

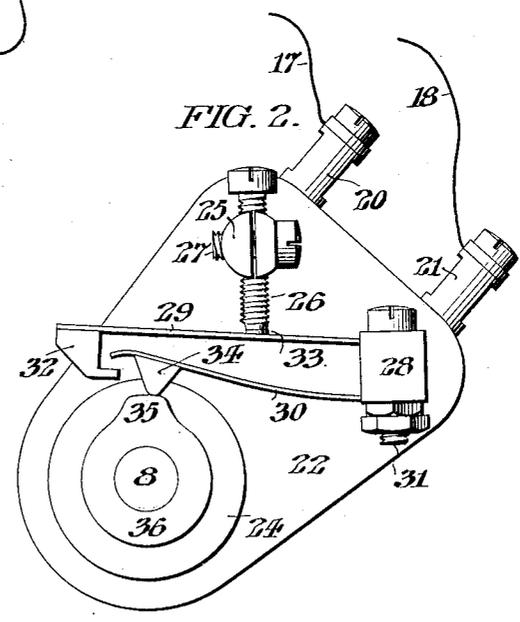
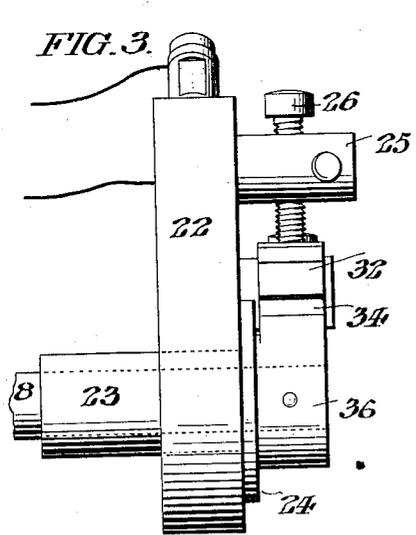
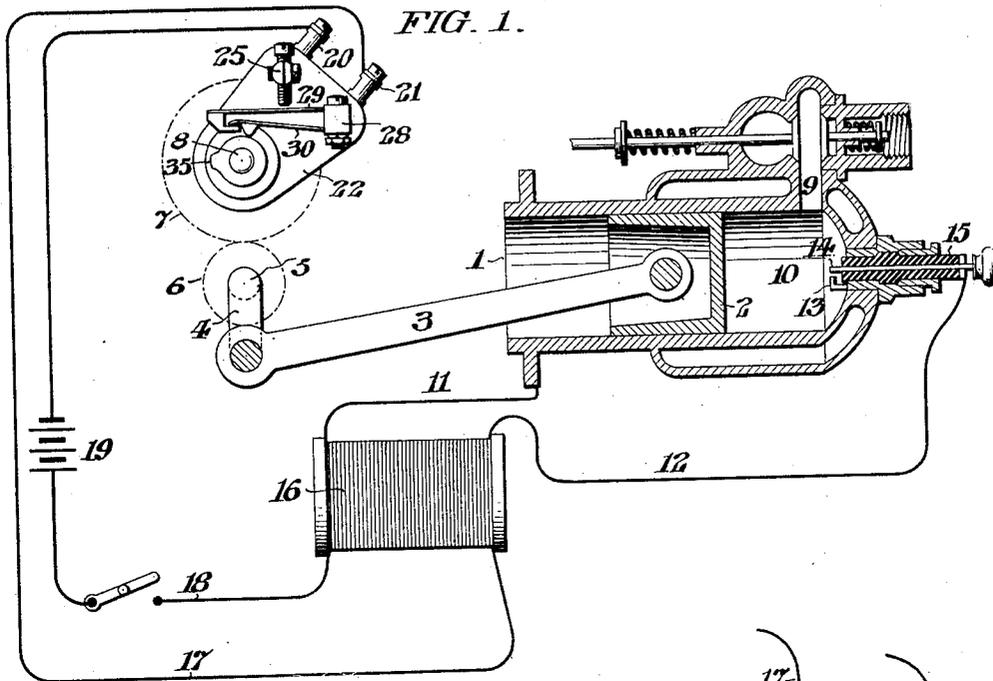
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L. S. CLARKE & J. G. HEASLET.
SPARKING IGNITER FOR EXPLOSIVE ENGINES.

(Application filed Aug. 30, 1900.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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SPARKING IGNITER FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 663,729, dated December 11, 1900.

Application filed August 30, 1900. Serial No. 23,503. (No model.)

To all whom it may concern:

Be it known that we, LOUIS S. CLARKE and JAMES G. HEASLET, citizens of the United States, and residents of Ardmore, Montgomery county, Pennsylvania, have invented certain new and useful Improvements in Igniting Devices for Explosive-Engines, of which the following is a specification.

Our invention relates to the class of motors, having cylinders to which proper quantities of a suitable explosive mixture are successively admitted, and in which such mixture is for the expulsion of the piston and the driving of the motor, ignited and exploded by the production, at the proper moment, of a spark.

