Aug. 20, 1940. W. H. STADLE 2,212,133

SURGICAL INSTRUMENT

Filed May 4, 1937 2 Sheets-Sheet 1

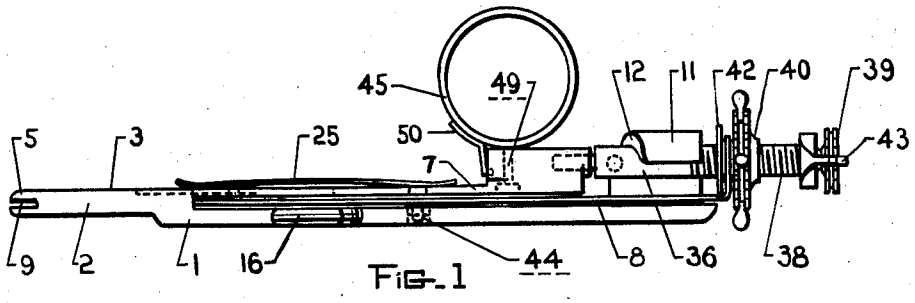


FIG. 1

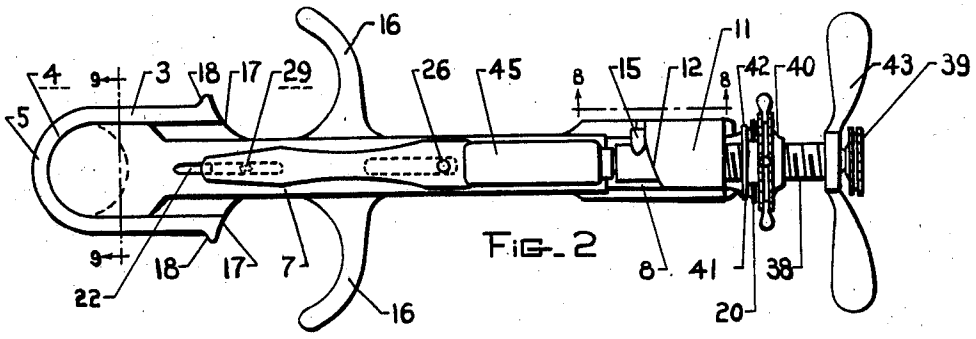


FIG. 2

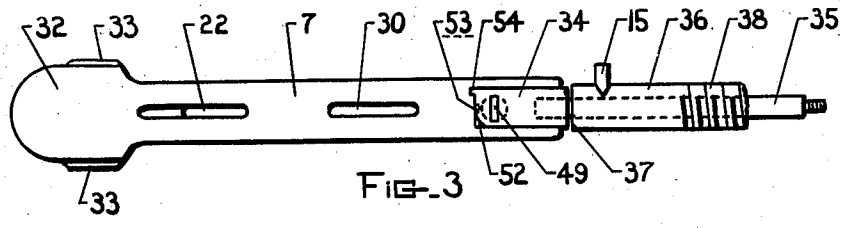


FIG. 3

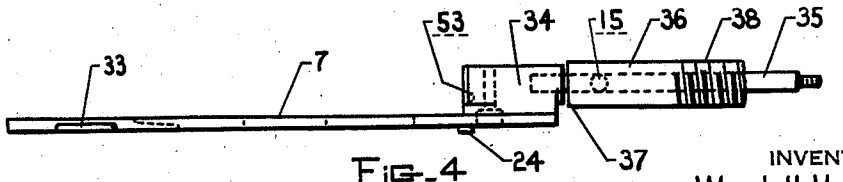


FIG. 4

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SURGICAL INSTRUMENT

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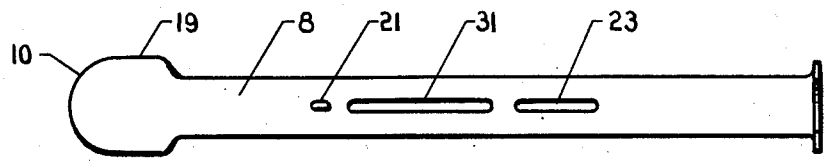


