

No. 717,902.

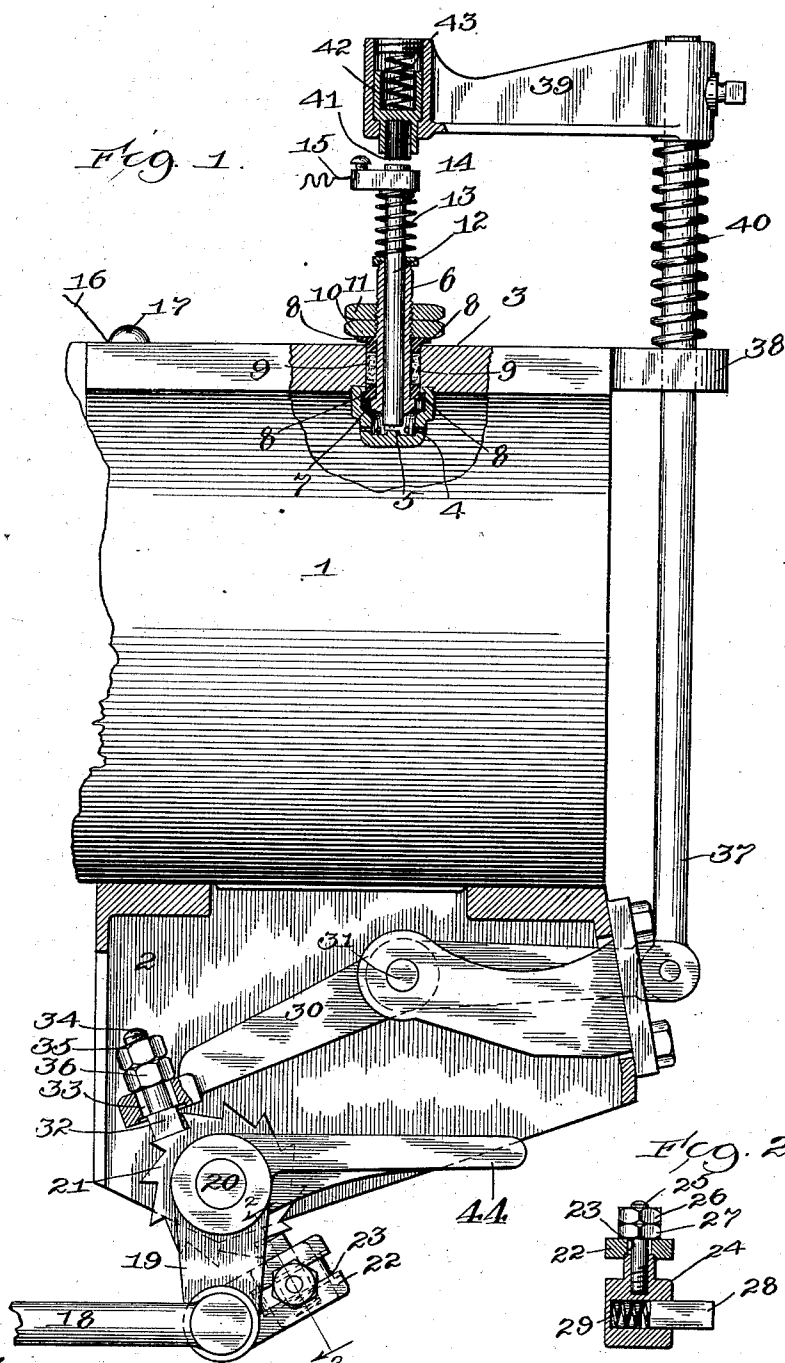
PATENTED JAN. 6, 1903.

F. R. McMULLIN.

ELECTRIC IGNITING DEVICE FOR INTERNAL COMBUSTION ENGINES.

APPLICATION FILED FEB. 7, 1902.

NO MODEL.



Witnesses:
 Harry B. White
 Ray White.

Inventor:
 Frank R. McMullin.
 By J. C. Bain Atty.

UNITED STATES PATENT OFFICE.

