

No. 664,360.

Patented Dec. 18, 1900.

A. T. OTTO.

IGNITER FOR GAS OR OIL ENGINES

(Application filed May 19, 1899.)

(No Model.)

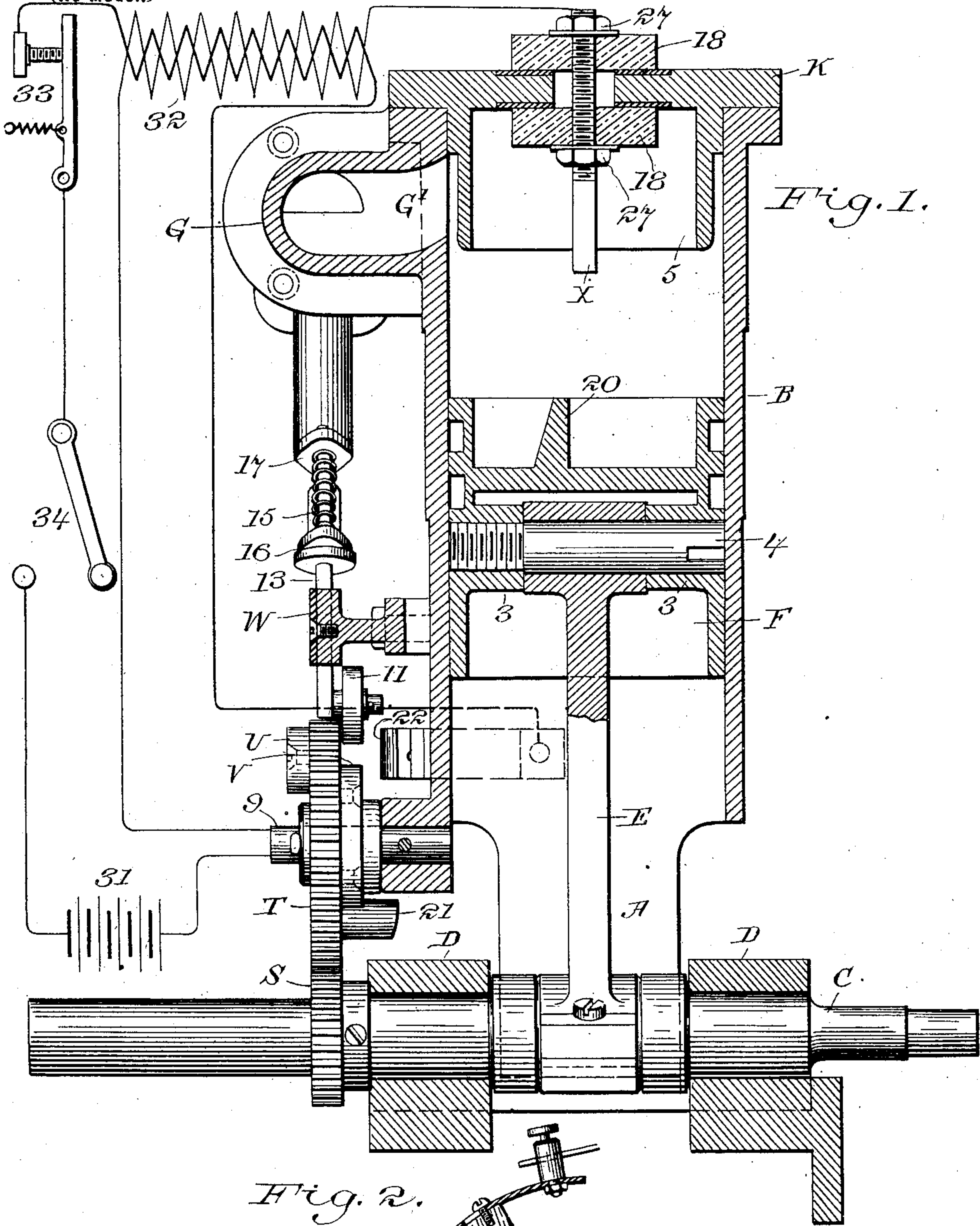
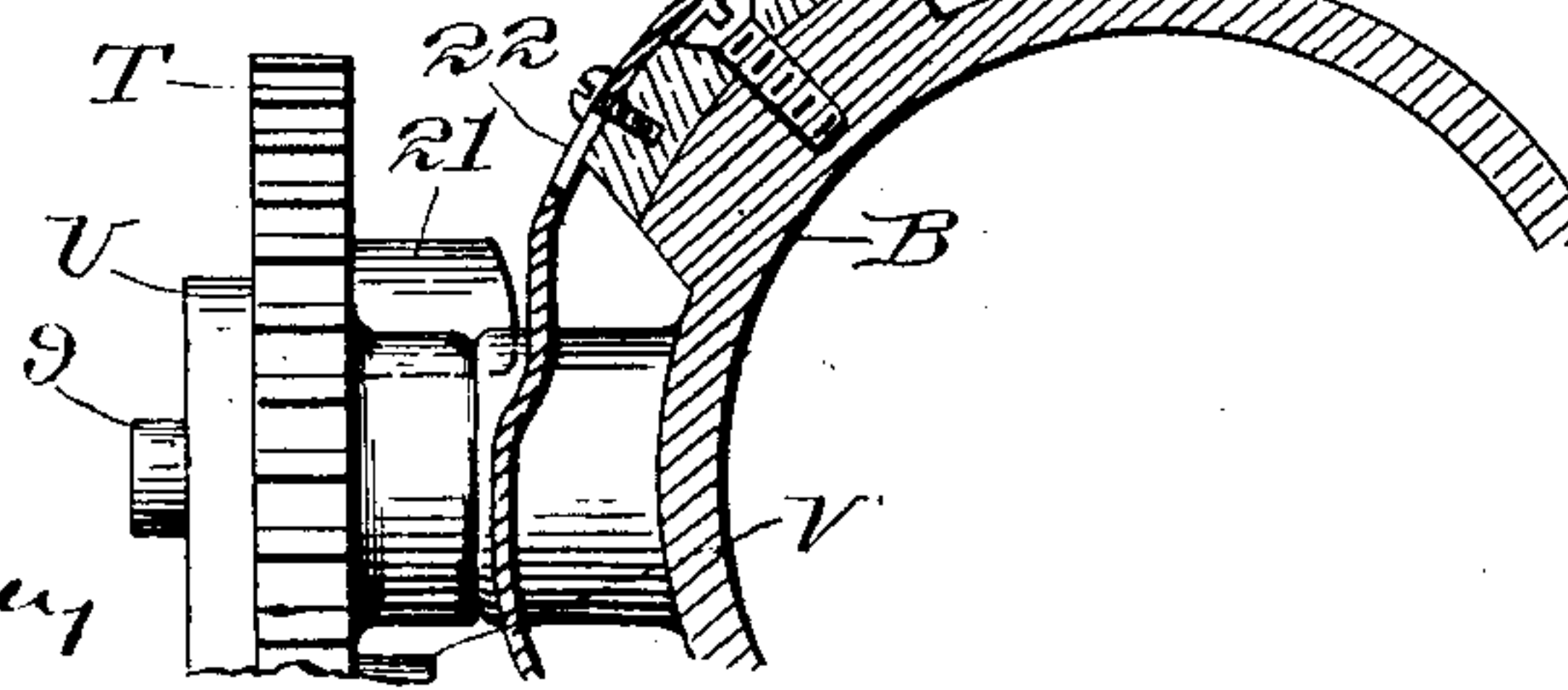


