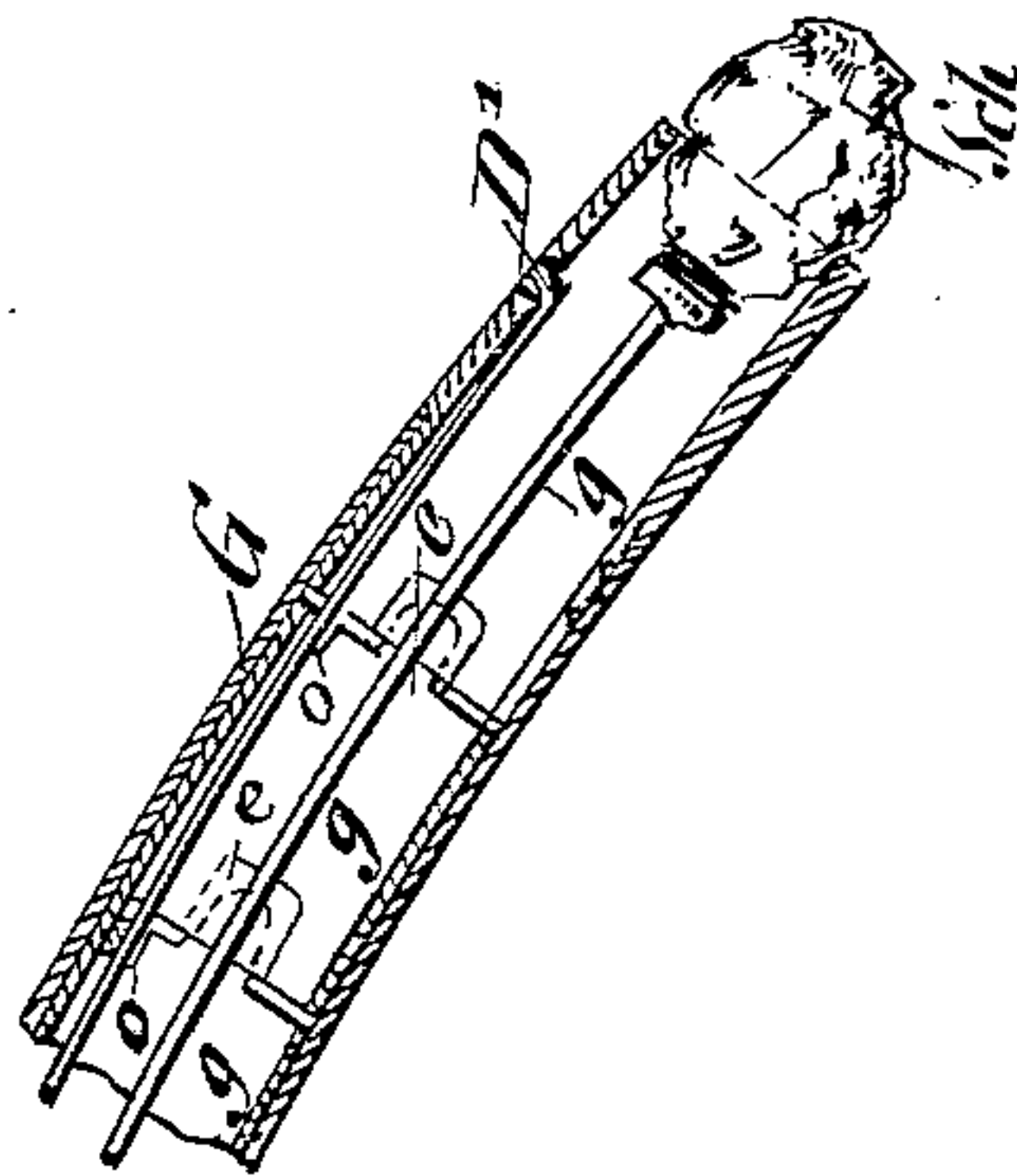
