

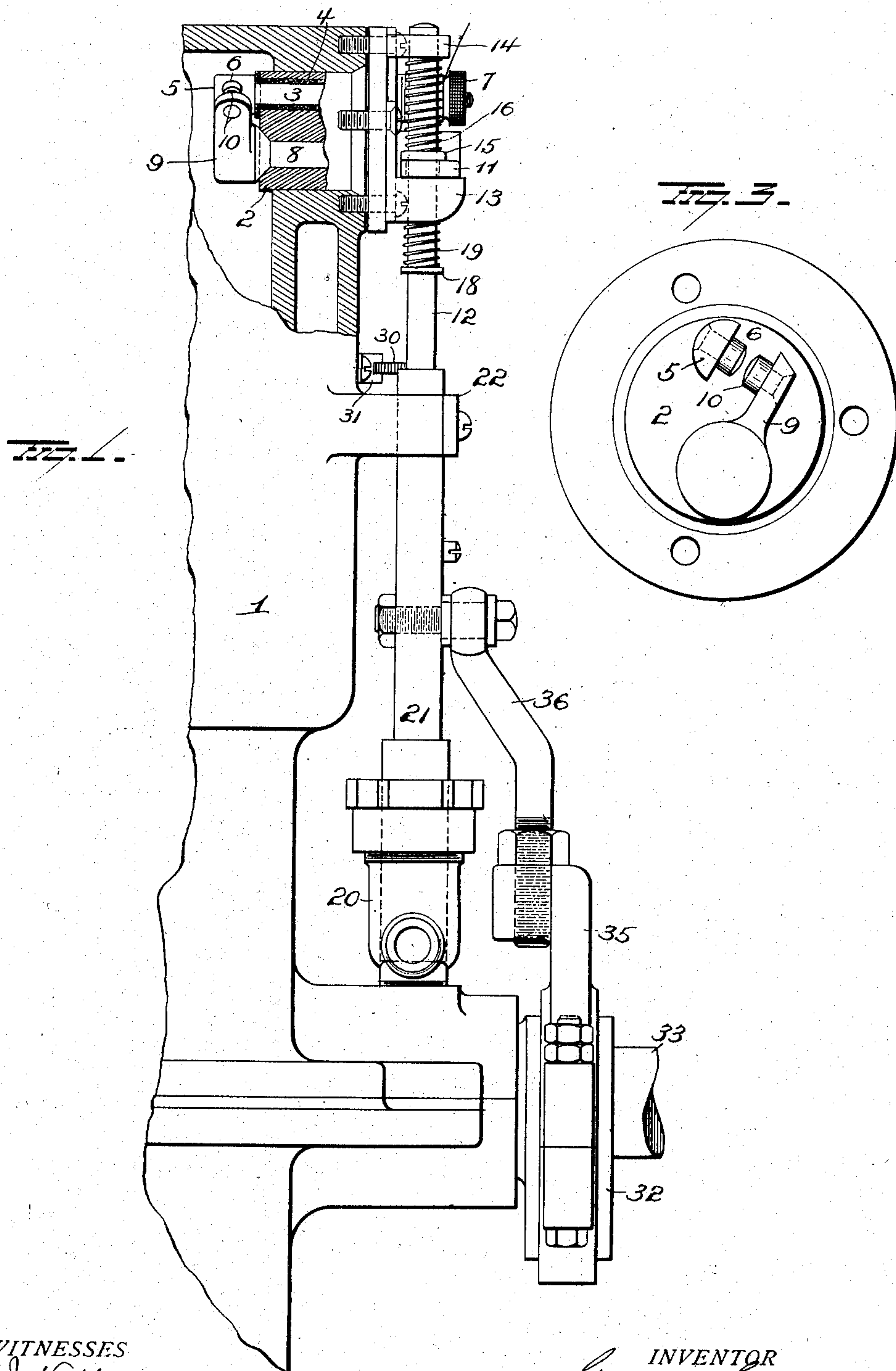
No. 865,099.

PATENTED SEPT. 3, 1907.

