

Nov. 9, 1926.

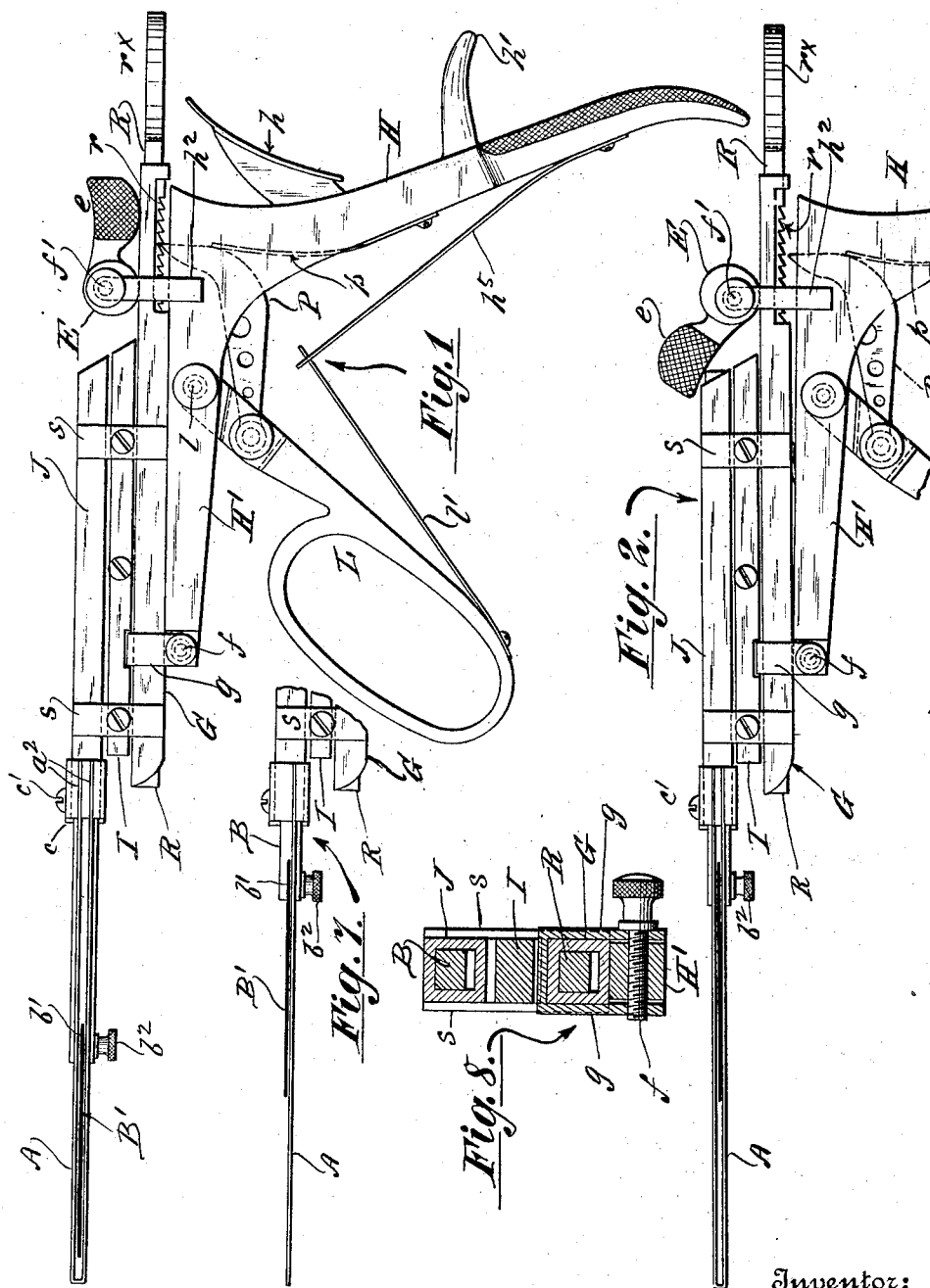
A. A. R. BERGER

1,606,498

SURGICAL INSTRUMENT

Filed May 26, 1926

2 Sheets-Sheet 1



Inventor:

