

No. 750,349.

PATENTED JAN. 26, 1904.

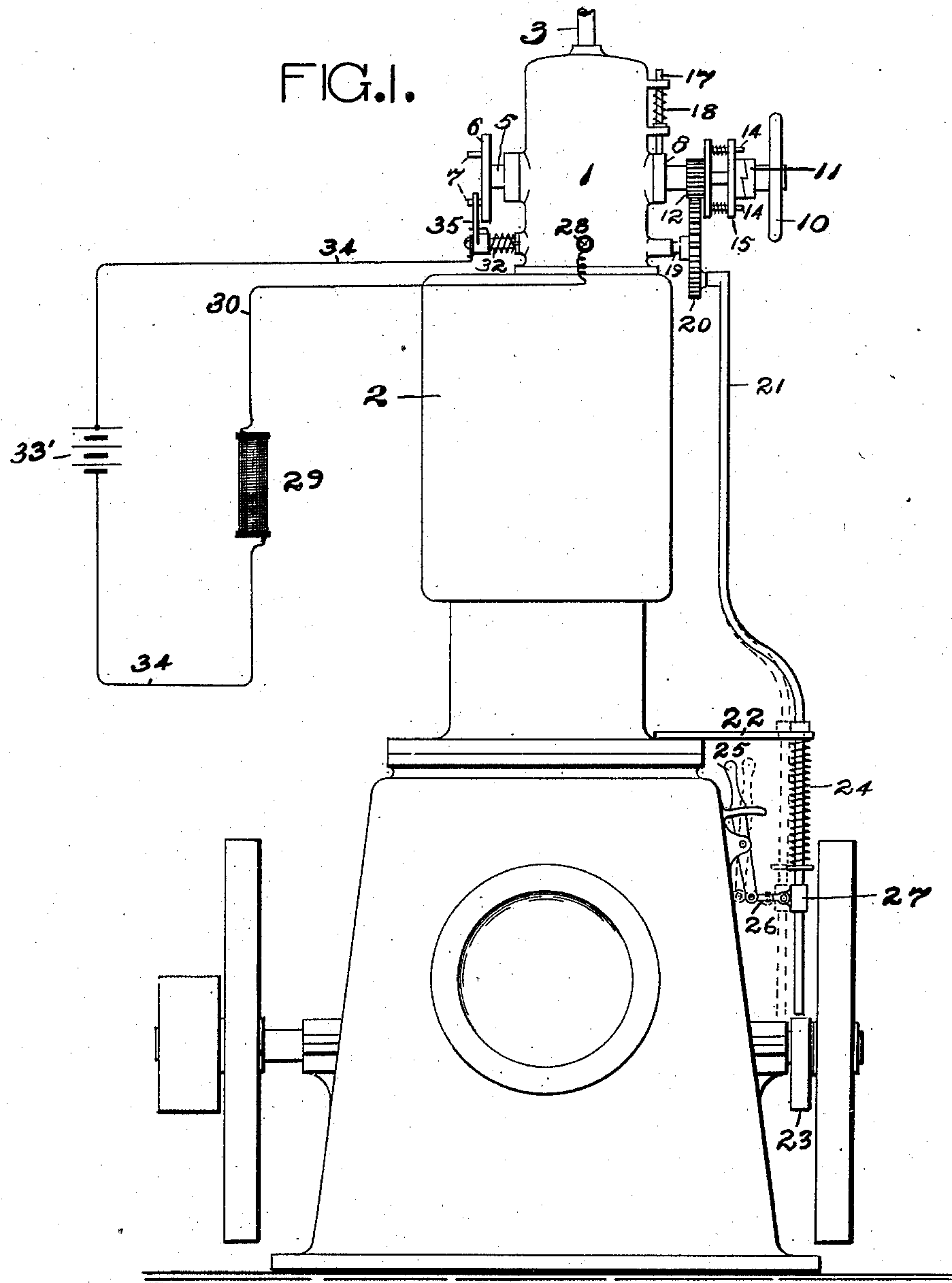
S. CUNNINGHAM.

