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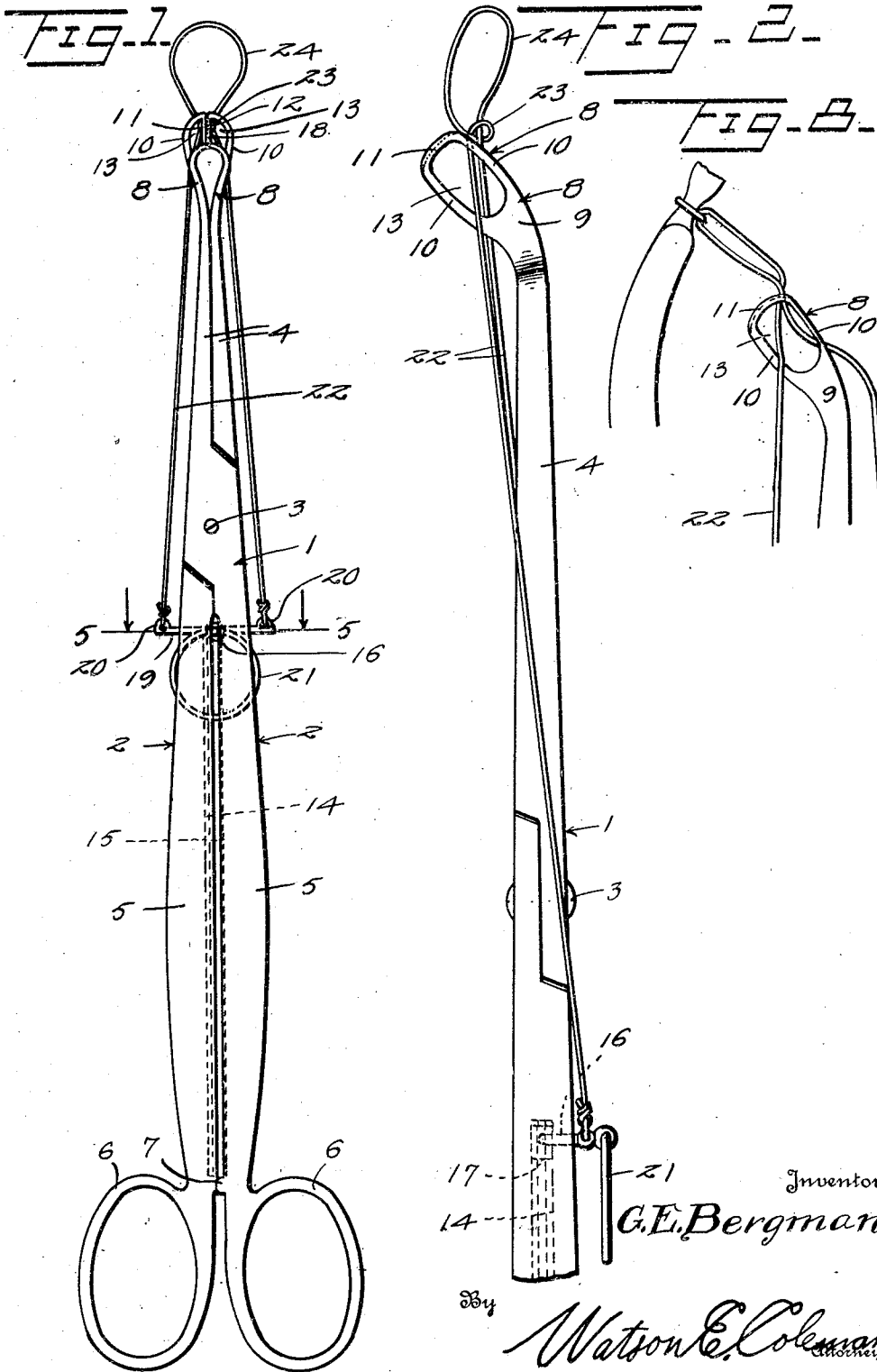
G. E. BERGMAN