Alfred A. R. Berger,

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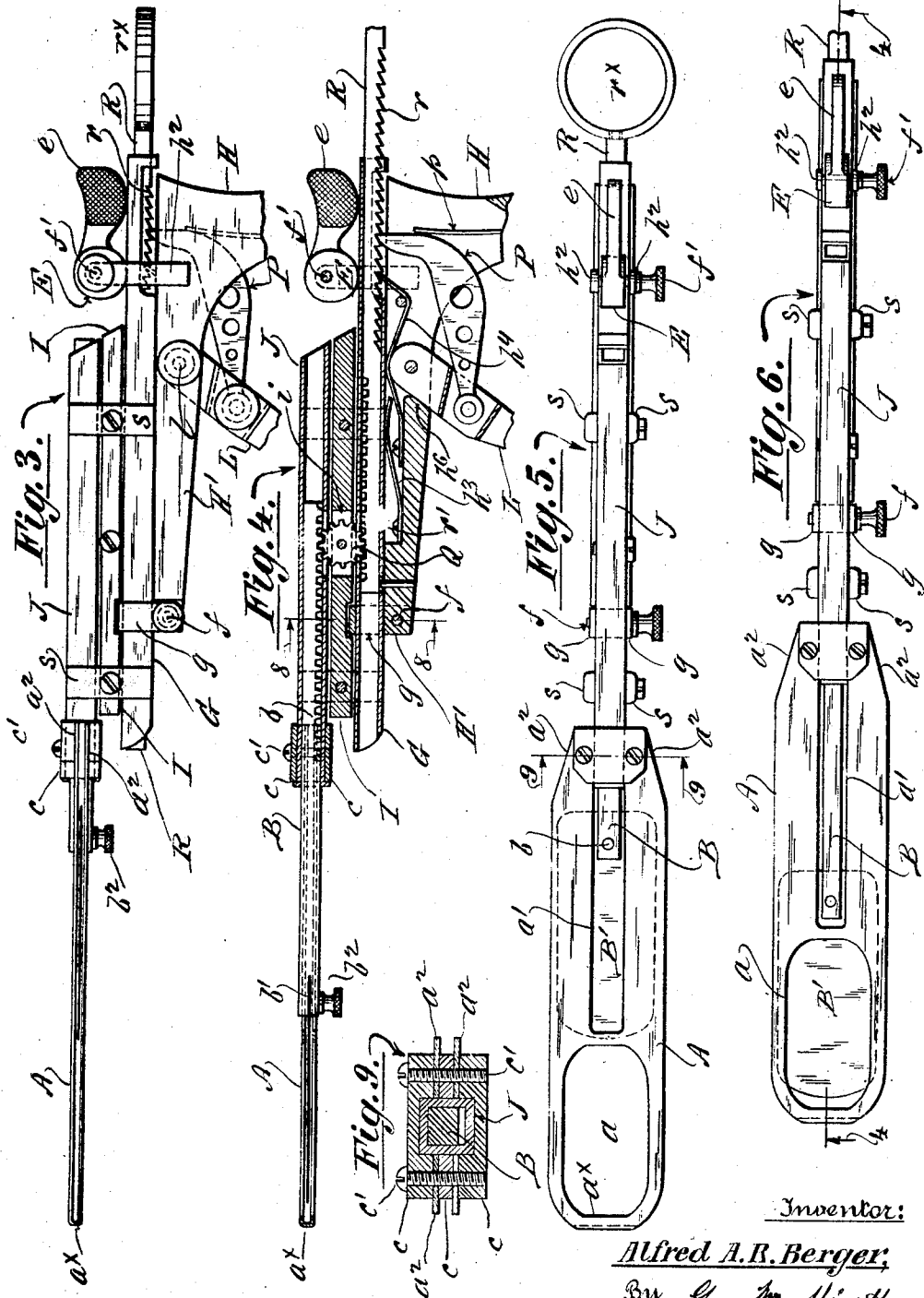
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2 Sheets-Sheet 2



Inventor:

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UNITED STATES PATENT OFFICE.

