

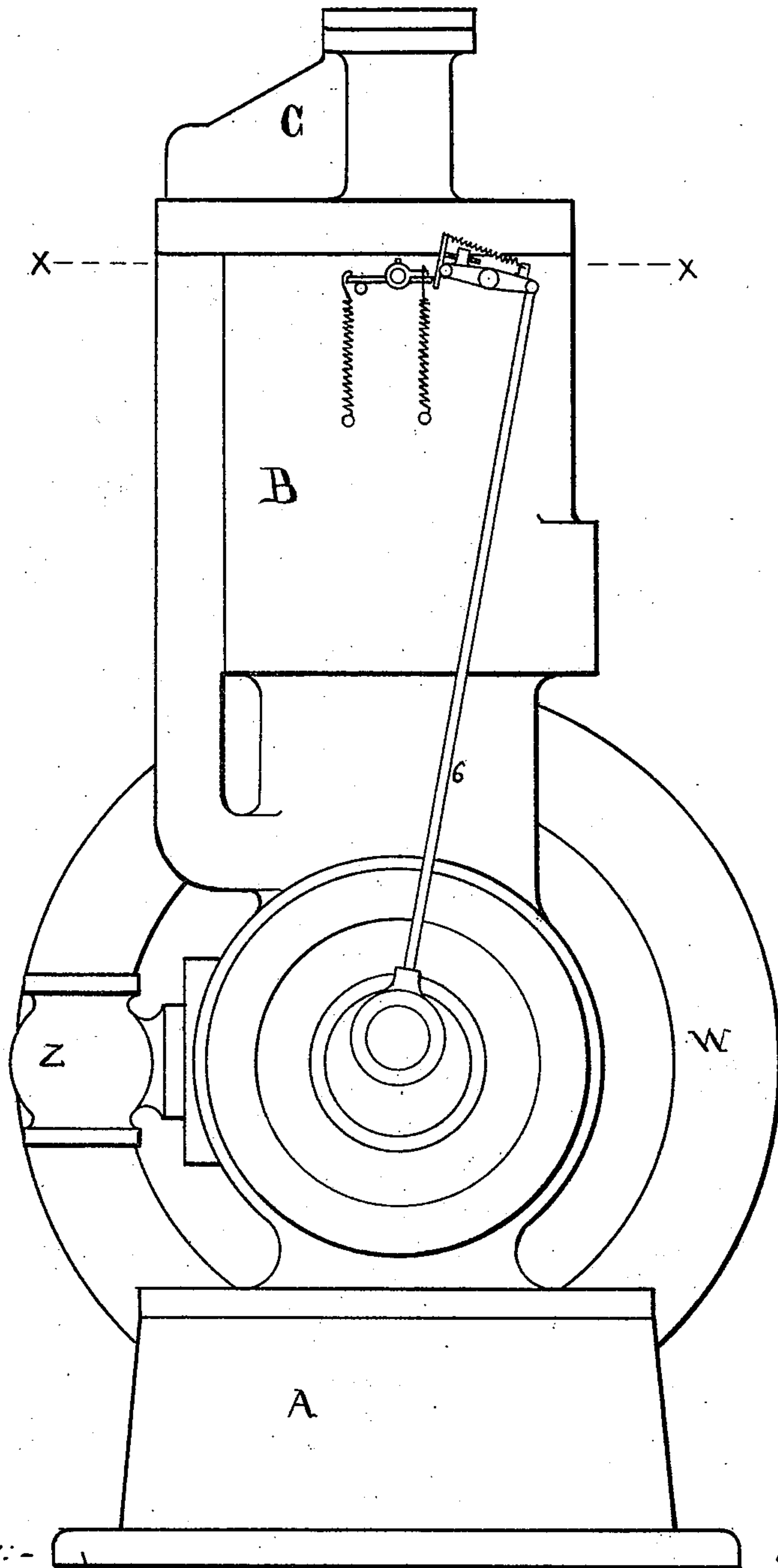
(No Model.)

3 Sheets—Sheet 1.

C. SINTZ.
GAS ENGINE.

No. 592,669.

Patented Oct. 26, 1897.