FIG-5

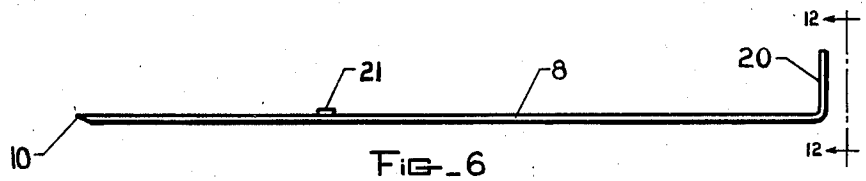


FIG-6

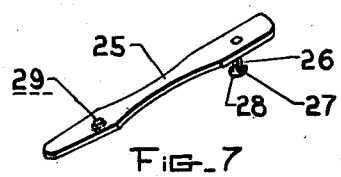


FIG-7

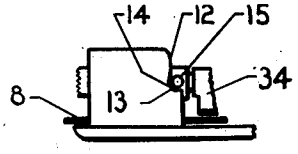


FIG-8

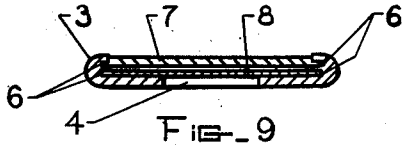


FIG-9

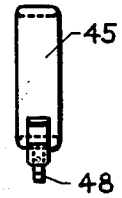


FIG-10

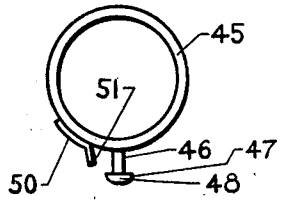


FIG-11



FIG-12

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Patented Aug. 20, 1940 2,212,133

UNITED STATES PATENT OFFICE

2,212,133

SURGICAL INSTRUMENT

Wendell H. Stadle, Battle Creek, Mich., assignor of fifty per cent to Fred J. Melges, Battle Creek, Mich.

Application May 4, 1937, Serial No. 140,609

4 Claims. (Cl. 128—305)

The present invention relates broadly to surgical instruments, and in its specific phases, it is directed at an instrument especially adapted for circumcision operations.

In the past, circumcision operations have been almost universally accomplished through the use of surgical scissors. The use of scissors for this operation almost invariably causes not only a rough and crude finished job, but also causes loss of blood and a cut edge which takes considerable time to heal. The present instrument has been devised to overcome the short-comings of the prior art, accomplish a substantially bloodless operation, and produce a finished job wherein the trimming is perfectly smooth and appears, aside from a shortened fore-skin and mucosa, to be the same as though no operation had been performed.

Accordingly, among the objects of the present invention is the provision of an instrument which is not only especially designed for circumcision operations, but the principles entering into its construction and operation are such that it may be effectively used for some other surgical operations which require amputation, and in some cases hemostasis, for their successful completion.

Another object of the invention is to provide an instrument which, when used in circumcision operations, will permit full vision control of the operation.

Another object of the invention is to so combine the several instrumentalities which make the complete device, that each will complement the other in effecting the various steps required in the complete operation of hemostasia and severing of the part to be removed.

Another object of the invention is the provision of a special hand-gripping or holding means for the instrument, part of which is in close proximity to the point of cutting so as to minimize shaking or moving the instrument which may injure the patient during the carrying out of the operation.

Another object of the invention is to provide a gripping means on the instrument such that when the surgeon tightens his grip, the sharp blade and the dull blade or hemostat will simultaneously be carried forward so that the hemostat will tightly grip the portion to be operated upon.

Another object is to provide the instrument with a cam including means for further tightening the hemostat grip.

A further object is to provide a locking means for holding the hemostat in final gripping position.

A further object is to provide separate means for further controlling the movement of the cutting blade, and by means of which the cutting blade may be forced in a forward direction to sever the piece that is gripped by the hemostat.

A further object of the invention is to provide an instrument wherein the dull blade or hemostat is between the cutting blade and the body of the person being operated upon. This permits the crushing action of the dull blade or hemostat to stop the flow of blood and prevent bleeding after the severing step is completed.

A further object of the invention is to provide a circumcision instrument having relatively adjustable members adapted to grip the part to be severed, whereby the part will be securely held in position for severing by the moveable cutting blade of the instrument.

A still further object is to provide a surgical instrument having clamping and cutting members adapted to be operated with one hand to effect the preliminary gripping of the part to be severed, while leaving the other hand free to control the point of severing, following which such second hand may be utilized to complete the clamping of the instrument and then operate the cutting blade mechanism to effect the desired removal of tissue or the like.

A still further object of the invention is to provide a surgical instrument of the character described having its members of strong and simple construction and associated together in such manner as to be adapted for convenient disassembly for cleaning and sterilization, as well as for replacement or repair of any part thereof, for instance, the sharpening of the cutting blade.

Other objects and advantages will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims, the annexed drawings and the following description setting forth in detail certain means for carrying out the invention, such disclosed means illustrating, however, but one of various ways in which the principle of the invention may be used.

In said annexed drawings:

Figure 1 shows a side assembly view of one form of the improved surgical instrument.

