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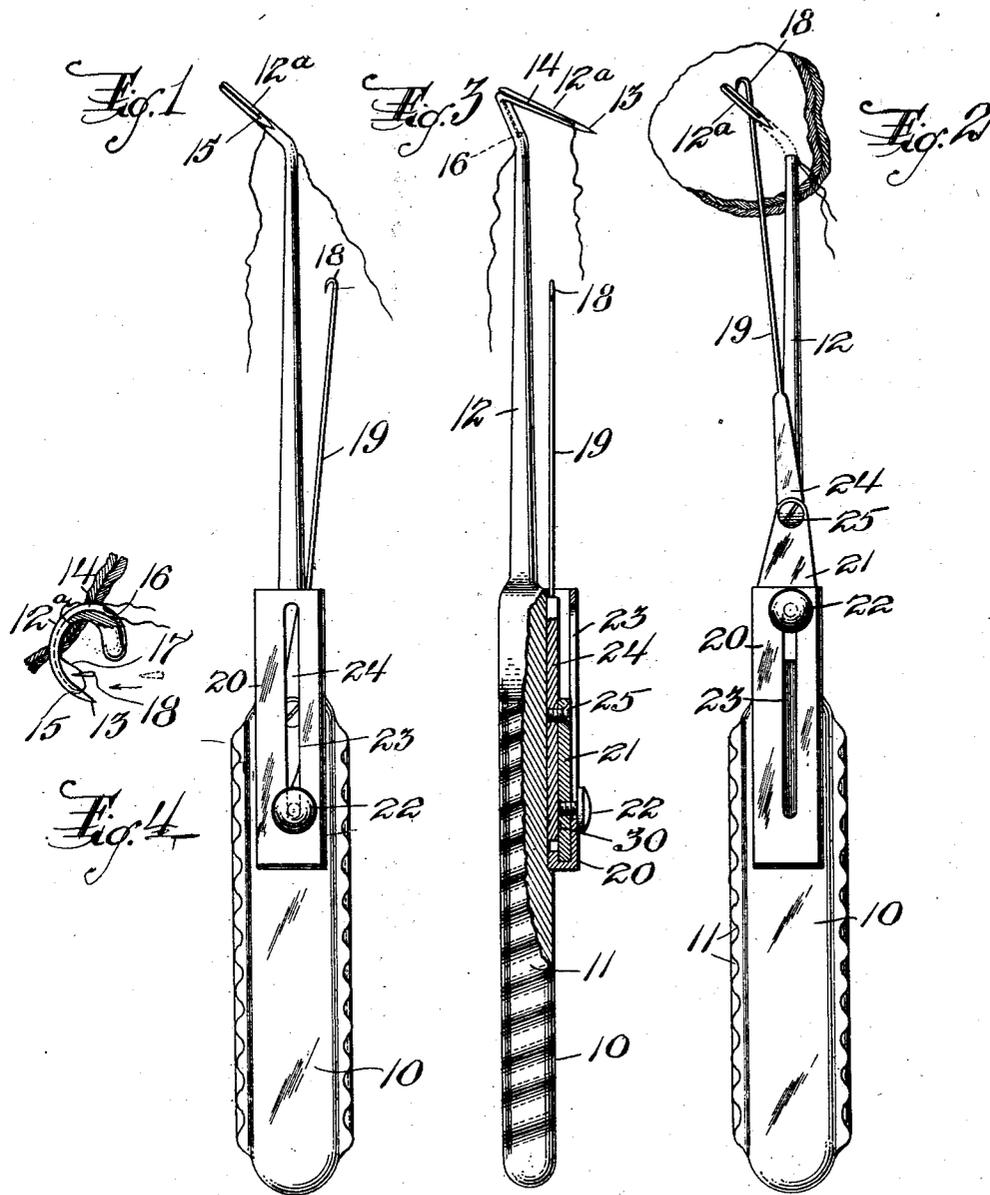
1,583,271

