

899,870.

2 SHEETS—SHEET 1.

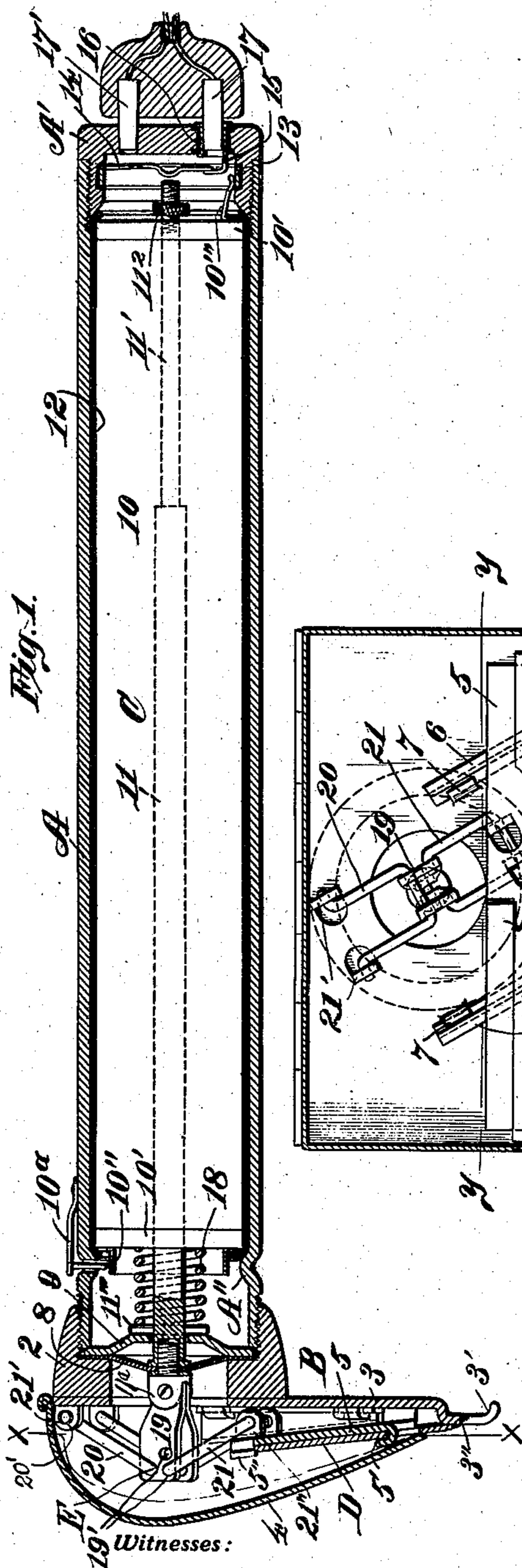


Fig. 1.