Figure 2 shows a top view of the instrument shown in Figure 1.

Figure 3 shows a top view of one preferred form of the dull or hemostat blade together with certain associated parts.

Figure 4 is a side view of the dull or hemostat blade shown in Figure 3.

Figure 5 is a top view of one preferred form of sharp blade usable in the instrument shown in Figure 1.

Figure 6 is a side view of the sharp blade shown in Figure 5.

Figure 7 is a perspective view of one form of locking device for fastening the dull and sharp blades to the frame of the instrument, while permitting such blades to be moved in an endwise direction.

Figure 8 is a side view of the instrument taken along the line 8—8 of Figure 2.

Figure 9 is a section of the instrument taken at the cutting end thereof along the line 9—9 of Figure 2.

Figure 10 is an edge view of the thumb ring.

Figure 11 is a side view of the thumb ring shown in Figure 10.

Figure 12 is an end view of the cutting blade as taken along the line 12—12 of Figure 6.

Referring more particularly to the drawings, Figure 1 shows an assembly of one form of the improved surgical instrument having a longitudinal supporting base 1 preferably flat on its upper side and rounded at its under side. This supporting base 1 is provided at its forward end with a laterally disposed guide head or nose 2 having an upstanding rim portion 3 extending about the sides and front end thereof, and provided with an aperture 4 adjacent the forward end of the guide head 2. This aperture 4 may be rectangular, triangular, elliptical, or of other shape suited to the particular work to be performed. The rim portion 3 partially encircles the aperture 4 and continues along the outer edges of the guide head 2. This rim portion 3 is preferably provided on its inner edge with grooves 6 (Figure 9) for guiding the dull blade or hemostat 7 and the sharp blade 8. The forward end of the guide head 2 is preferably provided with a slit or cut-away portion 9 (Figure 1) into which the cutting edge 10 of the sharp blade 8 may pass when projected forward during the severing step. The use of a slit or the like 9 permits a shearing action with the blade and yet prevents the cutting edge 10 of the sharp blade 8 from being forced up against a metal surface which would dull it.

The supporting base 1 is formed with an upstanding guide flange 11, preferably integral, of substantially inverted J shape in cross-sectional contour at the end thereof remote from the aperture 4. The use of an upstanding guide of this shape facilitates the disassembly of the instrument. The guide flange 11 is provided on the edge thereof facing the guide head 2 with a cam face 12 and a stop 13. The cam face 12 is preferably cut back slightly so as to form a pocket 14 (Figure 8) into which the cam follower 15 may drop when forced to the end of its travel, thus locking it against free-return movement during the course of a surgical operation. Instead of cutting back the cam face 12 to form the pocket 14, a slight hump may be placed on the cam face 12, or other means adapted to accomplish the same locking action. The illustration of pocket 14 in Figure 8 is intended to be considered as diagrammatically illustrating any of these locking means. Intermediate of guide head 2 and the upstanding guide flange 11 are placed laterally extending finger grip pieces 16. For circumcision operations, it is preferable to have these finger pieces just far enough from the rear end of guide head 2 that the surgeon's fingers may readily grip same, and yet when he reverses the gripping motion to pull the dull and sharp blades back, his fingers may push against the back faces 17 of the guide head 2. The guide head 2 may be perfectly straight from front to back, but for extra pushing surface, small projections 18 may be used. If desired, these projections 18 may be continued and join the outer ends of the finger pieces 16, thus making a complete closed ring for the fingers on each side of the instrument. For most purposes, however, it is more convenient to use the open construction, as shown in Figure 2, which facilitates quick release of the instrument, and yet permits adaptability of the instrument to considerable variation in size of fingers, while eliminating extending parts which might interfere with the use of the instrument in some operations.