1,816,952

LIGATURE HOLDING AND TYING INSTRUMENT

Filed Jan. 16, 1930

2 Sheets-Sheet 1



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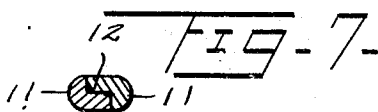
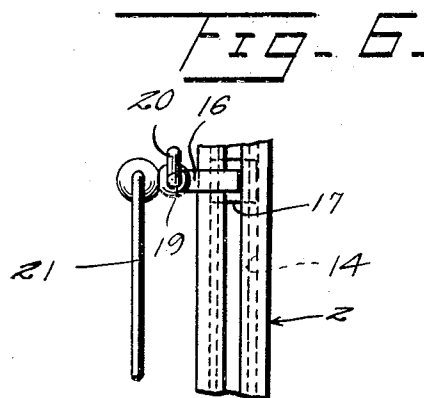
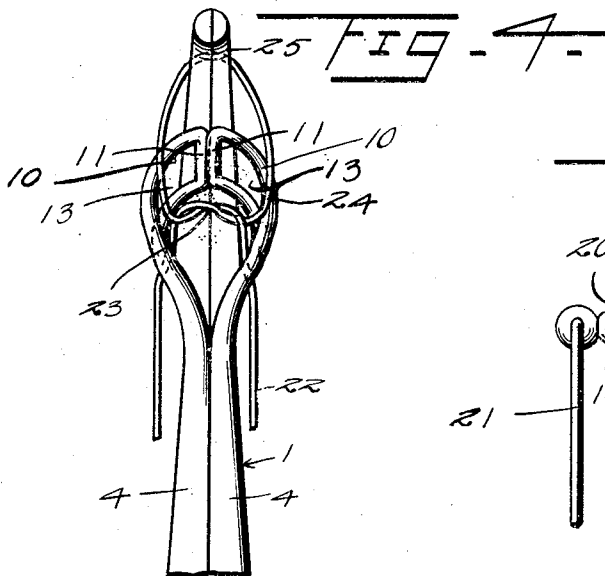
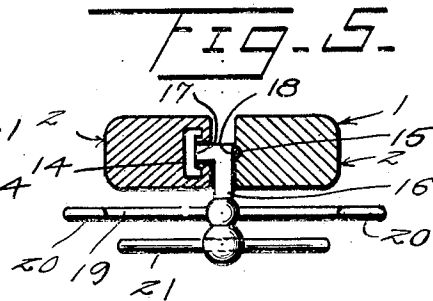
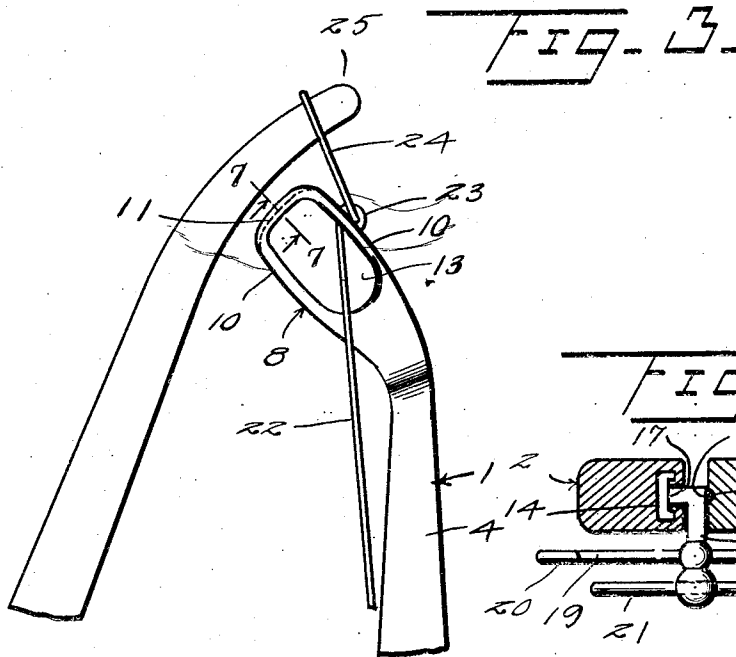
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LIGATURE HOLDING AND TYING INSTRUMENT

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2 Sheets-Sheet 2



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LIGATURE HOLDING AND TYING INSTRUMENT

Application filed January 16, 1930. Serial No. 421,255.

This invention relates to improvements in surgical instruments and pertains particularly to an improved instrument designed to facilitate the tying of a ligature after placing the same in position about an artery.

The primary object of the present invention is to provide a ligator so designed that the loop of a ligature may be readily slipped in place over the end of an artery to be tied and subsequently drawn tight about the artery quickly, easily and with a minimum of pain to a patient.

Another object of the invention is to provide a ligator so designed as to enable an operator to place the loop of a ligature in position and draw the same tight without tearing or otherwise damaging the tissue about the artery to be tied.

Still another object of the invention is to provide a ligator which in addition to serving as a means for placing a ligature in position and tying the same, may be employed in substitution for one of the usual two hemostatic forceps used by a surgeon when trying to locate a bleeding artery or vein, the device therefore performing the double function of acting as a hemostat and a ligature carrier and knoter.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing of the drawings but may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:—

Figure 1 is a back view of the instrument embodying the present invention.