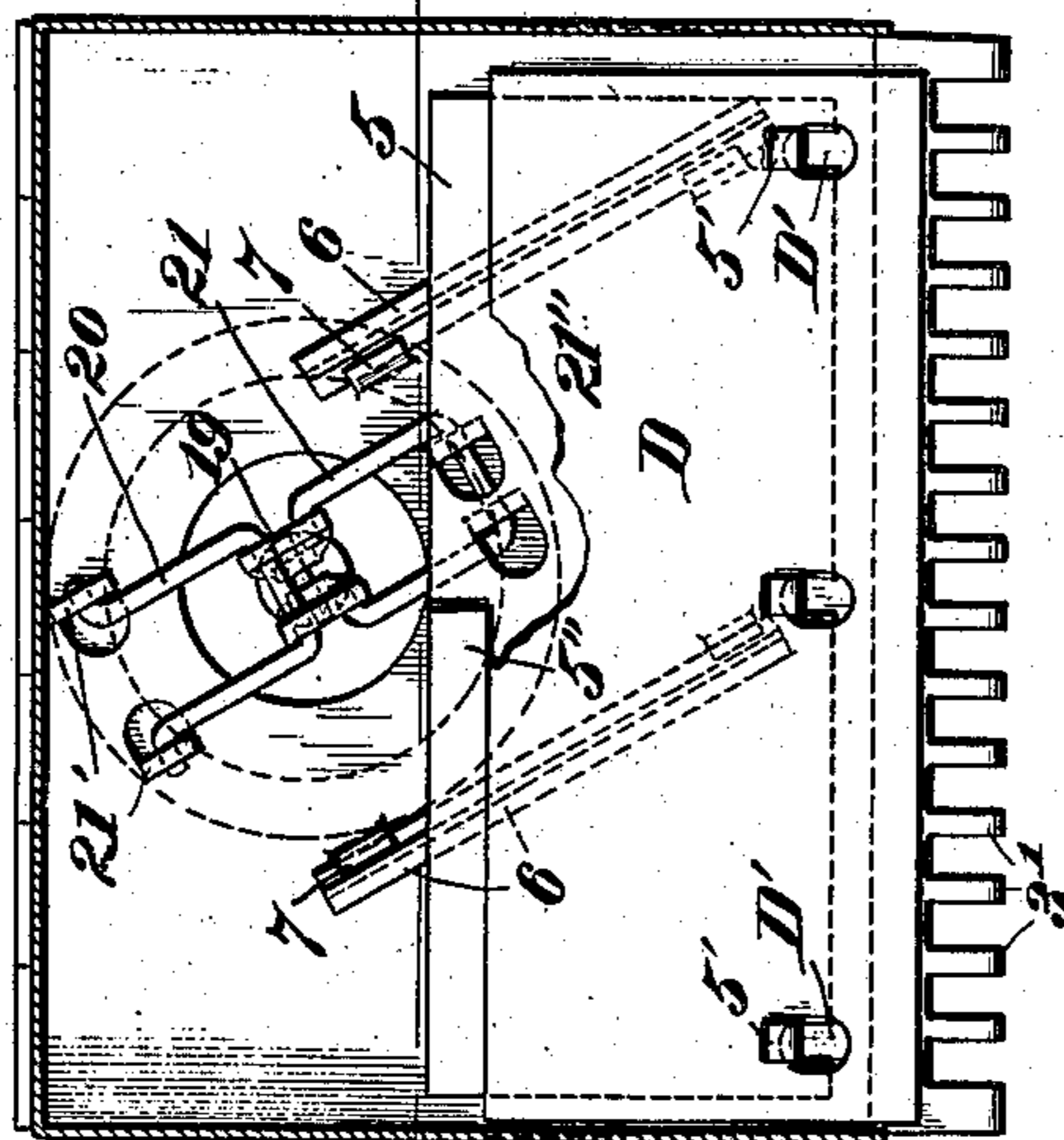


Fig. 2.

