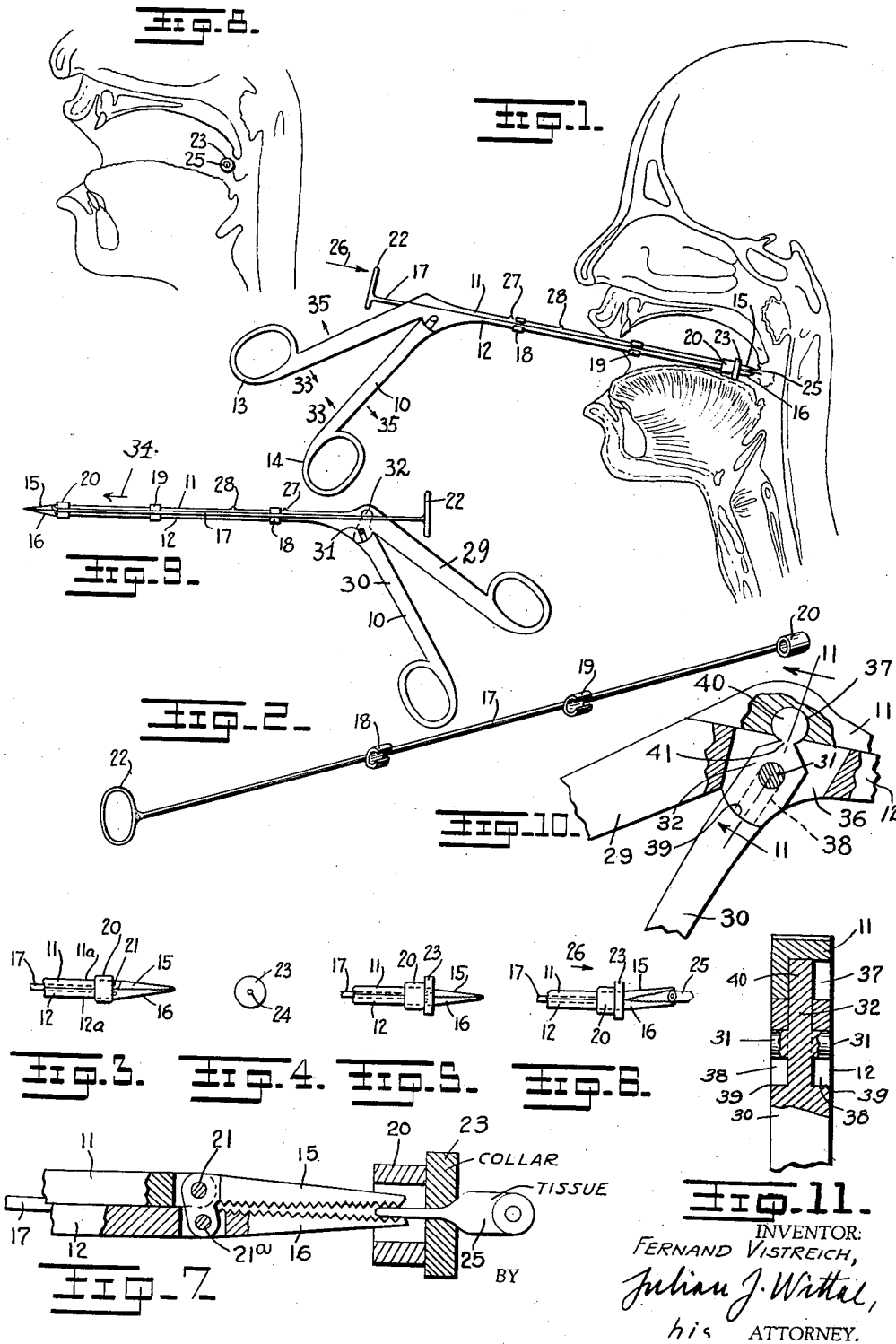


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SURGICAL APPLIANCE  
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## SURGICAL APPLIANCE

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3 Claims. (Cl. 128—325)

This invention relates to a means for use in connection with stopping of bleeding, more particularly in connection with surgical operations which are performed in such fields where the usual method of tying blood vessels is technically difficult.