G. GRAY.  
ENGINE.

APPLICATION FILED MAR. 28, 1907.

2 SHEETS—SHEET 1.



WITNESSES  
*E. J. Nottingham*  
*G. J. Downing*

INVENTOR  
*George Gray*  
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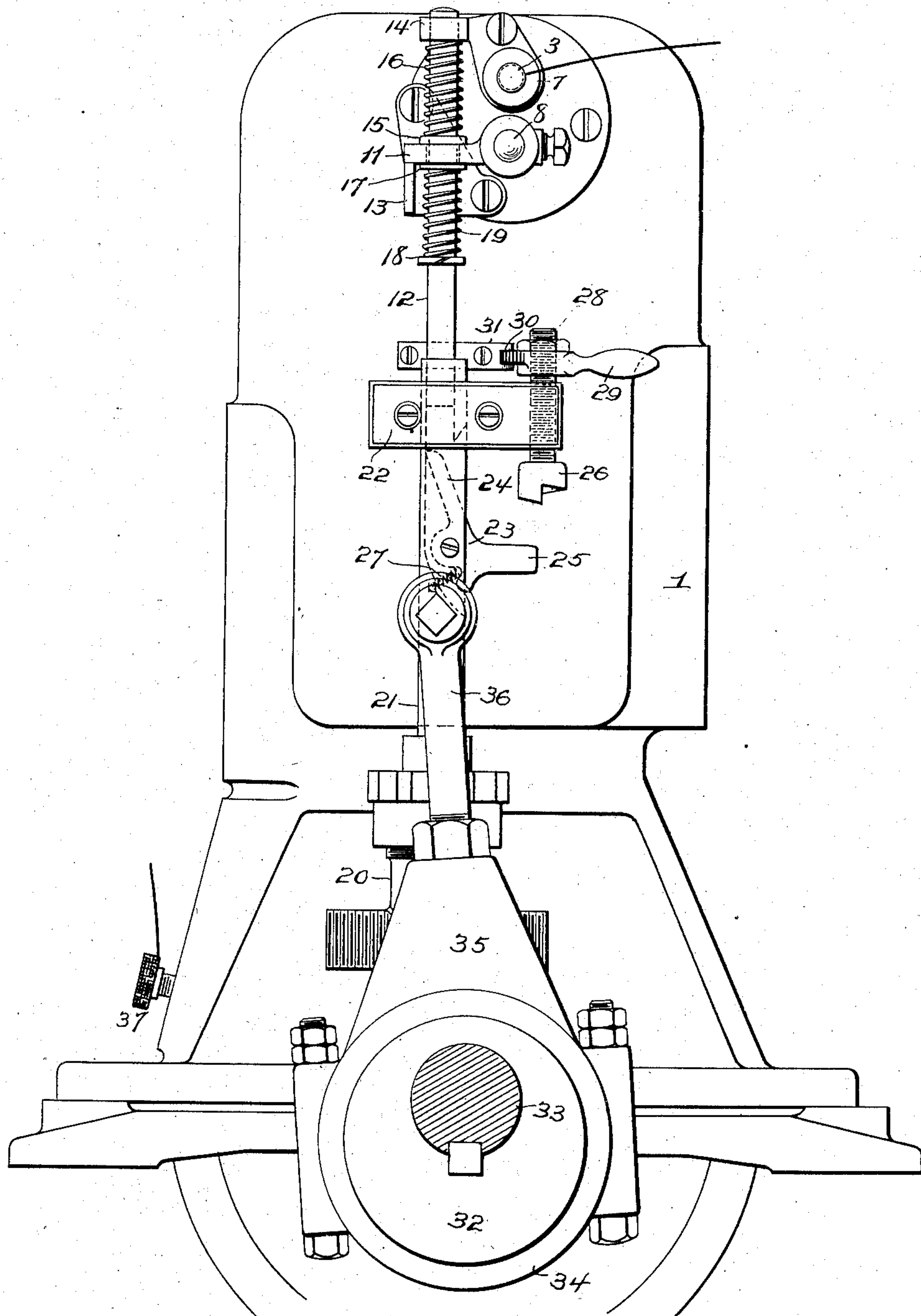
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Fig. 2.