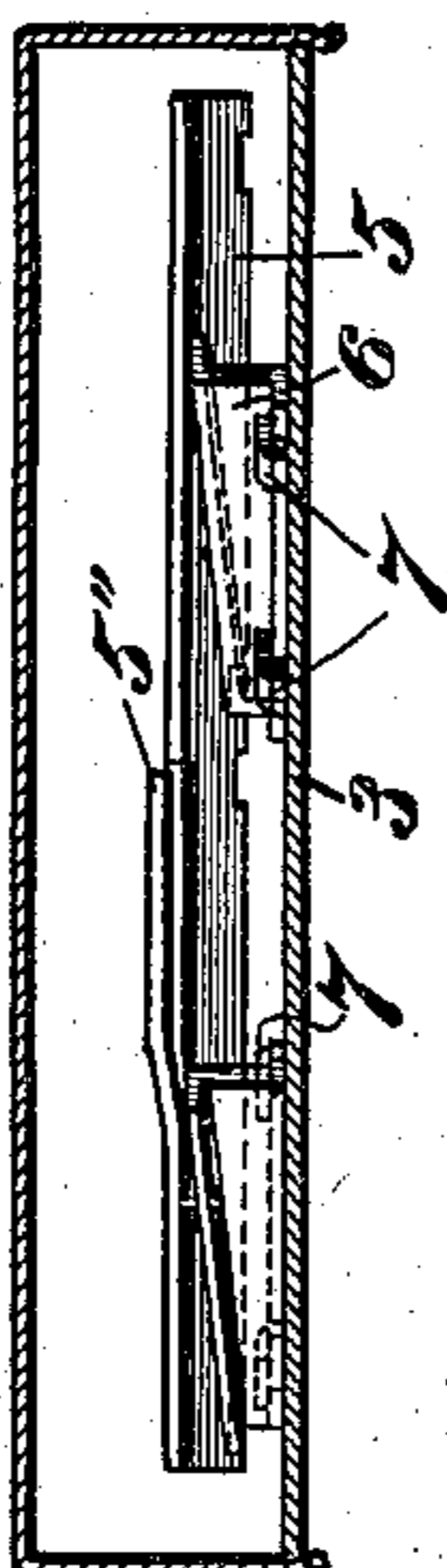
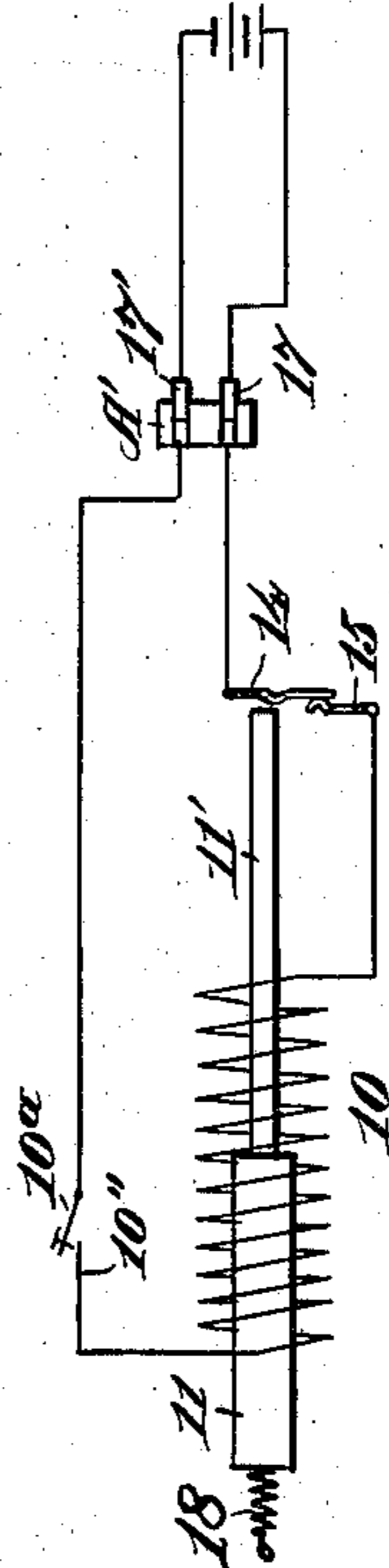


Fig. 3.



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Witnesses:

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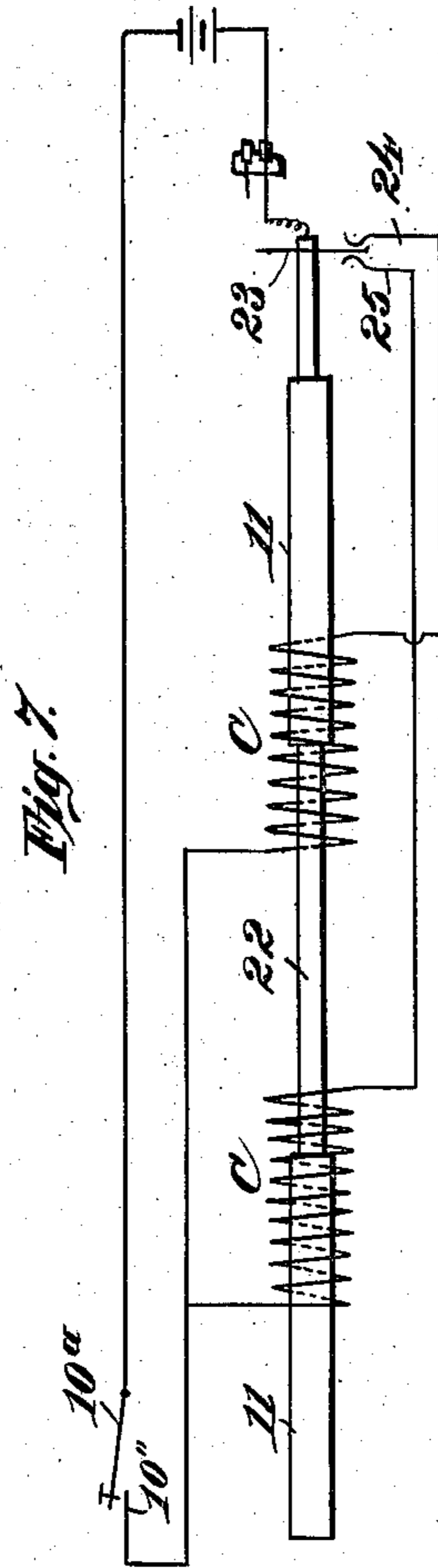
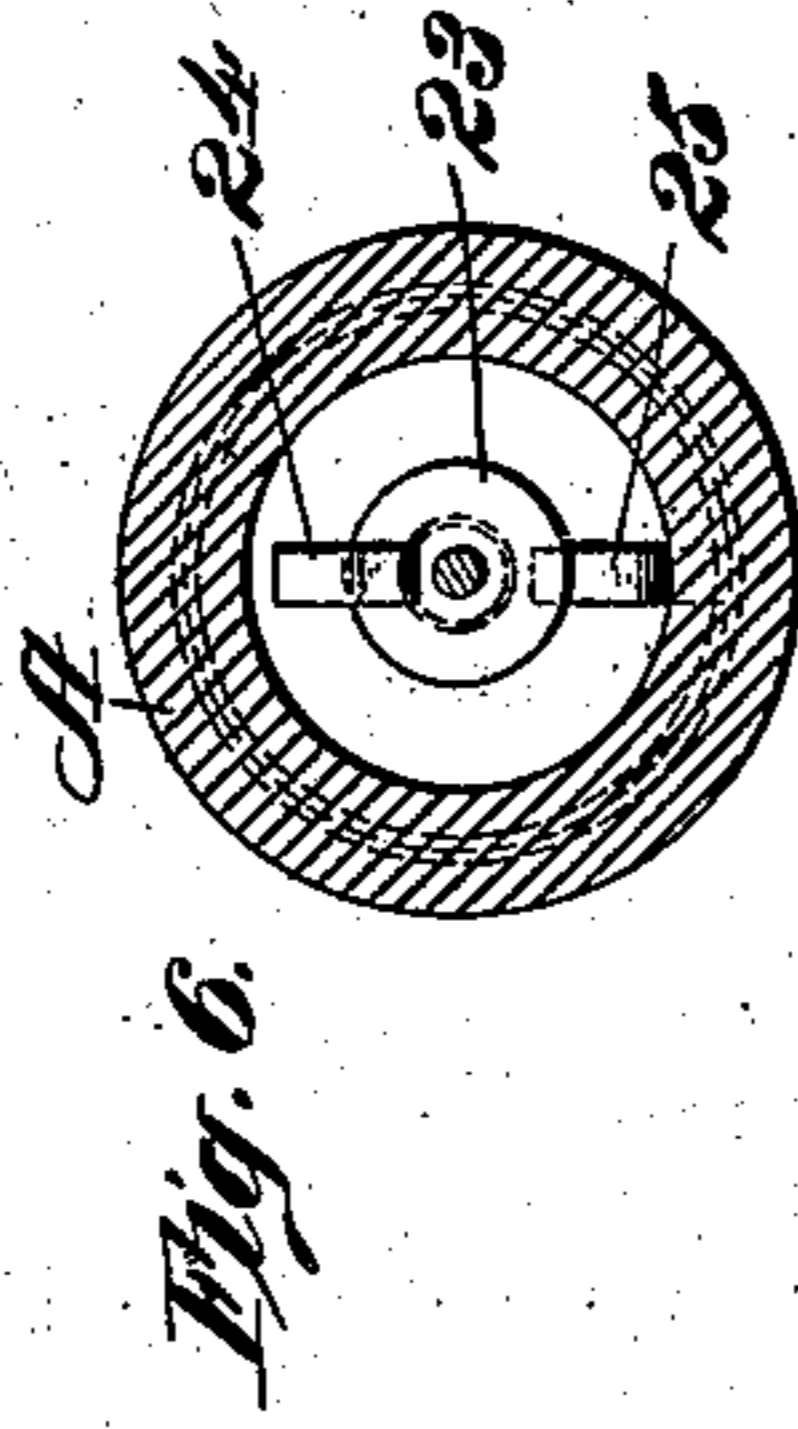
