No. 790,833. PATENTED MAY 23, 1905.

C. B. HARRIS.

IGNITER OPERATING DEVICE FOR GAS OR VAPOR ENGINES.

APPLICATION FILED JAN. 7, 1903.

Fig. 6.

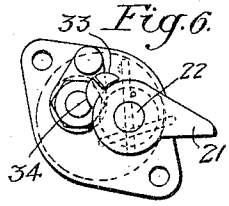


Fig. 5

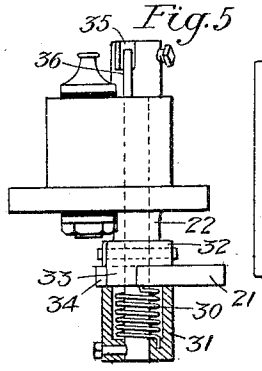


Fig. 4.

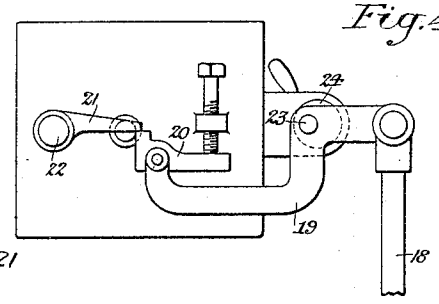


Fig. 2.

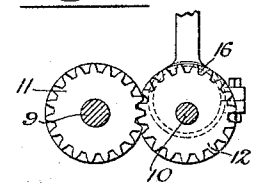
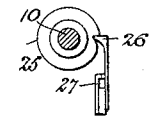


Fig. 1.

Fig. 3.



Witnesses:-

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No. 790,833. Patented May 23, 1905.

UNITED STATES PATENT OFFICE.

COLEMAN B. HARRIS, OF WILMINGTON, DELAWARE.

IGNITER-OPERATING DEVICE FOR GAS OR VAPOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 790,833, dated May 23, 1905.

Application filed January 7, 1903. Serial No. 138,141.

To all whom it may concern:

Be it known that I, COLEMAN B. HARRIS, a citizen of the United States, residing at Wilmington, Delaware, have invented certain Improvements in Igniter-Operating Devices for Gas or Vapor Engines, of which the following is a specification.

One object of my invention is to so construct the mechanism for operating the sparking device of an internal-combustion engine as to readily vary the point in the active stroke at which the explosive charge in the cylinder is fired, a further object being to provide simple and efficient means for throwing the sparking device out of operation when it is desired to stop the engine or at other times. These objects I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a side view of sufficient of a gas, vapor, or other form of internal-combustion engine to illustrate my invention. Fig. 2 is a transverse section of part of the same on the line *a a*, Fig. 1. Fig. 3 is a transverse section on the line *b b*, Fig. 1. Fig. 4 is a side view, on a somewhat larger scale, of the sparker-operating device. Fig. 5 is a plan view, partly in section, showing the detail construction of one form of igniter which may be used in carrying out my invention, and Fig. 6 is a front elevation of the igniter shown in Fig. 5.

In Fig. 1 of the drawings, 1 represents part of the casing, and 2 part of the projecting cylinder structure, of an internal-combustion engine of any desired type, 3 representing the main shaft of said engine, which turns in suitable bearings on the casing 1 and projects beyond said bearings. One of the projecting portions of the shaft has a spiral toothed gear-wheel 4, which meshes with a similar wheel 5 on an upright shaft 6, the latter being adapted to suitable bearings on the casing 1 and being provided with a spiral toothed gear 7, which meshes with a similar gear 8 on a shaft 9 parallel with the shaft 3 and also mounted so as to turn in suitable bearings on the casing 1. Any suitable gearing may, however, be used to transmit motion from the shaft 3 to the shaft 9, or the latter shaft and the interposed gearing may in some cases be dispensed with altogether. The shaft 9 is geared to a parallel shaft 10 by means of a pair of spiral toothed gears 11 and 12, one of these gears (in the present instance the gear 11 of the shaft 9) being considerably longer than the other, so that the short gear can travel across the face of the longer gear from one end of the same to the other. The gear 12 is splined upon the shaft 10, so that it is free to move longitudinally thereon, but cannot turn independently thereof, and such longitudinal movement can be readily effected by means of a lever 13, to which is connected a fork 14, the latter engaging a grooved collar 15, which is secured to the gear 12. When the shaft 9 is dispensed with, the gear 11 may be mounted directly upon the shaft 3 of the engine, the relative sizes of the gears 11 and 12 providing for any desired speed of rotation of the shaft 10 in respect to that of the shaft 3. The shaft 10 carries an eccentric 16 or other means for operating the sparking device of the engine.