The sharp blade 8 with its enlarged head 19 and cutting edge 10 is adapted to be laid on the upper face of longitudinal supporting base 1 and slid forward in the lower groove 6 of guide head 2. The opposite end of the cutting blade 8 is preferably provided with an upturned substantially U shaped member 20 (Figures 6 and 12) or other suitable means adapted to engage with a propelling mechanism, as will be hereinafter set forth. If desired, sharp blade 8 may be provided with a projecting guide member 21 adapted to project part way into and slide in guide slot 22 of dull blade 7 (Figure 3). A guide slot 23 may be provided in sharp blade 8 to receive a projecting guide member 24 on the under face of dull blade 7 (Figure 4). The use of projecting guide member 24 and guide slot 23 may be dispensed with if desired, since the dull and sharp blades are already guided at their head ends and are provided with a spring clip locking mechanism 25 (Figure 7) which has a stud 26 depending from the lower side near one end thereof and having a head 27 formed with the sides thereof extending transversely of the longitudinal axis of the spring member 25 and flattened as indicated at 28. The opposite end of the spring clip locking mechanism 25 is provided on its under face with a projecting member 29 adapted to slide in the upper side of guide slot 22 (Figure 2). With the spring clip locking mechanism 25 in place as is shown in Figures 1 and 2, the stud 26 will project downward through guide slot 30 in dull blade 7 and guide slot 31 in sharp blade 8 and into longitudinal supporting base 1 which is provided with an opening 44 (Figure 1) adapted to receive stud 26 and head 27 with the spring clip locking mechanism 25 turned at right angles to the position shown in Figure 2. By then turning the spring clip locking mechanism 25 to the position shown in Figure 2, it will lock the assembly in place in well-known manner. The sides of stud 26, acting in conjunction with guide slot 30 of the dull blade 7 and guide slot 31 of the sharp blade 8, will act to guide the respective blades in their forward and back movement.

The dull blade 7 is provided on its forward end with an enlarged head 32, the forward end of which has the same general contour as the inner edge of the rim portion 3 of guide head 2 at the forward end of aperture 4. The same general contour is preferably used to facilitate, when the dull blade is projected forward to locked position, the uniform gripping of the membrane to be severed. The enlarged head is also preferably provided on its edges with somewhat thinner projecting edge members 33 adapted to slidably engage the upper groove 6 (Figure 9) of the rim portion 3 of guide head 2. At the end of said

dull blade 7 opposite to said enlarged head 32 is provided an enlargement or boss 34 (Figures 3 and 4), preferably integral therewith. A rod or spindle 35 carried by the enlargement 34 extends in axial alignment therewith and in parallelism with the plane of the upper face of the dull blade, but at a higher level than the upper face of said dull blade and extending sufficiently therebeyond to carry the mechanisms for operating the sharp and dull blades. A sleeve 36 is mounted for rotation on the spindle 35 and is provided with a cam follower 15 arranged to protrude from the side thereof adjacent to the forward end of the sleeve, which forward end movably bears against the end of enlargement 34 at 37. The sleeve 36 is screw threaded externally for part of its length, as indicated at 38. A nut 39 threadedly engages the spindle 35 at its outer end and is used to removably fasten sleeve 36 on the spindle.

A thumb nut or wheel 40 is adapted to engage the threaded portion 38 of sleeve 36 and is formed with a forwardly extending collar portion 41 having a radially extending annular flange 42 at its forward end. A wing member 43 is secured to the sleeve 36 at the rearward or threaded end thereof by any suitable means adapted to fixedly or removably secure the wing member 43 thereon so as to move in unison therewith. One convenient way to accomplish this is to cut the end of sleeve 36 to square, hexagon, or like shape and provide the wing member 43 with an opening adapted to fit the so-prepared end of sleeve 36.

In assembling the instrument, the dull blade 7 with sleeve 36, thumb nut 40, wing member 43, and nut 39 are placed over the sharp blade 8 with its U-shaped member 20 projecting upward and engaging the collar portion 41 of thumb nut 40 inside of annular flange 42. This assembly of the dull and sharp blades is then slid endwise under the upstanding substantially inverted J-shaped guide flange 11 of the longitudinal supporting base 1 until the enlarged ends 19 and 32 of the sharp and dull blades respectively engage grooves 6 in the sides of guide head 2 of the instrument. Spring clip locking mechanism 25 is then placed with stud 26 and its flattend head 27 over opening 44 in the longitudinal supporting base 1 and the stud 26 passed downward through guide slot 30 in the dull blade 7 and guide slot 31 in the sharp blade 8. The spring clip locking mechanism 25 is then swung from its position at right angles to the lengthwise axis of the instrument to parallelism therewith, as shown in Figure 2, whereupon head 27 of stud 26 will engage the shoulders at the lower end of the stud receiving slot to prevent removal of stud 26. Projecting member 29 on mechanism 25 will at the same time engage with the upper edge of guide slot 22 to hold the parts of the instrument together in desired manner. Thumb ring 45 is then set cross-wise of the instrument and stud 46 with head 47, having flattened sides 48, passed downward through slot 49 in enlargement 34 of dull blade 7. The lower end of slot 49 is preferably enlarged to permit a 90 degree rotation of thumb ring 45 so that head 47 will hold same against vertical removal. Any suitable means may be provided for fastening the thumb ring 45 in place. For instance, a spring member 50 with projecting point 51 may be adapted to follow a rounded surface 52 (Figure 3), or the like, on enlargement or boss 34 of dull blade 7. A suitable depression 53 may be provided for the reception of projecting point 51 of spring member 50 when thumb ring 45 is turned to the position shown in Figures 1 and 2. A stop 54 may be provided to prevent the turning of the thumb ring 54 past the latching position where projecting point 51 of spring member 50 rests in depression 53. Other means may be used for detachably fastening thumb ring 45 in place, and if desired, the thumb ring 45 may be mounted on a threaded stud adapted to engage a corresponding threaded opening in the enlargement or boss 34 of dull blade 7. The use of a detachable thumb ring 45 is particularly advantageous in aiding the disassembly of the instrument for cleaning and sterilization purposes.