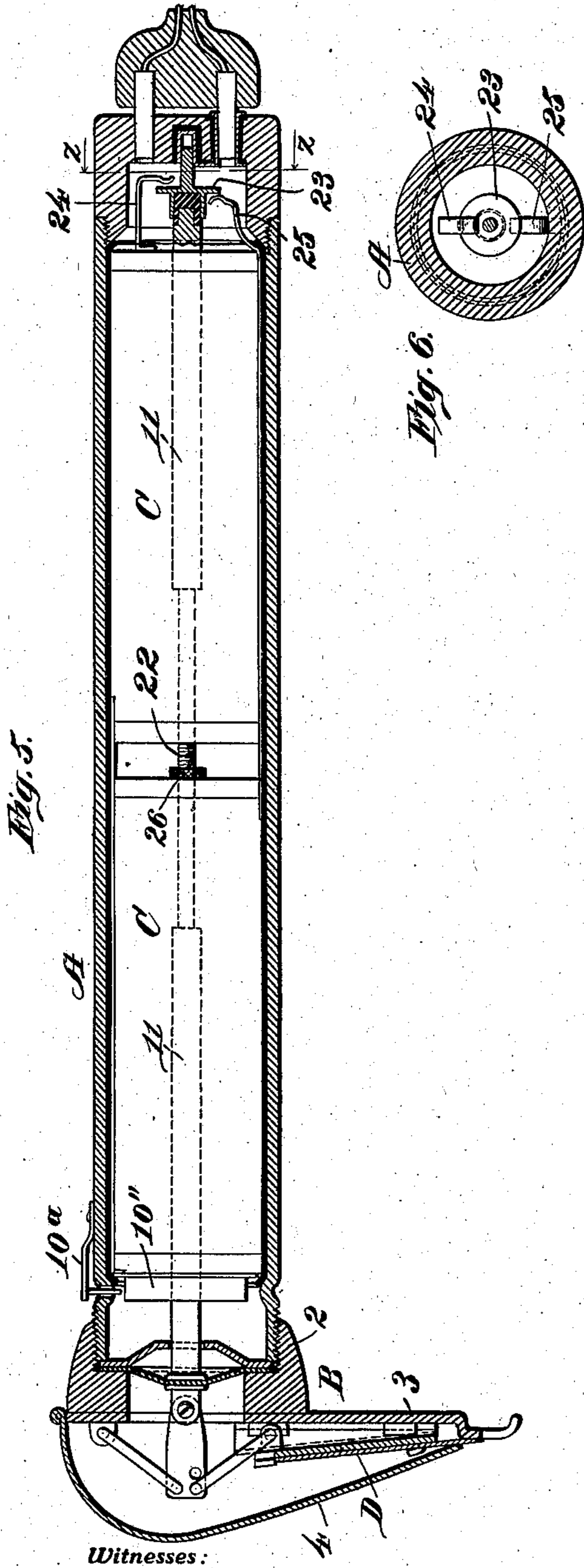
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J. K. JOICE.
 AUTOMATIC RAZOR.
 APPLICATION FILED MAR. 5, 1906.

