

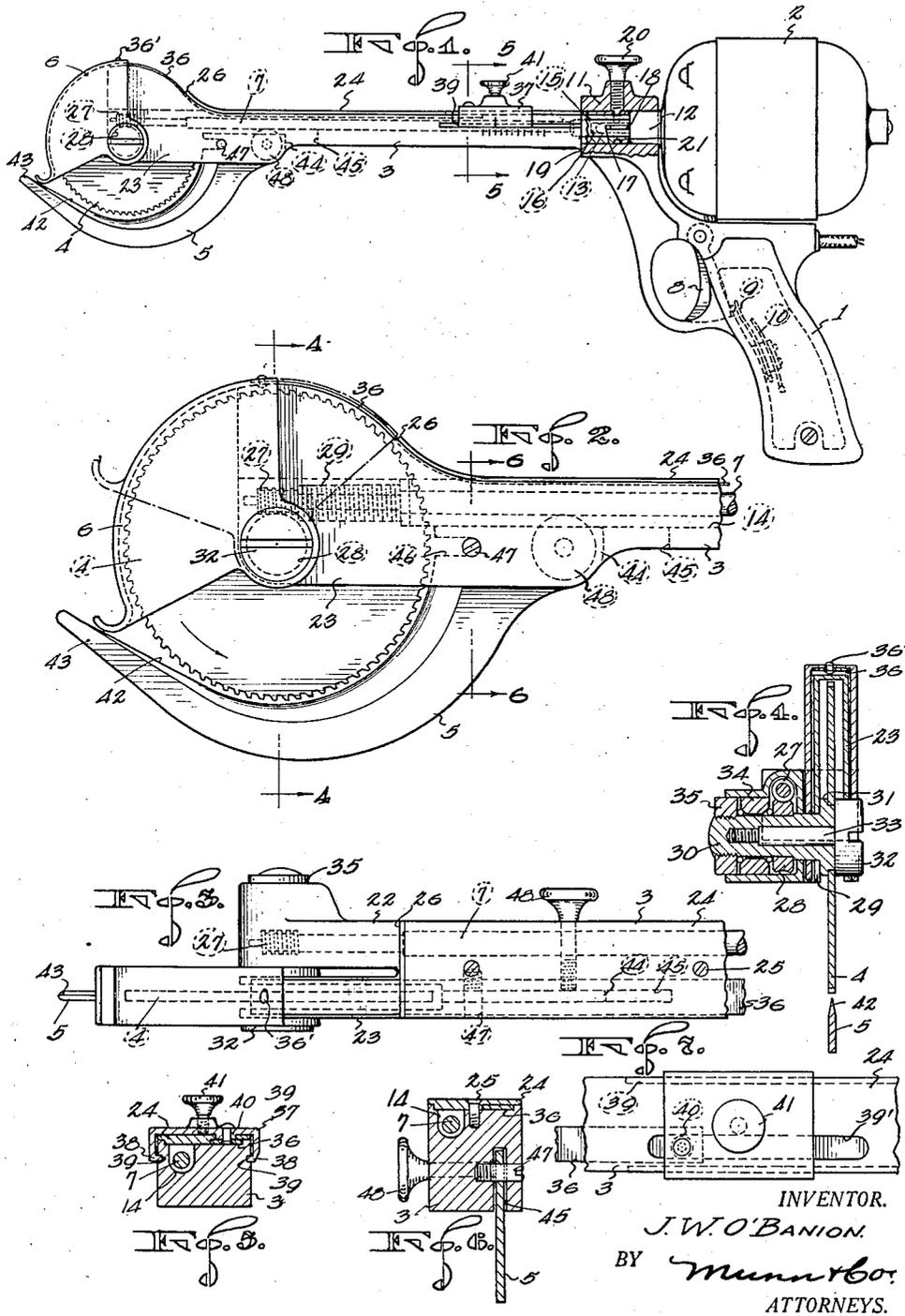
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SURGICAL INSTRUMENT

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SURGICAL INSTRUMENT

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5 Claims. (Cl. 128—317)

The present invention relates to surgical instruments and its principal object is to provide a tool adapted to be used for removing a plaster cast from a patient.

