

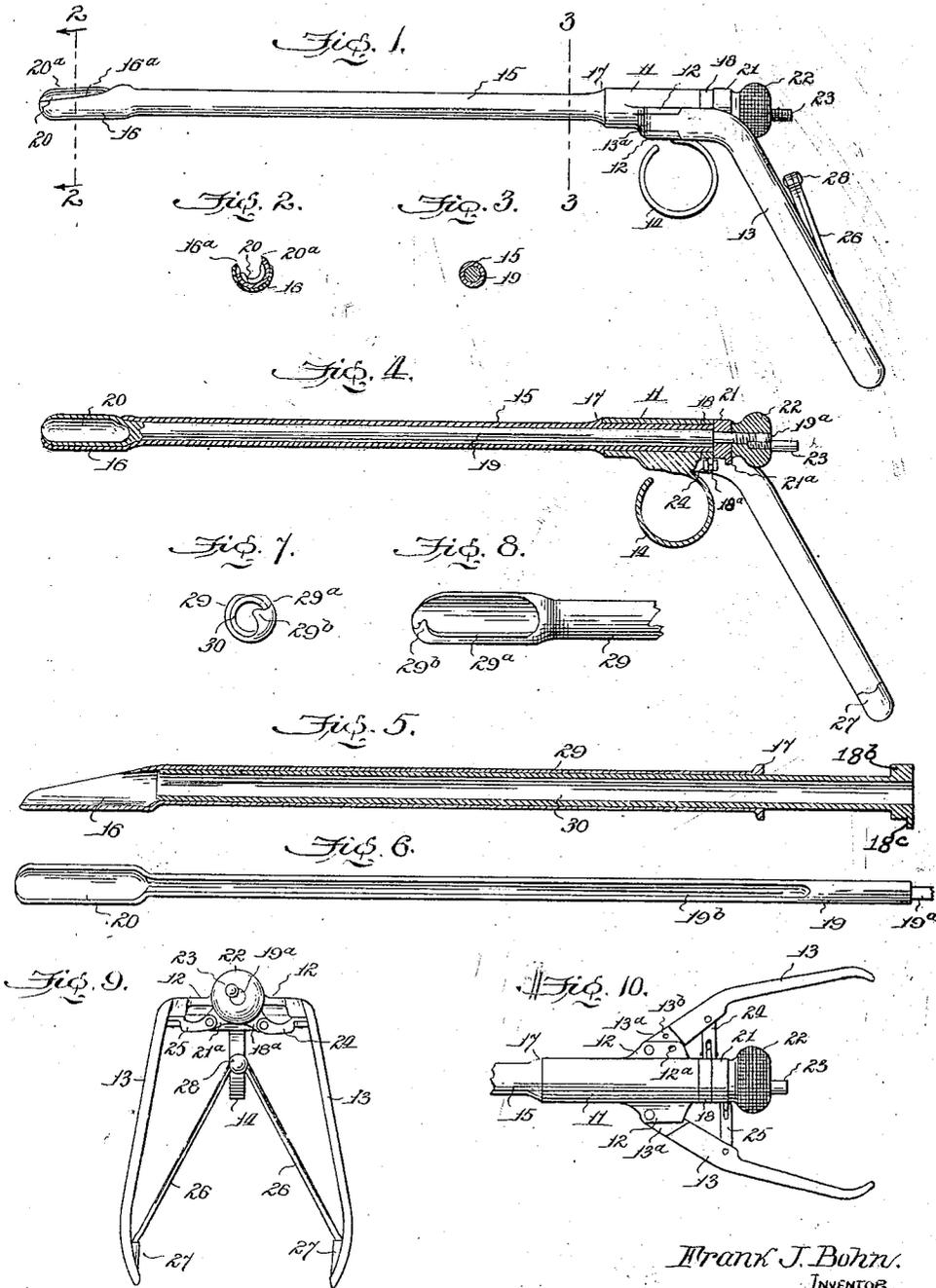
May 6, 1924.