# COMBINED GAS CONTROLLER AND IGNITER FOR EXPLOSIVE ENGINES.

APPLICATION FILED MAY 20, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



**WITNESSES:**

Katherine Leonard.  
J. E. Krepps.

**INVENTOR**

Stewart Cunningham,  
BY his ATTORNEY  
Richard Harrison

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2 SHEETS—SHEET 2.

FIG. 3.

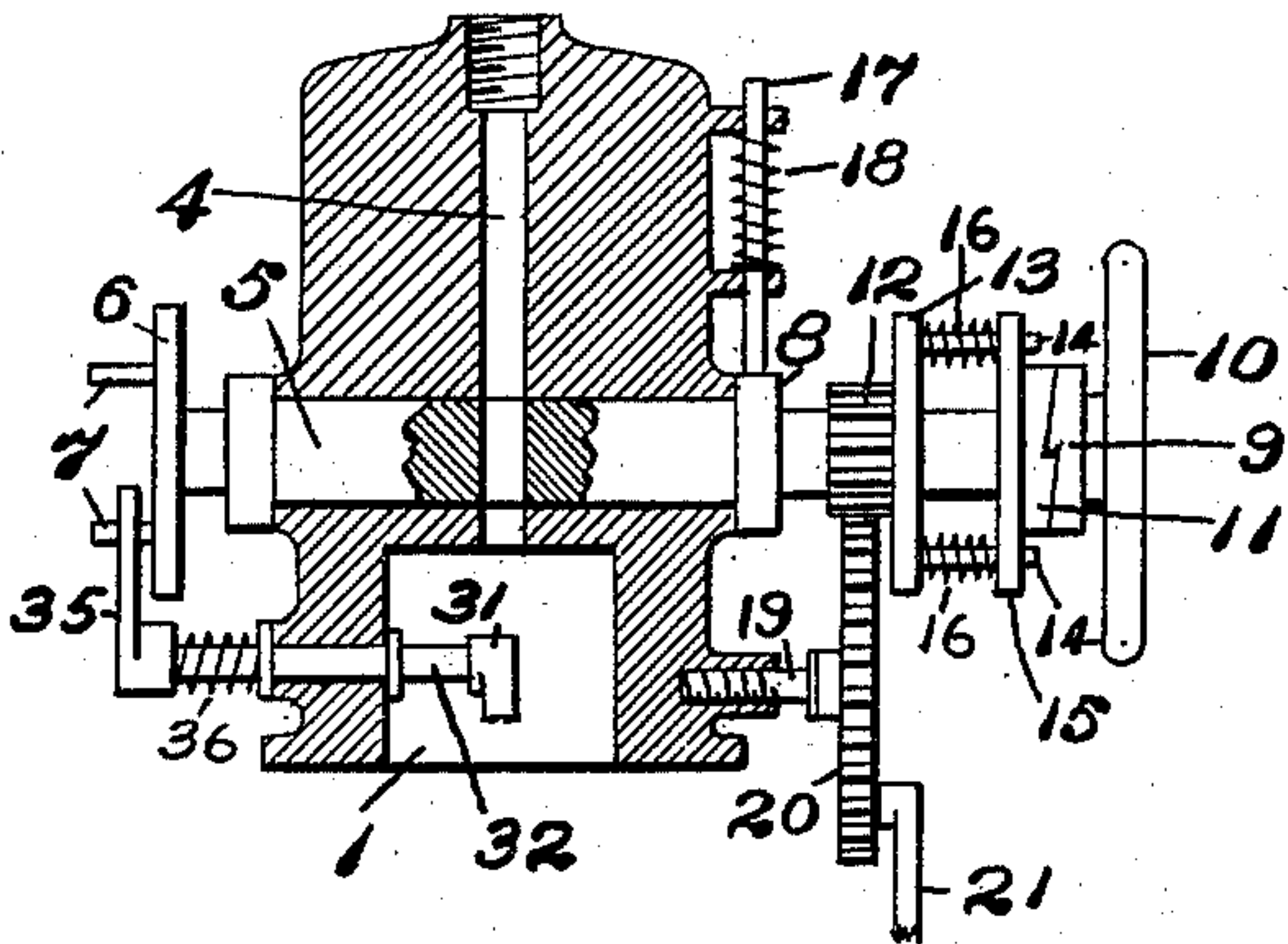


FIG. 2.