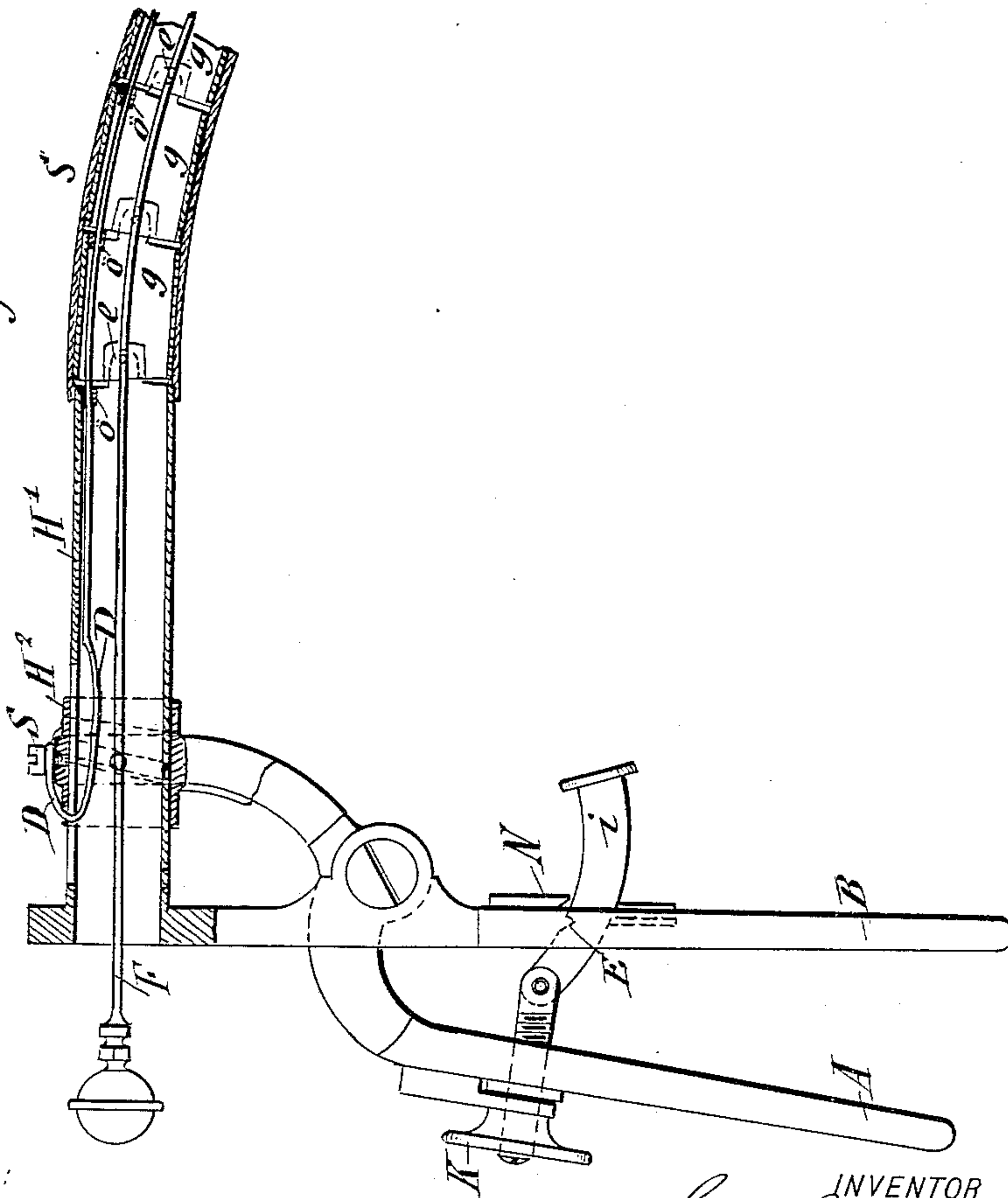


