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J. V. RICE, JR.

IGNITING DEVICE FOR GAS ENGINES.

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Fig. 1.

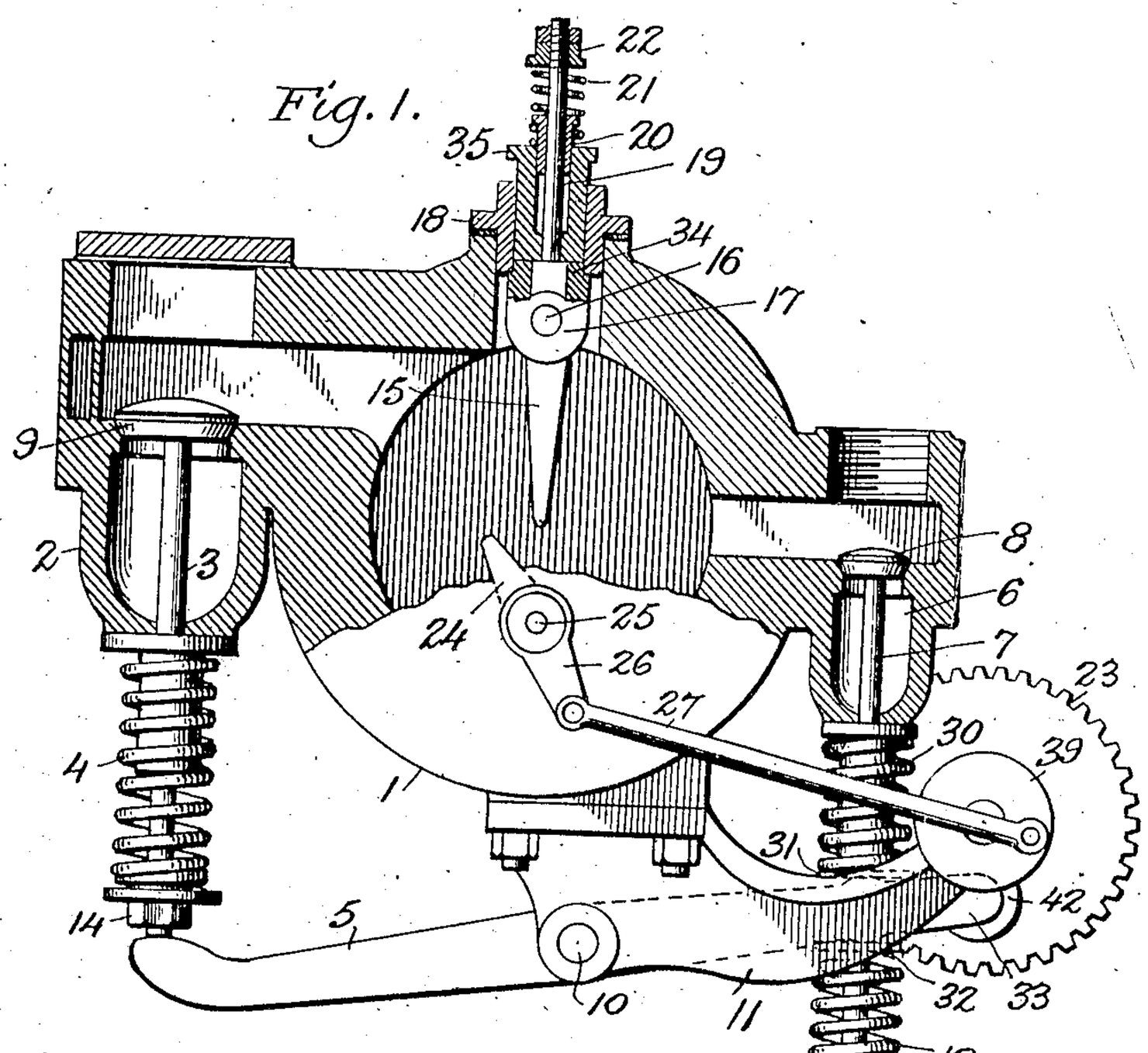

Fig. 3.