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# UNITED STATES PATENT OFFICE.

GEORGE GRAY, OF MIANUS, CONNECTICUT, ASSIGNOR TO THE MIANUS MOTOR WORKS, OF MIANUS, CONNECTICUT.

## ENGINE.

No. 865,099.

Specification of Letters Patent.

Patented Sept. 3, 1907.

Application filed March 28, 1907. Serial No. 365,127.

*To all whom it may concern:*

Be it known that I, GEORGE GRAY, of Mianus, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in  
5 Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in engines  
10 of the internal combustion type and more particularly to sparking mechanism therefor,—the object of the invention being to provide mechanism of this character by means of which positive electrical control can be effected and a quick make and break of the contacts  
15 secured so as to produce a spark of maximum intensity.

A further object is to provide simple and efficient means for tripping the sparking devices and for timing the operation of said tripping devices to regulate and control the rapidity of the recurrence of explosions  
20 within the engine cylinder behind the piston.

A further object is to improve in other respects various details of construction of a sparking mechanism and increase the efficiency as well as the simplicity of the same.

25 With these objects in view the invention consists in certain novel features of construction and combinations of parts as hereinafter set forth and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side  
30 elevation showing a portion of an engine cylinder and illustrating my improvements applied thereto and connected with the driven shaft of the engine. Fig. 2 is a view, partly in section, taken at right angles to Fig. 1, and Fig. 3 is a detailed view showing the sparking elec-  
35 trodes.

1 represents an engine cylinder provided at one end (in the side wall thereof) with an opening for the reception of a plug 2. This plug is provided with a hole through which a spindle 3 passes, said spindle being  
40 insulated from the plug by means of a bushing 4 of mica or other suitable material, and is provided at its inner end with a head 5 having a sparking point or electrode 6 thereon. The outer end of the spindle 3 is threaded for the reception of a thumb nut 7 by means  
45 of which the spindle and the electrode which it carries are clamped to the plug 2, said thumb nut also serving as a binding post with which one of the terminals of a suitable battery will be connected. Another spindle 8 is mounted to turn in the plug 2 and is provided at its  
50 inner end with an arm 9 having a contact point 10 to cooperate with the contact point 6 to produce the spark as hereinafter explained. An arm 11 is secured to the outer end of the spindle 8 and is provided with an opening for the passage of a rod 12. The arm 11 is normally  
55 disposed in a horizontal position and rests on a stop 13.

The rod 12 projects above the arm 13 and is guided at its upper end by means of a perforated lug 14. A fixed collar 15 on the rod 12 is normally disposed over the arm 11 and between this collar and the lug 14 a spring 16 is located on said rod. A collar 17 is located loosely  
60 on the rod 12 below the arm 11, and a collar 18 is located on said rod below the collar 17. The collar 18 is fixed to the shaft 12 and between this collar and the collar 17 a spring 19 is located.

20 illustrates the pump of the engine and the rod 21  
65 of this pump extends upwardly and passes through a guide 22,—the upper end of said pump rod serving as a guide for the lower end of the rod 12. The pump rod 21 is cut-away and has mounted therein an angular trip-lever 23, the arm 24 of which is intended to  
70 engage the lower end of rod 12 and raise said rod, while the arm 25 of said trip-lever projects outwardly so as to engage the cam-shaped head 26 for the purpose of causing the arm 24 of said trip-lever to move  
75 out of line with the lower end of rod 12 and permit the latter to descend. The trip-lever 23 is maintained in and returned to position to engage the rod 12, by means of a spring 27. The cam-shaped head 26 is  
80 located at the lower end of a screw 28 which passes vertically through the guide block 22. A hand-lever 29 is secured to the screw 28 for turning the same to  
85 adjust the cam-head 26 vertically and thus time the operation of the lever 23 and consequently of the sparking devices. In order that the screw 28 and its  
cam-head 26 may be secured at any desired adjust-  
ment, the lever 29 is provided with a toothed seg-  
ment 30 to engage a spring arm 31 secured to the side  
of the engine cylinder.

