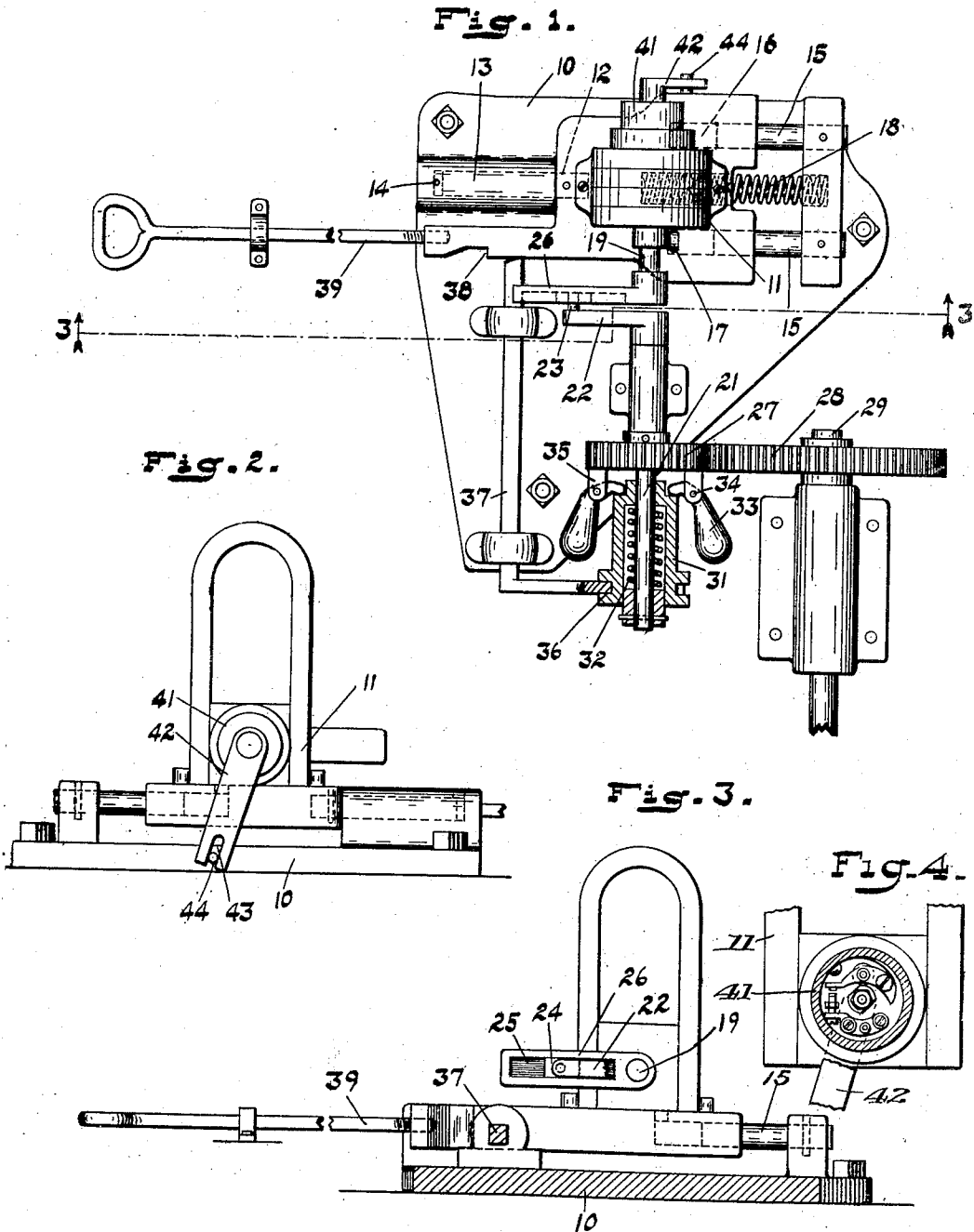


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SPARKING APPARATUS FOR INTERNAL COMBUSTION ENGINES.
APPLICATION FILED JULY 8, 1910.

1,015,005.

Patented Jan. 16, 1912.



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UNITED STATES PATENT OFFICE.