Witness:-
Arthur C. Devision.
Lowell Wright.

Fig. 1.

Inventor:-
Clank Sintz
By Edward Taggart
His Atty

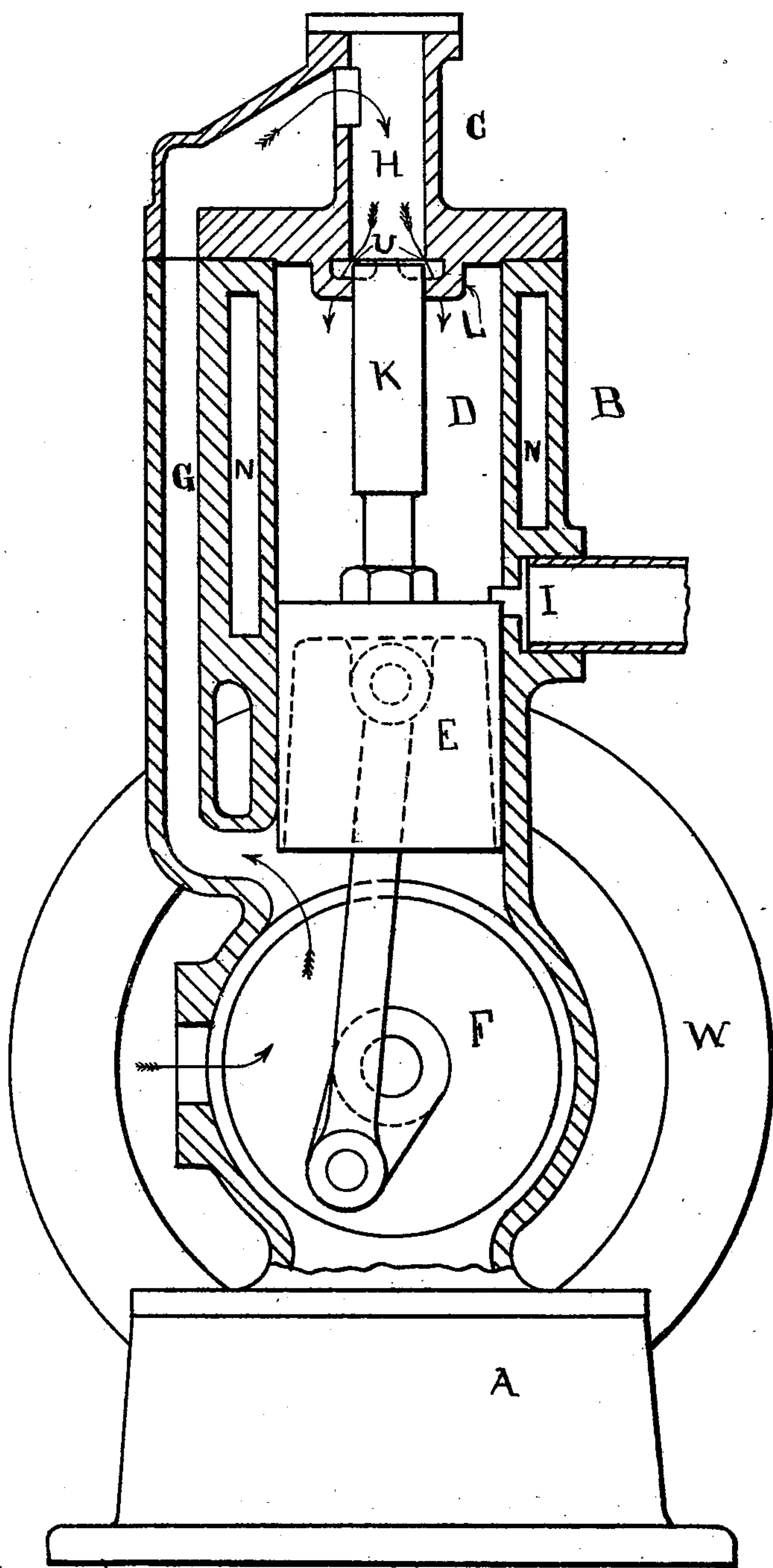
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C. SINTZ.
GAS ENGINE.