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SURGICAL INSTRUMENT.

Application filed May 26, 1926. Serial No. 111,736.

While available for various other purposes and operations, my improved surgical implement is especially adapted for the removal of tonsils, adenoids, and analogous purposes known in the art of surgery,—my object being to afford an instrument of this character of simple but substantial construction of component parts, affording facile adjustment and smooth, even manipulation, of adequate power, non-retractile in actuation, and conformable to the varying requirements and conditions of employment, all as hereinafter fully set forth; the invention consisting in the specific combination, arrangement and co-ordination of parts and appurtenances described and claimed.

In my concurrent application Serial No. 49,707, filed August 12th, 1925, I set forth somewhat analogous means for actuating and controlling a snare rod and wire for use in surgical operations of the character designated, whereas my present invention and improvements relate more particularly to the mounting and manipulation of a cutter blade for like or similar surgical uses,—the two inventions being co-related to that extent but the present invention involving additional mechanism for cutter blade control.

In the accompanying drawings I illustrate a practical embodiment of the essential features of my invention in a surgical device of the character designated, although I do not limit myself to the identical form, construction, and arrangement of component parts and appurtenances shown herein by way of exemplification, since changes may be made in minor details, and equivalent mechanical expedients resorted to with like results, and without departing from the spirit and intent of my invention in this respect.

With this understanding:—

Fig. 1, represents a side elevation of my improved surgical cutting implement with the blade in advanced position;

Fig. 2, is a similar view of the upper portion of the implement with the cutter blade retracted and the latch eccentric turned to release the rack bar;

Fig. 3, is a view like unto Fig. 2, but showing the cutter blade retracted, and the latch eccentric closed upon the rack bar tube;

Fig. 4, is a central longitudinal sectional elevation of the upper portion of the im-

plement, with the parts positioned as shown in Fig. 1;

Fig. 5, is a top view of the implement with the parts positioned as illustrated in Fig. 3;

Fig. 6, is a view similar to Fig. 5, with the parts positioned as illustrated in Figs. 1 and 4;

Fig. 7, is a detail view showing a modification in the construction of the cutter blade guard loop;

Fig. 8, is a transverse section, upon a larger scale, taken upon plane of line 8—8, Figs. 1 and 4.

Fig. 9, is a transverse section taken upon plane of line 9—9, Fig. 5.

The handle H, of my new surgical instrument is formed integral with a forward bracket extension H', on which the operative parts are mounted. Said handle proper H, is also formed with a rigid thumb rest h, and a rigid straddle rest h', the latter for fitting in the crotch between the thumb and palm of the hand of the manipulator.

Pivotaly attached to the forward end of the bracket extension H', is a longitudinal guide tube G, rectangular in cross section, and formed with integral bearing lugs g, g, through which the fulcrum screw f, extends as well as through said bracket extension H', as shown more particularly in Fig. 8, of the drawings.

Integral with the rear portion of the bracket extension H', are upright side lugs h², h², forming bearings for another fulcrum screw f', on which the clamp-eccentric E, is mounted, said clamp-eccentric E, being formed with a handle e, by means of which the eccentric may be applied to or raised from the guide tube G, upon occasion. A spring h³, countersunk in the upper side of the bracket extension H', bears against the under side of the guide tube G, and tends constantly to hold the rear portion thereof against the eccentric E, as shown more particularly in Fig. 4, of the drawings.

Slidably mounted in the guide tube G, is a longitudinal rack-ratchet bar R, formed on its under side with a series of ratchet teeth r, r, as also shown more particularly in said Fig. 4, of the drawings; a detent spring h⁴, also countersunk in the upper side of the bracket extension H', engaging with said ratchet teeth r, r, and preventing forward movement of the said ratchet bar

R, when the guide tube G, is clamped to the bracket extension H', by means of the eccentric E, as in Figs. 1, 3, 4 and 5, of the drawings.