FRANK R. McMULLIN, OF HIGHLAND PARK, ILLINOIS, ASSIGNOR TO McMULLIN MOTIVE POWER AND CONSTRUCTION COMPANY, A CORPORATION OF ILLINOIS.

ELECTRIC IGNITING DEVICE FOR INTERNAL-COMBUSTION ENGINES.

SPECIFICATION forming part of Letters Patent No. 717,902, dated January 6, 1903.

Application filed February 7, 1902. Serial No. 93,104. (No model.)

To all whom it may concern:

Be it known that I, FRANK R. McMULLIN, of Highland Park, in the county of Lake and State of Illinois, have invented certain new and useful Improvements in Electric Igniting Devices for Internal-Combustion Engines; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to improvements in electric igniting devices for internal-combustion engines.

The object of my invention is to provide a device by means of which an electric spark may be produced in the cylinder of an internal-combustion engine at an exact and critical time with reference to the stroke of the engine and to provide means whereby the device may be exactly and positively adjusted, so that the time at which the spark will occur in relation to the engine-stroke may be varied.

Another object of my invention is to improve generally the construction and arrangement of the parts, as will hereinafter appear and be more specifically and more particularly pointed out in the appended claims.

In the drawings, Figure 1 is an elevation of the device as applied to the cylinder of a gas-engine, showing certain parts in section for more definite illustration. Fig. 2 is a transverse section through line 2 2 of Fig. 1.

The same reference-numerals indicate similar parts in both figures.

1 is a portion of a cylinder of a gas-engine of the class described.

2 is a bracket fixed to the lower side of the cylinder. The walls of the cylinder are broken away at 3 to show the internal part of the cylinder and the plug inserted therein. The plug, which consists of an inner depending-stirrup 4, provided with a contact-point 5, is screwed into the walls of the cylinder and is conductively a part thereof.

An inner tube 6, provided with a head or shoulder 7, is insulated from the walls of the cylinder by means of bushings 8 8 and packing 9. The tube 6 is held firmly in position by means of the nut 10 and the check-nut 11.

A stem 12 passes vertically and freely through

the tube 6, the lower end of which is adapted to make electrical contact with the stationary contact 5 when it is depressed against the resilient action of the open helical elevating-spring 13, as will be more fully hereinafter described.

14 is a washer which surrounds the upper end of the stem 12 and serves as an abutment for the open helical spring 13 and also as an electric terminal for an electric circuit, of which the wire 15 forms a part.

When the stem 12 is depressed until the lower end thereof makes contact with the stationary contact 5, it is returned to the normal position (shown in the drawings) by means of the open helical spring 13, which surrounds the upper end of the stem and which is held against abutting surfaces provided by the washer 14 and the upper end of the tube 6.

16 is a part of an electric circuit fixed to the body of the engine by means of the terminal screw 17.

18 is a pitman-rod that is designed to be connected to any of the moving parts of the engine that will afford the necessary reciprocating motion for the purpose of oscillating the depending arm 19; to which it is pivotally connected and which latter is pivoted upon the shaft 20. A ratchet-wheel 21 has its axis upon the same shaft. An inclined extension-arm 22 of the depending arm 19 is provided with a slot 23, in which the block 24 is adapted to be adjustably secured by means of the stud 25 and the nuts 26 and 27. A radially-moving spring-pawl 28 is carried in the block 24 and is provided with an open helical spring 29, which maintains the contact of the said pawl with the toothed peripheral surface of the ratchet-wheel 21.

The location of the block 24 on the arm 22 may be varied by moving it in the slot 23 and securing it in the position to which it has been moved for the purpose of modifying its effect upon the ratchet-wheel 21 for the purpose of varying the time at which the spark will be produced in the cylinder.

An arm 30 is pivoted at 31 and carries a dent 32, which is adjustably fixed in an opening 33, made in the lower obliquely-extending

end of the lever 30, by means of the threaded stud extension 34 and the nuts 35 and 36. The horizontal end of the lever 30 is slotted and is pivoted to a vertical rod 37. This rod passes through a guide 38 and carries upon its upper end an arm 39. An open helical spring 40 surrounds the rod 37 and is contained under tension between the lower surface of the arm 39 and the upper surface of the bearing 38 and tends to hold the rod 37 and the arm 39 in a raised position and to elastically hold the detent 32 upon the surface of the teeth of the ratchet-wheel 21.