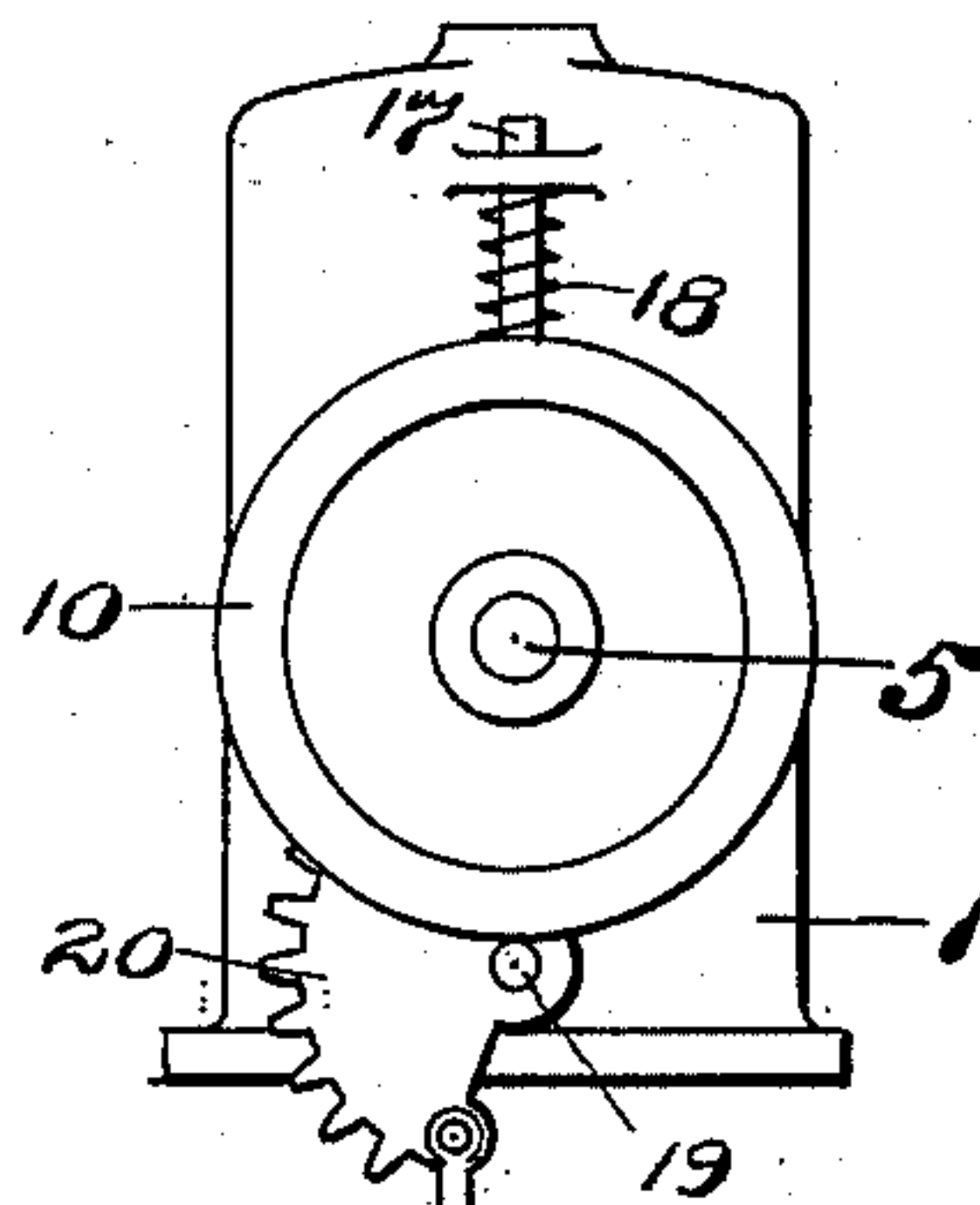


FIG. 4.