No. 592,669.

Patented Oct. 26, 1897.



Witnesses:-

Arthur C. Dawson.
Louise High.

Fig. 2.

Inventor:-

Clark Smith
By Edward Taggart
His Atty

(No Model.)

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C. SINTZ.
GAS ENGINE.

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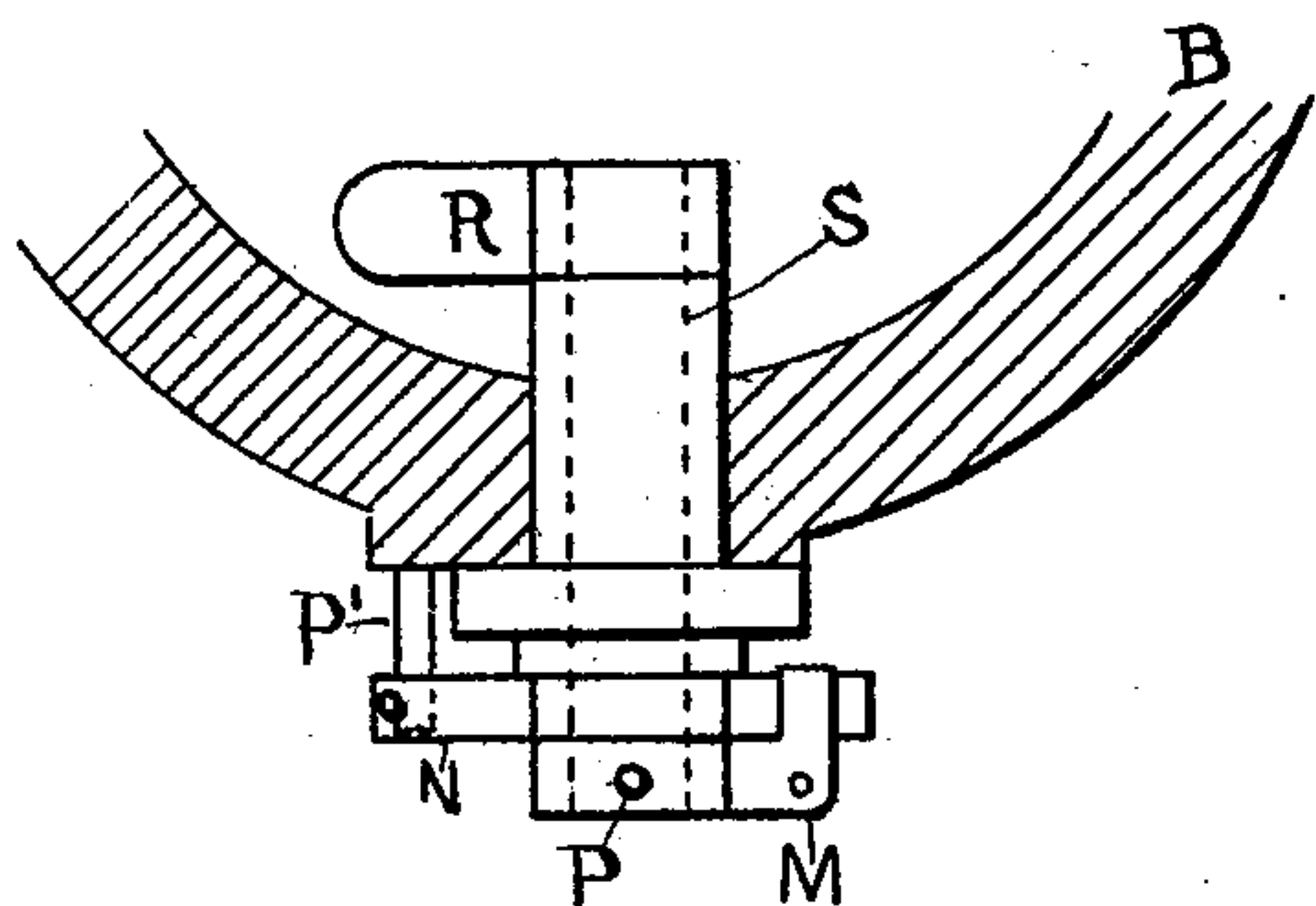


Fig. 4.

