

No. 755,817.

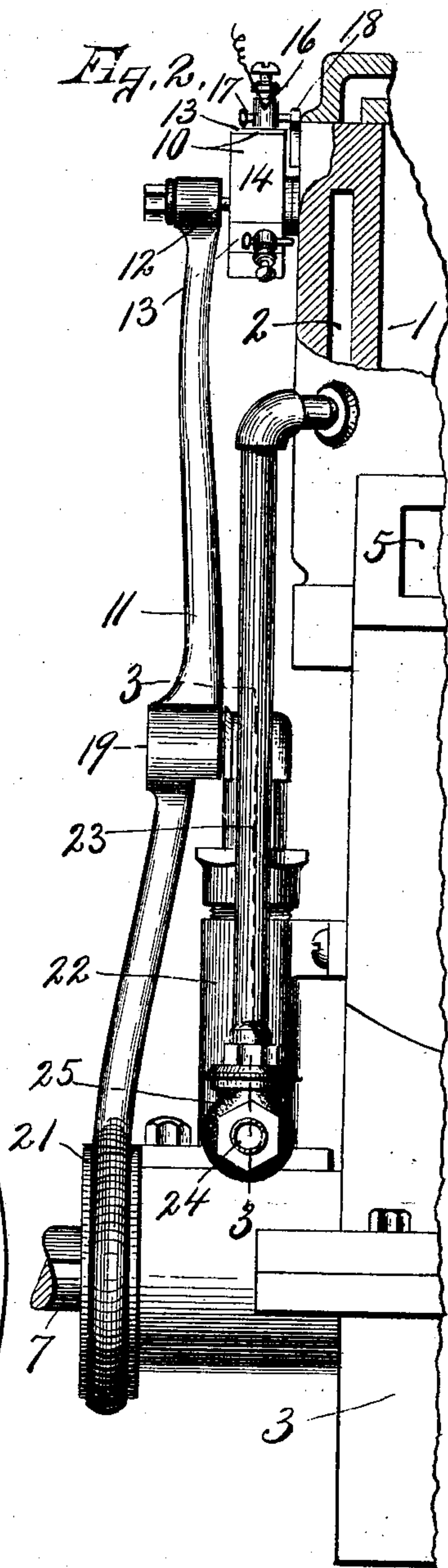
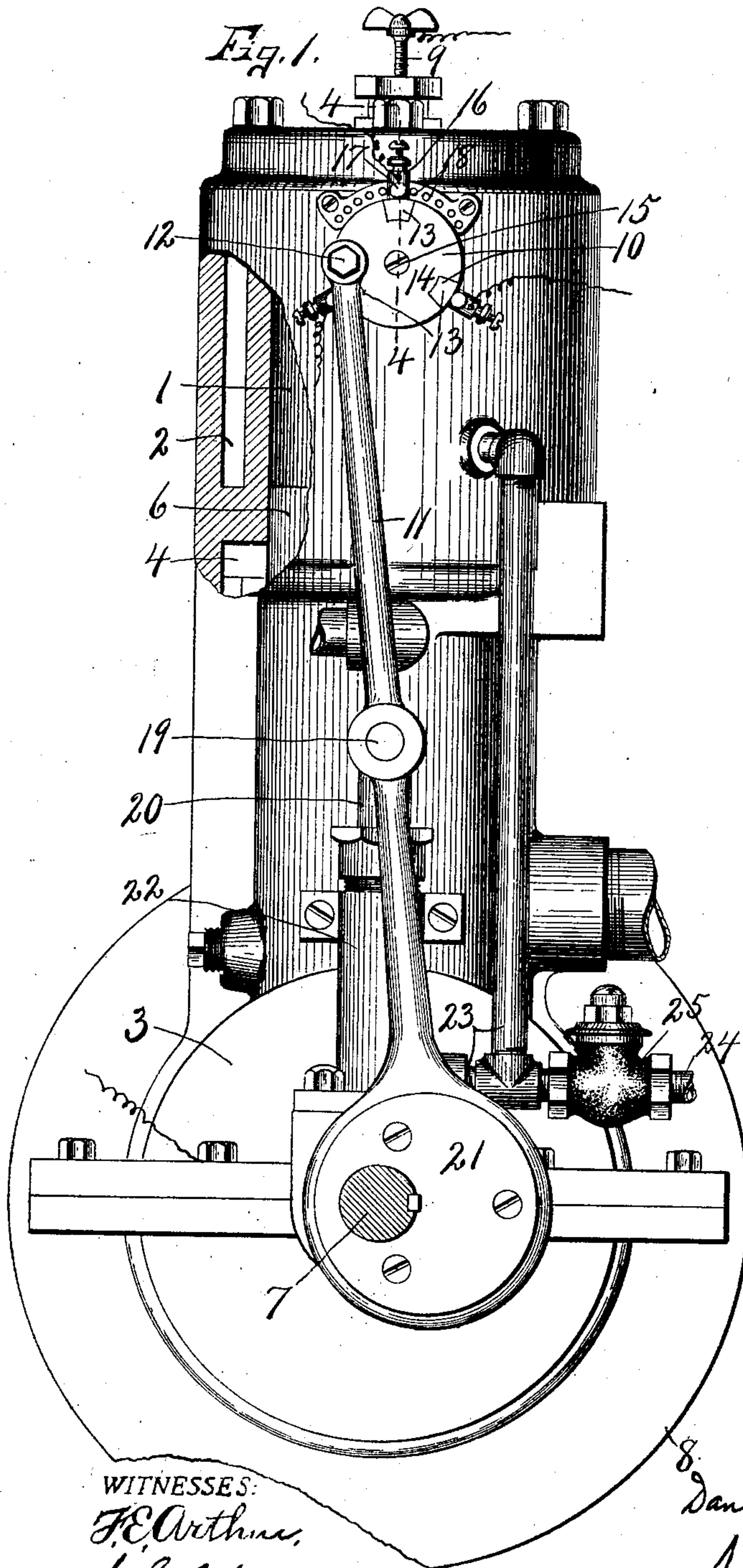
PATENTED MAR. 29, 1904.