41 is a pressure tip or block, of insulating material, which is fitted into a vertically-moving piston 42, yieldingly held in the position shown in Fig. 1 by means of the open helical spring 43.

44 is a hand-lever mounted upon the shaft 20 and fixed relative to the arm 19. Said lever may be used to operate the arm 19 and the connected parts to set the engine in motion, as will be well understood by those skilled in the art.

The operation of my device is as follows: The pitman-rod 18 is designed to be vibrated coördinately with the compression of the charge of fuel contained in the cylinder of the engine. At each vibration of the pitman-rod 18 the ratchet-wheel 21 is rotated one step or notch, as will be plainly evident from the construction shown in the drawings, at which time the tooth immediately under the pawl 32 will raise that end of the lever 30 and depress the horizontal end thereof, whereby the arm 39 will be lowered, by means of the connecting-rod 37, until the insulating tip or block 41 is brought into contact with the upper anvil end of the rod 12. The tension of the spring 43 is sufficient to depress the rod 12 until the lower contact end thereof is brought into electrical connection with the stationary contact-point 5 in the stirrup 4 against the tension of the spring 13. After the two contacts are brought together the spring 43 will be compressed in the event that the tooth of the ratchet-wheel should cause the arm 39 to be lowered a distance greater than is necessary to bring the contact-points into electrical connection. After the apex of a tooth of the ratchet-wheel 21 has passed beyond the detent 32 the spring 40 will return the lower end of the arm 30 and the accompanying detent 32 to the bottom of the next succeeding tooth, its former position, and will also raise the arm 39 to the position it formerly occupied, which is shown in Fig. 1, at which time the spring 13 will raise the vertical rod 12 into the position shown in the drawings, when contact between the lower end of the rod 12 and the stationary contact 5 will be thereby separated and a spark produced.

Any desired source of electrical energy may be connected to the terminals 14 and 17 by

means of the wires 15 and 16, which will include the plug in circuit therewith.

For the purpose of adjusting the apparatus so as to produce the spark at an earlier or later time with reference to the compression of the charge the detent 32 and the pawl 28 may either or each be moved in the respective supports for the purpose of effecting a change in position of the detent and pawl respecting the position of the teeth on the ratchet-wheel.

By moving the block 24 and its contained pawl farther out toward the end of the lever 22 in the slot 23 and securing it in position by means of nuts 26 and 27 the spark will occur later with reference to the compression-stroke, and by moving the block 24 and its containing pawl in the opposite direction the spark will occur earlier with reference to the stroke. The detent 32 may be also moved in conformity with the adjustment of the pawl 28.

Having described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an igniter for gas-engines, the combination with a stationary contact of a movable contact, and means for moving said movable contact, comprising a lever in operative association therewith, a ratchet arranged adjacent to the lever, a moving member actuated by the engine, an adjustable pawl carried by the moving member engaging the ratchet, and an adjustable pawl carried by the lever, likewise engaging the ratchet.

2. In an igniter for gas-engines, the combination with a stationary contact of a movable contact, and means for moving the last-said contact comprising a rocking lever, a pawl carried by said lever, a ratchet with which said pawl engages, an oscillating arm concentric with the ratchet, provided with a slotted portion, a spring-pawl mounted for adjustment in said slotted portion, and means actuated by the engine for moving the oscillating arm.

3. In an igniter of the class described, a ratchet-wheel 21, a pitman-rod 18, an arm 22, provided with a slot 23, a block 24 carrying the pawl 28 adapted to be adjusted and fixed in said slot by means of the threaded stud 25 and the nuts 26 and 27, an arm 30, an adjustable detent 32 carried thereby, a movable and a fixed electric contact, and connections between said arm and said movable contact.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

FRANK R. McMULLIN.

Witnesses:

C. INEZ WILCOX,
MARY F. ALLEN.