L. BIRO

SURGICAL INSTRUMENT

Filed Jan. 14, 1925

2 Sheets-Sheet 1



INVENTOR.  
*Ladislav Biro,*  
BY *Wm. H. Campfield,*  
ATTORNEY

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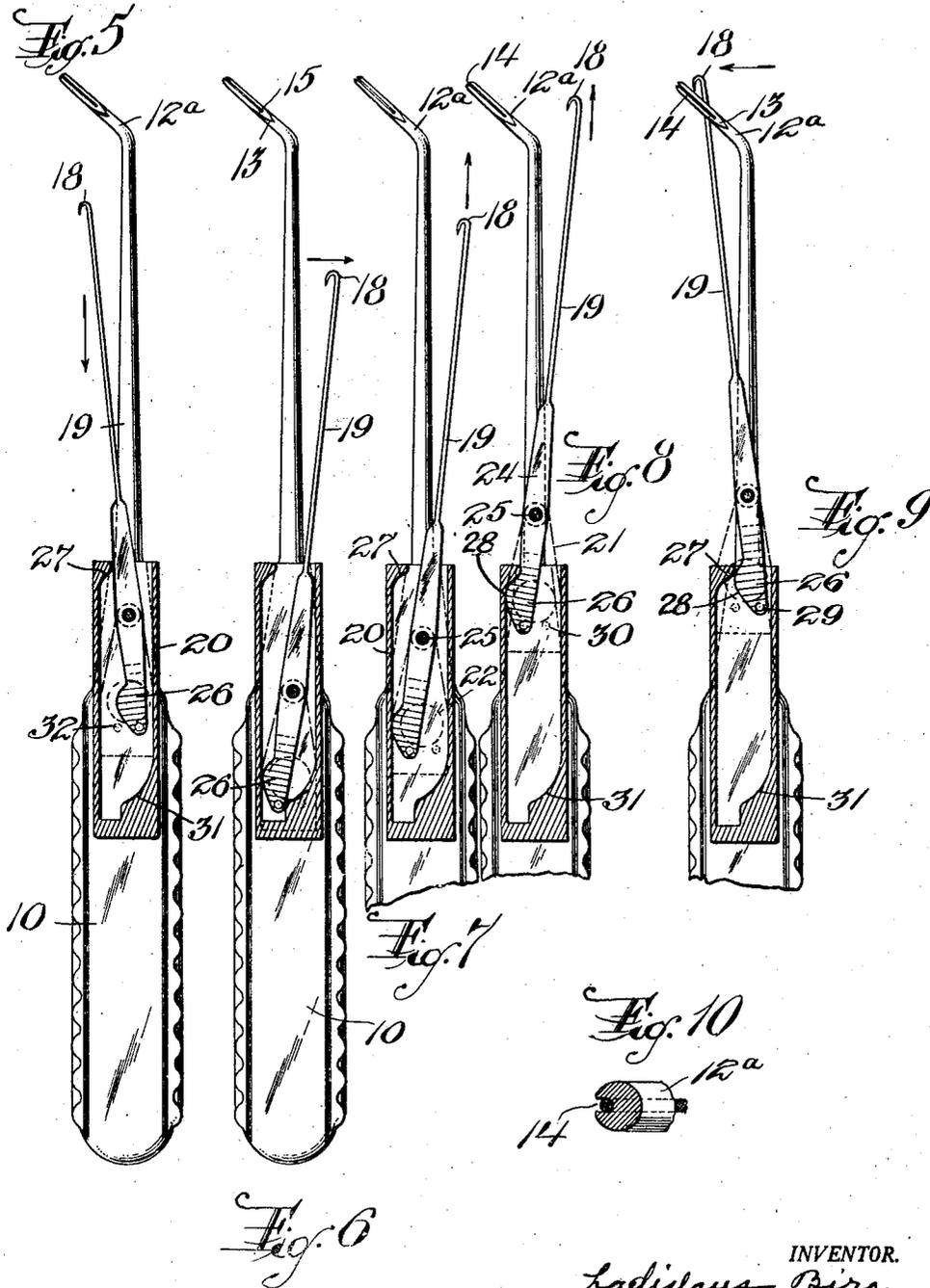
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2 Sheets-Sheet 2



INVENTOR.  
Ladislav Biro.  
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# UNITED STATES PATENT OFFICE.

LADISLAUS BIRO, OF NEWARK, NEW JERSEY.

SURGICAL INSTRUMENT.

Application filed January 14, 1925. Serial No. 2,298.

*To all whom it may concern:*

Be it known that I, LADISLAUS BIRO, a citizen of Hungary, and a resident of Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Surgical Instruments, of which the following is a specification.

This invention relates to an improved surgical instrument for sewing wounds and is particularly adapted for applying sutures in the throat or other rather inaccessible places, being adapted for passing the suture through both sides of the opening and withdrawing the needle at both ends of the suture, this being possible through the manipulation of the implement by one hand.

The invention also embodies certain details of construction which will be hereinafter more fully described and finally embodied in the clauses of the claims.

The invention is illustrated in the accompanying drawings in which Figure 1 is a front view of an instrument made according to my invention with the hook retreated and Figure 2 is a similar view with the hook advanced. Figure 3 is a side view of the construction shown in Figure 1. Figure 4 is a detail section showing the end of the instrument, that is, the needle thereof from an end view. Figures 5, 6, 7, 8 and 9 are face views of part of the handle broken away and illustrating the hook portion in various positions, and Figure 10 is an enlarged section through the needle.

Any form of handle 10 can be employed but I prefer to make it of light metal and preferably serrated on the edges as at 11 to provide a better grip. From one end of the handle projects the needle which is provided with an elongated shank 12 and the needle at the end is curved so that it can be passed downwardly, across and then upwardly in an opening through the wound and is preferably forwardly inclined so as to make its insertion and withdrawal more comfortable to the surgeon conforming to the normal wrist motion that is employed in passing the needle in a throat wound or suture or in any other inaccessible place where the use of two hands is uncomfortable and in some cases impossible.