D. M. TUTTLE, W. H. LINDLEY & W. H. TUTTLE.
ELECTRICAL IGNITING MECHANISM FOR EXPLOSIVE ENGINES.

APPLICATION FILED OCT. 27, 1902.

NO MODEL.

3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.

Fig. 3,

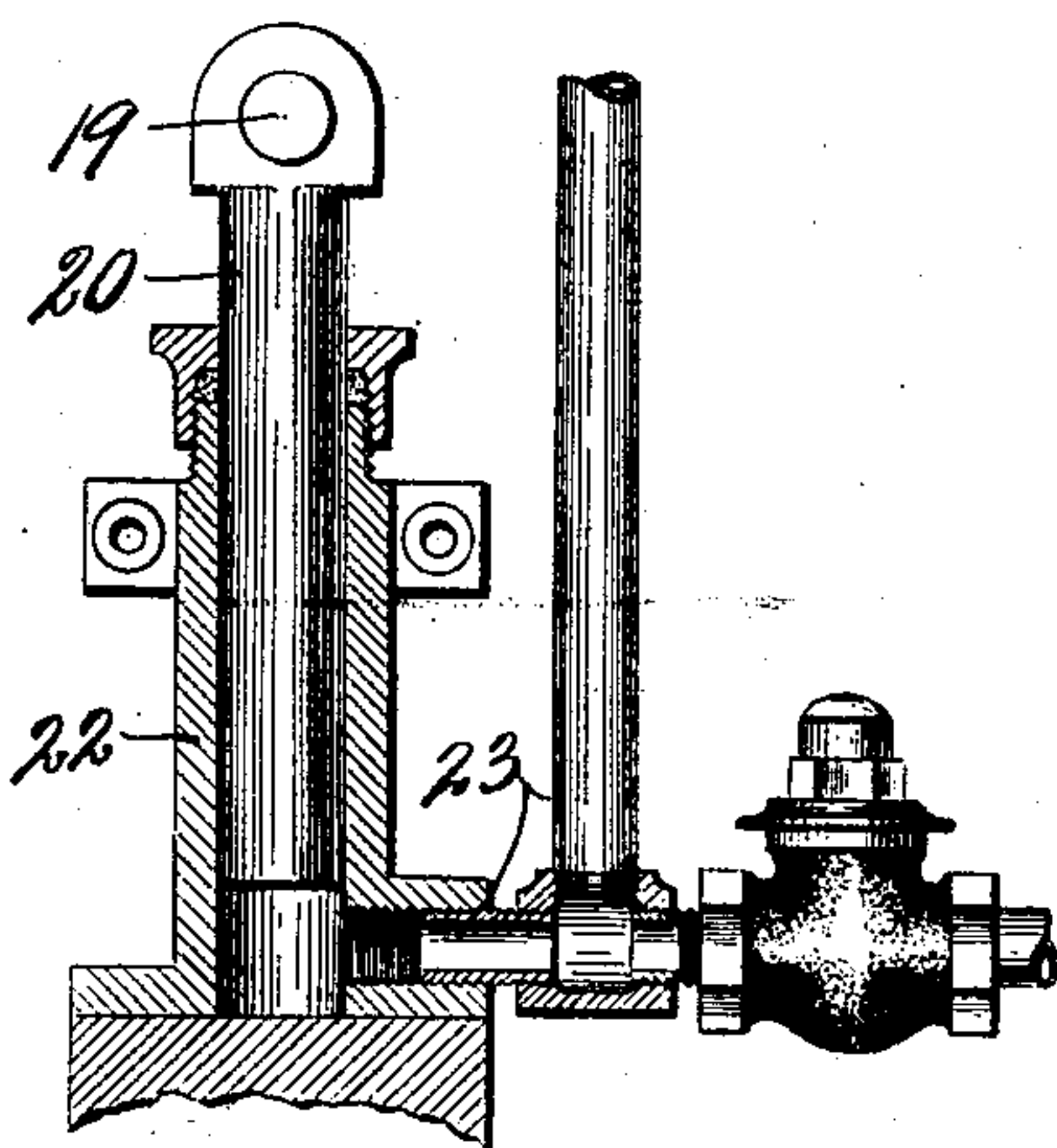