Figure 2 is a view in side elevation of the instrument embodying the present invention.

Figure 3 is an enlarged side elevational view of the tip of the instrument showing the manner in which it is used in connection with a hemostat.

Figure 4 is a view looking toward the back

of the instrument showing the same in use as in Figure 3.

Figure 5 is a cross-sectional view taken on the line 5—5 of Figure 1.

Figure 6 is a view looking at the inner edge of the slotted shank of the instrument.

Figure 7 is a sectional view taken on the line 7—7 of Figure 3.

Figure 8 is a view showing the completion of a tying operation and the manner in which the ligature ends are released by the ligator.

Referring more particularly to the drawings wherein like numerals of reference indicate corresponding parts throughout the several views, the instrument embodying the present invention is indicated generally by the numeral 1. As shown in Figure 1 this instrument is in general design much like the well known hemostatic forceps employed by physicians for grasping and closing the ends of blood vessels to prevent bleeding thereof in that it is made up of a pair of crossed pivotally connected members each of which is indicated by the numeral 2, these members being pivoted together as at 3.

The forward end of each member which is indicated by the numeral 4 will be hereinafter referred to as the tines of the instrument while the rear portions each of which is indicated by the numeral 5 will be referred to as the shanks.

Each of the shanks 5 is formed at its free end to provide a ring 6 one thereof being designed to receive the second finger of the user while the other receives the thumb, and adjacent these rings the shanks have formed upon their opposed faces the catches 7 which, when the instrument is closed, resiliently engage one over the other to maintain the tines 4 at the forward end of the instrument in closed position.

At its forward end each of the tines 4 tapers slightly as shown and terminates in a bowed tip 8, each tine being bent slightly at the point 9 where the tip is joined thereto so that the tip will be directed at an oblique angle from the tine as shown.

As shown the bowed or concave faces of the tips 8 are in opposed relation so that when the tines 4 are brought together the outer ends of

these tips will come into overlapping relation as will be hereinafter more fully described, the tips when so brought together forming an elliptical frame.

Each of the tips 8 comprises two side portions 10 connected at their forward ends by the bar 11 and as is clearly shown one of the bars upon its outer surface is slightly depressed as indicated at 12 so that the bar of the other tip may snugly position thereover and no sharp edge which would be likely to injure tissue against which the instrument contacts, will be formed.

The tips 8 formed in the manner described thus each provides an eye 13 through which one end of a ligature may pass when the instrument is in use, as will be hereinafter more fully described.

The shanks 5 of the instrument are separated slightly between the catch 7 and the pivot point 3 and one of the opposed faces thereof has formed longitudinally therein a guide slot 14, preferably in the form of a T. The opposing face of the opposite shank has formed longitudinally therein a shallow groove 15 which is disposed in the same plane as the central part of the T-slot 14.

Adapted to move between and longitudinally of the shanks 5 is a post 16, the lower end of which is turned laterally and formed to provide a T-head 17 which fits in the slot 14 and is adapted to move longitudinally therein as will be readily understood. Opposite the T-head 17 the post has formed thereon a button 18 which, when the shanks 5 are brought together, engages in the groove 15 of the shank.

Carried by the post is a pair of oppositely disposed laterally directed arms 19 each of which is suitably formed to facilitate the attachment thereto of one end of a ligature. One means whereby a ligature may be attached to one of the arms 19 is by providing the outer end of the arm with an eye 20 through which the end of the ligature may be passed and to which it may be tied.

About the arms 19 the post 16 carries a ring 21 in which a finger of the user of the instrument may engage for the purpose of drawing upon the ends of the ligature attached to the arms 19.

In the use of the present improved ligator the ligature, which is here indicated generally by the numeral 22 first has a single twist knot 23 loosely formed therein so as to provide the loop 24. Each end of the ligature is then passed through one of the eyes 13 and brought back and attached to an arm 19, in the manner shown, the knot 23 being disposed across the elliptical frame formed by the closed tips 8.