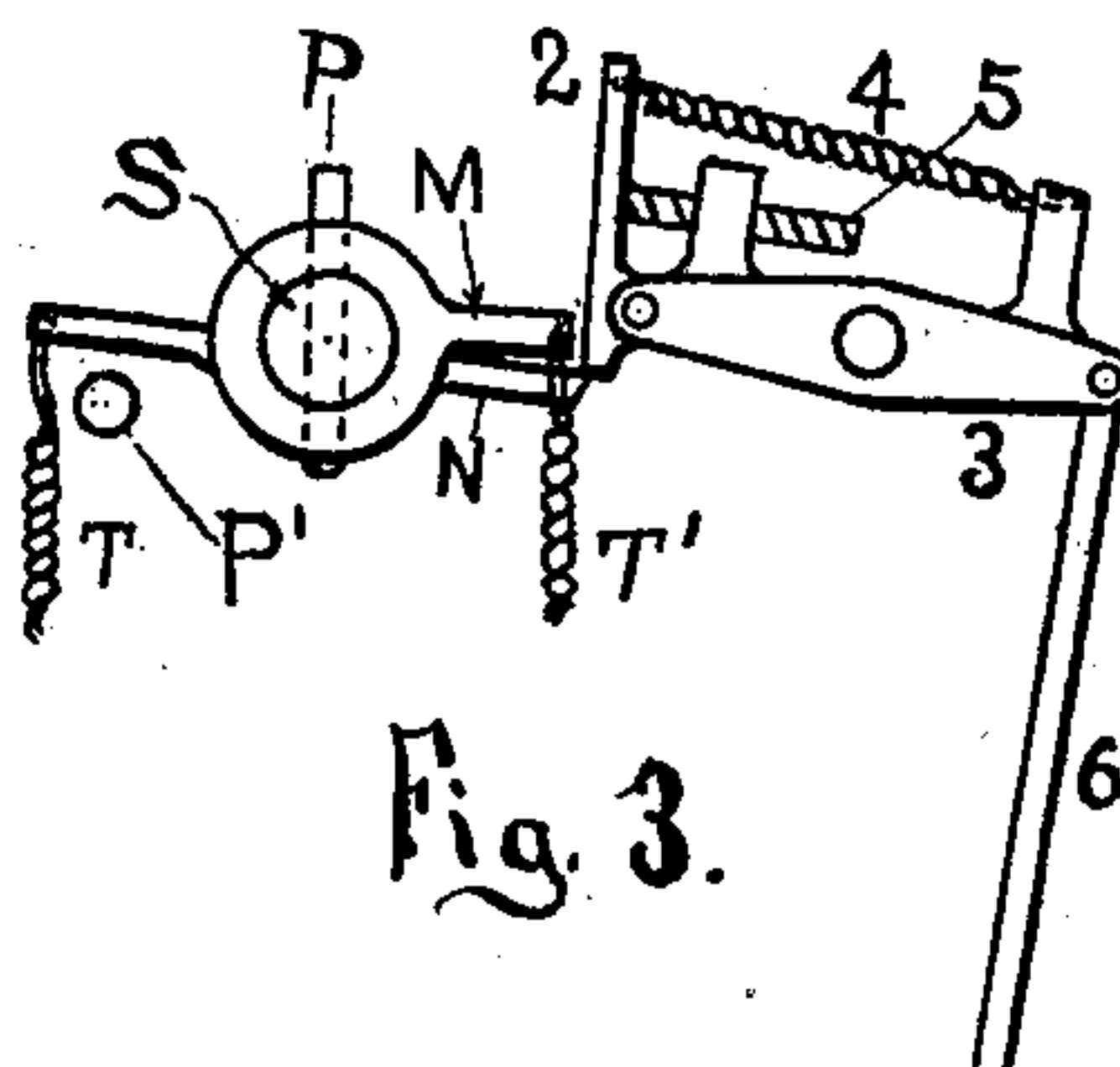


Fig. 3.