The control of the bleeding which occurs during a surgical operation, as for instance, when removing the tonsils, is a very important part of such an operation. The routine procedure consists of applying pressure in the fossae by means of gauze sponges and undoubtedly in many cases this will suffice to secure stoppage of bleeding. Nevertheless, even though cessation of the bleeding has been achieved, it is a matter of chance whether a late bleeding will not occur during the early convalescence. The length of time over which this pressure is to be applied is usually not less than three minutes, but often considerably more. Often, too, the bleeding will not stop by simple pressure, and other methods must be resorted to.

The method most frequently used is clamping the bleeding points and applying a catgut ligature on them. This may be an adequate way of controlling the bleeding, but the ligation itself requires special skill of a high degree. Every so often it happens that no sooner the artery forceps is removed from its position the ligature will lose its hold under the eyes of the surgeon, because it was not sufficiently tight, or the catgut tears while being tightened. The whole procedure must be done over and often enough the situation becomes quite serious. The suture is hardly an easier procedure.

Besides the difficulty of these methods, the fact that considerable time is spent in stopping the bleeding, makes a more efficient method of ligation in the tonsillar fossae highly desirable. Efficiency and speed in ligation is just as much, if not more, needed in late hemorrhages after tonsillectomy and other surgical operations.

My invention has for a further object to expedite and satisfactorily apply, by force, an automatically constrictible ligature relative to a bleeding point to stop bleeding.

My invention has for its further object to provide, in a manner as hereinafter set forth, a comparatively simple device for applying an automatically constrictible ligature for the purpose of stopping bleeding.

Embodying the objects aforesaid and others which may hereinafter appear, my invention consists of the novel construction, combination and arrangement of parts as will be more specifically

referred to and illustrated in the accompanying drawing, but it is to be understood that changes, variations and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawing:

Figure 1 is a side elevation looking towards one side of the device or appliance showing the adaptation thereof in applying a ligature after a tonsillectomy, and with the head of the patient shown diametrically in section,

Figure 2 is a perspective view of a push rod and a forcing sleeve forming elements of the device,

Figure 3 is a fragmentary view in side elevation illustrating the position of the parts for receiving a ligature,

Figure 4 is a front elevation of the ligature,

Figures 5, 6 and 7 are fragmentary views in side elevation of the device showing the steps employed when applying a ligature and with Figure 7 upon an enlarged scale and partly in section,

Figure 8 is a diagrammatic view illustrating a bleeding point provided with a ligature,

Figure 9 is a view looking towards the opposite sides of the device or appliance with the ligature omitted,

Figure 10 is a fragmentary view, upon an enlarged scale in side elevation and partly in section of that portion of the device at the upper ends of the handles, and

Figure 11 is a section on line 11, Figure 10.

Referring to the drawing, 10 indicates a scissor acting forceps of the well known so-called alligator type in which an upper element 11 may be caused to slidably move on and with relation to a lower element 12, by the operation of the handles 13, 14, as is well known in this art. The forceps have upper and lower termination lips or jaws 15, 16; said jaws in one relative movement of the members 11 and 12 being tightly closed upon one another, as illustrated in Figures 3 and 5, while in the opposite relative movement of the two elements, they will open up as shown in Figure 6. The jaws 15, 16 are so formed that when they are closed they provide the forceps with a forward terminal portion of tapered contour. The elements 11, 12 will be hereinafter referred to as superimposed supporting elements. The jaws 15, 16 will be hereinafter referred to as combined expander and grip members.

A slidable pushing or operating rod 17 is closely applied along one of the sides of the elements

or members 11, 12. The rod 17, intermediate its ends is secured to the outer faces of spaced, aligned, split, resilient, substantially ovoidal-shaped combined guiding and coupling members 18, 19 which overlap and grip the elements 11, 12. The members 18, 19 not only constitute guides for the rod 17, but also act as couplings for slidably connecting rod 17 to said elements 11, 12. The forward terminal portion of the rod 17 is secured to the outer face of a forcing sleeve 20 adapted to be normally mounted on the elements 11, 12 rearward of the jaws 15, 16 or the tapered forward terminal portion of the forceps formed by the jaws. The sleeve 20 is pulled over the jaws 15, 16 when the jaws are closed, to an extent to be positioned rearwardly beyond the hinge or pivot of the jaw 15. A handle or loop-like grip 22 is at the rear end of the rod 17. The ligature which is applied by the device consists of a comparatively thin resilient rubber disc 23 having a minute axially arranged opening 24. The disc 23 possesses a characteristic of being automatically constrictible when applied at the bleeding point.