Fig. 2.

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ALBERT T. OTTO, OF NEW YORK, N. Y.

IGNITER FOR GAS OR OIL ENGINES.

SPECIFICATION forming part of Letters Patent No. 664,360, dated December 18, 1900.

Original application filed December 26, 1896, Serial No. 573,294. Divided and this application filed May 19, 1899. Serial No. 717,417. (No model.)

To all whom it may concern:

Be it known that I, ALBERT T. OTTO, a citizen of the United States of America, and a resident of New York city, county of New York, State of New York, have invented certain new and useful Improvements in Igniters for Gas or Oil Engines, of which the following is a specification.

This application is a division of my original application filed December 26, 1896, Serial No. 573,294, and subsequently forfeited and renewed under Serial No. 697,801.

The portion of my invention herein described and claimed relates specifically to the improved form of igniter for gas or oil engines.

The preferred construction embodying my invention is illustrated in the accompanying sheet of drawings, in which—

Figure 1 is a section of the engine-cylinder and connecting parts, with the diagram of the electrical connections for the igniter; and Fig. 2 is an enlarged detail section of the contact maker and breaker.

Throughout the drawings like reference characters refer to like parts.

The frame A is of suitable size and shape, and to it is connected the cylinder B, and the crank-shaft C is supported in suitable bearings D upon the frame A, and the connecting-rod E extends to the piston F, where it is received between the lugs 3 and receives through it the connecting-pin 4. This piston F is to be of any desired character except in the parts hereinafter named.

At one side of the cylinder B is a hollow projection G at the port or opening G', leading into the cylinder, and the valve-chests are connected thereto.

The cylinder-head K is bolted onto the flanged end of the cylinder, and it is provided with an annular deflector 5 in the form of a comparatively thin cylinder projecting from the head K into the cylinder and extending as far as the opening or port G' in the projection G, and there is a space between this deflector and the interior surface of the cylinder, so that the air and gas or vapor passing into the cylinder through the port G' strikes against the deflector 5 and passes

around the cylinder at the same time that it passes into the cylinder at the edge or end of the deflector.

In almost all instances it is necessary to draw in the explosive gases at one movement of the piston and compress the same by the movement of the piston in the other direction previous to igniting the gases, so that the explosion takes place every other stroke. I therefore make use of a gear S upon the crank-shaft driving the gear T upon a stud 9, and this gear T is twice the size of the gear S, so as to revolve once for each complete movement of the engine, and upon this gear T are cams U and V, preferably on opposite sides, the one for actuating the induction-valve and the other the eduction-valve, and these cams are properly shaped and timed to open these valves at the proper moment.

I prefer to provide a roller 11 upon slide 13 in the stationary guides W for the cam V to act upon the roller and move the slide. Similar apparatus coacts with the cam U, and the slides are connected with the respective valve-stems, and the spring 15, intervening between the cross-pieces 16 at the ends of the slides and the cross-pieces 17 adjacent to the respective valve-chests, acts to close the valves rapidly as the cams pass out of contact with the respective rollers.

This engine is especially adapted to driving the wheels of a horseless carriage or as a motor for light work or for driving the propeller in a comparatively small boat, and such engine is made with reference to lightness and compactness, and in order to ignite a charge I find it advantageous to use an electric spark, and with this object in view I provide a central electrode X, passing through the cylinder-head and insulated therefrom by porcelain cylinders or non-conducting supports 18, through which the electrode passes, and which cylinders are firmly connected together by nuts 27 upon the central electrode, there being washers at the nuts and between the porcelain cylinders and the cylinder-head for making the parts gas-tight, and upon the piston there is a stud 20, that passes adjacent to the electrode; but this stud being eccentric to the piston is always in the proper

position to the electrode for a spark to be drawn between the electrode and the stud, and by adjusting the central electrode lengthwise the time at which the explosion takes place can be varied, because the spark will pass from one electrode to the other sooner or later in the endwise movement of the piston near the end of the stroke, and several sparks can pass between the electrodes to insure the ignition of the gases or vapors.

Any desired source of electric energy can be connected to the central insulated electrode X and also to the cylinder of the engine. I, however, prefer to employ a battery 31, which is in the primary circuit of the inductorium 32. The secondary circuit of the inductorium is connected with the central electrode and the engine-cylinder. The battery-circuit is closed and interrupted by the contact 21 upon the gear-wheel T coming into contact with an insulated plate 22 in the circuit to the battery, and the vibrator at 33 pulsates the battery-current and gives numerous sparks in the secondary in the cylinder.