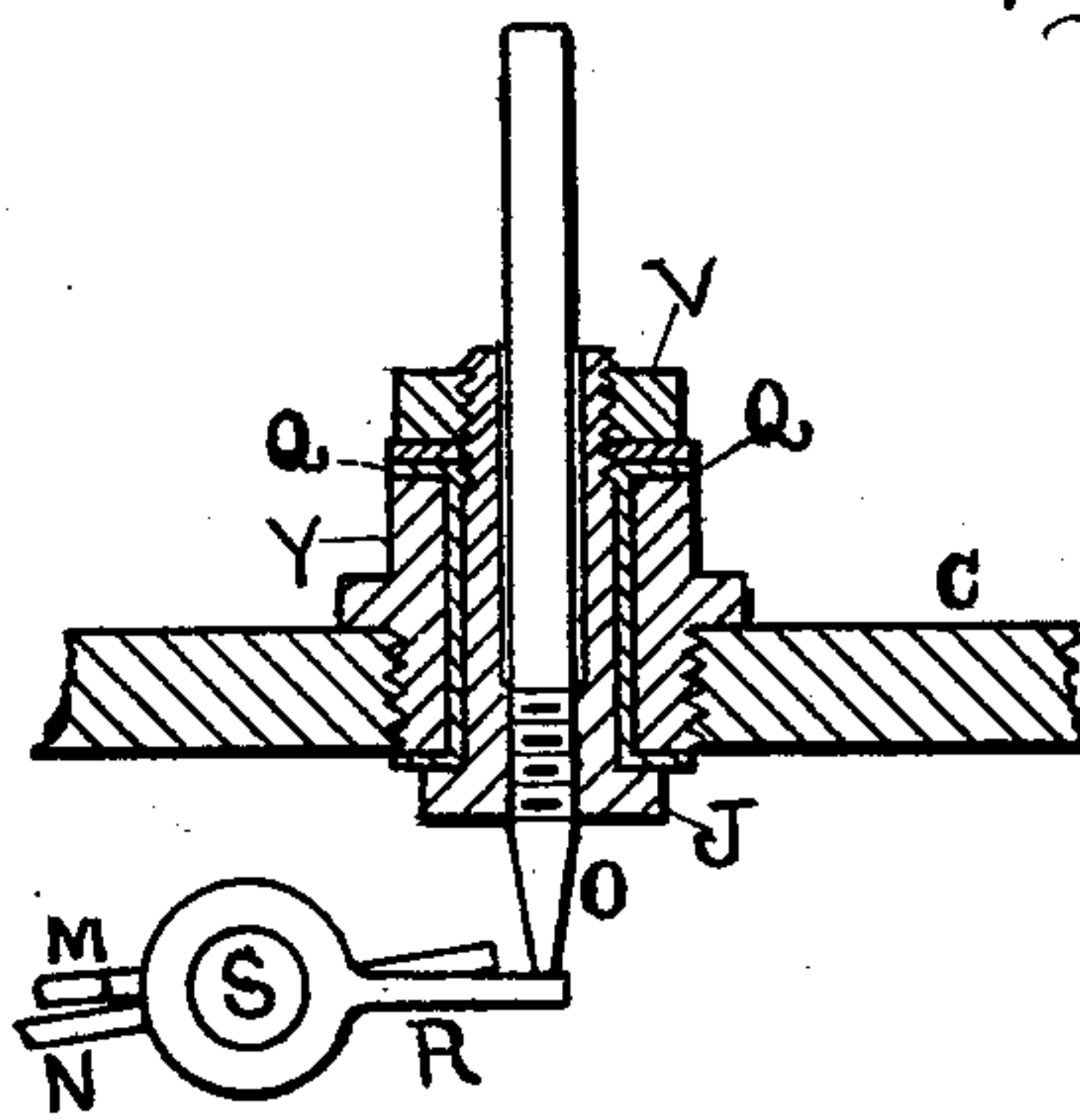


Fig. 5.

Witnesses:

Arthur C. Deane

Louise Wright

Inventor:

Clark Sintz

By Edward Tiggant
his Atty

UNITED STATES PATENT OFFICE.

CLARK SINTZ, OF GRAND RAPIDS, MICHIGAN.

GAS-ENGINE.

