

No. 741,923.

PATENTED OCT. 20, 1903.

J. A. MoGEE.  
SPARKER FOR GAS ENGINES.  
APPLICATION FILED MAR. 6, 1903.

NO MODEL.

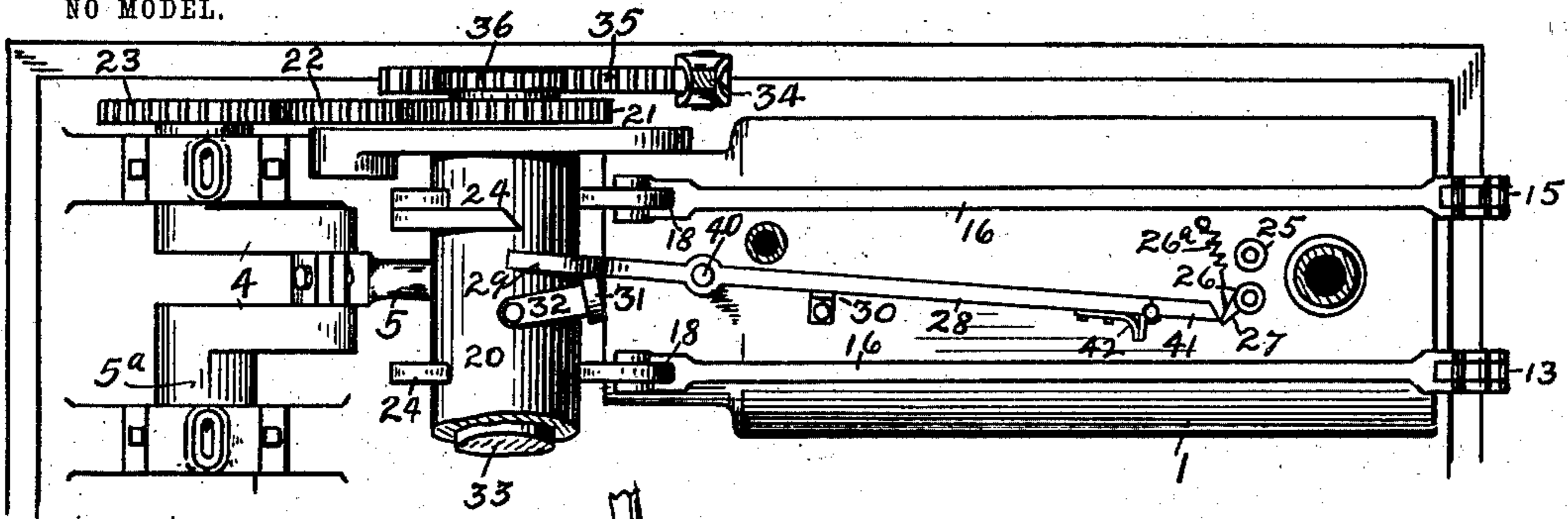


Fig. 1.