When the device applies a ligature relative to a bleeding point which is difficult of access, by way of example, after a tonsillectomy and with the bleeding point indicated at 25, Figure 1, the disc will be pulled over the closed jaws 15, 16 to an extent to abut the forcing sleeve 20, as shown by Figure 5, and when so positioned the wall of the opening 24 will be stretched. After disc 23 is in the position shown by Figure 5, the jaws are opened and positioned about and disposed in relation to grip the outer portion of the tissues surrounding the bleeding point, as is shown by Figure 6. With the jaws in the position shown in Figure 6, the rod 17 is then pushed forwardly carrying the sleeve 20 therewith, whereby the latter will force the disc 23 off the jaws to a position to surround and tightly grip together that portion of the tissues inwardly of the portion gripped by the jaws and thereby stop bleeding. The position of the disc will then be as shown by Figure 7. The forceps are then removed from that portion of the tissues, which are gripped by the jaws, and the disc 23 will then appear as shown by Figure 8.

The operation for stopping is effected in a very short time, that is to say, is expeditiously performed by a device in accordance with this invention. These self-holding ties or ligatures, if properly applied, will remain in position for a few days. They cause no discomfort whatsoever. The patient usually does not know of their presence and they can be thrown off after serving their purpose. They even may be swallowed without danger. The eventualities of a late hemorrhage is practically eliminated.

The instrument may be sterilized by boiling, but the ligatures must be soaked in alcohol.

The push rod may be removed from the forceps, as will be understood and the forceps taken apart as is known in the art, to effect a better cleaning and the same may be assembled in a similar obvious easy manner for new operation.

Limit stops 27, 28 are provided on the sliding member 11 to limit the inward and outward shifting movements of the sliding rod 17. The upper jaw 15 is secured to the upper sliding element or member 11 at the pivot joint 21, but this jaw has a downward extension which is pivoted around the small pin 21a in the lower element or member 12, with which the lower jaw 16 is integral.

The handle 29 is integral with the lower element or member 12, and handle 30 has a pivot 31 and an extension 32 engaging at its rounded upper end or the upper sliding element or member 11. When the two handles 29 and 30 are forced towards each other, as indicated by the arrow 33, the handle 29 with the lower element or member 12 will rock and slide on the pin 31 and the upper element or member 11 will be caused to slide forwardly towards the jaws 15 and 16, as indicated by the arrow 34, thereby causing jaw 15 to rock on the pivot 21a and close on jaw 16.

In a reverse manner, when the handles 29 and 30 are caused to separate as indicated by the arrow 35, the elements or members 11 and 12 will have an opposite relative motion, that is, the element 11 will move outwardly towards the handles 29 and 30, thereby rocking jaw 15 on the pivot 21a in a reverse direction and opening said jaws. The lower element or member 12 in proximity to the handle 29 is formed transversely thereof with a substantially tapered passage 36, opening at its lengthwise edges. The upper sliding element or member 11 is provided in proximity to its rear end with a cutout 37 of a contour greater than a half circle, but less than a complete circle. The cutout 37 opens at one side of the element 11 and communicates at its bottom with the upper end of passage 36. The member 12 is also formed with a pair of spaced aligned inclined cutouts 36 in its sides, which communicate with the passage 36 and open at the bottom edge of member 12.

The handle 30 has a reduced upper end portion which constitutes the extension 32. The latter passes through the passage 36 into the cutout 37. The reduced upper end portion of the handle 30 forms the latter with a pair of shoulders 39 which ride against the bottom edge of the element 12. The extension 32 has a rounded upper end of disc-like form which constitutes a head 40 which is arranged in the cutout 37. The extension 32 intermediate its ends is formed with a reduced part providing a neck 41 of less width than the diameter of said head and cutout. The neck 41 merges into the bottom of the head and is arranged between the ends of the wall of cutout 37. The head 40, cutout 37, neck 41 and extension 32 correlate to connect the parts 11 and 12 together. The pivot pin 31 is integral with and extends laterally from opposite sides of the extension 32. The pin 31 is slidably mounted in the cutouts 38.