Fig. 4,

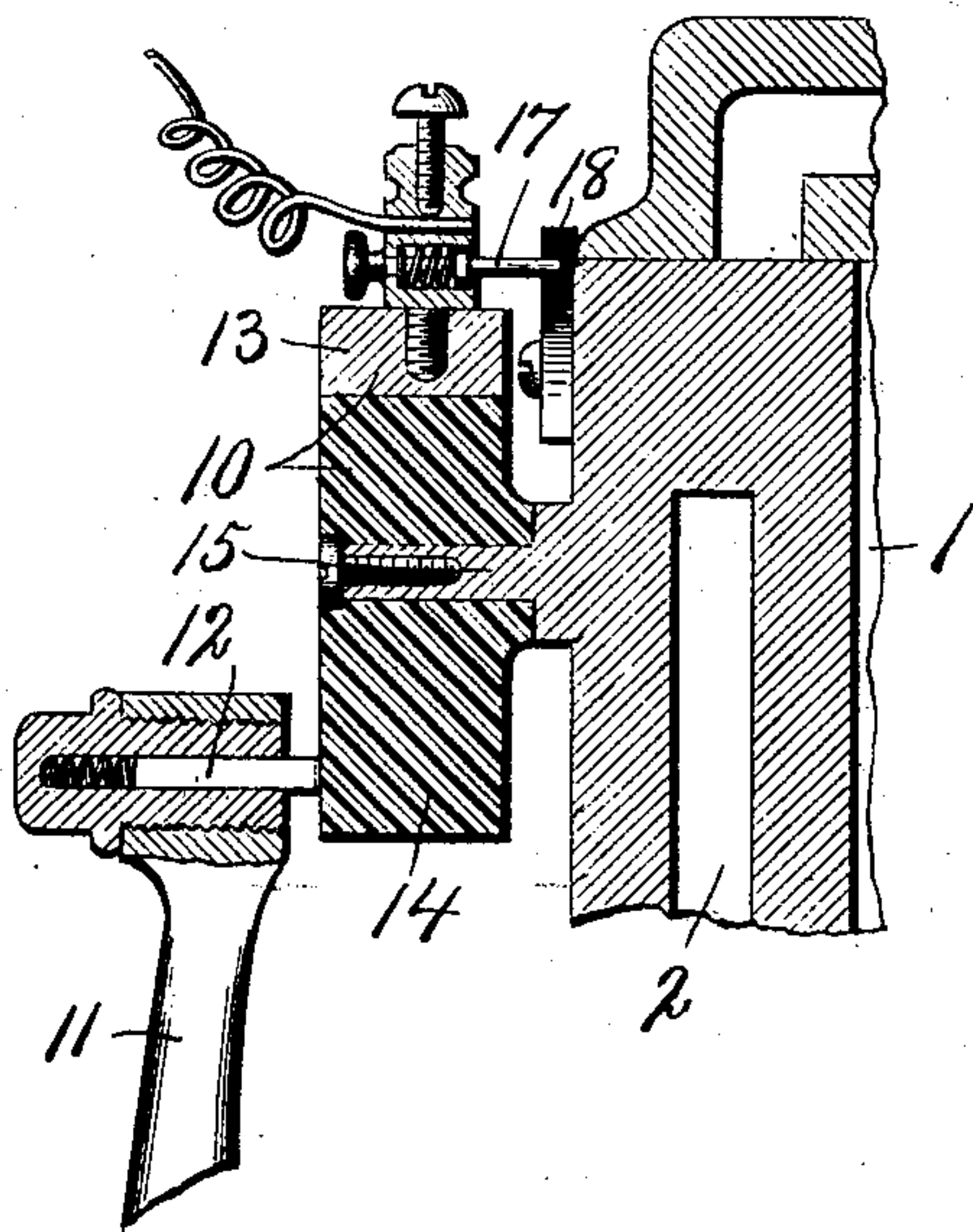
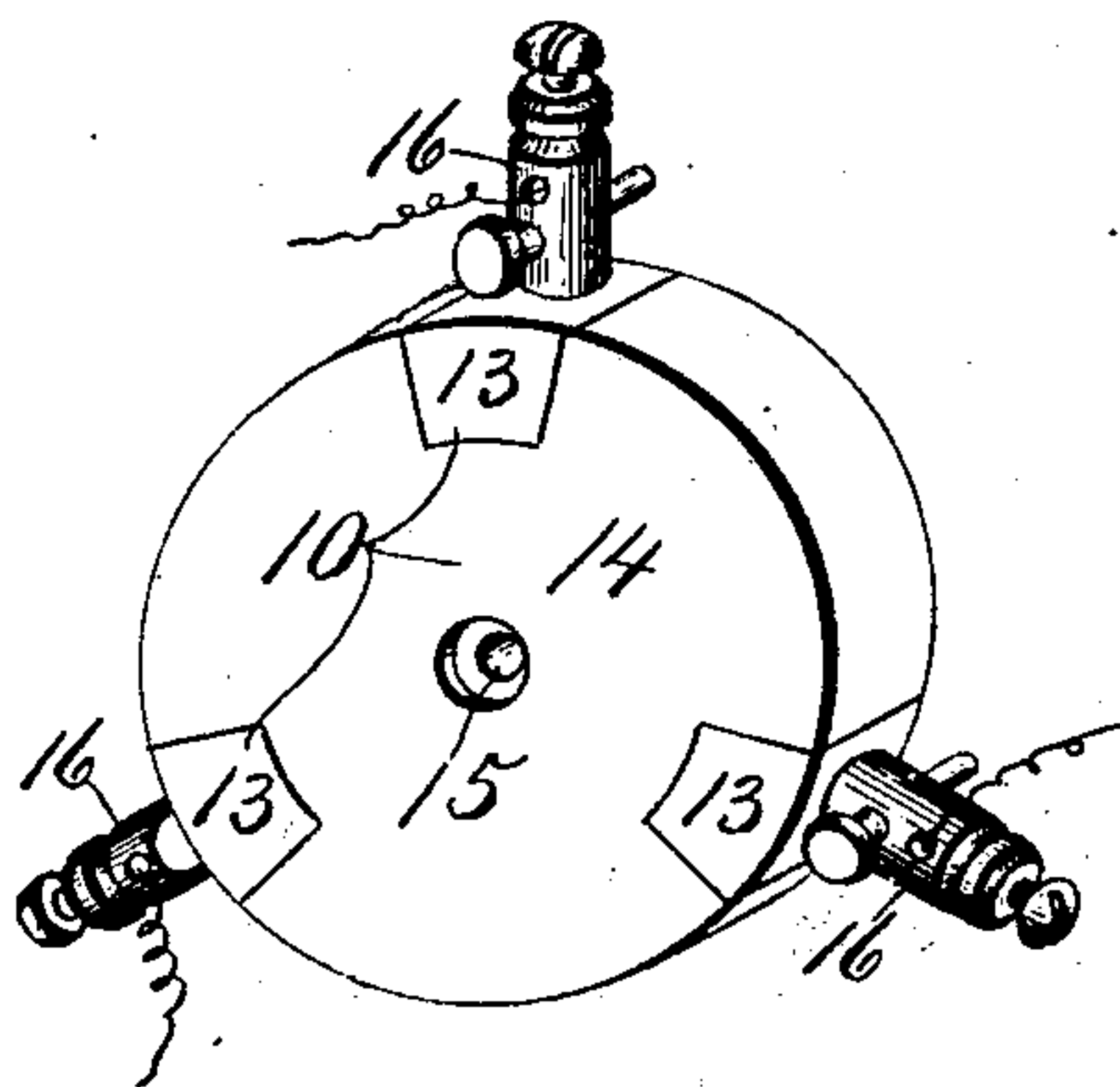