In practice, the operation of the instrument is as follows: The instrument is grasped with the thumb passing through thumb ring 45 and the fingers gripping the laterally extending finger pieces 16 with the dull and sharp blades retracted to leave a clear aperture. The tissue to be severed is passed through the aperture 4 and after determining the amount of tissue to remove, the surgeon grips the instrument so as to carry the thumb ring 45 forward and with it the dull blade 7 and sharp blade 8, the sharp blade 8 preferably being retracted so as not to cut the tissue when this preliminary gripping takes place. With the dull blade 7 thus forced forward into gripping position, all of which is done with one hand, the surgeon can then release his other hand, which he has been using to guide the tissue to be severed, and take hold of wing member 43 and rotate same so that cam follower 15 will follow cam face 12 to locking pocket 14 at stop 13. The dull blade in this position will have crushed the tissue at the point to be severed, and in doing so, will have sealed the blood vessels at that point. Then the rotation of thumb nut or wheel 40 in a forward direction on threads 38 will, through its engagement with U shaped member 20 at the end of sharp blade 8, project sharp blade 8 forward and sever the tissue projecting through the aperture 4. Thumb nut 40 may then be rotated in a backward direction, thus releasing any frictional holding of the severed tissue so that same may be disposed of. It is in most cases preferable to leave the dull or hemostat blade in the forward or crushing position until hemostasis takes place, a thing which normally takes a half minute or less. Wing member 43 may then be rotated to release the dull blade and permit the surgeon to back same up by extending the fingers of his operating hand in contact with back faces 17 of guide head 2.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. In a surgical instrument of the character described, an elongated supporting base having an aperture therethrough at one end, a sharp blade and a dull blade slidably mounted on the base and having operative ends cooperating with said aperture, lateral finger-gripping means on the supporting base in proximity of the apertured end thereof, means detachably mounted on said dull blade between the finger-gripping means and the end remote from the operative

end for moving the dull blade, and a manually adjustable connection between the ends of the blades remote from the operative ends thereof, whereby both blades may be moved in unison and whereby the sharp blade may be moved relative to the dull blade.

2. In a surgical instrument of the character described, an elongated supporting base having an aperture therethrough at one end, a sharp blade and a dull blade slidably mounted on the base and having operative ends cooperating with said aperture, lateral finger-gripping means on the supporting base in proximity of the apertured end thereof, means detachably mounted on said dull blade between the finger-gripping means and the end remote from the operative end for moving the dull blade, a manually adjustable connection between the ends of the blades remote from the operative ends thereof, whereby both blades may be moved in unison and whereby the sharp blade may be moved relative to the dull blade, and a cooperating pin and cam member carried by the dull blade and supporting base for moving the operative end of the dull blade into operative position and constructed and arranged to prevent accidental movement of the pin relative to the cam for holding the dull blade in operative position.

3. In a surgical instrument of the character described, an elongated supporting base having an aperture therethrough at one end, a sharp blade and a dull blade slidably mounted on the base and having operative ends cooperating with said aperture, lateral finger-gripping means on the supporting base in proximity of the apertured end thereof, means detachably mounted on said dull blade between the finger-gripping means and the end remote from the operative end for moving the dull blade, and a manually adjustable connection between the ends of the blades remote from the operative ends thereof, whereby both blades may be moved in unison and whereby the sharp blade may be moved relative to the dull blade, said detachably mounted means comprising a ring detachably engaged with the dull blade, and means carried by the ring and cooperating with the dull blade for holding the ring engaged with the dull blade.

4. In a surgical instrument of the character described, an elongated supporting base having an aperture therethrough at one end, a sharp blade and a dull blade slidably mounted on the base and having operative ends cooperating with said aperture, lateral finger-gripping means on the supporting base in proximity of the apertured end thereof, thumb-engaging means carried by the dull blade in proximity of the finger-gripping means for moving the dull blade, and a manually adjustable connection between the ends of the blades remote from the operative ends thereof, whereby both blades may be moved in unison and whereby the sharp blade may be moved relative to the dull blade.

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