1,493,240

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SURGICAL BONE CUTTER AND EXTRACTOR

Filed Feb. 15, 1923



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SURGICAL BONE CUTTER AND EXTRACTOR.

Application filed February 15, 1923. Serial No. 619,075.

To all whom it may concern:

Be it known that I, FRANK J. BOHN, a citizen of the United States, and a resident of Baltimore, in the county of Baltimore and State of Maryland, have invented certain new and useful Improvements in Surgical Bone Cutters and Extractors, of which the following is a complete specification.

My invention is an improvement in surgical instruments, and relates more especially to a cutting implement employed for the purpose of operating in the nose, ear and throat.

The primary object of my invention is to provide an instrument of this general character in which the cooperating cutting members may be readily passed into small passages, as for instance the nose, and manipulated to sever a bone, cartilage or other growth it may be desired to remove, the cutting members giving a shearing cut longitudinally and laterally of the instrument and providing for extracting the severed portion with the withdrawal of the instrument.

A further object of my invention is to provide a cutting implement or surgical instrument which is easily operated and of the required strength so that the cutting members or cutting edges thereof will give a clean cut when severing bone or other tissues.

My invention also contemplates a construction of the instrument whereby the several parts thereof may be readily and conveniently separated for the purpose of sterilization.

Other objects and advantages of my invention will hereinafter appear, and what I claim as new and desire to protect by Letters-Patent is more specifically set forth in the appended claims.

In the accompanying drawings:

Fig. 1 is a side elevation of a surgical instrument constructed in accordance with my present invention.

Fig. 2 is a transverse sectional view on the line 2—2 of Fig. 1.

Fig. 3 is a sectional view on the line 3—3 of Fig. 1.

Fig. 4 is a longitudinal sectional view through the instrument.

Fig. 5 is an enlarged view of a modification, showing the preferred manner of con-

structing the barrel carrying one of the cutting members.

Fig. 6 is an enlarged detail view of the rod working in the barrel and carrying the other cutting member.

Figs. 7 and 8 are detail views showing the cutting members of the parts shown in Figs. 5 and 6.

Fig. 9 is a rear view of the cutting implement, and

Fig. 10 is a plan view of the rear end of the implement.

Like numerals of reference indicate like parts in all the figures of the drawings.

In carrying out my invention I provide a body portion 11 bored longitudinally at its center to receive a rotatable barrel, hereinafter described, and formed near its rear end at opposite sides with lateral extensions recessed horizontally to provide pairs of ears 12 12, said ears being preferably located immediately below the plane of the longitudinal center of said body portion to give an unobstructed view along the upper part of the instrument. Between the ears and extending rearwardly therefrom are pivoted handles 13 13, being curved downwardly preferably at the angle shown in the drawings, said handles being reduced in thickness at their inner ends, as at 13^a, for pivotal connection with the ears, and are movable towards each other for operation of the parts of the instrument which carry the cutting members. The handles may be held normally separated by springs 26 26 seated in pockets 27 at the ends of said handles and connected together at their upper ends by a pin 28. Furthermore the underside of the body portion 11 may be provided with a finger ring 14 cooperating with the handles in the operation of the same.

A rotatable barrel 15 is mounted in the longitudinal bore of the body portion, fitting closely therein and extending a suitable distance from the forward end thereof to give the required length for convenient operation of the implement, one of the cutting members, as 16, being located at the outer end of the barrel. The barrel is held in place against longitudinal movement in the body portion by shoulder 17 and collar 18 at front and rear ends respectively of said body portion, the collar being sweated on or otherwise attached and provided with an

integral member, as ear 18^a, for connecting thereto the means, such as hereinafter described, by which the aforesaid barrel is turned upon the manipulation of one of the handles.