Fig. 1.



WITNESSES:

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INVENTOR

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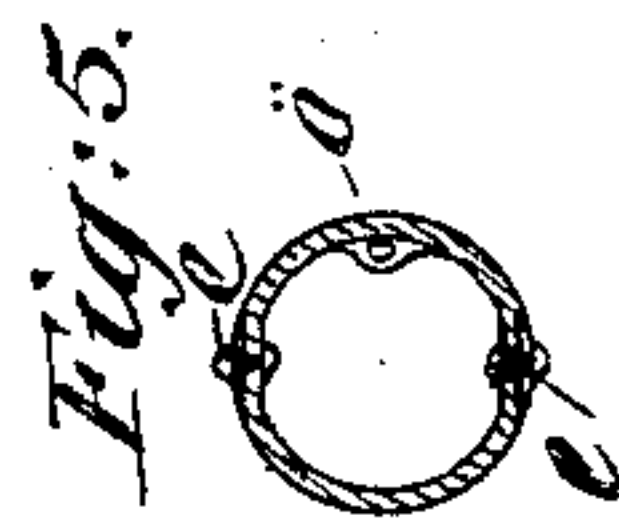
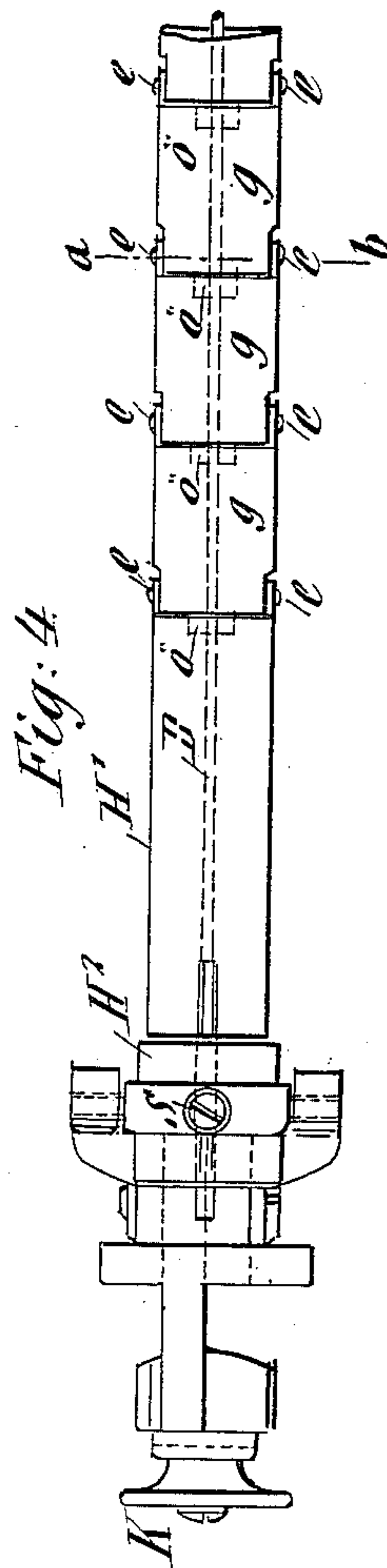