Our invention deals with the provision of the devices for the production of the sparks, and relates especially to the class of such devices in which the spark is produced between two terminals or sparking points in circuit with the secondary of an induction coil, the primary of which is periodically closed and opened by mechanical means, the movements of such means being preferably controlled by a moving part of the motor or the apparatus actuated thereby.

It is the object of our invention to provide means, mechanically actuated, for periodically closing and opening the primary of an induction coil, which shall be very simple in construction and more certain and reliable in operation than kindred devices as heretofore arranged.

In the accompanying drawings we show, and herein we describe, a good form of a convenient embodiment of our invention, the particular subject matter claimed as novel, being hereinafter definitely specified.

In the accompanying drawings, Figure 1 is a view in side elevation of apparatus embodying our invention, the piston chamber and piston being illustrated in central vertical section, and the associated conductors being also indicated in this view.

Figure 2 is a view in side elevation, on a somewhat larger scale, of devices embodying our invention and removed from the machine.

Figure 3 is a view in edge elevation of the device as shown in Figure 2, sight being sup-

posed taken toward the left hand edge of the structure as the same is shown in Figure 2.

Similar numerals of reference indicate corresponding parts.

In the accompanying drawings, 1 is a piston cylinder, in which is mounted the piston 2, connected with which is a connecting rod 3, the outer end of which is connected by the crank 4, to the crank shaft 5, and the rotation of which crank shaft is, through the usual gears 6 and 7, transmitted to the usual counter shaft 8. Through a port 9 of any usual arrangement the explosive mixture employed is admitted to the explosion chamber 10 in the piston cylinder.

11 and 12 are the line wires or conductors of the secondary circuit, one of which, 11, is shown as connected to the piston cylinder, which in turn is provided with a projection or sparking point 13, and the other, 12, is shown as in circuit with an electrode constituting a second sparking point 14, said electrode being formed as a pin, mounted in a suitable insulating block 15. The inner end of the electrode 14 projects within the explosion chamber and into suitable proximity to the projection 13.

16 is the usual induction coil.

17 and 18 designate the conductors of the primary circuit, one of which is connected with the battery 19, said respective conductors terminating in suitable binding posts 20 and 21, mounted on an insulating and supporting block 22, which is in turn mounted for support upon the counter shaft 8.

An opening in said block, through which the counter shaft extends, is provided with a suitable bushing 23, having a flange 24, which overlies the adjacent portion of the front face of the block.

Mounted on the face of the block is a projecting boss of metal 25, in circuit with the binding post 20, said boss being divided by a longitudinally extending kerf into two legs, and having a tapped opening, intersected by said kerf, in which opening is mounted a contact screw 26, the advance end of which constitutes a contact point.

The two free ends of said boss embody

tapped openings in axial alinement, transverse with respect to the kerf, in which tapped openings is mounted a tightening screw 27. Manifestly when the contact screw 26, has by

5 adjustment in its opening, been set in proper position, the rotation to the right of said screw 27, drawing together the free ends of the boss, will secure said contact screw 26 very firmly in position.

10 A second boss 28, mounted upon the face of the block, is in circuit with the binding post 21. Said second boss, which may be termed the spring supporting boss, is conveniently as to its projecting portion of square

15 section and upon opposite sides or flat faces of said boss, are respectively secured the inner or basal ends of two spring strips, which we designate respectively the contact spring strip 29, and the holder spring strip 30, said

20 strips being conveniently secured to said boss by means of a screw 31 passing through the boss and through the spring ends, the head at one end of screw, and the nuts at the other, binding said strips very firmly against the

25 boss.

The contact spring strip 29, projects past the lower end of the contact screw 26, and is provided as to its outer end with a hook conveniently formed by attaching to it a suitably shaped block 32, as shown in the drawings.

The contact spring strip, when extending in its natural position, or unflexed, is adapted to make contact with the contact screw 26.

35 The holder spring strip is of such length that its free end enters the hook 32 and is adapted to engage against the bill thereof. The contact spring strip is, intermediately of its length, conveniently provided with a small

40 platinum or other wearing plate 33, through which said strip makes its contact with the contact screw, while the holder spring strip is provided, intermediate of its length, with a wearing plate or shoe 34, conveniently

45 formed as a block of metal, suitably attached thereto.

Upon the counter shaft 8 of the engine, or upon any other shaft, in suitable proximity to which the described operative parts are

50 arranged, is located a cam, 35, which rotates with said shaft, said cam being conveniently formed as a part of a collar, 36, suitably pinned or otherwise secured to said shaft.

The operation of the apparatus will be readily understood. The set of the parts is such that the contact spring strip 29, when free,

55 occupies a position in which it is in contact with the screw 26.

The holder spring strip, which is of greater

60 stiffness or strength than the contact spring strip, has such set or action that it tends to press toward the shaft 8 on which the cam 35 is mounted, and, by reason of its engagement with the hook of the contact spring strip,

65 force said spring strip downward with it, the holder spring being, however, limited in its downward movement, by the contact of its

shoe 34 with the face of the collar or other rotating or moving body on which the cam

70 35 is formed.