HARRY C. CLAY, OF COLUMBUS, INDIANA, ASSIGNOR TO REEVES & COMPANY, OF COLUMBUS, INDIANA, A CORPORATION OF INDIANA.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HARRY C. CLAY, a citizen of the United States, residing at Columbus, in the county of Bartholomew and State of Indiana, have invented a new and useful Sparking Apparatus for Internal-Combustion Engines, of which the following is a specification.

It is a well known fact that, in order to produce the proper igniting spark by means of a magneto or other generator, the generator must be given a maximum speed of rotation at the time of spark production. Where the generator is used for supplying the sparking current to an internal combustion engine of large power, especially where there are only one or two cylinders to the engine, it is difficult, and many times impossible, to move the engine by hand through its compression stroke with that amount of speed which is necessary to drive the generator at its minimum speed. Accidents have also occurred in the starting of engines of this kind by reason of the failure of the operator to properly retard the time of sparking.

The object of my present invention is, therefore, to produce a driving train for the magneto or other generator of such character that, for hand starting of the engine, the generator may be driven at an increased speed at the moment of spark production, mechanism being provided for automatically returning the driving train to normal condition whenever the engine proceeds under its own power.

A further object of my invention is to provide a construction by means of which the time of the spark will be automatically retarded for hand starting and automatically advanced whenever the structure is in normal operating position.

The accompanying drawings illustrate my invention.

Figure 1 is a plan in partial horizontal section of a device embodying my invention; Fig. 2 a partial end elevation; Fig. 3 section on line 3—3 of Fig. 1; and Fig. 4 is a detail of the timer.

In the drawings, 10 indicates a supporting base or frame for the magneto or other generator and 11 indicates the generator. Secured to the bottom of the generator and extending horizontally therefrom, is a plunger 12, shown in dotted lines in the figures,

which is slidably mounted in a pocket or chamber 13 formed in the base 10 and provided at its rear end with a vent 14, the plunger and cylinder thus forming a dash pot, the purpose of which will appear. Secured to base 10 are two horizontally extending pins 15 which slide in suitably formed guides or pockets 16 in the bottom of the generator, the said pockets being freely vented at 17. A spring 18 serves to normally hold the generator in the position shown in the drawings, at which position the shaft 19 of the generator will be concentric with a driving shaft 21. Shaft 21 carries a crank 22, the wrist pin 23 of which is journaled in a block 24 slidably mounted in a radial slot 25 formed in a long crank-arm 26 secured to shaft 19.

Shaft 21 may be driven in any suitable manner, and in the present drawings I have shown it provided with a gear 27 meshing with a gear 28 carried by shaft 29 driven in any suitable manner by the engine. Slidably mounted on shaft 21 is a collar 31 normally urged in one direction by means of a spring 32. Engaging collar 31 are centrifugally affected governor arms 33 pivotally mounted at 34 on ears 35 carried by gear 27 in a well known manner. Collar 31 is provided with a circumferential groove 36 into which is projected one end of a latch bar 37 which is adapted to engage in a notch 38 formed in the bottom of generator 11. The rod 39 is secured to the bottom of the generator and extended to any point of convenient access so that the generator may be moved bodily against the action of spring 18 so as to shift shaft 19 to a position eccentric to shaft 21.

The operation is as follows: The operator shifts rod 39 so as to move the generator to a position where latch 37 will move into notch 38 and thus hold shaft 19 eccentric to shaft 21. When the engine is moved by hand through its compression stroke, shaft 21 will, through crank 22 and wrist pin 23, block 24 and crank 26, drive shaft 19, but, owing to the eccentricity of this shaft, the velocity of the shaft at different points in its rotation will vary, the higher speed being obtained at that point relative to the movement of the engine piston, which will be desirable to obtain spark. As a consequence, the operator, while being unable to move the engine at a velocity sufficient to produce a

spark in the generator under ordinary conditions, will, nevertheless, be able, by reason of the shifted position of the generator, to obtain a proper speed of the generator.

As soon as the engine proceeds under its own power, gear 27 will be driven at a sufficient speed to cause the governor balls 33 to shift collar 31 and thus withdraw latch 37 from notch 38 so that spring 18 will serve to shift the generator back to a position where its shaft 19 will be concentric with the driving shaft 21, the dash pot 12-13 preventing too sudden a movement.

