No. 648,689. Patented May 1, 1900.

L. HUTCHINSON.

IGNITING DEVICE FOR GAS ENGINES.

(Application filed Nov. 11, 1899.)

(No Model.) 2 Sheets—Sheet 1.

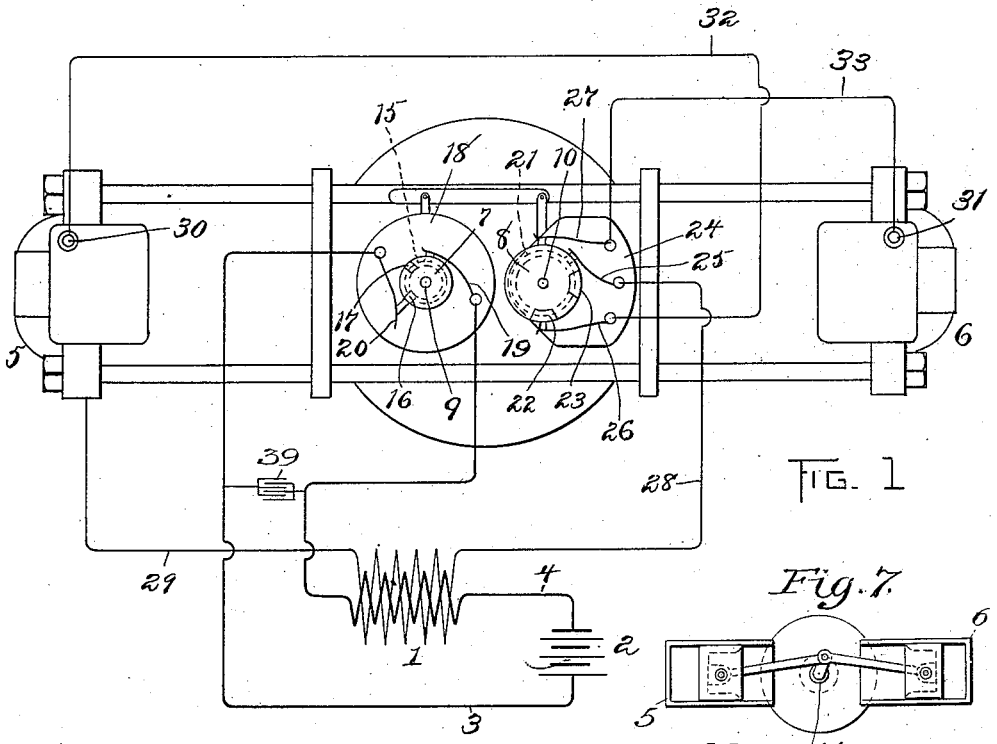

FIG. 1

Fig. 7.

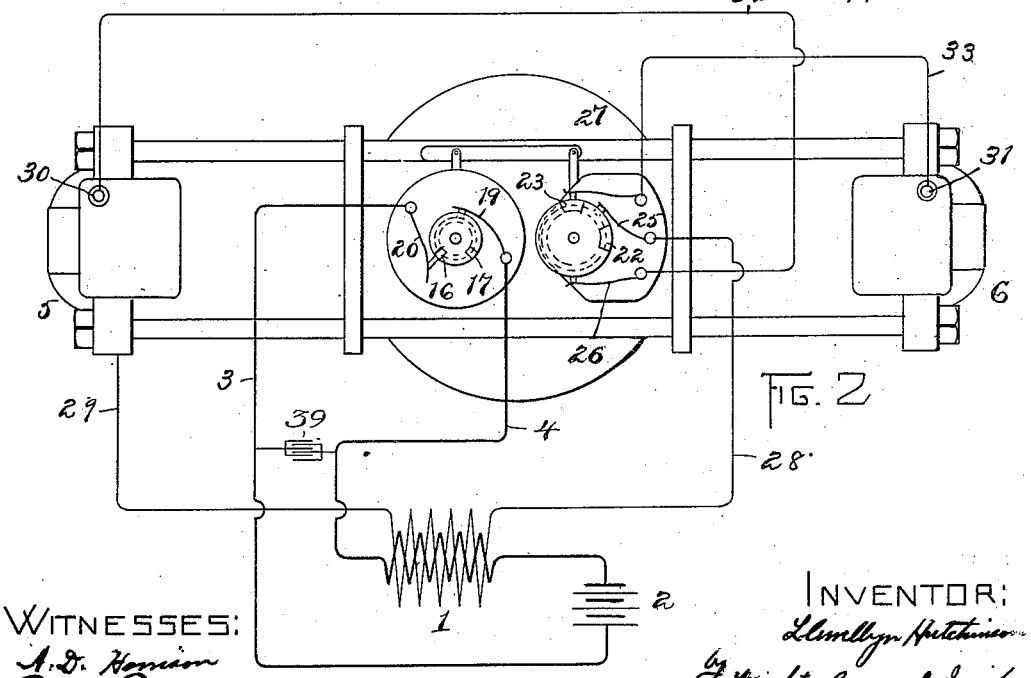

FIG. 2

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No. 643,689. Patented May 1, 1900.