Fig. 5,



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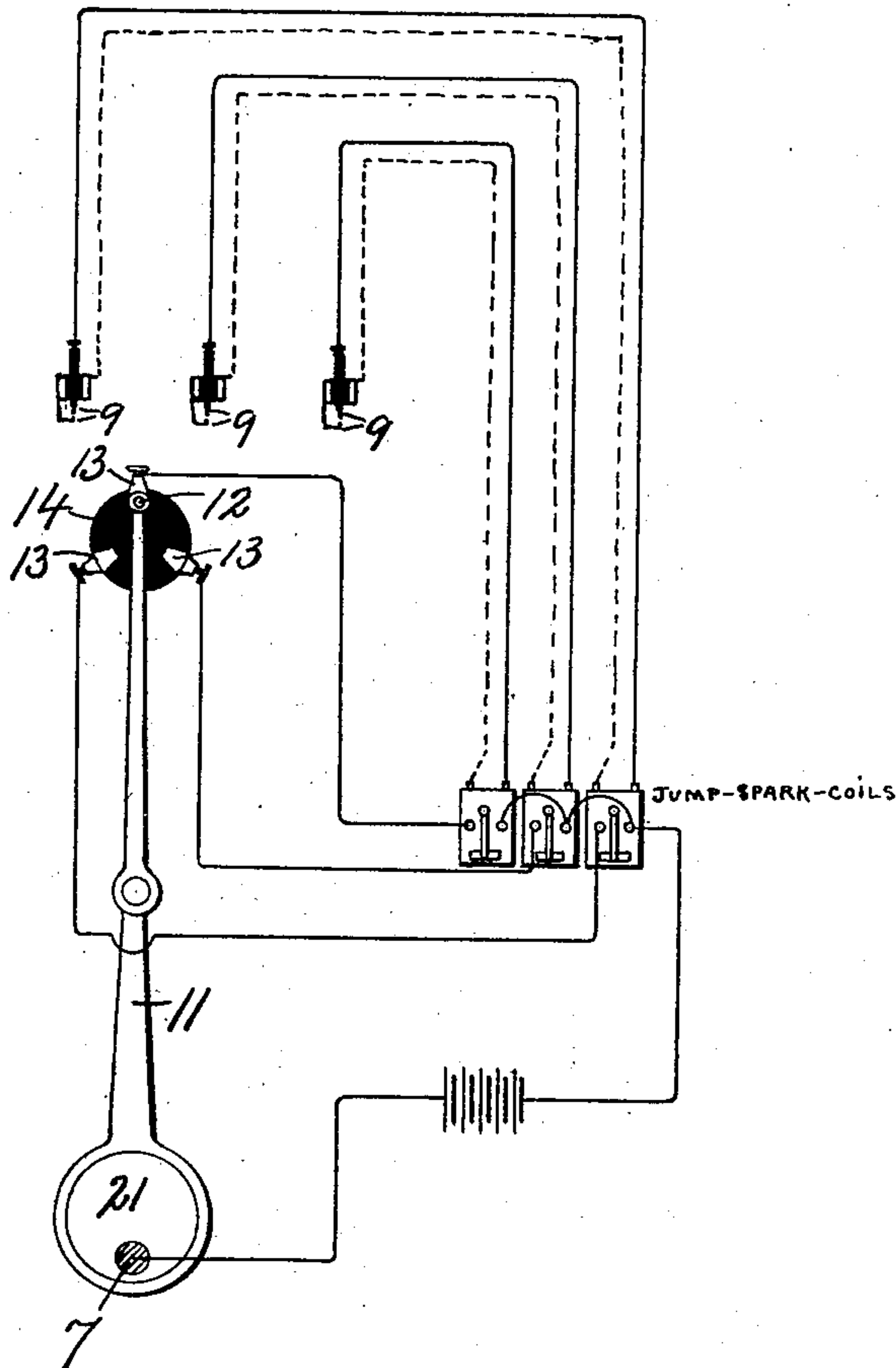
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NO MODEL.