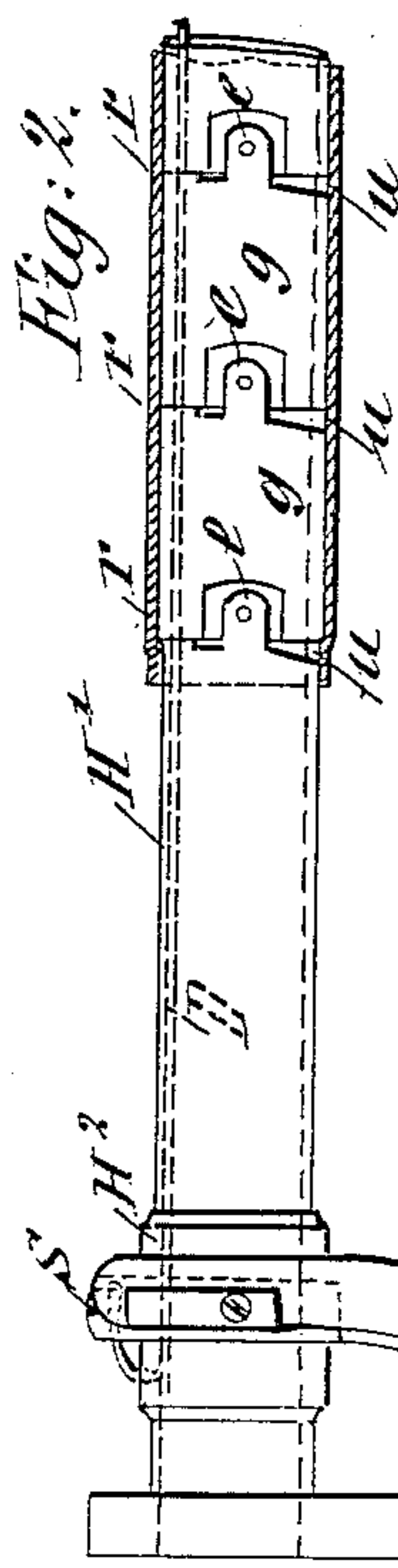
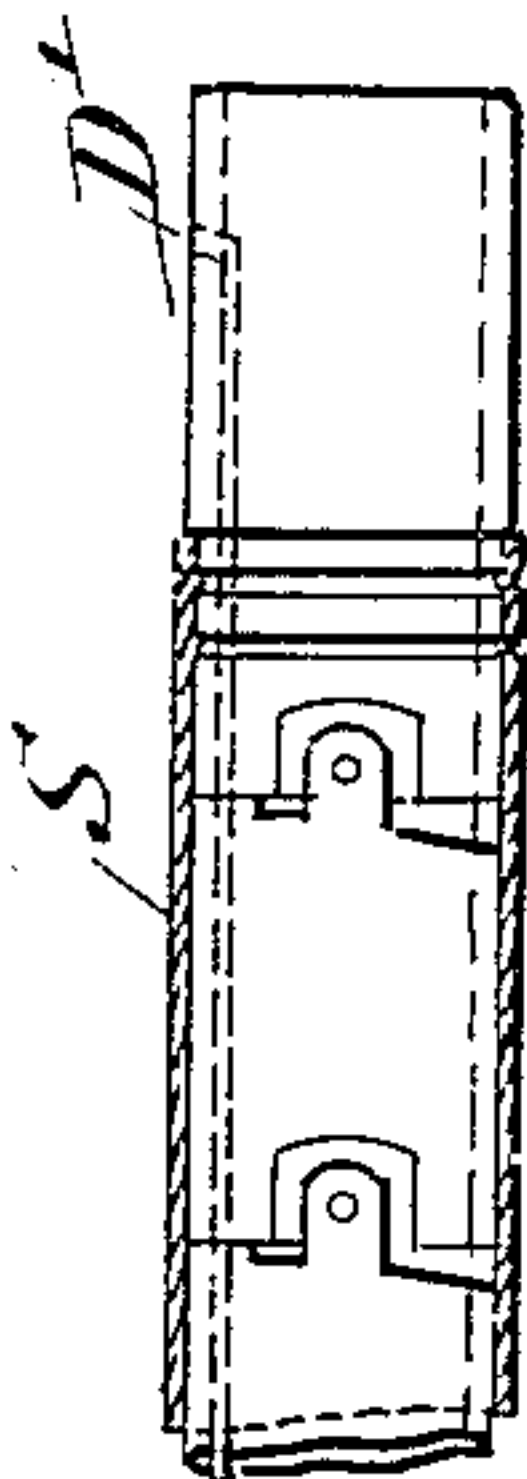
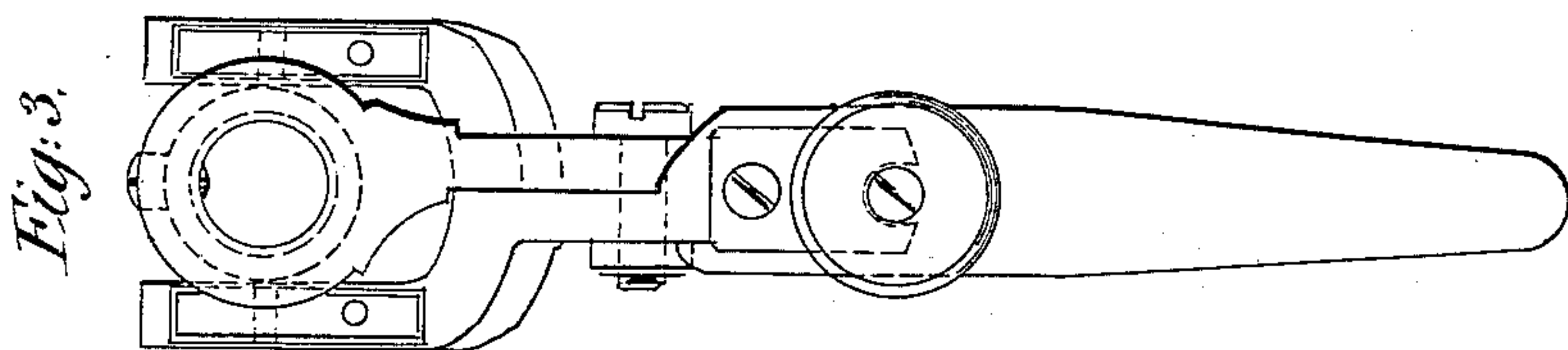
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2 Sheets—Sheet 2.