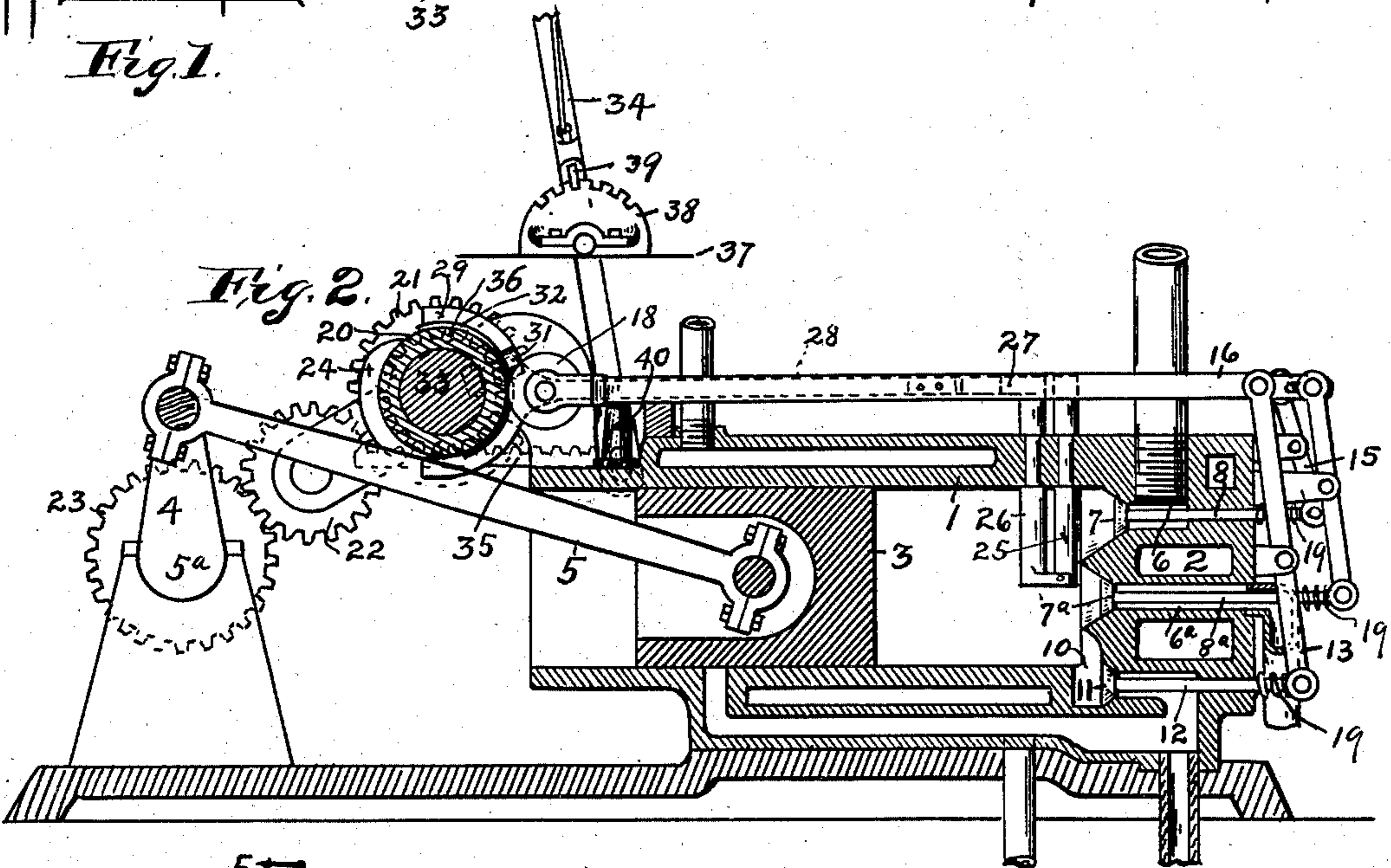


Fig. 2.

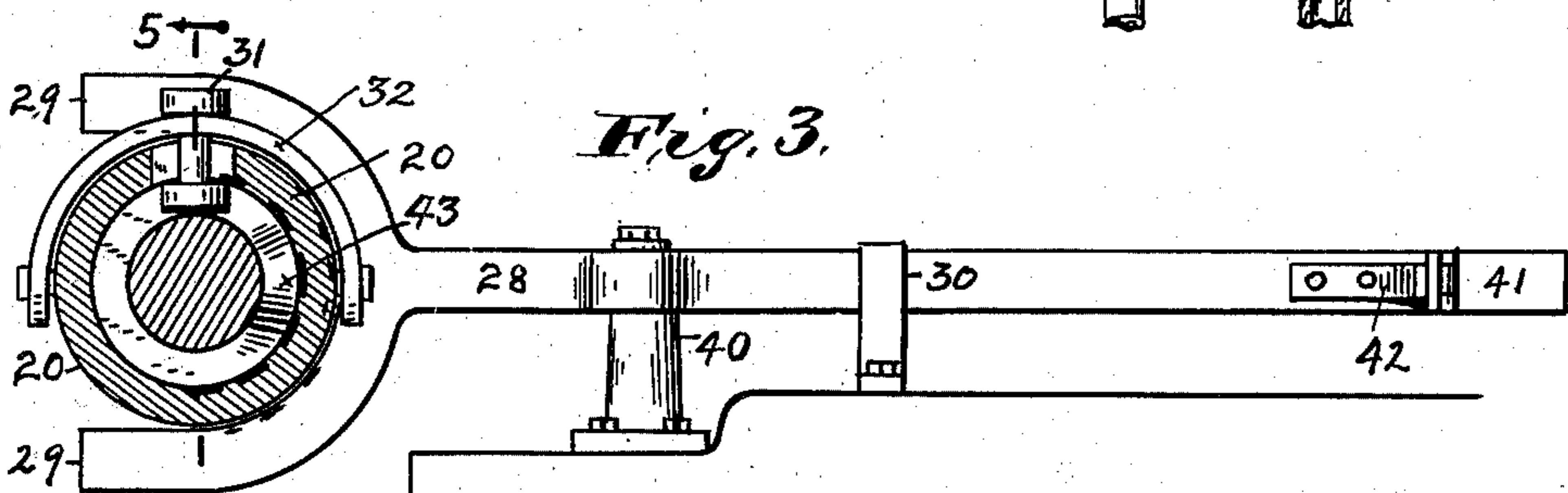


Fig. 3.