3 SHEETS—SHEET 3.

Fig. 6



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UNITED STATES PATENT OFFICE.

DANIEL M. TUTTLE, WILLIAM H. LINDLEY, AND WILLIAM H. TUTTLE,
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ELECTRICAL IGNITING MECHANISM FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 755,817, dated March 29, 1904.

Application filed October 27, 1902. Serial No. 128,964. (No model.)

To all whom it may concern:

Be it known that we, DANIEL M. TUTTLE, WILLIAM H. LINDLEY, and WILLIAM H. TUTTLE, of Canastota, in the county of Madison, in the State of New York, have invented new and useful Improvements in Electrical Igniting Mechanism for Explosive - Engines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

Our invention relates to electrical igniting mechanism for explosive-engines, and refers more particularly to an igniting mechanism therefor. These engines are used extensively for the propulsion of yachts and are usually placed low down in the boat or in a suitable pit provided therefor, and it is found that more or less of the explosive gases may escape and accumulate in the engine-pit. Furthermore, the electric-circuit make-and-break mechanism is generally mounted on the base of the engine, and therefore is frequently enveloped by this free explosive gas. It not infrequently happens that an electric spark is produced at the circuit - breaker and may cause an explosion of the gases in the vicinity of the engine and result in serious injury to the boat and endanger the lives of the occupants. Another disadvantage of placing this circuit-breaker at the base of the engine, or rather on or near the crank-shaft, is that it is not easily accessible for repairs and the contact-surfaces frequently become coated with oil and other foreign matter to such an extent as to render the circuit-breaker unreliable or entirely inoperative.

The primary object of our invention is to obviate these objectionable features by elevating the circuit-breaker sufficiently to be free from the escaping or accumulated gases and at the same time to position the parts of the circuit make-and-break device so as to produce a wiping contact across a vertical contact-face, which reduces the liability of the

accumulation of any foreign matter on the contacts.

Another object is to enable the circuit-breaker to be shifted to change the period of ignition and also to provide for successive ignitions in a series of engines, if desired.

To this end the invention consists in the combination, construction, and arrangement of the parts of a gas-engine, as hereinafter fully described, and pointed out in the claims.

In the drawings, Figure 1 is an end elevation of an engine equipped with our improved circuit-breaker and water-circulating device, the cylinder being partly broken away to show the intake and exhaust ports. Fig. 2 is a side elevation of a portion of the engine-shell and the circuit-breaker and water-feed seen in Fig. 1. Figs. 3 and 4 are sectional views taken, respectively, on line 3 3, Fig. 2, and 4 4, Fig. 1. Fig. 5 is a perspective view of the detached commutator. Fig. 6 is a diagrammatic view of an electric igniting system for three cylinders.

Similar reference characters indicate corresponding parts in all the views.

This invention is particularly adapted for upright gas-engines, and we have shown an engine of this type having an explosion-chamber 1 in its upper end, a cooling-chamber 2, surrounding the explosion-chamber and in which a cooling liquid is circulated in a manner hereinafter described, and a crank-chamber 3 in the base of the shell. The explosion-chamber is provided with the usual intake and exhaust ports 4 and 5 to admit the live gases and to expel the spent gases in the manner well known. Movable in this chamber is a suitable piston 6, which is connected to impart rotary motion to a crank-shaft 7, journaled in the side walls of the crank-chamber and provided with a balance-wheel 8. In the upper end of the explosion-chamber are suitable sparking terminals 9, which are connected to a spark-coil and are adapted to ignite the ex-

plosive mixture or live gases at each upward stroke of the piston or rather at each revolution of the crank-shaft.

We preferably admit the live gases beneath the piston and provide suitable leads to the intake-ports 4, so that the live gases are forced into the explosion-chamber on the downward stroke and compressed on the upward stroke of the piston. We have thus far described the general features of an upright two-cycle gas-engine, which description is believed to be sufficient to demonstrate the practical application and utility of our invention in connection therewith.