The tip of a hemostatic forcep 25 is then extended through the loop 24 and the bleeding blood vessel which is to be ligated grasped thereby. After the bleeding blood vessel has

been secured by the hemostat the ligator 1 is then moved forwardly along the hemostat sliding the loop off of the tip thereof and over the blood vessel. The operator's index finger, engaged in the ring 21, is then drawn back sliding the post toward the rear of the ligator so that the ends of the ligature 22 will be pulled in such a manner as to tighten up the knot 23. The knot 23 initially will be disposed across the tips 8 but it may be drawn slightly therebetween when the ends of the ligature are pulled thus uncovering the edges of the tips so that the same may be pressed firmly in against the tissue surrounding the blood vessel permitting the knot to be firmly secured. Following the complete tightening of the knot the hemostat may be released and removed from position and the ends of the ligature severed from the arms 19 by the use of scissors, following which these ends may be again severed at a point close to the knot.

From the foregoing description it will be readily seen that with an instrument of the character herein described the tissues surrounding a bleeding vessel may be held back thereby until the vessel is located and grasped by a hemostat after which the firm tying of the ligature about the bleeding vessel may be easily and quickly accomplished with a minimum of discomfort to the patient.

Having thus described my invention, what I claim is:—

1. A ligature holding and tying instrument, comprising a body made up of a pair of elongated crossed and pivotally connected members, said members at one end being formed to provide a pair of bowed tips the concave sides thereof being in opposed relation, the said tips each being formed to provide an eye for the passage therethrough of an end of a looped and knotted ligature, and a shiftable element carried by the members adjacent their other ends having the ends of the ligature secured thereto, said bowed tips being directed laterally from the members of which they form a part.

2. A ligature holding and tying instrument, comprising a pair of elongated members crossed and pivotally connected intermediate their ends, each of the members being formed at one end to provide grasping means whereby the ends may be brought together, a bowed tip formed at the other end of each member and obliquely directed therefrom, the tips being disposed to bring their concave faces into opposed relation, the outer ends thereof being adapted to overlap, each of said tips being formed to provide an eye through which the end of a looped and knotted ligature may be passed, and a device reciprocable longitudinally of the members between said grasping means and the pivot point thereof having said ends of the ligature secured thereto.

3. A ligature holding and tying instru-

ment, comprising a pair of elongated members crossed and pivotally connected intermediate their ends, each of the members being formed at one end to provide grasping means whereby the ends may be brought together, a bowed tip formed at the other end of each member and obliquely directed therefrom, the tips being disposed to bring their concave faces into opposed relation, the outer ends thereof being adapted to overlap, each of said tips being formed to provide an eye through which the end of a looped and knotted ligature may be passed, a device reciprocable longitudinally of the members between said grasping means and the pivot point thereof adapted to have said ends of the ligature secured thereto, said element constituting a post slidably carried by one of the members, a pair of laterally directed arms carried by the post and formed at their outer ends to facilitate the attachment of the ligature ends thereto, and means whereby the finger of a user of the instrument may be employed for exerting a pull upon the post.

4. A ligature tying and holding instrument, comprising an elongated body having the forward end thereof designed to form a substantially oval frame having its long axis directed obliquely of the body and joined thereto by a curved neck, said frame having each side open, forming an eye, said frame being designed to support the knot of a looped ligature and said eyes forming guides for the ends of the ligature, and a slide mounted to move longitudinally of and on the body and having the ends of the ligature secured thereto.

5. A ligature holding and tying instrument, comprising an elongated body, a pair of members formed at one end of the body, said members together substantially forming an elliptical frame having its long axis directed longitudinally of the body and each of the members being formed to provide a laterally opening eye for the reception of the ends of a looped and knotted ligature, and longitudinally shiftable means adjacent the other end of the body for holding the ligature ends and for facilitating the pulling thereof to tighten said knot.

6. A ligature holding and tying instrument, comprising an elongated body, an obliquely directed tip at one end of and formed integral with the body, said tip being of a width to support on the top thereof, the knot of a looped and knotted ligature and having openings in the sides thereof extending to and through the top to act as guides for the ends of the ligature threaded therethrough and means to which the ends of the ligature are secured on opposite sides of the body, for drawing the ends of the ligature away from the tip to effect the closing of the loop.

7. A ligature holding and tying instrument, comprising an elongated body, a tip

formed at one end of the body and directed obliquely thereof and designed to support upon its top the knot of a looped and knotted ligature, said tip having guide apertures formed therethrough through which the ends of the ligature may be threaded, said body adjacent its opposite end having a longitudinally extending recess therein, one of the opposed walls of the recess being slotted, a pin having one end extending into said recess and having a laterally turned finger upon said end slidably engaging in said slot, a pair of arms extending from the pin and laterally of the body, each of said arms being formed to facilitate the tying of the end of the ligature thereto, and a finger ring carried by the pin to facilitate the shifting of the same longitudinally in said recess.

In testimony whereof I hereunto affix my signature.

GERTRUDE E. BERGMAN.

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