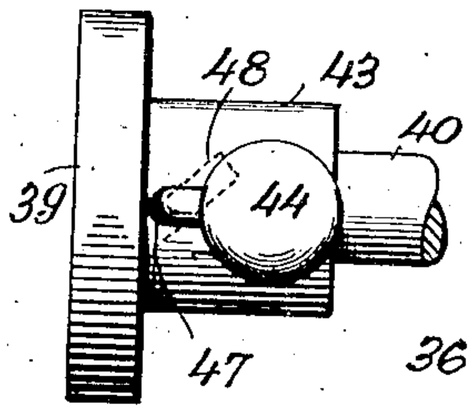

Fig. 2.

WITNESSES

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IGNITING DEVICE FOR GAS-ENGINES.

No. 881,952. Specification of Letters Patent. Patented March 17, 1908.

Application filed June 1, 1906. Serial No. 319,694.

To all whom it may concern:

Be it known that I, JOHN V. RICE, Jr., a citizen of the United States of America, and a resident of Bordentown, county of Burlington, State of New Jersey, have invented certain new and useful Improvements in Igniting Devices for Gas-Engines, of which the following is a specification.

My present invention has reference to an igniting or sparking device for gas and similar explosive engines, one object of the same among others that might be mentioned being to simplify and perfect a device of this character to the end that it may become more efficient and also that the engine may be more economical in operation; and the invention therefore consists essentially in the construction, arrangement and combination of parts, substantially as will be hereinafter described and claimed.

In the annexed drawings illustrating my invention, Figure 1 is a sectional view of the improved igniting device, certain parts being shown in elevation. Fig. 2 is an elevational view of the same, at right angles to the view in Fig. 1, certain parts being represented in section. Fig. 3 is an enlarged detail view of the governor device for timing the operation of the sparker.

Similar numerals of reference designate corresponding parts throughout all the different figures of the drawing.

1 designates an engine cylinder, on the wall of which is an exhaust valve casing 2, containing a valve seat for the exhaust valve 9, whose stem 3 passes through the wall of the casing 2 and is provided with an enveloping spiral spring 4, against which bears the terminal collar and nut 14, the same serving to regulate the tension of the spring, the function of which is to draw the valve 9 to its seat. Likewise on another part of the wall of cylinder 1 is another valve chamber 6, in connection with which is arranged the inlet valve 8, whose stem 7 projects through the wall of casing 6 and is enveloped by the two spiral springs 30 and 12, said spring 30 surrounding that portion of stem 7 nearest to the casing 6 and being tensioned between said casing and the collar 31 which is fast on the stem 7; and said spring 12 being on the outer end of stem 7 and being tensioned between the loose collar next to the nut 13, and a space between the two collars 31 and 32, through which space passes or within which lies an arm 33 of a two-arm rocking-lever, that portion of said arm between the collars 31 and 32 preferably having curved protuberances on the edges as shown. The fulcrum of the two-arm rocking lever is at 10 on the bracket 11, bolted to the cylinder 1. The other arm 5 of said two-arm lever bears against the outer end of the exhaust valve stem 3, see Fig. 1. Thus it will be seen that the rock lever 5, 33, controls the opening and closing of the inlet and exhaust valves of the engine. The spring 12 is larger and stronger than the spring 30. Spring 30 acts as a closing spring for valve 8 and spring 12 has a yielding function in connection with the lever 5, 33. The mechanism which controls the movements of this rock lever 5, 33, will be hereafter alluded to, although the present invention is directed chiefly to the sparking devices.

I will now explain the construction and arrangement of the electrodes. Projecting into the cylinder 1, near one end of the interior thereof and adjacent to the piston, is the electrode or contact finger 15. This is formed at its end nearest the wall of the cylinder with a cam 17, having the two shoulders or seats, as shown, that bear upon the annular ring 34, said cam-shaped end of the electrode 15 being pivoted at the inner end of a pin 19 by means of a transverse pivot 16. The electrode device now being described is supported in an opening in the wall of cylinder 1 by means of an externally-flanged and internally-threaded sleeve 18 which is secured in the cylinder wall, and is insulated therefrom, as shown. Into the lower end of the sleeve 18 is screwed the annular ring 34, while into the body of sleeve 18 above ring 34 is screwed the hollow adjustable packing gland 35, into the upper end of which is screwed the perforated plug 20, through which, as also through ring 34 and gland 35, (the opening in ring 34 being preferably square to receive the square section of pin 19 which square section has a seat upon the lower end of gland 35, as shown in Fig. 1), passes the pin 19, that part of said pin above the plug 20 being surrounded with a spring 21, tensioned between plug 20 and the lock nut 22 on the extremity of pin 19. With this construction it will be evident that whenever the inner end of the electrode 15 is rocked, or deflected from its normal position which is at right angles to the axis of cylinder 1, it will upon being released by the deflect-