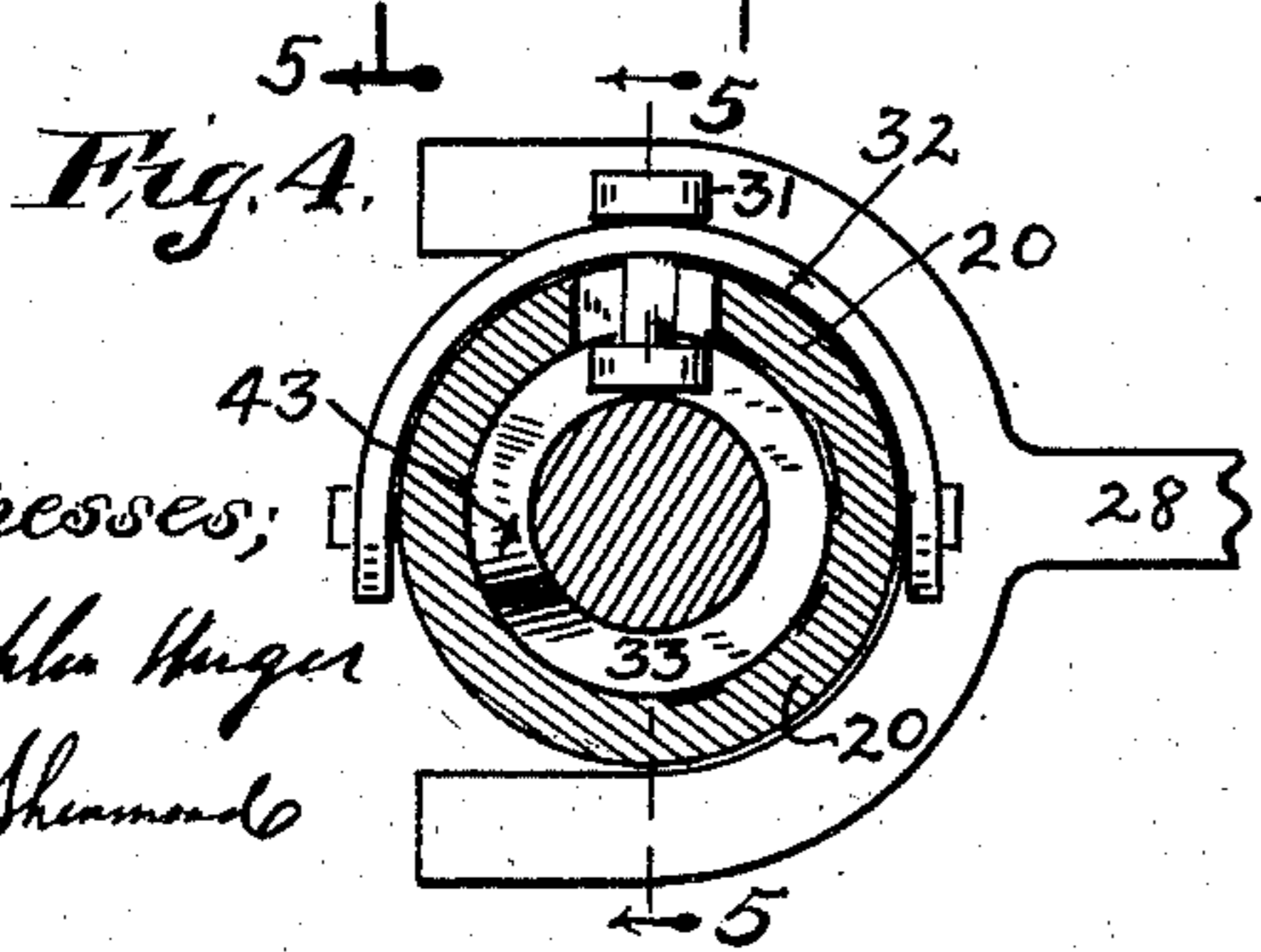


Fig. 4.