A battery or source of electric energy is illustrated at 31 and a switch at 34 for closing or breaking the primary circuit.

The mode of operation of my invention is as follows: The contact-spring 22 and cooperating projection 21 on the wheel T are so located that they will make a contact just at or slightly before the time the piston has reached the inner end of its stroke. This will set the pulsator 33 into action, the primary circuit of the inductorium being completed from the battery 31 through closed switch 34, pulsator 33, and the primary coil of the inductorium 32 back to contact-spring 22 and through contact projection 21 back to the battery. This will set up the usual high-tension pulsatory current in the secondary of the inductorium 32, whose circuit will now be complete from the right-hand end of the coil, as shown in Fig. 1, through the electrode X, electrode 20, and the short air-gap between said electrodes, through the engine piston and cylinder, and back to the left-hand end of the secondary by the fine-wire connection shown in Fig. 1. This will of course produce a rapid series of sparks between the electrodes X and 20, which will insure the ignition of the charge in the engine-cylinder. On the outward motion of the piston the contact projection 21 runs off the contact-spring 22, thereby opening the primary circuit, and the inductorium ceases to act. Thus a double control of the period of sparking action is produced, one through the adjustment of the contacts at 21 22 and the other by the adjustment of electrodes X and 20.

The advantages of the invention consist in the certainty of action, there being no possibility of short-circuiting by which the spark will be eliminated, and in the accuracy obtainable through the double adjustment

above described. Moreover, the creating of a spark between two moving electrodes X and 20 causes the same to vary slightly in position during the different periods of its existence and brings said spark in contact with different portions of the charge.

It is evident, of course, that various changes could be made in the details of construction without departing from the spirit and scope of my invention. Other forms of inductorium and connections might be employed and other forms of contact-breakers, and different methods of insulation might be substituted, &c.; but all these I consider within the scope of my invention so long as the apparatus is arranged to create a powerful secondary induced-current spark between moving electrodes within the engine-cylinder.

I do not herein claim the form of deflector and cooperating chamber or port, as the same is more specifically described and claimed in my pending application, originally filed December 26, 1896, Serial No. 573,294, and renewed under Serial No. 697,801, of which this application is a division.

Having therefore described my invention, what I claim as new, and desire to protect by Letters Patent, is—

1. The combination with the piston, cylinder, and its head, in a gas-engine, of an electrode passing through the center of the head and insulated, and a projection upon the piston arranged eccentrically thereof, and acting in connection with the insulated electrode in drawing the spark to explode the charge.

2. The combination with the piston, cylinder, and its head, in a gas-engine, of an electrode passing through the center of the head and insulated, and a projection upon the piston arranged eccentrically thereof, and acting in connection with the insulated electrode in drawing the spark to explode the charge, and means for adjusting the electrode endwise.

3. The combination of the engine-cylinder and piston, an electrode mounted on the cylinder, a second electrode mounted on the piston, and an electric circuit of which said electrodes constitute the terminals, said electrodes being so disposed as to approach each other while the piston is near the end of its inward stroke, but never to touch each other.

4. The combination of the engine-cylinder and piston, an electrode mounted on the cylinder, a second electrode mounted on the piston, and an electric circuit of which said electrodes constitute the terminals, said electrodes being so disposed as to approach each other while the piston is near the end of its inward stroke, but never to touch each other, together with the induction-coil, of which said electric circuit constitutes the secondary circuit.

5. The combination of the engine-cylinder and piston, an electrode mounted on the cylinder, a second electrode mounted on the pis-

ton, and an electric circuit of which said electrodes constitute the terminals, said electrodes being so disposed as to approach each other while the piston is near the end of its
5 inward stroke, but never to touch each other, together with the induction-coil, of which said electric circuit constitutes the secondary circuit, and means whereby the primary cir-

cuit of said coil is closed and broken by the moving parts of the engine.

Signed by me at New York city, New York,
this 15th day of May, 1899.

ALBERT T. OTTO.

Witnesses:

LILIAN FOSTER,
ERNEST V. PLATT.