L. HUTCHINSON.

IGNITING DEVICE FOR GAS ENGINES.

(Application filed Nov. 11, 1899.)

(No Model.) 2 Sheets—Sheet 2.

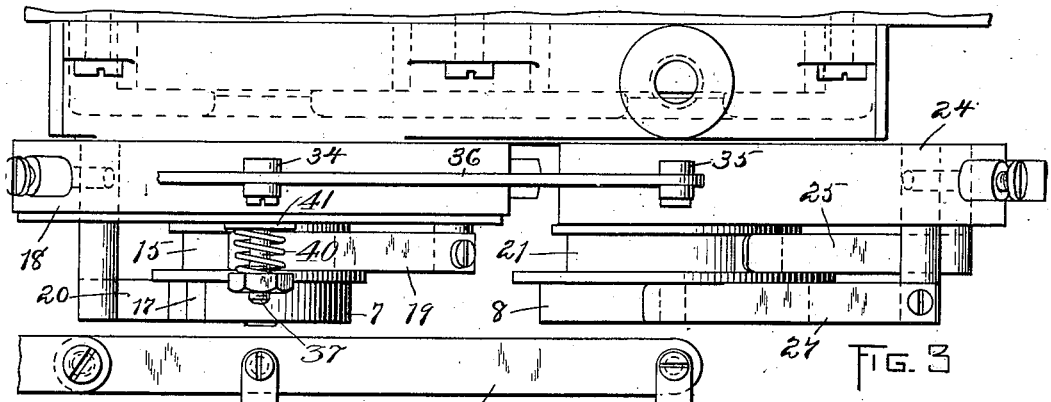

FIG. 3

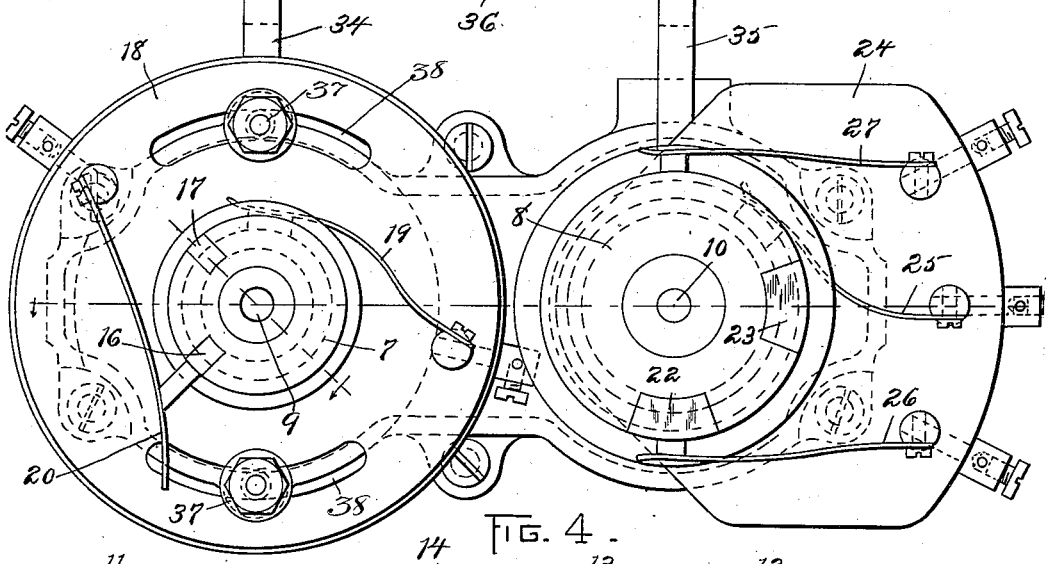

FIG. 4.