SPECIFICATION forming part of Letters Patent No. 592,669, dated October 26, 1897.

Application filed August 22, 1895. Serial No. 560,181. (No model.)

To all whom it may concern:

Be it known that I, CLARK SINTZ, a citizen of the United States, residing at the city of Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Gas-Engines, of which the following is a specification.

This invention relates to certain new and useful improvements in gas-engines in which the explosive material is drawn into the engine, conveyed to the compressing-chamber, and there exploded by gas or similar explosive material; and it has for its object to improve the construction of such gas-engines and to provide a new and useful sparking device for exploding the charge.

To these ends my invention consists in the novel features hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 shows a side elevation of an engine constructed in accordance with my invention, the figure showing the side of the engine which contains the eccentric adapted to operate the sparking device. Fig. 2 shows a vertical sectional view of my invention through the center of the exhaust-port, through which the exploded charge is exhausted. Fig. 3 shows a side elevation of the sparking device, detached, on an enlarged scale. Fig. 4 shows an enlarged sectional view on line X X of Fig. 1. Fig. 5 shows a vertical sectional view of the cylinder just back of the point of contact of the sparking device.

Similar letters and numerals refer to similar parts throughout the several views.

A represents the base of the engine, which may be of any suitable material and of any required form or shape.

B represents the cylinder proper. This cylinder is provided with a cylinder-head C.

D represents the chamber in the cylinder above the piston, which chamber is referred to as the "explosion" or "firing" chamber.

E represents the piston, constructed in an ordinary manner and connected through a pitman to a suitable crank.

F represents the crank-chamber, and Z represents the valve placed in the port, which receives the explosive material into the crank-chamber.

G represents a passage connecting the crank-chamber F to the small cylindrical chamber H within the head C of the cylinder.

L represents guides for the piston-valve K, and U represents the port or opening from the small cylinder H to the firing-chamber D.

I represents the exhaust-port for the escape of the gas after the explosion.

W represents the fly-wheel, of any ordinary construction. The explosive charge is received through the port controlled by the valve Z.

The operation of this part of my invention is as follows: When the piston E moves upward, it draws an explosive charge into the crank-chamber F. As it moves downward the explosive charge within the crank-chamber F is driven upward through the passage G into the cylindrical chamber H and from thence through the port U into the firing-chamber D, it being understood that the piston E has been driven down by the explosion of a charge within the firing-chamber. The upward movement of the piston E now compresses the charge within the firing-chamber D and at the same time draws into the crank-chamber F a new charge. When the compression in the firing-chamber D reaches a suitable point, the charge is exploded by means of a spark from the sparking device, as hereinafter described, which will again drive the piston E down to its lowest point. The port I opens as the piston E moves by it and before the opening of the port U in order to relieve the pressure and to allow the exploded charge to move out freely from the chamber D. When the piston E has moved upward, so as to close the port I, the piston-valve K has closed the port U, and the charge in the chamber D is in position to be compressed ready for firing.

Referring now to the sparking device, M represents a bent arm, which is rigidly attached to a shaft S by means of a pin P or any other suitable means. The outer end of the arm M is bent nearly at a right angle; preferably as shown in Fig. 4, so as to overlap the lever N near one end of the last-named lever. N is a lever supported upon the shaft S and preferably placed at the side of M. This lever N has an oscillating movement upon the shaft S, its movement in one direc-