WITNESSES :

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UNITED STATES PATENT OFFICE.

GEORG EMIL KELLING, OF DRESDEN, GERMANY.

SURGICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 616,672, dated December 27, 1898.

Application filed December 30, 1897. Serial No. 664,556. (No model.)

To all whom it may concern:

Be it known that I, GEORG EMIL KELLING, a citizen of Germany, residing at Dresden, in the Kingdom of Saxony, German Empire, have invented certain new and useful Improvements in Surgical Instruments, of which the following is a specification.

This invention relates to improvements in surgical instruments of that class designed for insertion into the natural passages of the human or animal body for inspection of the diseased or injured parts preparatory to further medical or surgical treatment.

The invention consists of a surgical instrument for insertion into the body, consisting of a flexible insertion-tube, a straightening-wire attached to said tube, and means for pulling the latter for straightening said insertion-tube, and, further, in the specific construction of the insertion-tube itself.

While the improvements forming the subject-matter of my invention may be applied to a tube of suitable size and shape for insertion into any of the passages of the body for the purpose stated, the invention will be described in connection with an esophagoscope designed to facilitate inspection of the human esophagus, as the instrument is illustrated in the accompanying drawings, in which—

Figure 1 represents a side elevation, partly in section, of an esophagoscope embodying my invention, showing the tube of the instrument in curved condition. Fig. 2 is a side elevation, partly in section, showing the instrument with the tube straightened. Fig. 3 is an end view. Fig. 4 is a top view of a portion of the esophagoscope, and Fig. 5 is a cross-section of the tube through one of the joints of the same.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, *g g* represent short tube-sections, preferably of circular cross-section, which are each provided at one end with diametrically opposite ears 1. The end of the tube-section, at one side of the ears, is not cut squarely off, but is cut back at a slant, as indicated at *u u u*, Fig. 2. At its opposite end the exterior of the tube-section is flattened, as indicated in Fig. 5, whereby the rear ends of each section are adapted to