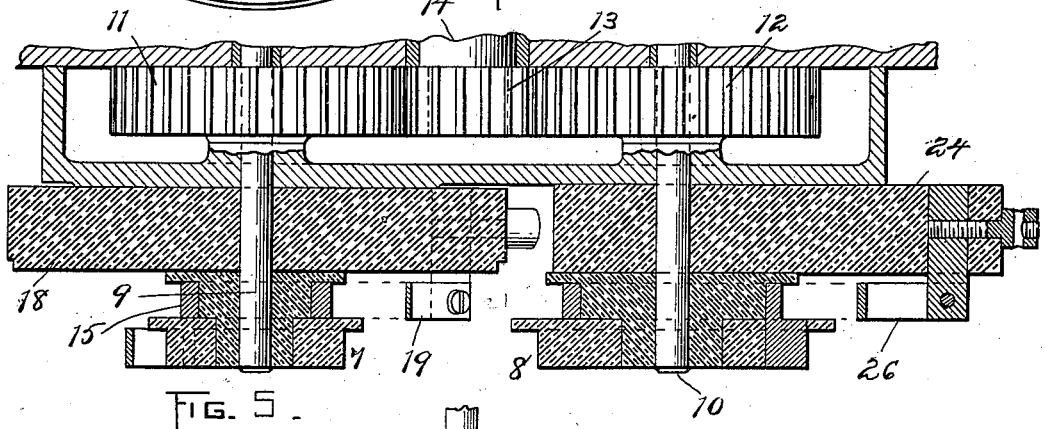

FIG. 5.

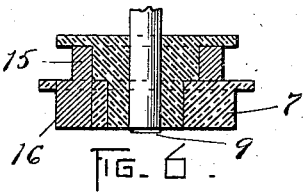

FIG. 6.

WITNESSES:

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UNITED STATES PATENT OFFICE.

LLEWELLYN HUTCHINSON, OF CAMBRIDGE, MASSACHUSETTS, ASSIGNOR TO E. D. MELLEN, OF SAME PLACE, AND ISAAC H. DAVIS, OF BOSTON, MASSACHUSETTS.

IGNITING DEVICE FOR GAS-ENGINES.

SPECIFICATION forming part of Letters Patent No. 648,689, dated May 1, 1900.

Application filed November 11, 1899. Serial No. 736,592. (No model.)

To all whom it may concern:

Be it known that I, LLEWELLYN HUTCHINSON, of Cambridge, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Igniting Devices, of which the following is a specification.

This invention relates to igniting devices such as are required for explosive-gas engines and other purposes.

The nature and object of the invention will appear from the succeeding description and claims.

A practical embodiment of my invention is set forth in the succeeding specification, taken in connection with the accompanying drawings.

Of the drawings, Figures 1 and 2 represent diagrammatic views illustrating my invention and showing the movable parts in two different positions. Fig. 3 represents an edge view of the circuit-controlling devices. Fig. 4 represents a front elevation thereof. Fig. 5 represents a sectional view thereof. Fig. 6 represents a detail sectional view of one of the controller spindles or shafts. Fig. 7 represents diagrammatically the arrangement of cylinders, crank, &c., in the engine.

The same reference characters indicate the same parts in all the figures.

Referring to the drawings, 1 designates an induction-coil. 2 is a battery, for which may be substituted any other suitable source of electricity, included in the primary circuit 3 4 of the induction-coil, and 5 6 represent the cylinders of a two-cylinder explosive-engine, having a single crank-shaft 14, Figs. 5 and 7.

My invention as herein set forth is particularly adapted for successively exploding the charges in the cylinders of a multiple-cylinder engine, and to this end it may embody a construction and arrangement as follows:

7 and 8 are two rotatable disks, of insulating material, which, as seen in Fig. 5, are secured to two short shafts or spindles 9 10, which have suitable bearings and are provided with gears 11 12 of equal size meshing with a pinion 13, secured to the crank-shaft 14 of the engine, the pinion being illustrated as of half the diameter of the gears, so as to complete two rotations to one of the gears. The rotatable members 7 and 8 constitute parts of two circuit-controllers, the one including the member 7 being herein termed the "primary" circuit-controller, while that which includes the member 8 is termed the "secondary" circuit-controller.

15 is a conductive ring, preferably of metal, mounted on the member 7 and having two lateral projections 16 17, constituting contacts, separated by a predetermined angular distance and having insulating material interposed between them. An insulating-plate 18, which is normally stationary, but is capable of rotation about a center—in this case the shaft 9—carries two contact-brushes 19 20, which form the terminals of the circuit 3 4, containing the primary winding of the induction-coil 1 and the source of electrical-energy 2, with a condenser 39 in shunt. The brush 19 is in continuous contact with the conductive ring 15, and therefore with each of the contacts 16 17, and the brush 20 rests on the cylindrical surface, which includes the insulating material and the two contacts 16 17. When the member 7 is rotated, the contacts 16 and 17 are successively brought into connection with the brush 20, and the primary circuit is thereby successively made and broken twice for each revolution of the member 7.