When, in the rotation of the shaft 8, the cam 35, comes beneath the shoe 34, the holder strip is, as shown in Figure 2, elevated clear of the contact spring strip and thereupon, said contact spring strip in recoiling or flying up

75 to assume its normal set, comes into vibratory contact with the contact screw 26 and of course closes and opens with great rapidity the circuit of the primary of the induction coil, with the result that free and instantaneous

80 sparking occurs between the points 13 and 14.

As the shaft 8 continues its rotation, the cam 35 passes out from beneath the shoe, which under the stress of the holder spring

85 30, descends to its normal position in contact with the face of the collar 36, said holder spring strip drawing the contact spring strip down with it, thereby carrying the latter out of contact with the contact screw, and the

90 parts remain with the contact spring strip out of contact with the contact screw until the cam in the rotation of the shaft is again carried against the shoe.

The release of the contact spring strip in

95 the manner indicated, allows it in flying back to the contact screw, to make what may be termed a vibrating contact therewith, striking it a number of times in rapid succession, the mechanical devices thus providing that

100 each time the cam 35 releases the contact spring strip, a series of quick closures and openings of the primary circuit are effected and a series of sparks consequently form in the explosion chamber, with the result that

105 the explosion of the mixture is insured so far as said explosion depends upon the production of a spark.

It is of course to be understood that if two or more cylinders are employed, two or more

110 cams 35, are carried upon the shaft, although in connection with the single cylinder and explosive chamber herein illustrated, we have indicated but a single cam.

Manifestly, by slight rotative adjustment

115 of the insulating block 22 upon the shaft 8 the precise moment of the explosion within the cylinder may be controlled at will.

It is to be understood that the block 32, while acting as a hook to engage the spring

120 30, is a mass of much magnitude that, situated as it is at the free extremity of the spring strip 29, it controls, so to speak, the vibration thereof, that is to say the relation of the weight of said block to the length and resilience of

125 the spring 29 may be such that the vibration imparted to the spring 29 by its release, will be characterized by such number of oscillations per second as the constructor desires to secure.

It is, of course, manifest that the sparking in the explosion cylinder is caused at the instant that the primary circuit is broken or interrupted by the spring strip 29 swinging

130

away from the screw 26, in the operation of the parts; such sparking will, in the vibration of the strip 29, be caused to occur a number of times each time the cam 35 comes into play.

It is, of course, obvious that other devices than the cam on the rotating shaft may be resorted to for moving the holder spring strip.

Having thus described our invention, we claim—

1. In an explosive engine, in combination with an explosion chamber and an induction coil the secondary of which is suitably connected with said chamber, a moving body provided with a cam, a holder spring which presses toward said moving body, a weight provided contact spring engaged by said holder spring and carried toward said moving body by it, a contact device with which said contact spring makes contact when released by said holder spring, said contact device and said contact spring being in circuit with the primary of the induction coil, substantially as set forth.

2. In combination with the primary of the induction coil of an igniting device of an explosion engine, a moving body provided with a cam, a holder spring strip which bears against said body, a contact spring strip, said holder strip being stronger than the contact spring strip, a hook on one of said strips engaged over the other of said strips, and a temporarily fixed contact device in position to be encountered by said contact spring strip when released, substantially as set forth.

3. In combination with the induction coil of an igniting device for an explosion engine, a moving body provided with a cam, a holder spring strip, one end of which is fixedly mounted, a wearing face or shoe on the body of which is held by the set of said spring strip in contact with said moving body, a contact spring strip, of less stiffness than the holder spring strip, fixedly mounted as to one end, a hook on one of said strips engaging the other strip, by which hook said contact spring strip is normally held by the holder spring strip in a bent position, and a contact device in posi-

tion to be encountered by the contact spring strip when released by the holder spring strip, substantially as set forth.

4. In combination with the primary of the induction coil of an igniting device for an explosion engine, a rotating body having a cam, a contact spring strip and a holder spring strip each fixedly secured as to its basal end, said holder spring strip being stiffer than the other and provided with a shoe near its outer end which it presses against said rotating body, said contact spring strip being provided with a hook in which the other spring strip engages, and a contact screw in position to be encountered by said contact spring strip, when the latter assumes its normal position, substantially as set forth.

5. In combination with the primary of the induction coil of an igniting device for an explosion engine, the rotating body having a cam, the contact device, the two spring strips of different flexibility, one of superior stiffness tending to bear against the rotating body and the other tending toward the contact device, a device on one of said strips engaging the other of said strips, through which device the spring strip of greater stiffness holds the spring strip of lesser stiffness out of contact with the contact device until said spring strip of greater stiffness is deflected by the cam, substantially as set forth.

6. In an igniting device for an explosive engine, a holder spring strip, a contact screw or device, a contact spring strip, a weight on said contact spring strip, means by which said holder spring strip holds said contact spring strip normally away from said contact device, and mechanical means for occasioning the periodic release of the contact spring strip, as specified.

In testimony that we claim the foregoing as our invention we have hereunto signed our names this 27th day of August, A. D. 1900.

LOUIS S. CLARKE.

JAMES G. HEASLET.

In presence of—

G. A. SCHWAB,

THOS. K. LANCASTER.