In the present instance the eccentric-strap 17 is connected by a rod 18 to a lever 19, and said lever carries a trigger 20, Fig. 4, which is adapted to engage an arm 21 on the sparker-shaft 22 of the engine, whereby as the lever 19 is vibrated said trigger will strike and lift said arm 21, which is free to turn on the shaft 22. It is, however, connected to said shaft through a spring 30, one end of which is fixed to said arm, while its other end is held in a cap 31, made to inclose said spring and attached to the shaft 22 by a set-screw. A collar 32, pinned to the shaft, has a projecting lug 33 placed to engage a similar lug 34 on the arm 21, and there is in addition the usual sparking terminal or electrode 35 on said shaft, the movement in one direction of the arm 35 forming said electrode being limited by a pin 36 and in the other direction by the second or fixed electrode within the engine-cylinder. After the trigger 20 has lifted the arm 21 for a predetermined distance, and thereby wound up the spring 30, said arm slips off of the end of said trigger and being returned somewhat violently to its normal position under the action of the spring causes the lug 34 to strike the lug 33 on the collar 32.

Since the electrodes within the engine are in contact with each other as long as the arm 21 is being lifted, the blow given to the lug on collar 32 causes partial revolution of the shaft 22, thus separating the electrodes and forming a spark which explodes a charge in the cylinder in the well-known manner.

The lever 19 is hung to a pin 23 on an eccentric 24, and the latter is mounted in a bearing on the fixed structure of the engine, so that it is free to turn therein, whereby when the eccentric is in position shown in Fig. 2 the trigger 20 of the lever 19 will be in position to engage the arm 21 of the sparker-shaft; but when the eccentric is partially rotated in its bearing, so as to carry the pivot-pin 23 outwardly, the lever 19 and its trigger will be likewise moved outwardly, and said trigger will clear the arm 21, and thus arrest the operation of the sparker.

Longitudinal movement of the spiral toothed gear 12 along the face of the gear 11 will cause partial turning movement of said gear 12, and consequently of the shaft 10, and this will change the timing of the eccentric 16 in respect to the acting stroke of the engine. Consequently the formation of the spark and the explosion of the gas in the cylinder of the engine can be effected at any desired point in the forward position of the piston during the active stroke. The gear 11 may, if desired, be the movable gear instead of the gear 12.

The sparker may operate on every stroke, as in engines of the two-cycle type, or on every other stroke, as in engines of the four-cycle type, the gearing for driving the shaft 10 being constructed accordingly, and instead of operating a mechanical make-and-break device, as described, the shaft 10 may, if desired, carry a rotating cam—such, for instance, as represented at 25 in Figs. 1 and 3—this cam acting upon a contact-finger 26, so as to cause it to make and break contact with a fixed terminal 27, and thereby convey current at the proper intervals to a sparking plug 28 on the cylinder, or both of these devices may be used upon the same engine, as shown, so that either is available, the current-supply to the plug 28 being controlled by a switch 29.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. The combination of the rocking igniter-shaft of an internal-combustion engine with the projecting arm of said shaft, a lever having a portion for engaging said arm, means including a reciprocating bar positively connected to the lever for rocking the same, a shiftable fulcrum for said lever and means for moving said fulcrum and the lever to cause the latter to engage with or be disengaged from the arm on the igniter-shaft, with a non-moving device for adjusting the time of engagement of the lever with the arm on the igniter-shaft, substantially as described.

2. The combination of the rocking igniter-shaft of an internal-combustion engine, a projecting arm thereon, a lever having a portion for engaging said arm, with means for oscillating said lever, a movably-mounted eccentric for supporting the lever and means for rotating said eccentric, the eccentric having a throw such that in one position it permits said portion of the lever to engage with the arm on the igniter-shaft and in another position causes said lever to be disengaged from said arm, substantially as described.

3. The combination in a sparking device for an internal-combustion engine of an engine-frame, a shaft free to oscillate and having a contact-piece for causing a spark, an arm on the shaft, a lever, a cylindrical piece having a supporting-bearing on the frame, a pin engaging the lever and eccentrically carried on said cylindrical piece, means for turning said piece so as to bodily move the lever, said lever having means for engaging and operating the arm on the oscillating shaft and having pinned to it a reciprocating shaft free to move toward and from the fulcrum of the lever, substantially as described.

4. The combination of an engine-frame, an oscillating shaft carrying an arm, a cylindrical piece having a bearing on the frame and means for moving it thereon, a lever pivoted eccentrically to said piece, a bar pivoted to the lever and placed to engage the arm on the oscillating shaft, with an adjustable piece carried by the engine-frame and placed to engage the said pivoted bar, and means for operating the lever, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

COLEMAN B. HARRIS.

Witnesses:
F. E. BECHTOLD,
JOS. H. KLEIN.