5 More particularly it is proposed in the present invention to provide a tool whereby the plaster cast may be cut or sawed without injury or irritation to the skin under the cast.

10 It is further proposed to provide an instrument of the character described which is motor driven and which can be handled with the greatest ease by the attending person. It is further proposed to provide a tool of the character described in which a guard is provided for covering the rotary
15 saw in such a manner that all parts of the saw except that particular portion of its periphery engaged in the actual cutting operation are fully covered so that no injury may result on account of accidental contact with the teeth of the revolving saw.

20 It is further proposed in the present invention to provide certain details of construction for carrying out the above objects.

25 Further objects and advantages of my invention will appear as the specification proceeds.

The preferred form of my invention is illustrated in the accompanying drawing in which

Figure 1 shows a side elevation of my surgical instrument, portions being shown in section;

30 Figure 2 an enlarged detail view in side elevation of the operating end of my instrument;

Figure 3 a top plan view of that portion of my device shown in Figure 2;

35 Figure 4 a vertical section taken along line 4—4 of Figure 2;

Figure 5 a vertical section taken along line 5—5 of Figure 1;

40 Figure 6 a vertical section taken along line 6—6 of Figure 2; and

Figure 7 a top plan view of an intermediate portion of my instrument illustrating the manipulating means for adjusting a guard forming a part of my invention.

45 While I have shown only the preferred form of my invention, I wish to have it understood that various changes or modifications may be made within the scope of the claims hereto attached without departing from the spirit of the invention.

50 In its principal features my invention comprises a pistol grip 1 having a motor 2 mounted thereon, and having a shank 3 extending therefrom in the outer end of which is supported the rotary
55 cutter 4, the guide 5, and a guard 6, while a shaft

7 within the shank transmits movement from the motor to the rotary saw.

The pistol grip 1 is provided with a trigger 8 adapted to bear on a leaf spring 9 and causing the latter to make contact with a second leaf
80 spring 10, the two leaf springs forming a switch for the motor 2 so that when the trigger is pulled the motor becomes active.

The grip is formed with a sleeve 11 into which extends a portion 12 of the motor housing. The
85 latter serves as a bearing for the motor shaft 13. The shank 3, which is substantially rectangular in form as shown for instance in Figure 5, is rounded at its rear end so as to be adapted for insertion into the sleeve 11 in such a manner
90 that the shaft 7, which is accommodated in a groove 14 in the shank, is aligned with the motor shaft. The shaft 7 is enlarged at its rear end as shown at 15, and is cored as shown at 16 to receive the motor shaft 13, which latter is provided with a transverse pin 17 adapted to be slidably received in two slots 18 of the rear end of the shaft 7. Due to this construction the shank 3 with its shaft 7 may be pulled out of the sleeve 11 as a unit, and may be cleaned in an antiseptic
95 liquid without wetting the motor. The shank is formed with a shoulder 19 limiting its penetration into the sleeve 11 while a set screw 20 engaging with a groove 21 prevents accidental removal of the shank from the sleeve.

Toward its outer end the shank 3 is split into two sections 22 and 23, the former being in alignment with the shaft 7 which occupies one side of the shank 3, while the section 23 is a continuation of the other part of the shank. The shank itself
90 is formed with a removable cover 24, which may be held in place by screws 25 and which extends through the major portion of the shank, being rounded at its rear end so as to fit into the sleeve 11 and stopping at the front end at 26 adjacent the beginning of the split sections 22 and 23.

The shaft 7 extends into the section 22 and carries a worm 27 adapted for engagement with a gear 28, which latter is co-axially mounted with the rotary cutter 4 and drives the same. The section 22 has a removable threaded bearing 29 which allows of the introduction of the worm 27.

The section 23 of the shank 3 is made in the form of a hood adapted to receive through a slot
105 29 the bolt 30 carrying the rotary cutter 4, which latter is held in place between a shoulder 31 of the bolt 30 and the head 32 of the second bolt 33 adapted to be threaded into the first bolt 30. Partly supported on the bolt 30 and partly on the
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head 32 there is a guard 6 adapted to cover the exposed section of the cutter 4.