Extending longitudinally through the barrel 15 and independently rotatable therein is a rod or stem 19 having at its outer end a cutting member 20 operable within the cutting member 16 to cooperate therewith, for which purpose this member 20 has a cutting edge 20^a opposing the cutting edge 16^a and having a sliding motion thereunder. The rod extends slightly beyond the rear end of the barrel to receive a collar 21 with an integral member or ear 21^a for connecting thereto the means for turning said rod upon the manipulation of the other handle than that operating the barrel, the collar being keyed on the rod by fitting the opposite flattened sides of the reduced end 19^a of the latter and is held in place thereon by a nut 22. For convenience in removing the nut and collar to permit the rod to be withdrawn from the barrel by drawing it out of the forward end thereof the nut is in the form of a knurled button and is more securely locked on the rod by a pin 23 threaded in registering key slots or grooves in the meeting surfaces of the button and rod. As will be noted by reference to the drawings the cutting members 16 and 20 at the outer end of the barrel and rod respectively are semi-cylindrical in cross-section, one, as 20, being of slightly less diameter than the other, 16, to work closely therein, and in their normal position the cooperating cutting edges thereof diverge forwardly, after the manner of the blades of a pair of scissors to give a shearing cut when said rotatable members are operated, and the forward ends of both members may be curved inwardly to a more or less extent to provide a transverse cut at the end of the stroke; for instance the ends may be curved inward only slightly, as shown in Figs. 1 and 4, or to a greater extent as shown in Figs. 7 and 8. Furthermore, any desired shape may be given to the main cutting edges instead of having them straight as shown in the drawings.

For turning the barrel 15 and rod 19 in opposite directions, for the cutting operation, by the manipulation of the handles 13 one of said handles is connected to the ear 18^a projecting from the barrel or collar thereof by a link 24, and the other handle is likewise connected by a link, 25, to the ear 21^a projecting from the collar on the rod, said links being pivoted to said handles as well as to the ears on said barrel and rod and are cut away at their upper edges as shown so that the collars will not interfere with their swinging movement, being received in the recesses when the handles are

closed. In order that one handle only may be operated, when desired, as for instance when it is desirable to position a stationary cutting edge against the part to be severed, the other handle is connected to the body portion when closed by means of a pin (not shown) inserted in the registering holes 13^b and 12^a in said handle and companion ears 12 on the body portion adjoining the pivot of the knuckle-joint connection of said parts.

Having described the construction and arrangement of the several parts of the implement the operation of the same will be readily understood, for when the handles are gripped lightly to leave them separated the cutting edges of the semi-circular members 16 and 20 at the outer end of barrel and rod are likewise separated ready for cutting, and for making an operation, for instance in the nasal passage, the outer end of the implement is inserted therein to locate the part of the bone or other growth to be removed between said cutting edges, and the bone may be now severed by pressing the handles towards each other causing the connecting links 24 and 25 to rotate the barrel and rod in opposite directions correspondingly rotating the cutting members 16 and 20 to make the cut. The part of the bone which is removed drops into the semi-circular cutting members and being enclosed therein will be removed with the implement by retaining the grip on the handles to maintain said members closed. In effecting the operation the surgeon has a clear unobstructed view into the nasal passage along the barrel, and the body portion of the implement being below the center of the rear portion of the barrel will not interfere with the view. It may be here mentioned that the particular construction of the implement provides not only for cutting through hard bone as well as softer growths but also effects a clean cut, an important consideration in surgical operations.

The cutting edges may be any of a variety of shapes, as hereinbefore stated, according to the nature of the operation to be performed, and consequently it will become customary for the surgeon to keep several implements at hand each having a different size cutting head and cutting edges of a particular shape. However, instead of several complete implements to provide for different operations it may be found more practicable and economical to only provide several sets of barrels and rods for substitution in a single body portion carrying the operating handles, inasmuch as the barrel and rod are removable from said body portion and collars 18 and 21 by simply removing the pin 23 and nut 22; but in this instance the collar 18 would have to be removably at-

tached to the inner end of the barrel 15 (accomplished in any well known manner) instead of being sweated on as hereinbefore mentioned. This construction for separating the barrel and rod from each other and from the body portion will also provide for more readily and thoroughly cleaning the several parts and sterilizing the same. On the other hand it may be found desirable to connect the barrel to the body portion permanently with a close joint at the ends of said body portion between it and the collars 17 and 18.