The member 8 is provided with a conductive ring 21, having two lateral projections 22 23, constituting separated contacts. An insulating-base 24, normally stationary, but rotatable about the shaft 10, carries three contact-brushes 25 26 27. The brush 25 is in continuous contact with conductive ring 21, and therefore with the contacts 22 23, and forms one terminal of the circuit 28 29, which includes the secondary winding of the induction-coil. The other terminal of said secondary winding is carried, as herein shown, to the iron of the engine, which conventionally represents one point of each of the two pairs of ignition-points relating to the respective cylinders of the engine. The other ignition-points of said pairs are conventionally represented by the plugs 30 and 31, which are connected in branch circuits 32 33 with the re-

spective brushes 26 27. The angular relation of the two members 7 and 8 is such that one of the two contacts 16 17 will be in connection with the brush 20 at the same time that one of the contacts 22 23 is in connection with one of the brushes 26 27, and the other contact of the pair 16 17 will be in connection with the brush 20 at the same time that the other contact of the pair 22 23 is in connection with the other brush of the pair 26 27, so that the following action results: The terminals of the primary circuit of the induction-coil are alternately connected and disconnected, so as to produce an igniting-spark between the terminals of the secondary coil, and the two pairs of ignition-points are successively constituted as the said secondary terminals simultaneously with the completion of the primary circuit.

It is obvious that the rotation of the two insulating-bases 18 and 24, carrying the several brushes about the shafts 9 10 as centers, will change the points at which the spark occurs relatively to the stroke of the engine-piston, thereby timing the explosion with relation to said stroke. I provide means for simultaneously and equally rotating said insulating-bases about their centers, and thus changing the time of the spark while maintaining the coacting relation of the primary and secondary circuit-controllers, said means as herein illustrated consisting of arms 34 35, attached to the respective bases 18 and 24, said arms being pivotally connected at their outer ends with a link 36, adapted to receive motion from a suitable manually-operated lever or handle.

The complete operativeness of the circuit-controllers would be retained if the two members 7 and 8 were mounted upon a single shaft; but as this would increase the space occupied by the structure in a direction longitudinally of the said shaft, and since, moreover, this increase of space occupied would frequently be undesirable in the situations in which engines are commonly employed, there being, however, ample lateral space available on the side of the crank case or frame of the engine, I prefer to mount the said controllers separately in gear connection with the crank-shaft 14, as illustrated. It is further to be observed that the two shafts 9 and 10 in such gear connection with the crank-shaft 14 are then available for other uses in the engine and are, in fact, employed in practice, in an engine of the type hereinbefore specified, to operate the exhaust-valves of the two cylinders.

The brush 20 is in Fig. 4 shown as extended into the path of a fixed stud 37, which has a cam action on said brush, operating to move the latter away from the contacts 16 17 when the arms 34 35 are thrown over to one of their extremes of position, thereby providing a cut-out switch which is available for throwing the igniting device entirely out of operation. I hereby disclaim such construction, as the same forms no part of my present invention. The stud 37 is one of a pair fixed to the frame of the engine and extended through segmental slots 38 in the disk 18 to guide said disk and also having springs 40 bearing against washers 41, which furnish a friction to retain the disks 18 and 24 in the positions to which they are moved.

I claim—

1. An igniting device comprising an engine having a plurality of cylinders and a single crank-shaft, a pinion attached to said shaft, two gears meshing with said pinion on either side of it, a plurality of ignition-points relating to the respective cylinders, a primary and a secondary controller attached respectively to the shafts of the said two gears and controlling the action of the said ignition-points, combined with the induction-coil having a source of electrical energy included in its primary circuit, and said circuit controlled by the primary circuit-controller, and the secondary circuit of said coil including the ignition-points and controlled by the secondary circuit-controller.

2. An igniting device comprising an engine having a plurality of cylinders and a single crank-shaft, a pinion attached to said shaft, two gears meshing with said pinion on either side of it, a plurality of ignition-points relating to the respective cylinders, a primary and a secondary controller attached respectively to the shafts of the said two gears and controlling the action of the said ignition-points, two sets of contact-brushes relating to the respective controllers, bases supporting said sets of brushes and movable about said shafts to vary the time of ignition, and a link connecting said two bases and causing them to move together in common, combined with the induction-coil having a source of electrical energy included in its primary circuit, and said circuit controlled by the primary circuit-controller, and the secondary circuit of said coil including the ignition-points and controlled by the secondary circuit-controller.

In testimony whereof I have affixed my signature in presence of two witnesses.

LLEWELLYN HUTCHINSON.

Witnesses:
A. D. HARRISON,
M. B. MAY.