899,870.

Patented Sept. 29, 1908.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JOHN K. JOICE, OF CHICAGO, ILLINOIS.

AUTOMATIC RAZOR.

No. 899,870.

Specification of Letters Patent.

Patented Sept. 29, 1908.

Application filed March 5, 1906. Serial No. 304,244.

To all whom it may concern:

Be it known that I, JOHN K. JOICE, a citizen of the United States, and a resident of Chicago, Cook county, Illinois, have invented a certain new, useful, and Improved Automatic Razor, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in razors and has particular reference to improvements in razors of that class known as "safety" razors.

The object of my invention is to provide a razor which may be used without special skill on the part of the person who is shaving himself, in other words, a razor of the "safety" type.

A further and particular object of my invention is to provide a razor which shall be automatic in action, that is to say, a device in which the cutting blade shall be moved with great rapidity; so that to do its proper work the device need only be held against the face and moved slowly thereon, the user being relieved from the necessity of exercising special care or skill in the manipulation of the razor.

My invention consists generally in an automatic razor which comprises a knife guard, having a suitable handle, in combination with a knife or blade arranged for reciprocation in said guard and means for rapidly reciprocating said knife.

Further, my invention consists in an automatic razor comprising a knife guard having a handle, in combination with a razor blade arranged for movement in said guard and a suitable motor provided in said handle and connected with said blade, for operating the blade in the guard.

Further, my invention consists in the combination of a razor blade with a casing or guard therefor and an electro magnetic mechanism for actuating said blade.

The invention also consists in various details of construction and in combinations of parts, all as hereinafter described and particularly pointed out in the claims.

The invention will be more readily understood by reference to the accompanying drawings; forming a part of this specification, and in which:—

Figure 1, is a longitudinal section of an automatic razor embodying my invention. Fig. 2, is a transverse section thereof on the

irregular line X—X of Fig. 1. Fig. 3, is a sectional detail on the line Y—Y of Fig. 2. Fig. 4, is a diagrammatic view of the electric circuit of the device. Fig. 5, is a view similar to Fig. 1, but showing an electro magnetic mechanism of modified form. Fig. 6, is a cross section on the line Z—Z of Fig. 5. Fig. 7, is a diagram of the electric circuit of the electro magnetic motor of Fig. 5.

In carrying my invention into effect, I prefer to employ a handle, A, which carries the razor guard or casing, B, and contains the motor, C. The remaining principal element is the razor knife or blade, D, arranged within the guard, B, and operated by the motor, C. The guard, B, preferably comprises the annular ring, 2, the plate, 3, and the light, hinged part or hood, 4. The edge of the plate, 3, is provided with guard teeth or fingers, 3', which constitute the guard proper and a slot is left between the parts 3 and 4, through which the sharp edge of the knife extends and operates. The knife, D, is held on a knife carrier, 5; the knife, D, having openings, D', near its edge and the carrier having lugs or hooks, 5', which engage the knife as shown in Fig. 1. The knife or blade is preferably slightly inclined with respect to the plate, 3, so that its extreme edge may lie close to the surface, 3'', of the guard. The motor hereinafter described is arranged to reciprocate the blade and as it is desirable that the blade shall perform a drawing cut or compound movement, I provide the carrier with relatively inclined or angular guide members, 6, 6. These are preferably Z shaped in section (see Fig. 3) and they engage with guide lugs, 7, struck and formed from the plate, 3. Thus the knife is made to move angularly with respect to the guard. Obviously other means may be devised for holding the carrier in such manner that the knife will be reciprocated both longitudinally and transversely when the carrier is subjected to a vibratory force; and in this regard, as in others hereinafter specified, my invention is to be construed as including equivalent structures, and not confined to the specific devices or constructions herein shown and described. To prevent movement of the knife on the carrier, 5, that is to lock the knife on the carrier, I prefer to use a small spring, 5'', formed from the metal composing the carrier, 5, and engaging the rear edge of the knife; also slightly overlapping the outer surface thereof, as shown

in Fig. 1. This device holds the knife on the lugs 5' and flat upon the carrier. The knife may be released from the carrier by forcing the spring, 5'', backward and downward.

The handle, A, is screwed into the ring, 2, which has a recess to receive it; but first I place a rubber diaphragm, 8, and a dished stop-plate, 9, in the recess. When the handle is screwed home the diaphragm, 8, is bound between the ring and the plate, 9. The razor proper becomes wet when used and the purpose of the diaphragm is to exclude moisture from the tubular handle, A. The opposite end of the handle is closed by a cap or plug, A'.