The device is particularly intended for use in connection with gasoline engines to be used for stationary or traction engine work and in such work the time of spark production is practically fixed because the engine works under full speed. This time of spark production, however, is not well adapted for starting the engine and, therefore, the generator is provided with an ordinary timer 41 to which is secured an arm 42 provided with a slot 43 which receives a pin 44 carried by the base 10, the arrangement being such that, when the generator is shifted bodily to bring its shaft eccentric to the driving shaft, the timer is shifted sufficiently to retard the time of spark production by a proper amount.

I claim as my invention:

1. The combination, with a generator and a driving member, of an intermediate driving train between said driving member and generator having relatively movable portions capable of occupying different speed relations to produce differences in speed effect of the driving member upon the generator, means for normally holding the members of said driving train in one speed relation, means for holding said driving train in abnormal speed relation, and a speed controlled governor connected to said driving train and arranged to withdraw said last mentioned holding means to permit the driving train to assume its normal speed relation.

2. The combination of a driving shaft, a generator with its shaft, a support for one of said parts permitting shifting of one of said shafts to a position eccentric to the other, a wrist-pin crank and a slotted crank engaged thereby, one carried by one of said shafts and the other by the other, means for yieldingly shifting one of said shafts to a position in normal relation to the other, means for holding said last mentioned shaft in a position eccentric to the other shaft, and a speed controlled governor connected to one of said shafts and to said holding means whereby, when desired speed of one of the shafts has been attained, the holding means will be withdrawn and the yielding means will serve to bring the displaced shaft to normal relationship with the other shaft.

3. The combination of a driving shaft, a generator with its shaft, a support for one of said parts permitting shifting of one of said shafts to a position eccentric to the other, a wrist-pin crank and a slotted crank engaged thereby, one carried by one of said shafts and the other by the other, means for yieldingly shifting one of said shafts to a position in normal relation to the other, means for holding said last mentioned shaft in a position eccentric to the other shaft, a speed controlled governor connected to one of said shafts and to said holding means whereby, when desired speed of one of the shafts has been attained, the holding means will be withdrawn and the yielding means will serve to bring the displaced shaft to normal relationship with the other shaft, a timer connected with said generator, and means controlled by the movement of the shiftable shaft for shifting the time to retard the spark production when the shiftable shaft is in abnormal position.

4. The combination of a driving shaft, a generator with its shaft, a support for one of said parts permitting shifting of one of said shafts to a position eccentric to the other, a wrist-pin crank and a slotted crank engaged thereby, one carried by one of said shafts and the other by the other, a timer connected with said generator, and means controlled by the movement of the shiftable shaft for shifting the time to retard the spark production when the shiftable shaft is in abnormal position.

5. The combination of a driving shaft, a generator with its shaft, a support for one of said parts permitting shifting of one of said shafts to a position eccentric to the other, a wrist-pin crank and a slotted crank engaged thereby, one carried by one of said shafts and the other by the other, means for yieldingly shifting one of said shafts to a position in normal relation to the other, means for holding said last mentioned shaft in a position eccentric to the other shaft, a timer connected with said generator, and means controlled by the movement of the shiftable shaft for shifting the time to retard the spark production when the shiftable shaft is in abnormal position.

6. The combination of a driving shaft, a generator with its shaft, a support for one of said shafts permitting shifting of the same to a position eccentric to the other and intermediate driving connections between the two shafts maintainable in either position of the movable shaft and of such character that in one position of said movable shaft some portion of the rotation of the driven shaft will be accelerated beyond the velocity attainable when the shiftable shaft is in its other position, means for holding the shiftable shaft temporarily in its abnormal position, and a speed controlled gov-

ernor connected to one of said shafts and to said holding means whereby, when desired speed of one of the shafts has been attained, the holding means will be withdrawn and the shiftable shaft returned to normal position.

my hand and seal at Columbus, Indiana, this second day of July, A. D. one thousand nine hundred and ten.

HARRY C. CLAY. [L. S.]

Witnesses:

J. H. BACHTEL,
PERRY KING.

In witness whereof, I, have hereunto set

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."