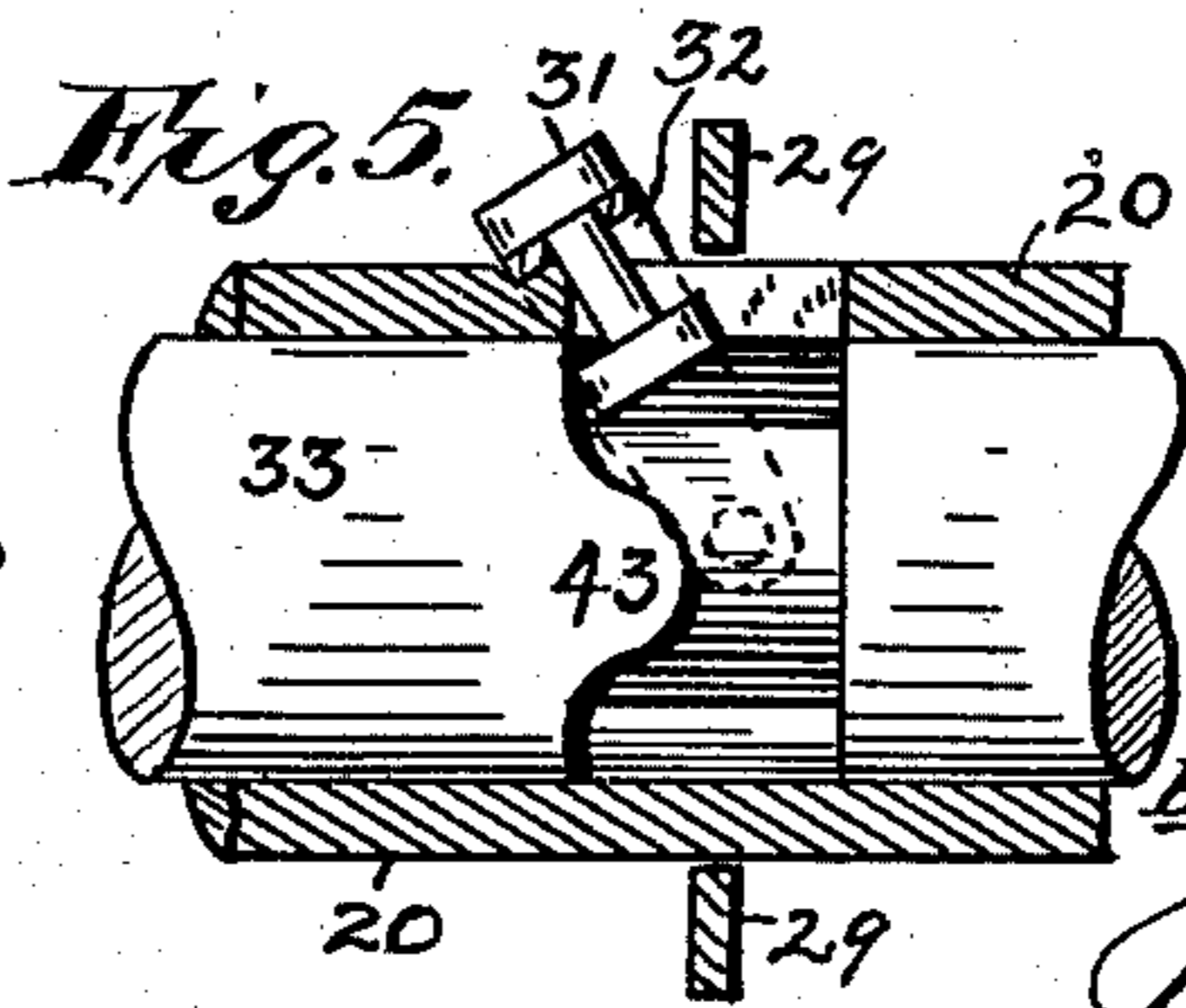


Fig. 5.

Witnesses;  
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# UNITED STATES PATENT OFFICE.

JOSEPH A. MCGEE, OF BIG SPRING, INDIANA.

## SPARKER FOR GAS-ENGINES.

SPECIFICATION forming part of Letters Patent No. 741,923, dated October 20, 1903.