In Fig. 5 I have shown a modification which consists in making the barrel composite, that is of two metals, the inner portion or body 30 being of Monel metal with the forward end portion thereof covered by a shell or sleeve 29 of hardened steel to provide a tempered steel cutting member 16 for said barrel, the body portion terminating at the inner end of the cutting member. The sleeve or steel shell may be extended inward any suitable distance, but as shown is extended sufficiently to provide the shoulder 17 which fits against the outer end of the body portion of the implement as hereinbefore described. Furthermore, this body portion of the barrel may have the collar 18^b carrying the pivot-ear 18^c formed integrally therewith, as indicated in said Fig. 5, said collar and aforementioned shoulder on the shell corresponding with collar 18 and shoulder 17 in Fig. 4, for receiving the body portion of the implement between them. With this construction of barrel it is connected to the body portion of the implement by first inserting the body portion 30 of the barrel into the body portion 11 of the implement to bring the collar 18^b against said body portion 11 and then the sleeve or shell is slipped on to the body portion 30 until the shoulder 17 fits against the forward end of body portion 11, after which the parts may be sweated together. It may be desirable to taper the body portion 30 towards its outer end and correspondingly taper the interior of the shell. By forming the barrel in this manner the bore through the same to receive the rod 19 will not rust and therefore can be kept clean and more sanitary than when the barrel is made of solid steel as indicated in Fig. 4.

As the rod 19 is assembled within the barrel 15 by sliding it into the same from the forward end thereof it is necessary to provide said rod with a longitudinal groove 19^b at one side from front to near the rear if the outer end of the cutting member on the companion barrel is turned in, as at 29^b (Figs. 7 and 8) at the outer edge of the cutting edge 29^a, whereby in assembling the parts said inward end 29^b will take into the groove 19^b and follow along the same as the rod is pushed into place.

Before stating the claims upon which I base my claims for patent protection attention may be drawn to the fact that the general construction of the implement may be modified to a more or less extent, for instance by leaving off either the spring separating the handles or the finger ring which assists in gripping said handles, or leaving off both the spring and ring, and the construction may be changed as to the details or individual parts of the implement beyond the changes herein shown and described, in so far as the appended claims may contemplate such changes.

I claim:

1. A surgical instrument comprising a body portion forming a supporting member, a barrel rotatably supported by said body portion and having an edged cutting member at its outer end, a rod supported for independent rotation with respect to the barrel and having an edged cutting member cooperating with the cutting member on the barrel, and means carried by the body portion and connected to the barrel and rod for turning the same.

2. A surgical instrument comprising a body portion forming a supporting member, a barrel rotatably supported by said body portion and having an edged cutting member at its outer end, a rod supported for independent rotation with respect to the barrel and having an edged cutting member cooperating with the cutting member on the barrel, means carried by the body portion and connected to the barrel and rod for turning the same, and means for locking one of the rotatable parts to the body portion.

3. A surgical instrument comprising a body portion forming a supporting member, a barrel rotatably supported by said body portion and having a semi-cylindrical member at its outer end with a straight cutting edge extending at an angle to the axis of the barrel, a rod rotatable with respect to the barrel and having a semi-cylindrical cutting member with an edge cooperating with the cutting edge of the member on the barrel to provide a shearing cut, and means carried by the body portion and connected to the rotatable parts for turning the same.

4. A surgical instrument comprising a body portion forming a supporting member, a barrel rotatably supported by said body portion and having a cutting member with a straight longitudinal cutting edge extended inward at its outer end, a rod rotatable within the barrel and having a cutting member rotatable within the aforesaid cutting member with a straight cutting edge and inward extension cooperating with the corresponding cutting edges of the member carried by the barrel, and means carried by the body portion and connected to the rotatable parts for turning the same.