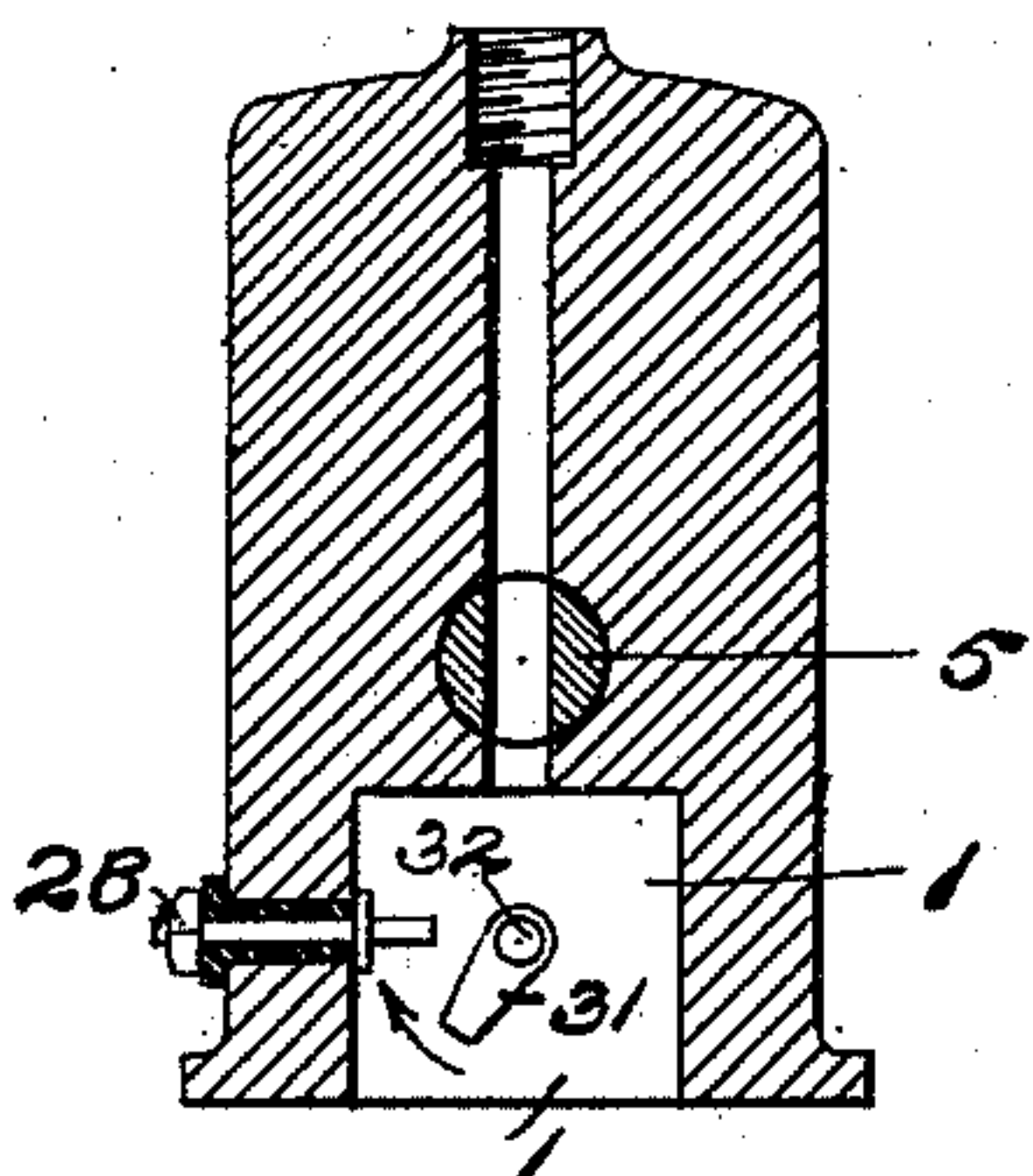


FIG. 5.