Original application filed October 25, 1902, Serial No. 123,704. Divided and this application filed March 6, 1903. Serial No. 146,466. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH A. MCGEE, a citizen of the United States, residing at Big Spring, in the county of Boone and State of Indiana, have invented certain new and useful Improvements in Sparkers for Gas-Engines, of which the following is a specification.

This invention relates to improvements in the sparking or electric-ignition device for gas-engines, and is a division of an application for patent for a reversible explosion-engine filed by me on the 25th day of October, 1902, Serial No. 123,704.

The principal object of this invention is to change the sparking time with relation to the movement of the engine-piston, (here shown as a two-cycle engine, but applicable to four-cycle engines,) so as to make the explosion early or late or change the time of explosion from one stroke of the piston to the other.

The object is to provide a simple mechanism by which the sparking may be made to cease for as long a time as may be desired and then be made to begin again in reverse order, so as to reverse the engine.

I accomplish the objects of the invention by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of my invention; Fig. 2, a longitudinal vertical section of Fig. 1; Fig. 3, a detail showing the cam-shaft in cross-section and the sparking-lever in side elevation; Fig. 4, a detail in cross-section of the cam-shaft, showing it in different relative position to its enveloping sleeve; and Fig. 5, a vertical section on the line 5 5 of Fig. 3.

Like characters of reference indicate like parts throughout the several views of the drawings.

1 is the engine-cylinder; 3, the piston connected by pitman 5 with the crank 4, mounted on shaft 5<sup>a</sup>.

6 is the gas-supply port, which is closed by valve 7. The stem 8 of valve 7 extends through the head 2 longitudinally of the cylinder.

10 is an exhaust-port which is opened and

closed by the valve 11. It has the stem 12, which extends through the head 2 of the cylinder and connects with the lever 13. The port 6<sup>a</sup>, controlled by the valve 7<sup>a</sup>, is for the supply of compressed air to purify the cylinder after an explosion and particularly to blow the particles of carbon and other refuse matter resulting from an explosion away from the contact-points of the sparking electrodes 25 and 26, which are located in the path of said air-blast. The stems of the valves 7, 7<sup>a</sup>, and 11 connect with levers which are pivotally secured to longitudinally-reciprocating bars 16, located on top of the engine-cylinder. These bars have rollers 18, which bear by the action of springs 19 (on the stems of the valves) against the cam-roller 20. The cam-roller 20 is mounted above the front end of the cylinder and is rotated by a train of gears 21, 22, and 23 from the crank-shaft 5<sup>a</sup>. Cams 24 are positioned opposite the rollers 18 of the bars controlling the inlet and exhaust valves at portions of the circumference of said roller 20, which will move said bars 16 properly to give the amount of valve-opening at the required times.

25 is the insulated electrode of the sparking device, and 26 the electrode which has a rocking movement to and from the post to make and break the contact. It is drawn in a direction to separate the contact-points by the spring 26<sup>a</sup>. The electrode 26 has a top arm 27, which is pressed by the long arm of a lever 28. The latter is pivoted to the top of the cylinder to the post 40 and has the semi-annular fork 29 closely following the roller 20. The fork 29 is pressed over by the spring 30 toward the roller 31, carried by a bail 32, which latter is pivoted at diametrically opposite points to the roller 20. The spindle of the roller 31 projects through a slot in the roller 20 into an annular cam-groove in a shaft 33, on which the roller 20, which is a sleeve-roller, is revolvably mounted. 43 represents the cam in said cam-groove. The bail 32 and its roller 31 are moved longitudinally of the sleeve-roller 20 at each revolution of said roller, thereby swinging the lever 28 against arm 27 to rock the electrode 26.

The relative positions of cam-roller 20 and cam-shaft 33 are changed by moving the lever 34, which is pivotally secured to any suitable support 37 and has its lower end hinged to the rack-bar 35. The latter engages the teeth of a spur-gear 36 on shaft 33. By this change in position of shaft 33 the sparking may be timed for any desired part of the piston-stroke. Thus with the cam 43 in the position shown in Fig. 3, opposite the body of lever 28, the sparking will occur when the roller 31, carried by the bail 32, reaches said cam 43 opposite body 28 of said lever. When the cam 43 is turned down, the time of sparking will be correspondingly later until the roller 31, moved by the cam, no longer touches the lower fork 29, as when the cam 43 is in the position shown in Fig. 4. When the cam 43 is in the latter position, the lever 28 is not moved at all and no sparking occurs; but the continued upward movement of the cam 43 brings the movement of the roller 31 into range of the upper fork 29 of lever 28 and the sparking will begin again, but will take place at the time of the opposite piston-stroke, thereby reversing the engine. The lever 34 will be held in a given position by the rack 38 and dog 39.