An eccentric 32 is secured to the driven-shaft 33 and the strap 34 of this eccentric is provided with an  
90 arm 35. A pitman 36 is secured at its upper end to the pump rod 21, preferably at a point just below the trip-lever 23, and the lower end of said pitman is adjustably connected with the arm 35 of the eccentric  
95 strap. Through the medium of these devices the pump rod will be reciprocated vertically and the distance to which it may be moved and consequently the time at which the sparking mechanism may be  
tripped, can be regulated by adjusting the connection of the pitman 36 with the arm 35 of the eccentric  
100 strap 34.

I have hereinbefore explained that one terminal of a suitable battery is connected with the insulated  
spindle 3 and it is evident that as the spindle 8 is in  
metallic contact with the plug 2 and as said plug 2  
105 is in metallic contact with the engine cylinder, the other terminal of the battery may be connected at any suitable point on the engine. In the drawing I have indicated a binding post 37 for this purpose.

From the construction and arrangement of parts 110



herein described, it will be seen that if the shaft 30 be turned the pump rod 21 will be moved upwardly and the trip-lever caused to engage the lower end of rod 12 and raise the same, this movement of the rod 5 12 being transmitted through the arm 11 to the spindle 8 and the latter caused to turn and bring the contact point 10 against the contact point 6. After these contact points shall have been brought together the rod 12 will move a short distance further, continuing 10 to compress spring 19 and causing the collar 15 to move a short distance above the arm 11 and further compress the spring 16, thus insuring perfect contact of the electrode 10 with the electrode 6. The continued movement of the pump rod will now cause the arm 15 25 of the trip-lever 23 to engage the cam-head 26 and cause the arm 24 to be withdrawn and release the rod 12. The springs 16 and 19 will now cause the rod 12 to descend and the collar 15 to strike the arm 11 and turn the spindle 8 so as to quickly separate the 20 electrode 10 from the electrode 6 and result in forming a spark between said electrodes which will be of maximum intensity.

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

- 25 1. In a sparking mechanism, the combination with a fixed electrode, a spindle carrying a movable electrode, an arm on said spindle and a stop to receive said arm when in its normal position, of a vertically movable rod passing through said arm, a guide through which said rod moves, 30 a fixed collar on the rod, a spring between said fixed collar and guide, means for engaging said rod to raise it and turn the spindle of the movable electrode to cause the lat-

ter to engage the fixed electrode and means for releasing said rod and permitting it to descend after the fixed collar thereon shall have moved above the arm on the spindle 35 of the movable electrode.

2. In a sparking mechanism, the combination with a fixed electrode and a spindle provided with a movable electrode, of an arm secured to said spindle, a rod passing through said arm, springs on said rod above and below 40 said arm, a hollow rod connected with the driven shaft of an engine, a trip-lever mounted in said hollow rod to engage the first-mentioned rod, and adjustable means for tripping said lever.

3. The combination with the pump rod and the driven 45 shaft of an internal combustion engine, of a vertically movable rod guided in the upper end of the pump rod, sparking devices connected with said vertically movable rod, a trip-lever carried by the pump rod, a spring for maintaining the trip lever normally in line with the lower 50 end of the vertically movable rod, an adjustable device for tripping the trip lever, and means connecting the pump rod with the driven shaft.

4. The combination with the pump rod and the driven 55 shaft of an internal combustion engine, of a vertically movable rod, sparking devices, spring connections between said sparking device and the vertically movable rod, a trip-lever carried by the pump rod and maintained normally in line with the vertically movable rod, means for tripping 60 said lever, an eccentric on the driven shaft of the engine, a strap on said eccentric provided with an arm and a pitman connected at one end with the pump-rod and adjustably connected at its other end with the arm on the eccen- 65 tric strap.

In testimony whereof, I have signed this specification in 65 the presence of two subscribing witnesses.

GEORGE GRAY.

Witnesses:

LEROY EDDY,  
W. R. MONROE.