5 The inner or rear extremity of the rack-ratchet bar R, is formed with a finger ring r^* , to facilitate preliminary adjustment thereof, and also to afford means whereby both hands of the manipulator may be utilized if necessary in effecting successful operation in case of exceptional resistance to severance of the anatomical part to be removed.

15 The pawl P, for engagement with the teeth r, r , of the rack-ratchet bar R, is pivotally connected with the finger lever L, which is fulcrumed at l , to the underside of the bracket extension H', and a spring p , attached to the handle H, tends constantly to hold the otherwise free end of the pawl P, in engagement with said ratchet teeth, r, r , as shown in Figs. 3 and 4, of the drawings.

20 A leaf spring h^5 , attached at its lower extremity to the handle H, contacts and interlocks with a corresponding spring l' , attached to the finger lever L, the two said springs, acting in conjunction, tending constantly to thrust and hold said lever L, into its forward position and against the shoulder h^6 , on the bracket extension H', as shown in Fig. 4, of the drawings.

25 When the eccentric E, is turned upward as in Fig. 3, the spring h^3 , tilts the guide tube G, on its fulcrum f , sufficiently to raise the rear of the rack-ratchet bar R, and its ratchet teeth r, r , out of contactual engagement with the pawl P, and detent h^4 , as indicated in Fig. 2, provided the finger lever L, is in normal forward position as in Figs. 1, 2, 3 and 4, so that the rack-ratchet rod R, may be forwarded and adjusted longitudinally within and through the guide tube G, by means of the finger ring r^* , on the rear end of the ratchet rod R, according to requirements. The turning of the eccentric E, back to normal position as in Figs. 1, 3, 4 and 5, re-establishes operative engagement of the ratchet teeth r, r , with the said pawl P, and detent spring h^4 , so that when the finger lever L, is drawn toward the handle H, the ratchet bar R, will be retracted more or less according to the extent of movement imparted to said finger lever L. Thus, in the preliminary stages of an operation, a full stroke of the finger lever L, may be resorted to, retracting the rack-ratchet bar R, a corresponding number of teeth, after which the finger lever may be so manipulated as to move the ratchet bar R, only to the extent of one, two or more teeth as required, it being understood that the finger lever L, when released, is returned automatically, by means of the springs l', h^5 , to its normal forward position against the rest shoulder h^6 , on the bracket extension H'.

The construction and arrangement of parts thus far described herein are essentially the same as that set forth in my aforesaid concurrent application Ser. No. 49,707, except that the ratchet bar R, is not formed with a 70
snare rod, the function of the substitute rack-ratchet bar R, in the present case being to actuate and control the rack bar B, through the medium of the pinion Q, as will be understood by reference more particularly to Fig. 4, of the drawings. 75

To this end the upper side of the rack-ratchet bar R, is formed with rack teeth r' , which mesh with said pinion Q, and in like manner the under side of the rack-bar B, is formed with rack teeth b , also meshing with said pinion P. 80

The pinion Q, is mounted on and between the side walls of a recess i , formed for the purpose in the intermediate partition I, which latter, together with the secondary guide tube J, for the rack bar B, is rigidly attached, by means of side straps s, s , to the pivotally supported primary guide tube G, containing the rack ratchet bar R, as before stated. Hence, the primary and secondary guide tubes G, and J, and the intermediate partition I, are all practically mounted on the fulcrum screw f , of the bracket extension H', of the handle H, as will be understood by reference more particularly to Fig. 4, of the drawings, so that the release of the primary guide tube G, by cam-eccentric E, and the tilting of said guide tube G, by the spring h^3 , will correspondingly and simultaneously tilt the secondary guide tube J, thus maintaining the mesh of the pinion Q, with both rack bars R, and B, under all circumstances and conditions of use. 85
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A cutter blade B', is rigidly mounted on the forward extremity of the rack bar B, the latter being formed with a bifurcate end slot b' , for the reception of the shank of the blade, and a binding screw b^2 , being provided for detachably securing the blade in position. 105
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A blade guard plate A, formed with an operative loop aperture a , is rigidly attached to the forward extremity of the guide tube J. This blade guard plate A, may be single in character, extending only on the underside of the blade, as indicated in the modification shown in Fig. 7, of the drawings, but is preferably duplex in character as shown in the other figures of the drawings, extending around and beyond the cutter blade B, and parallel to both the upper and lower sides thereof. In either case the rear portion of the blade guard plate is slotted, as at a' , to accommodate the rack B, and its shank ends a^2, a^2 , are rigidly secured to the forward end of the guide tube J, by means of clamping plates c, c , and screws c', c' , as indicated clearly in Fig. 9, of the drawings. 115
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The end α , of the operative loop aperture α , affords a bearing for resistance to the action of the cutter blade upon occasion during an operation on parts to be severed or removed.