What I claim is:

1. In a means for stopping bleeding of a part of the human body, a pair of superimposed upper and lower supporting elements, a pair of oppositely disposed tapered superimposed combined expander and grip members capable of tightly and releasably gripping the outer portion of the tissues surrounding a bleeding point to arrest bleeding, one of said members being integral at its rear end with the forward end of said lower element, the other of said members being pivotally connected at its rear end to the forward end of said upper element to the rear end of the said one member and aligned with said upper element, an axially apertured inherently constrictible disc releasably mounted axially thereof on the rear ends of and having its aperture expanded by said members, said disc releasably binding against said members, interengaging oppositely shiftable means at the rear ends of said elements for imparting a forward and a rear

sliding movement to said upper element relative to said lower element for respectively moving said pivoted member towards and from said integral member, a sleeve mounted on said elements and normally disposed rearwardly of said members and disc, a forwardly and a rearwardly shiftable rod arranged in juxtaposition to one side of said elements and having its forward portion secured to said sleeve and providing when shifted forwardly for said sleeve forcing said disc over said members, while the diameter of the aperture of the disc gradually decreases and off the forward ends of said members to encompass and tightly grip together tissues inwardly of said gripped outer portion of the tissues to stop bleeding while said members are in gripping relation with said outer portion, and a set of spaced, split, resilient couplers common to said rod and elements, secured to one side of said rod and overlapping said elements.

2. In a means for stopping bleeding of a part of the human body, a pair of superimposed upper and lower supporting elements, a pair of oppositely disposed tapered superimposed combined expander and grip members capable of tightly and releasably gripping the outer portion of the tissues surrounding a bleeding point to arrest bleeding, one of said members being integral at its rear end with the forward end of said lower element, the other of said members being pivotally connected at its rear end to the forward end of said upper element, to the rear end of the said one member and aligned with said upper element, an axially apertured inherently constrictible disc releasably mounted axially thereof on the rear ends of and having its aperture expanded by said members, said disc releasably binding against said members, interengaging oppositely shiftable means at the rear ends of said elements for imparting a forward and a rear sliding movement to said upper element relative to said lower element for respectively moving said pivoted member towards and from said integral member, a sleeve mounted on said elements and normally disposed rearwardly of said members and disc, a forwardly and a rearwardly shiftable rod arranged in juxtaposition to one side of said elements and having its forward portion secured to said sleeve and providing when shifted forwardly for said sleeve forcing said disc over said members, while the diameter of the aperture of the disc gradually decreases and off

the forward ends of said members to encompass and tightly grip together tissues inwardly of said gripped outer portion of the tissues to stop bleeding while said members are in gripping relation with said outer portion, a set of spaced, split, resilient couplers common to said rod and elements, secured to one side of said rod and overlapping said elements, and a stop intermediate the ends of and extended from the upper element, said stop being disposed between a pair of said couplers for limiting the extent of the shifting of said rod in one direction.

3. In a means for stopping bleeding of a part of the human body, a pair of superimposed upper and lower supporting elements, a pair of oppositely disposed tapered superimposed combined expander and grip members capable of tightly and releasably gripping the outer portion of the tissues surrounding a bleeding point to arrest bleeding, one of said members being integral at its rear end with the forward end of said lower element, the other of said members being pivotally connected at its rear end to the forward end of said upper element, to the rear end of the said one member, and aligned with said upper element, an axially apertured inherently constrictible disc releasably mounted axially thereof on the rear ends of and having its aperture expanded by said members, said disc releasably binding against said members, interengaging oppositely shiftable means at the rear ends of said elements for imparting a forward and a rear sliding movement to said upper element relative to said lower element for respectively moving said pivoted member towards and from said integral member, a sleeve mounted on said elements and normally disposed rearwardly of said members and disc, a forwardly and a rearwardly shiftable rod arranged in juxtaposition to one side of said elements and having its forward portion secured to said sleeve and providing when shifted forwardly for said sleeve forcing said disc over said members, while the diameter of the aperture of the disc gradually decreases and off the forward ends of said members to encompass and tightly grip together tissues inwardly of said gripped outer portion of the tissues to stop bleeding while said members are in gripping relation with said outer portion, and spaced combined guiding and coupling members secured to said rod and encompassing said elements.

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