The invention lies more particularly in the specific construction and arrangement of the circuit-breaker; and it consists, essentially, of a vertical rotatable disk 10 and a lever 11, which is capable of oscillatory and reciprocatory movements and carries a suitable brush 12, movable across the vertical face of the disk in a circular path. This disk may conveniently be termed a "commutator," for the reason that we are enabled to use one or a plurality of contact-segments 13 for the successive excitation of one or more electric igniters of as many gas-engines. The segment 13 consists of a metal conductor embedded in or placed upon a body of insulating material 14, which is preferably circular in form and is centrally pivoted at 15 to the upper end of the explosion-cylinder or other available support clear from the accumulated gases, oils, and dust in the engine-pit. This commutator is arranged to be rocked on its pivot when desired to change the period of ignition relatively to the position of the piston, and we therefore provide the contact-segment 13 with a suitable binding-post 16, which not only serves to connect the segment in the primary exciting-circuit of the spark-coil, but also serves as a handle by which the commutator is rocked, said commutator being held in its adjusted position by any well-known detent, as a pawl 17 and a rack 18. The brush 12 is adjustably mounted on the upper end of the lever to bear with more or less pressure against the upright face of the commutator and its segments and is also connected in the primary circuit, while the spark-coil is connected directly to the sparking terminals 9 in the explosion-chamber of the engine, so that when the brush contacts with the segment the primary circuit is closed and produces a spark at said terminals through self-induction in the spark-coil.

The lever 11 is fulcrumed intermediate its ends at 19 to a vertically-sliding member 20, and its lower end is mounted upon an eccentric 21, which is secured to the crank-shaft 7, so that as the eccentric is rotated an oscillating and endwise movement is imparted to the lever and causes the brush 12 to travel in a circular path around the face of the commu-

tator and to successively contact with its metal segments, thereby intermittently making and breaking the primary circuit or circuits. It may be understood from this last statement that as many electric igniters may be successively excited by contact with the same brush 12 as there are segments in the commutator and that this number may be increased or diminished, as desired, according to the number of engines employed whose pistons may be connected to the same crank-shaft for purposes well known.

The vertically-sliding member 20 preferably consists of a piston which is movable in a cylinder 22 and is utilized to circulate a cooling fluid through the cooling-chamber 2, the base of said cylinder 22 being connected by a conduit 23 to the cooling-chamber and is provided with an inlet-conduit 24, having a check-valve 25, whereby water is admitted to the base of the cylinder 22 and is diverted through the pipe 23 to the chamber 2 when the plunger descends.

It is thus seen that we not only elevate the circuit-breaker to a position where it is clear from the free accumulated gases, dust, and oils, but it is so arranged that any dust or oil which may be present falls from the vertical contact-faces or is readily wiped off by the brush, which thus insures a bright and perfect contact, and it is also clear that by utilizing the movement of the lever 11 to circulate a cooling fluid through the cooling-chamber at each explosion we reduce the cost of the engine and insure a more perfect cooling of the cylinder.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. An electric igniting mechanism for explosive-engines comprising an electrical igniting-circuit including sparking terminals therein, a rockable disk of insulating material, a segment of electric conducting material on the disk and connected in said circuit, a lever fulcrumed intermediate its ends and having oscillatory and endwise-reciprocatory movement, a brush carried by one arm of the lever around the face of the disk to contact intermittently with said segment, said brush being connected in the circuit and means actuated by the engine and operatively connected to the other arm of the lever for effecting its oscillatory and endwise-reciprocatory movements.

2. In combination with a gas-engine, of an explosion-cylinder and a crank-shaft, an electric igniting-circuit including sparking terminals in the explosion-chamber, a centrally-pivoted disk of insulating material adapted to be adjusted circumferentially, means for holding the disk in its adjusted position, a segment of electric conducting material on the disk and connected in said circuit, a sliding

member movable lengthwise of the cylinder,
a sleeve fulcrumed on the sliding member, an
eccentric on the crank-shaft to which one arm
of the lever is connected for imparting end-
5 wise-reciprocatory and oscillatory movement
to the lever, a brush electrically connected in
the circuit and bearing against the face of the
disk to intermittently contact with said seg-
ment for closing the igniting-circuit.

In witness whereof we have hereunto set our 10
hands this 22d day of October, 1902.

DANIEL M. TUTTLE.
WILLIAM H. LINDLEY.
WILLIAM H. TUTTLE.

Witnesses:

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