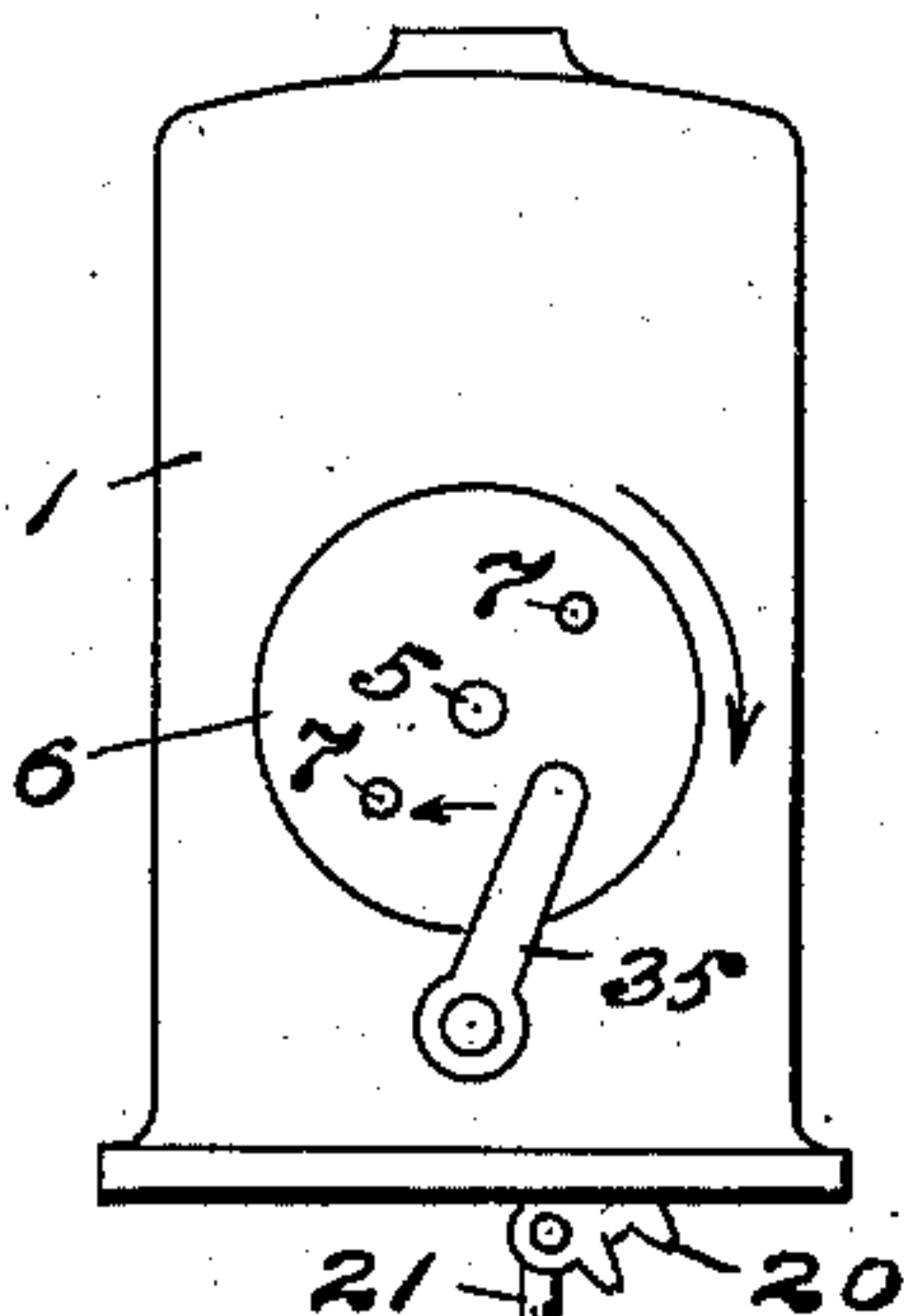
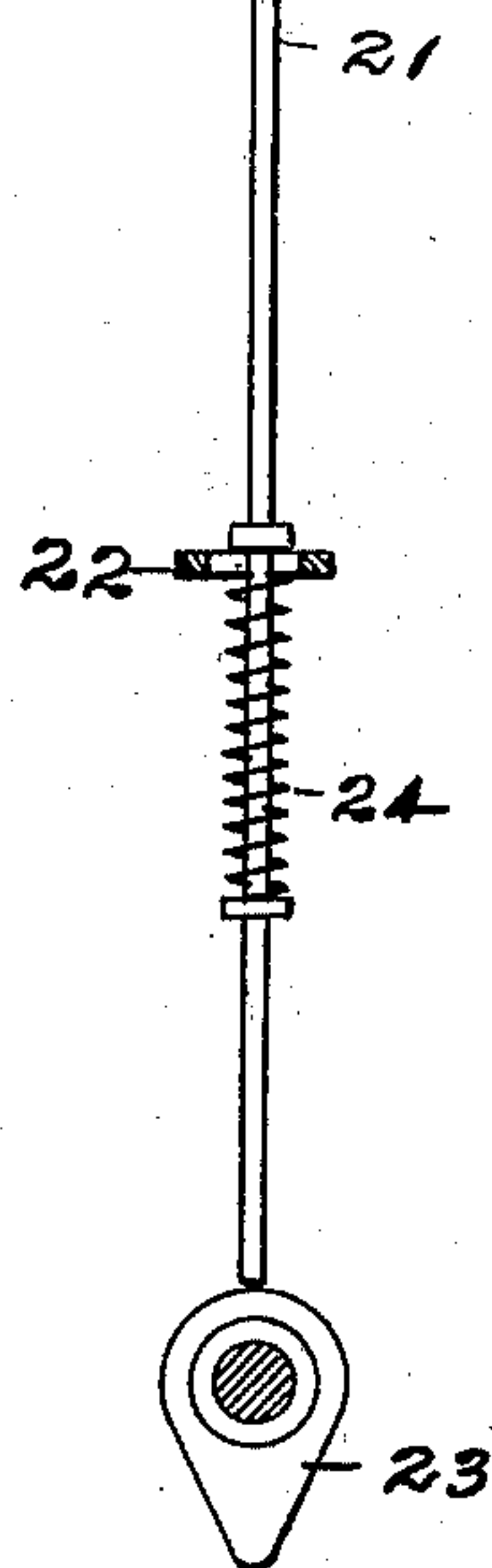