The function of the ratchet bar R, in the construction and arrangement of parts herein set forth is to actuate the cutter bar B, through the medium of the pinion Q, but in operations where the use of a snare wire is preferable in lieu of the knife, I contemplate the removal of both the blade rack bar B, and the rack ratchet bar R, and the substitution in lieu of the latter of a snare rod as set forth in my aforesaid concurrent application Ser. No. 49,707, so that a single instrument of this character is thus adapted to all the varying requirements of surgical use.

What I claim as my invention and desire to secure by Letters Patent, is:—

1. In a surgical instrument of the character designated, the combination of a handle formed with a bracket extension, a primary guide tube pivotally mounted on said bracket extension, a secondary guide tube rigidly attached to said primary guide tube, a cutter rack bar positioned in said secondary guide tube, a cutter blade attached to said rack bar, a rack-ratchet bar positioned in said primary guide tube, an intermediate pinion mounted between and meshing with said cutter rack bar and with said rack-ratchet bar, clamping means mounted on said handle and adapted to bind the said primary guide tube to said bracket extension, elastic resilient means arranged to press said pivotally mounted primary guide tube against said clamping means, a finger lever fulcrumed on said handle and a spring pawl pivotally connected with said finger lever and engaging with the teeth on the said rack-ratchet bar in the primary guide tube, substantially in the manner and for the purpose set forth.

2. In a surgical instrument of the character designated, the combination of a handle formed with a bracket extension, a primary guide tube pivotally mounted on said bracket extension, a secondary guide tube rigidly attached to said primary guide tube, a cut-

ter blade guard rigidly attached to said secondary guide tube and formed with an operative aperture, a cutter rack bar positioned in said secondary guide tube, a cutter blade attached to said rack bar, a rack-ratchet bar positioned in said primary guide tube, an intermediate pinion mounted between and meshing with said cutter rack bar and with said rack-ratchet bar, clamping means mounted on said handle and adapted to bind the said primary guide tube to said bracket extension, elastic resilient means arranged to press said pivotally mounted primary guide tube against said clamping means, a finger lever fulcrumed on said handle, and a spring pawl pivotally connected with said finger lever and engaging with the teeth on the said rack-ratchet bar in the primary guide tube, substantially in the manner and for the purpose set forth.

3. In a surgical instrument of the character designated, the combination of a handle formed with a bracket extension, a primary guide tube pivotally mounted on said bracket extension, a secondary guide tube rigidly attached to said primary guide tube, a cutter blade guard rigidly attached to said secondary guide tube and formed with an operative aperture, a cutter rack bar positioned in said secondary guide tube, a cutter blade attached to said rack bar, a rack-ratchet bar positioned in said primary guide tube, an intermediate pinion mounted between and meshing with said cutter rack bar and with said rack-ratchet bar, clamping means mounted on said handle and adapted to bind the said primary guide tube to said bracket extension, elastic resilient means arranged to press said pivotally mounted primary guide tube against said clamping means, a finger lever fulcrumed on said handle, and a spring pawl pivotally connected with said finger lever and engaging with the teeth on the said rack-ratchet bar in the primary guide tube, together with elastic resilient means interposed between said finger lever and the handle and tending to hold the said finger lever in retracted position as related to the handle, for the purpose and substantially in the manner set forth.

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