5. A surgical bone cutter and extractor comprising a barrel having a semi-cylindrical portion at its outer end with a cutting edge at one side, a rod rotatable within the barrel and having a semi-cylindrical portion at its outer end with a cutting edge at one side cooperating with the cutting edge on the barrel, the semi-cylindrical portions combining to provide a closed receptacle receiving the part severed by the cutting edges, and means for turning the barrel and rod one upon the other.
6. A surgical instrument comprising a body portion forming a supporting member, a barrel supported by said body portion and having a semi-cylindrical member at its outer end with a cutting edge at one side extended inwardly at the outer end of said member, a rod rotatable within the barrel and having a groove at one side for the passage of the intumed end of the cutting edge on the barrel in assembling the parts, and a semi-cylindrical member on the rod rotatable within the corresponding member on the barrel and having an edge cooperating with the aforesaid cutting edges; together with means for turning the rod within the barrel.
7. A surgical instrument comprising a body portion, handles pivoted thereto and normally separated from each other, a barrel supported by said body portion and having an edged cutting member at its outer end, a rod rotatable within the barrel and having an edged cutting member cooperating with the aforesaid cutting member of the barrel, a pivot-ear projecting from the rod, and a link pivoted to one of the handles and to said pivot-ear for turning the rod.
8. A surgical instrument comprising a body portion, handles pivoted thereto and normally separated from each other with a spring for separating the same, a barrel rotatable within the body portion and having an ear projecting therefrom, said barrel also provided with an edged cutting member at its outer end, a rod rotatable within the barrel and having an edged cutting member cooperating with the aforesaid cutting member of the barrel, a pivot-ear projecting from the rod, a link pivoted to one of the handles and to the pivot-ear on the barrel, and a link pivoted to the other handle and to the pivot-ear on the rod, for operating the barrel and rod, respectively, by manipulation of the handles.
9. A surgical instrument comprising a body portion, handles pivoted thereto and normally separated from each other, a barrel rotatable within the body portion and having an ear projecting therefrom and an edged cutting member at its outer end, a rod rotatable within the barrel with a pivot-ear projecting therefrom and an edged cutting member at its outer end cooperating with the aforesaid cutting member of the barrel, links pivoted to the handles and to the pivot-ears, respectively, for operating the barrel and rod in opposite directions by manipulation of said handles, and means for locking one of the handles against movement.
10. A surgical instrument comprising a body portion having handles pivoted thereto and projecting rearwardly therefrom, a composite barrel supported by the body portion and comprising a body portion of Monel metal and an outer sleeve of steel, the latter having an edged cutting member formed at its outer end, a rod rotatable within the composite barrel and having an edged cutting member cooperating with the aforesaid cutting member, and means connected to one of the handles and to the rod for turning the latter.
11. A surgical instrument comprising a body portion, having handles pivoted thereto at opposite sides thereof to extend rearwardly for movement towards and from each other, a barrel rotatable within the body portion and having an edged cutting member at its outer end, a collar fixed on the rear end of the barrel at the rear end of said body portion and having a pivot-ear, a rod rotatable within the barrel and having an edged cutting member at its outer end cooperating with the aforesaid cutting member on the barrel, a collar with a pivot-ear fixed on the rear end of the rod, and a nut threaded on the rod to hold said collar in fixed position; together with a link pivoted to one of the handles and to the pivot-ear carried by the barrel, and a link pivoted to the other handle and to the pivot ear carried by the rod, for turning the barrel and rod in opposite directions upon manipulation of the handles.
12. A surgical instrument comprising a body portion and barrel the latter having a cutting member at its outer end, a rod rotatable within the barrel and having a cutting member cooperating with the aforesaid cutting member, handles pivoted to the body portion and connected to the barrel and rod for turning the same, and handles having pockets at the lower ends of the same, and a spring for separating the handles having terminals seated within the pockets.

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