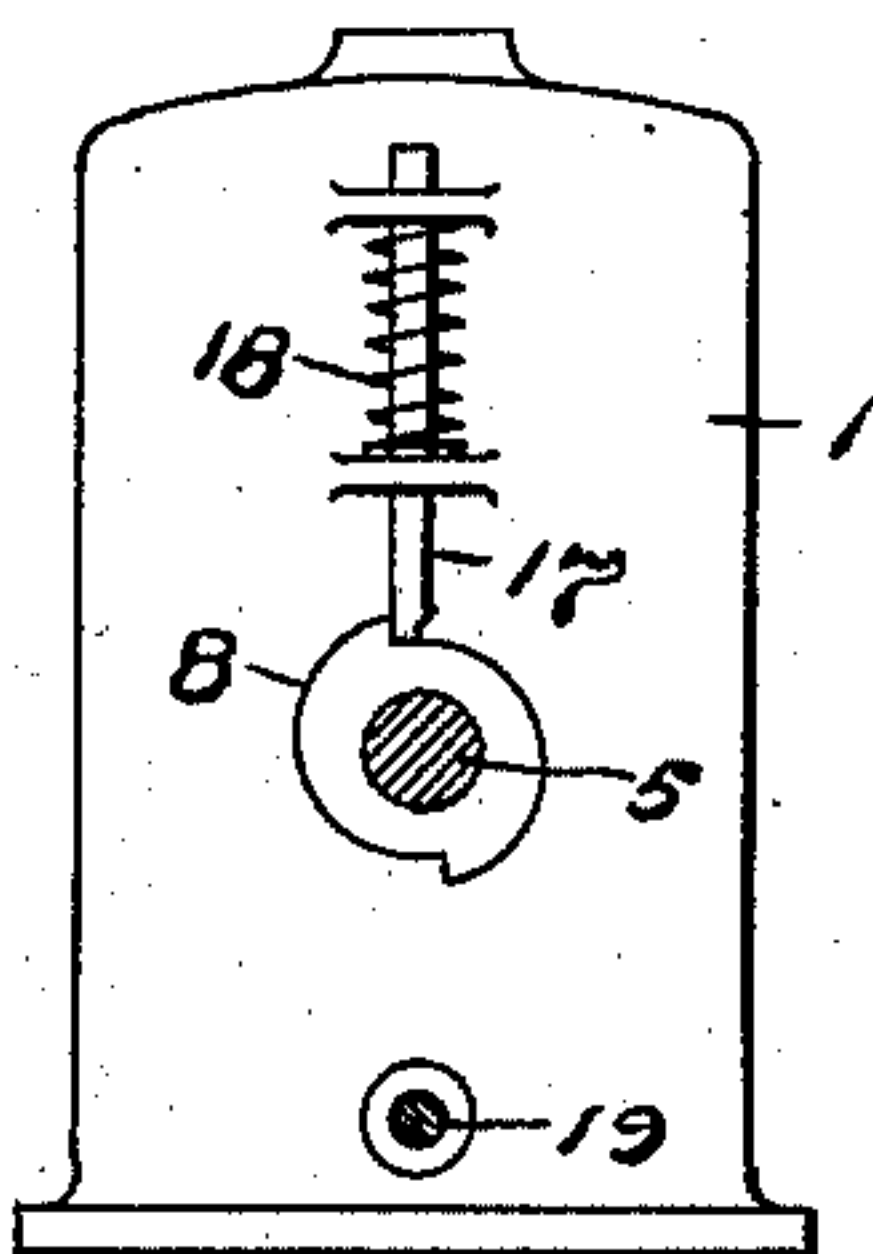