ing agency immediately fly back into its former place under the influence of the elastic means which I have specified. This electrode device may be insulated in any desired manner, as for instance, by placing suitable insulating material between the flange of sleeve 18 and the adjoining portion of the cylinder wall. A wire will run to this electrode from a battery.

I pass now to describe the other electrode. Journaled in the head 36 of the cylinder 1 is a rock shaft 25, carrying at its inner end within the cylinder the contact point 24, which is adapted to strike the electrode 15, said shaft 25 also carrying outside the head 36 the crank arm 26, slidably feathered thereon or otherwise attached, which connects through a link 27 with the rotary crank disk 39. On the outer extremity of shaft 25 is a nut and washer 37, tensioned between which and the crank 26 is a spiral spring 38 for keeping the parts in proper relative position.

Alongside of the cylinder 1 is a horizontal shaft 40, on which is fixed a gear 28, a cam 41, and the crank disk 39. The gear 28 meshes with a pinion 50 on a parallel shaft. Both of the shafts are properly supported in bearings and the gears are driven by any convenient connection with the driving gearing of the engine, which it is unnecessary to set forth with any amount of detail herein. The cam 41 operates upon an anti-friction roller 42 in the end of the rock lever 5, 53, and the result is a rocking or vibration of said lever and an opening and closing of the inlet and exhaust valves. The disk 39 has an integral sleeve 43 which fits over the end of shaft 40, as shown in Fig. 2. In sleeve 43 are a couple of oppositely-located slots 47, one on each side, in which are pivoted the arms 46, 46, carrying the weights 44, 44, that are connected together by the spring 45, and the inner ends of arms 46 engage the inclined slots 48, 48, in the shaft 40; the effect of which arrangement of parts is that when the engine runs very rapidly the ball levers 44 will fly out, thus causing the arms 46 to deploy in the inclined slots 48, thus shifting the sleeve 43 a short distance around on its axis, so that the electrodes 24 and 15 are brought closer together in order that ignition of the charge may take place earlier than before. In this way the ignition will be made to take place before as much compression has occurred as usual.

In the operation of my improved igniting means the movement of the engine gearing will rock the electrode 24 to and fro, causing it to strike and pass each time the elastic electrode 15, allowing the latter to fly back into its normal place after contact. The normal position of the two electrodes or contact points is shown in full lines in Fig. 1. When the speed of the engine is high enough to bring about a centrifugal action of the weights 44, 44, and a consequent shifting of the disk 39 the electrode 24 will be moved closer to the electrode 15 and contact of the two will be made earlier than before so that the spark will be produced before the piston reaches the end of its stroke, the time of sparking being proportioned to the speed of the engine; and hence there will be a gain in power and a distinct gain in economy.

Numerous changes in the precise construction and arrangement of the various parts may be made without departing from my invention.

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

1. In an igniting device for gas engines, the combination with a sparker, of mechanism for moving one of the electrodes of said sparker, and a governor for controlling the time of sparking, said governor consisting essentially of a rotatably-shiftable disk having a slotted sleeve, weighted levers engaging slots in the shaft that carries the disk, and connections between the disk and the movable electrode, substantially as described.

2. In an igniting device for gas engines, the combination with a sparking mechanism, of a governor for controlling the time of sparking, said governor consisting essentially of a rotatably-shiftable disk having a slotted sleeve, a shaft over which said sleeve fits, said shaft having inclined slots therein, and the ball levers pivoted in the sleeve and having their inner ends engaging the said inclined slots, together with connections between the disk and one of the electrodes of the sparking mechanism, substantially as described.

Signed at New York this 29th day of May 1906.

JOHN V. RICE, JR.

Witnesses:
JOHN H. HAZELTON,
H. L. ROCKWELL.