The end 13 of the needle is pointed and is slightly flattened and from this point around the outside edge of the needle, I arrange a groove 14 which is adapted to contain the

thread which passes through an eye 15 at one end of the groove near the point and is preferably passed through an opening 16 at the other end of the groove at the base of the curved part 12<sup>a</sup> so that this reach of the thread is positively carried by the needle and is held in place and does not become entangled with the other reach.

It will thus be seen that as the needle is used after it has been threaded, it is passed through as in Figure 4, and when the pointed end emerges there is a looped part 17. To catch this looped part and pull it towards the surgeon, I provide a hook which is operable from the handle and while many constructions can be devised for carrying out this invention, I show the hook 18 on the end of the stem 19 and it is so mounted on the handle that it can be slid longitudinally thereof and there are co-acting means of these elements to cause the hook to move laterally at predetermined points in its longitudinal movement.

This lateral movement at the outer or forward limit of movement of the hook is to cause the hook to pass from the position shown in Figure 8 to the position it occupies in Figure 9 and after this occurs, when the needle is withdrawn its path of travel is as shown in Figure 5, the hook staying over to keep hold of the thread, pulling it down toward the handle and then when it is out a considerable distance, the hook moves laterally back to the original position as will be seen from Figure 6. These movements take place by a simple movement of one of the fingers, preferably the thumb, of the hand that grips the handle and then the needle is withdrawn by twisting it out of the opening it caused when it penetrated the suture and the two ends of the thread or suture used in sewing it are available for knotting or for repetition of the stitch as above described.

The means for causing the lateral movement in the construction illustrated comprises a pair of shifting or cam surfaces in the housing 20 which is mounted on the handle and into which is adapted to slide the plate 21, this plate being operated by a suitable thumb piece 22, the shank of which slides in the slot 23 in the housing 20 so that its movement longitudinally is limited. The plate 21 carries the shank 19 of the hook, the shank 19 being broadened as at 24 and being

pivoted as at 25 so that it can swing and its inner end 26 is acted upon at predetermined points.

In the drawing, I show a cam surface 27 which is engaged by the edge 28 of the end 26 of the stem to cause the hook to swing toward the needle to grasp the loop of thread when the hook and its associated parts are at their outer limit of movement as will be seen from Figures 8 and 9.

It is preferred to retain the hook in its position until it is retreated and for this purpose I provide a slight holding means consisting of a small projecting part which can be punched out as shown at 29, this part being on the end 26 and fitting into a slight recess 30 on the underside of the plate 21. As the hook is retreated the end 26 engages the cam surface 31 and is swung the other way as shown in Figure 6 and is held in this position by a second recessed part 32 similar to the recess 30.

It will be evident that a surgeon using this instrument can withdraw the hook out of the way of the needle and hold it there and sew with the needle at the desired point and then without shifting his hand at all, he can move his thumb up to cause the hook to travel across and engage the loop and retreat toward the handle and retain control of the thread so looped or hooked while the needle is withdrawn carrying with it, of course, that part of the thread that was carried in the groove 14 and then with the pulling back on the handle the needle and the hook both will deliver to him at an accessible point, the two ends of the suture that he has inserted.

It will be evident that modifications can be made in the construction of the parts without departing from the scope of the invention.

I claim:

1. An instrument for applying sutures comprising a handle with a needle extending therefrom, and a hook operable from the handle and co-operating means on the hook and handle for causing the hook to move laterally at predetermined points in its longitudinal movement.

2. An instrument for applying sutures comprising a handle with a shank carrying a needle at its end and at an angle thereto,

and a hook slidable longitudinally on the handle, means for sliding the hook and means for moving the hook laterally toward the needle when it arrives opposite the needle.

3. An instrument for applying sutures comprising a handle with a needle projecting from one end, a hook slidable on the handle toward and from the needle, the hook being pivoted to allow lateral movement, and co-acting means on the hook and its support to swing the hook laterally when it is opposite the needle.

4. An instrument for applying sutures comprising a handle with a needle projecting from one end, a hook slidable on the handle toward and from the needle, the hook being pivoted to allow lateral movement, and co-acting means on the hook and its support to swing the hook laterally when it is opposite the needle, and to swing it in the reverse direction when it arrives at the other end of its longitudinal movement.

5. An instrument for applying sutures comprising a handle with a needle projecting from one end, a hook slidable on the handle toward and from the needle, the hook being pivoted to allow lateral movement, and co-acting means on the hook and its support to swing the hook laterally when it is opposite the needle, and to swing it in the reverse direction when it is slid back from the needle.

6. An implement for applying sutures and like threads comprising a handle, a needle extending from one end of the handle, a hook including a stem extending into the handle, a thumb piece for sliding the stem by the hand which grips the handle, and means on the handle for moving the hook end of the stem laterally at predetermined points in its longitudinal movement.

7. An instrument for applying sutures comprising a handle with a needle extending therefrom, the needle having a channel for holding a suture, and a hook operable from the handle both longitudinally and laterally.

In testimony that I claim the foregoing, I have hereto set my hand, this 19th day of November, 1924.

LADISLAUS BIRO.