FIG. 6.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

STEWART CUNNINGHAM, OF TURTLECREEK, PENNSYLVANIA.

## COMBINED GAS CONTROLLER AND IGNITER FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 750,349, dated January 26, 1904.

Application filed May 20, 1903. Serial No. 157,974. (No model.)

*To all whom it may concern:*

Be it known that I, STEWART CUNNINGHAM, a citizen of the United States, residing at Turtlecreek, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in a Combined Gas Controller and Igniter for Explosive-Engines, of which improvement the following is a specification.

This invention relates to improvements in a combined device for controlling the gas-supply to and igniting the mixture in explosive-engines, said device being so constructed and arranged as to operate automatically and when occasion demands be operated by hand to permit the explosive-chamber being supplied with gas at starting or on first stroke.

In the accompanying drawings I have in various ways illustrated my improved device and parts thereof, in which—

Figure 1 is a vertical rear elevation of an explosive-engine having my improved device attached thereto. Fig. 2 is a vertical side elevation of the device detached from the engine. Fig. 3 is a vertical sectional view through the valve and sparking chamber of said device. Fig. 4 is also a vertical sectional view through said chambers and the valve thereof as the same would appear at right angles to the former view. Fig. 5 is an exterior view of said device as it would appear looking at the opposite side of Fig. 2. Fig. 6 is a view similar to that shown at Fig. 2 as it would appear in section on the line X X of Fig. 3.

On further reference to said drawings for a detailed description of said device and its operation the numeral 1 designates a sparking-chamber, which is attached to and communicates with the explosive-chamber 2 of the engine and to the pipe 3 for conducting the gas to said chamber by a port 4. A transverse opening is formed through the ported portion of the chamber-body, into which opening is loosely fitted a ported cut-off valve in the form of a shaft 5 for controlling the gas-supply, which valve-shaft is provided at one extremity with a rigid disk 6, provided with outwardly-extended pins 7. This valve-shaft is provided at its opposite end with a