The bolt 30 is supported by a bearing 34 within the section 22 and the latter is held in place by a nut 35.

The guard 6, which is sector shaped and swingable on the axis of rotation of the cutter 4, is actuated by means of a leaf spring 36 attached to its rear end as shown at 36' and covering one portion of the cutter and then extending into the upper portion of the shank 3, where it is confined between the shank and the cover 24, with freedom of sliding motion. The rear end of the spring 36 is fastened to a slide 37 movable on the shank, the slide having projections 38 adapted to ride in corresponding grooves 39 in the shank. The cover 24 is formed with a slot 39' allowing the connecting portion 40 of the slide and the spring to ride therein as the slide is moved. The slide may be held in adjusted position by means of a set screw 41.

The guide 5 for the rotary cutter forms a part of the shank 3 and is made in the form of a crescent having an inner knife blade 42 mounted to encircle the lower section of the cutter and terminating in a pointed end 43 diverging from the cutter. The guide may be fastened to the shank in any suitable manner and is preferably fastened by its rear end 44 being introduced into a slot 45 in the bottom of the shank, so that a slot 46 of the guide passes over a pin 47 extending through the slot 45, while a screw 48 holds the guide in its final position.

The manner of using my device will be readily understood from the foregoing description. Underneath the plaster cast there is usually provided some cloth material such as gauze, and if the plaster is to be removed the point 43 of my surgical instrument is inserted between the gauze and the plaster, while the slide 37 is retracted to cause the guard 6 to swing on the axis of rotation and to provide an opening for the plaster. The guard is preferably adjusted, corresponding to the thickness of the plaster to be cut, so that the lower end of the guide rides on top of the plaster. After the instrument has thus been adjusted and positioned, the operator pulls the trigger 8 so that the motor starts the rotary cutter, which now draws a kerf through the plaster material, the cutter rotating in the direction of the arrow. It will be noted that my construction entirely safe-guards the patient against accidental cutting, and it also protects the operator, since no part of the rotary saw is exposed. The cutter saws through the

plaster with great ease and with little annoyance to the patient. After the operation is completed the entire shank, with the shaft 7 and the tool assembly, can be removed from the pistol grip and the motor by merely unscrewing the set screw 20. To gain access to the saw teeth the operator may either retract the guard 6, or may remove the guide 5 which can be done without any difficulty and merely requires the unscrewing of the set screw 48.

I claim:

1. A cutting device for a plaster cast comprising a guide adapted for introduction underneath the cast, a rotary cutter mounted for cutting into the plaster as the guide advances, a pistol grip mounted in supporting relation to the guide and the cutter, and having a motor thereon, a driving connection between the motor and the cutter, a guard for the latter and a slide mounted near the pistol grip and operatively connected to the guard for retracting and advancing the same.

2. A cutting device for a plaster cast comprising a pistol grip having a shank extending therefrom, a motor mounted above the pistol grip in alignment with the shank and having a shaft extending through the shank, a rotary cutter mounted on the end of the shank and a driving connection between the shaft and the cutter.

3. A cutting device for a plaster cast comprising a pistol grip having a shank extending therefrom, a motor mounted on the pistol grip having a shaft extending through the shank, a rotary cutter mounted on the end of the shank, a driving connection between the shaft and the cutter, a guide for the cutter, a movable guard for the cutter and a member slidable on the shank having means for moving the guard.

4. A cutting device for a plaster cast comprising a pistol grip having a shank extending therefrom, a motor mounted on the pistol grip having a shaft extending through the shank, a rotary cutter mounted on the end of the shank, a driving connection between the shaft and the cutter, a movable guard for the cutter and means associated with the shank for adjusting the guard.

5. A cutting device for a plaster cast comprising a pistol grip having a motor mounted thereon, a shank having a rotary cutter thereon and a shaft in driving connection with the cutter, and a separable connection between the shank and the shaft on one hand and the pistol grip and the motor on the other hand.

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