tion being limited by the outer end of the arm M, the position being shown in Figs. 3 and 4. The opposite end of the lever N is limited in its movement by a stop P'. A spring T is
 5 attached to one end of the lever N and is continually under tension, having a tendency to pull down the lever N until the same reaches the stop P'. M is also provided with a spring T', which has a tendency at all times to hold
 10 the same in contact with the lever N. 2 represents a pivoted arm, pivoted near its lower end to the lever 3 and held in position by means of a spring 4. It is also provided with an adjusting-screw 5 in order to adjust the
 15 same to the required position to meet the end of the lever N, as hereinafter described. 3 represents a lever pivoted at or near its center, preferably, and having one end connected to the eccentric-rod 6, by means of which it
 20 is operated. The position of the eccentric-rod and connections is fully shown in Fig. 1, and as this rod is moved by the ordinary eccentric no further description will be needed. O represents the contact-rod, through which
 25 the electric spark is conveyed. Surrounding this rod O is a sleeve J, having an insulation Q. The sleeve J is supported in an outer sleeve Y, the outer sleeve Y being provided at its lower end with a screw-thread which
 30 engages with a corresponding screw-thread in the cylinder-head C. V is a nut engaging with the screw-thread on the sleeve J and securing the same in position within the outer sleeve Y.
 35 The operation of this part of my invention is as follows: The upward movement of the eccentric 6 turns the lever 3 upon its pivot, lowers the end which is opposite to the connecting-point between the lever 3 and the eccentric 6, bringing the pivoted arm 2 in contact
 40 with the surface of the lever N, moving this end of the lever N downward and allowing the spring T' to pull down the bent end of the arm M, thereby rocking the shaft S and raising the arm R in contact with the contact-rod O, holding the same in the position
 45 shown in Fig. 5. The further movement of the pivoted arm 2 by reason of the mechanism above described will pass the said arm beyond the end of the lever N, allowing this
 50 end of the lever N to escape, when the spring T will suddenly act upon the other end of the lever N, bringing the lever N in contact with the bent portion of M, lifting the outer end of M, turning the shaft S, and quickly removing the contact-arm R from the contact-rod O, thereby causing the spark. Thus at every
 55 revolution of the crank-shaft of the engine the eccentric-rod 6 will be raised and lowered and the lever or arm R will be brought in contact with the contact-rod O and held in contact until the escape of N from the lower point of the arm 2, thereby causing a very quick
 60 separation of the contact-points and producing the spark for exploding the explosive charge within the cylinder D, the arrangement of the explosive mechanism being such that

the spark is caused just at the time the charge in the chamber D has been suitably compressed by the upward movement of the piston E. It will be understood that this spark
 70 is produced by an electric current and that the explosion is produced by the withdrawal of the contact-arm R from the contact-rod O.

Having thus described my invention, what
 I claim to have invented, and desire to secure
 by Letters Patent, is—

1. In an explosive gas-engine, the combination of a cylinder having a crank-chamber provided with a valved inlet for explosive material, a firing-chamber having an inlet-port and an exhaust-port, a supplementary inlet-chamber adapted to communicate with the firing-chamber through said inlet-port, a passage leading from the crank-chamber to the inlet-chamber, a power-piston moving in the firing-chamber and adapted to directly control the exhaust-port, and a piston-valve carried by the said piston and adapted to control the inlet-port connecting the inlet-chamber and firing-chamber, substantially as described.

2. In an electric-spark-producing device for the explosion of the gas in gas-engines, the combination with the eccentric and eccentric-rod of a lever operated by said eccentric-rod, a pivoted arm carried by the said lever, a spring connecting the said pivoted arm to said lever, a rock-shaft, an arm rigid with the said rock-shaft at one end, a crank-arm on the said rock-shaft on the other arm adapted to come in contact with the spark-producing rod, a lever mounted on said rock-shaft adapted to engage with the pivoted arm on the lever attached to the eccentric-rod, a spring adapted to hold the tangent arm of the rock-shaft in contact with the sparking-point, and a spring upon the lever which is supported by the said rock-shaft, adapted when said lever is released to quickly remove the tangent point between the arm and the spark-producing point, thereby producing a spark and exploding the gas within the engine, substantially as described.

3. In an electric-sparking device for gas-engines, the combination with the eccentric and eccentric-rod, a lever operated by said rod, an arm pivoted to said lever, and a spring for said arm, of a shaft provided with rigidly-attached arms on its opposite ends, a contact-rod with which one of said arms is adapted to make and break contact, a spring connected to the other arm of said shaft, and a lever loosely mounted on said shaft and having one end provided with a spring and its other end adapted to be acted on by the arm pivoted to the eccentric-operated lever, substantially as described.

In witness whereof I have hereunto set my hand and seal in the presence of two witnesses.

CLARK SINTZ. [L. S.]

Witnesses:

EDWARD TAGGART,
 CHRISTOPHER HONDELINK.