collar 8 in the form of a ratchet-wheel, a clutch member 9, and a hand-wheel 10. A clutch member 11 for registering with the aforesaid fixed clutch member is loosely mounted upon the same end of said valve-shaft, so that said cut-off valve may be locked thereto as it is turned in one direction and yet permit the same being turned in the opposite direction by means of the hand-wheel for the purpose hereinafter specified. A gear-pinion 12 is likewise loosely mounted upon said valve-shaft and is provided at one end with a disk 13, from which projects guide-pins 14, which enter openings within the collar 15, carried by the loose clutch member, thereby locking said pinion to said member, and in order to cause engagement between said members spiral springs 16 are fitted upon said pins. A vertically-disposed pawl 17 is loosely mounted within a pair of lugs formed upon the side of the chamber to engage the ratchet of the valve-shaft and limit the movement to one half-revolution when turned by hand, and in order to insure engagement of said pawl at all times with said ratchet a spiral spring 18 is employed. Loosely mounted upon a shaft or stud 19 at the side of said chamber is a segmental gear-rack 20, having attached thereto a rod 21, which passes down through a bracket 22 to a point over the cam 23. This rod is adapted to be reciprocated vertically by means of the cam when the engine is in operation, and thereby automatically transmit a semirotary movement in one direction to the valve, and thus permit the gas to enter the explosive-chamber and be cut off at proper intervals in accordance with the piston-stroke, said rod being actuated upon its downward stroke by a spiral spring 24, and when occasion demands, as in starting, the rod is thrown out of engagement with the cam by means of the lever 25, link 26, and sleeve 27, thus permitting the valve to be turned by hand. To ignite the explosive elements, a fixed contact-terminal 28 is insulatedly secured within the wall of the sparking-chamber and is connected to one terminal of a spark-coil 29 by a wire 30. This fixed contact is adapted to be engaged by an oscillatable contact 31, arranged upon a shaft 32 and



connected by a wire 33 with a battery 33', and the spark-coil by a wire 34, said shaft being provided with a lever 35, whereby the same is moved in one direction by engaging  
5 with the valve-shaft pins 7 as said valve performs its semirotary movement with a lever 35, attached to the shaft of said contact, and is returned to its normal position in the opposite direction by a spiral spring 36.

10 It is to be understood that the movable parts are to be so proportioned and arranged relative to the piston and cam movements as to permit the gas being supplied and cut off and the ignition thereof take place at the  
15 proper moment. It is also understood that the relative proportion of the cam may be so arranged as to cause a lesser or greater movement of the valve in accordance to the cycle of the engine.

20 Having thus fully shown and described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an igniter for explosive-engines, the combination of a sparking-chamber arranged  
25 upon and communicating with the explosive-chamber and provided with a passage-way communicating with the gas-supply line, an electric circuit, a pair of contact members arranged in said sparking-chamber and included  
30 in said circuit one of which is adjustably secured therein and the other arranged upon a shaft provided with a rock-lever, an automatically-operated intermittingly-rotatable valve-shaft extending through said passage-way and  
35 provided with a port adapted to register with said passage-way and control the gas there-through, a member carried by one end of said

valve-shaft adapted to engage with and operate said rock-shaft in one direction to cause said contacts to engage, and a spring to return  
40 said rock-shaft to its normal position and thereby break the contact between said members, as shown and set forth.

2. In an igniter for explosive-engines, the combination of a sparking-chamber arranged  
45 upon and communicating with the explosive-chamber and provided with a passage-way communicating with the gas-supply line, an electric circuit, a pair of contact members arranged in said sparking-chamber and included  
50 in said circuit one of which is adjustably secured therein and the other arranged upon a shaft provided with a rock-lever, an automatically-operated intermittingly-rotatable valve-shaft extending through said passage-way and  
55 provided with a port adapted to register with said passage-way and control the gas there-through, a member carried by one end of said valve-shaft adapted to engage with and operate  
60 said rock-shaft in one direction to cause said contacts to engage, means to intermittingly rotate said valve-shaft independent of the automatic means to control the gas-supply, and a spring to return said rock-shaft to its  
65 normal position and thereby break the contact between said members, as shown and set forth.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

STEWART CUNNINGHAM.

Witnesses:

RICHARD S. HARRISON,  
JOHN GROETZINGER.