In constructing my novel device, I prefer to use an electro-magnetic motor for actuating the razor blade or knife. I have herein shown a reciprocating electro-magnetic motor for this purpose, the same comprising a solenoid, 10, and a core, 11, but it should be understood that my invention is not limited or confined as to a special form of motor, it being obvious that an electro-magnetic motor of another form or type or a rotary electric motor, or a purely mechanical motor may be substituted for the mechanism shown.

The coil of the solenoidal motor shown in Fig. 1, is an ordinary coil or helix having suitable ends, 10', of insulating material. It is inclosed in an insulating jacket, 12. The handle is provided with an internal annular rib, A'', and the solenoid is held between this and the plug, A'.

10'', represents a light, metal ring on the part, 10', and connected with one end of the coil. The opposite end of the coil is connected to a light spring, 10''', on the other insulating part, 10'. This last engages an insulated ring, 13, on the inner side of the plug, A'.

14 and 15, represent spring contacts on the ring, 13, and the insulated bushing, 16; the latter having an opening to receive one of the terminals of a battery circuit. The other terminal, 17', enters a hole or socket in the metal plug, A'.

The circuit closer, 10^a, arranged on the handle is adapted to be pressed against the metal part, 10'', and is used to complete the circuit through the coil and battery. The contacts, 14 and 15, and the extension, 11', on the core, 11, form an interrupter. Said extension is adapted to engage the part, 14, and force it away from the contact, 15, thereby opening the circuit after the coil has been energized to draw in the core. The core is equipped with an adjustable stop, 11², and a fixed stop, 11''', for limiting its movement or stroke. The spring, 18, serves to return the core when the coil is deenergized by the breaking of the connection at contacts, 14 and 15. It is obvious that the core will be

rapidly reciprocated whenever the circuit is closed at 10^a.

The end of the core, 11, passes through the elastic diaphragm, 8, and is connected with the knife carrier by any suitable mechanism, 70 such as the toggle device, E, which forms a part of the motor. This portion of the mechanism comprises the link, 19, and the links, 20 and 21. For convenience I preferably make the end of the core of two threaded parts, which incidentally, serve to bind the inner edges of the diaphragm, 8, upon the core as shown in Fig. 1. The part, 11^a, carries the pivot for the link, 19, the end of which is of reduced thickness. I prefer to make said link, 19, of sheet metal and substantially V shaped to increase its speed or width at the outer end. It has several pivot openings, 19', which provide for the adjustment of the stroke of the knife carrier, the wire link, 21, having ends which may be snapped into either pair of holes, 19'. The link, 20, has its bent ends or pivot portions held in lugs, 20', which are struck up from the plate, 3. Similar lugs, 21'', on the carrier, 5, receive the cross portion of the link, 21.

In Fig. 1, the parts are shown in deenergized position, at such time the razor is in retracted position. When the solenoid is energized the core being drawn back strengthens the toggle and thereby projects the razor across the safety guard. This movement is accomplished many times in a minute, through the automatic operation of the motor. As before stated the movement of the core and the stroke of the toggle mechanism may be varied at will to regulate the operation of the razor, as may be desired. By slight modifications of the parts I may do away with the knife carrier and connect the motor directly to the razor blade.

The device shown in Fig. 5, differs from that hereinbefore described only in the form of its motor. In this case I use double or opposed solenoids. My object in so doing is to dispense with the retracting spring, 18. The solenoids used are like unto the solenoids 10, of Fig. 1, but are shorter. They are arranged in an insulating casing after the manner of Fig. 1, and their cores are connected by non-magnetic bar, 22. The solenoids are alternately energized and reciprocate the compound core. The contact ring, 10'', is preserved on the end of the solenoid 1, to coöperate with the circuit closer, 10^a. The coils are wound in opposite directions, as indicated in the diagrammatic view of Fig. 7, and the automatic connection of the coils with the battery is brought about by means of the make and break device at the end of the core. This device comprises the disk 23, mounted on the core, insulated therefrom and coöperating with the terminal springs or contacts 24 and 25, connected to the coils as shown in the dia-

gram. The disk, 23, has an electrical connection with one branch of the battery circuit, while the metal handle is connected with the other branch of said circuit.