The end of lever 28 at 41 is connected to the body of the lever by a hinge-joint, which is rigid in the sweep of the lever, which moves the arm 27 of the electrode 26, but swings to allow the lever to pass the arm 27 on its return. Spring 42 holds the jointed end in alignment with the body portion.

Having now fully described my invention, what I claim as new, and wish to secure by Letters Patent, is—

1. The combination with a rocking terminal of an ignition-electrode of an oscillating lever to rock the terminal, said lever having a bifurcated end, a cam-shaft between the bifurcated ends of said lever, means operated by the cam-shaft for oscillating the bifurcated lever and means for adjusting the cam-shaft to change the time of oscillation of said bifurcated lever.

2. The combination with a rocking terminal of an ignition-electrode, of an oscillating lever to rock the terminal, said lever having a bifurcated end, a cam-shaft between the bifurcated ends of said lever, a revoluble sleeve mounted on the cam-shaft, a short shaft extending through the revoluble shaft having a roller on its inner end to contact with the cam of the cam-shaft and a roller on its outer end to contact with the bifurcated end of the oscillating shaft by the action of the cam, and means for rotating the cam-shaft to change the time of oscillation of said bifurcated lever by the action of the cam on the roller of the short shaft.

3. In a sparking device for gas-engines, a rocking terminal of an ignition-electrode having an arm at its outer end and a spring to

move the terminal to break the electrical contact, a shaft having an annular cam-groove, a pivoted lever having one end engaging the arm of said electrode and an expanded end adjacent to said cam-groove, a shaft traveling around the shaft with the cam-groove having a roller in said groove and an outside roller bearing against the expanded end of said lever.

4. In a sparking device for gas-engines, a rocking terminal of an ignition-electrode having an arm outside of the cylinder and a spring to move the post to break the electrical contact, a shaft having an annular cam-groove, a revoluble sleeve mounted on said shaft having an opening into the cam-groove, a bail pivoted to the sleeve and crossing said opening, a roller in the cam-groove, a shaft on which said roller is mounted, said shaft passing out through the opening in the sleeve and having a bearing in said bail, a second roller mounted on the outer end of said shaft outside of the bail, a lever having a fixed pivot and a semi-annular bifurcated end adjacent to said second roller outside of the bail, said lever having its end opposite said bifurcation adapted to contact with the arm of the rocking terminal by the action of the cam-groove to rock said terminal.

5. In a sparking device for gas-engines, a rocking terminal having an arm outside of the cylinder and a spring to move the terminal to break the electric contact, a shaft adjustable in a rotary direction, having an annular cam-groove, a revoluble sleeve mounted on said shaft having an opening into the cam-groove, a bail pivoted to the sleeve and crossing said opening, a roller in the cam-groove, a shaft on which said roller is mounted said shaft passing out through the opening in the sleeve and having a bearing in said bail, a second roller mounted on the outer end of said shaft outside of the bail, a lever having a fixed pivot and a semi-annular bifurcated end adjacent to said second roller outside of the bail, said lever having its end opposite the bifurcated portion adapted to contact with the arm of the rocking terminal by the action of the cam-groove to rock said terminal and means for rotatively adjusting said cam-shaft.

6. In a sparking device for gas-engines operated by a cam-groove in an adjustable shaft, said shaft, a cog-wheel on said shaft, a rack-bar engaging said cog-wheel, a lever to adjust said rack-bar longitudinally and means for holding a given adjustment of said lever.

7. In a sparking device for gas-engines, a rocking terminal of an ignition-electrode having an arm at its outer end and a spring to move the terminal to break the electrical contact, a shaft having an annular cam-groove, a pivoted lever having one end engaging the arm of said electrode by the oscillation of the lever and having a hinge-joint which yields

on the return stroke of the lever past said  
terminal, said lever having an end adjacent  
to said cam-groove, a hollow shaft traveling  
around the shaft with the cam-groove, having  
5 a roller in said groove, and an outside roller  
which bears at each revolution against the  
end of said lever.

In witness whereof I have hereunto set my  
hand and seal, at Big Spring, Indiana, this  
27th day of February, A. D. 1903.

JOSEPH A. MCGEE. [L. s.]

Witnesses:

DAVID J. McMATH,  
C. F. INNIS.