fit between the ears of the adjacent section. The tube-sections are movably connected to each other by pivots passed through the ears and flattened portions, as shown in Fig. 5, and when connected form the insertion-tube of the instrument, which it will be seen is capable of bending in one direction. The forward edge of the first or entering section *D'* is preferably cut squarely off and the edge rounded to prevent abrasion of the tissues when the tube is inserted into the esophagus. The main tube-section *H'* at the opposite end of the tube is preferably longer than the intermediate tube-sections and is provided with a longitudinal slot in its upper portion. A short sleeve *H²* is mounted on this section and is provided with a guide-screw *S*, the lower end of which enters the slot, thereby guiding the sleeve *H²* and preventing its rotation on the main tube-section *H'*. To the outer end of the main tube-section is attached a lever *B*, to which is pivoted a lever *A*, the upper end of which is movably attached to the sleeve *H²* in any suitable manner. The lower ends of said levers *A* and *B* form handles, by the movement of which the sleeve is moved longitudinally on the main tube-section. Each of the tube-sections *g* is provided at its upper portion with an internal wire guide or eye *ö*, as shown in Fig. 5. A straightening-wire *D* is attached at one end to the entering-section *D'* of the insertion-tube and passes through the guides *ö* of the successive tube-sections, as shown in Fig. 1, and is attached at its opposite end to the sleeve *H²*. This wire is of such length that when the sleeve is drawn back by the levers the insertion-tube will be straightened, as indicated in Fig. 2, while if the lever-handles be separated the tube will be free to bend in one direction until the abutting of the rear ends of the tube-sections upon the slanting portions of the adjacent sections prevents further curvature.

For retaining the tube in straightened condition an adjustable catch device is used, which consists of a set-screw extending transversely through the handle of the lever *A* and provided with a lock-nut *K* and a latch *i*, which is hinged at one end to the inner end of the set-screw and provided with a notch *E* in its upper side, which is adapted to be en-

gaged by the catch N. A spring attached to the lever B and indicated in dotted lines in Fig. 1 serves to keep the latch in contact with the catch. At its outer end a flanged stop
 5 prevents accidental withdrawal of the latch from the lever B. To close the joints between the tube-sections and render the tube water-tight and provide a smooth exterior, a sheath G, of rubber or similar material, ex-
 10 tends upon the tube from the entering end to the main tube-section.

To insert the tube, the exterior is coated with a suitable lubricant and the entering end closed by means of a small rubber ball or
 15 sponge S^{ch}, attached to a wire or rod F, as shown in Fig. 1. The tube in flexible condition is then gently inserted in the esophagus, the patient throwing his head back to bring the mouth in line therewith. The tube
 20 is inserted with the curvature toward the front. To straighten the tube, the levers A and B are brought together and at the same time the instrument is given a quarter-turn, so that the levers are in the direction of the
 25 patient's side. The levers are pressed together until the catch N enters the notch E. The sponge is then withdrawn and by means of a small incandescent lamp inserted into the instrument the examination of the parts
 30 below the end of the esophagoscope may be made.

The advantages of my device are that it may be inserted without causing pain by reason of its flexibility in the direction of the
 35 natural curve of the passage into which it is inserted, and, further, that the joints of the instrument are so constructed that the quarter-turning of the same brings the strain when the instrument is straightened largely upon
 40 the pivots of the joints and not so much upon the straightening-wire or other parts of the instrument. The tube is thus retained in a perfectly straight condition without danger of breakage, and the surgeon is enabled to

look directly through the tube to make the examination.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A surgical instrument for insertion into the body, consisting of a flexible insertion-tube, a sleeve on said tube, a straightening-wire attached at one end to said tube and at the opposite end to said sleeve, and means for shifting said sleeve, substantially as set forth.

2. In a surgical instrument for insertion into the body, an insertion-tube composed of end sections and a series of intermediate tube-sections, each of said intermediate tube-sections being provided at one of its ends with ears and at the other end with flattened portions adapted to fit between the ears of the next adjacent tube-section, pivots passing through said ears and flattened portions, wire guides in said tube-sections, and a sheath extending upon said tube and closing the joints between said tube-sections, substantially as set forth.

3. In a surgical instrument for insertion into the body, an insertion-tube composed of end sections and a series of intermediate tube-sections, each of said tube-sections being provided at one of its ends with ears and at the other end with flattened portions adapted to fit between the ears of the next adjacent tube-section, and having its ear-bearing end at one side of said ears cut back at an angle, pivots passing through said ears and flattened portions, and a sheath extending upon said tube and closing the joints between said tube-sections, substantially as set forth.

In witness whereof I have hereunto set my hand in presence of two witnesses.

GEORG EMIL KELLING.

Witnesses:

WILLY KELLING,
 JOHANNES KELLING.