5 Therefore, when the circuit is closed at 10^a, one of the coils will be energized to indraw the core. This movement will be followed by the breaking of the circuit between the corresponding contact and the disk, 23, and
10 the completion of the circuit of the other coil through the other contact, the energization of the second coil causing an opposite movement of the core. In this manner the coil is kept in rapid movement as long as
15 the circuit is closed between the parts 10^a and 10^b. 26, represents a stop for limiting the stroke of the core, same being arranged on the connecting bar, 22.

The use and operation of my automatic
20 razor is extremely simple. When the face has been lathered and is in readiness for the razor, the user simply grasps the handle and places the razor guard against his face. He then depresses the circuit closer, 10^a,
25 whereupon the razor blade is set into rapid movement and, the device being slowly passed over the face, rapidly and comfortably performs the shaving operation.

As numerous modifications of the structure
30 herein shown and described will readily suggest themselves to one skilled in the art, I do not confine my invention thereto.

Having thus described my invention I claim as new and desire to secure by Letters Patent:

35 1. In an automatic razor, a suitable "safety" guard, in combination with a razor blade, mounted for reciprocation in said guard, a suitable motor connected to
40 said blade and means for varying the stroke of said blade, substantially as described.

2. In an automatic razor, a suitable safety guard, in combination with a razor blade,
45 said blade and means for varying the stroke of said motor, substantially as described.

3. In an automatic razor, a suitable "safety" guard, in combination with a motor casing therefrom, a motor arranged
50 in said casing, an elastic diaphragm, interposed between said guard and said casing, and a razor blade arranged in said guard and connected to said motor, substantially as described.

55 4. In an automatic razor, a suitable "safety" guard or hood, in combination with a reciprocating motor, a toggle lever mechanism connected to said motor and a razor blade arranged in said guard, for
60 actuation by said mechanism, substantially as described.

5. In an automatic razor, a suitable han-

dle, in combination with a guard plate thereon, angularly positioned guides on said plate, a blade carrier mounted in said
6 guides, a motor mechanism connected with said carrier and a razor blade, on said plate, substantially as described.

6. In an automatic razor, a suitable "safety" guard, in combination with a
70 knife carrier, mounted for reciprocation in said guard, lugs near the outer edge of said carrier and a knife blade having openings near its edge and engaged with said lugs, substantially as described. 75

7. In an automatic razor, a suitable guard, in combination with a razor blade mounted therein, a motor for reciprocating said blade, and guides angularly arranged in
80 said guard for directing the movement of said blade; substantially as described.

8. In an automatic razor, a suitable safety guard, in combination with angularly arranged guides therein, a blade carrier
85 mounted upon said guides, a blade secured to said carrier, and a suitable motor for actuating the same; substantially as described.

9. In an automatic razor, a suitable guard, in combination with a knife arranged for
90 reciprocation therein, an elongated handle attached to said guard and at substantially right angles to the plane of reciprocation of said knife, a knife driving shaft in said handle, suitable connection between said
95 shaft and said knife, and means for moving said shaft longitudinally to impart reciprocation to said knife; substantially as described.

10. In an automatic razor, a suitably attached handle and guard, in combination
100 with a knife arranged in said guard, a knife driving shaft in said handle, means for imparting longitudinal reciprocation to said shaft, and means connecting said shaft
105 and knife whereby motion of the former imparts reciprocation to the latter, substantially as described.

11. In an automatic razor, a suitably attached handle and guard, in combination
110 with a knife arranged in said guard, a knife driving shaft in said handle, suitable connection between said shaft and said knife, and means for moving said shaft longitudinally to impart reciprocation to said knife,
115 substantially as described.

In testimony whereof, I have hereunto set my hand, this 31st day of January, 1906, in the presence of two subscribing witnesses.

JOHN K. JOICE.

Witnesses:

CHARLES GILBERT HAWLEY,
CHAS. F. MURRAY.