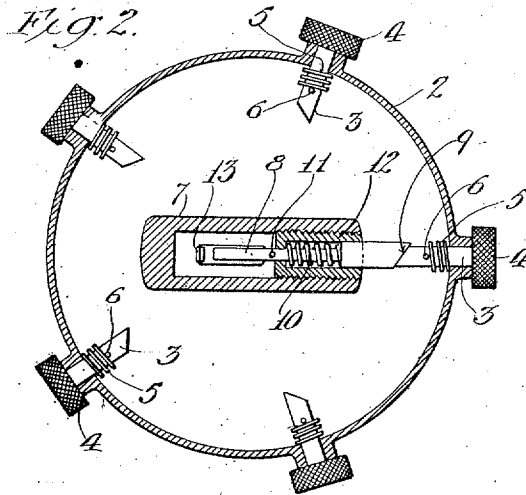
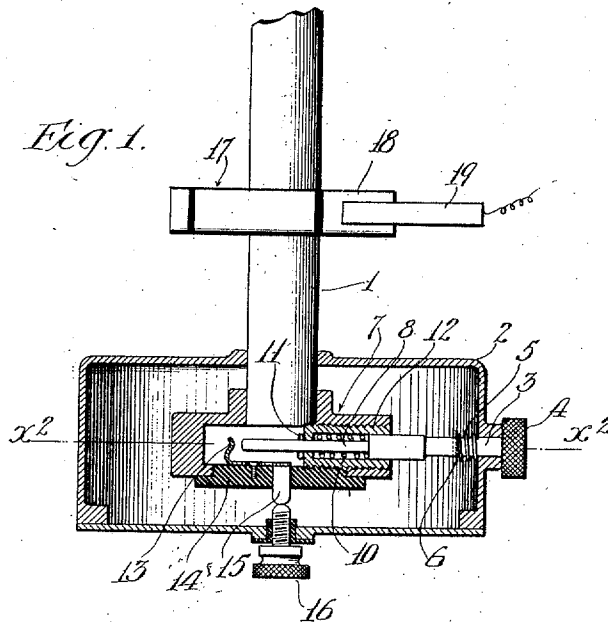


T. C. FORBES.
IGNITION TIMER AND DETECTOR.
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1,019,886.

Patented Mar. 12, 1912.



Witnesses:
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UNITED STATES PATENT OFFICE.

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IGNITION TIMER AND DETECTOR.

1,019,886.

Specification of Letters Patent.

Patented Mar. 12, 1912.

Application filed June 9, 1910. Serial No. 566,110.

To all whom it may concern:

Be it known that I, THOMAS C. FORBES, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Ignition Timer and Detector, of which the following is a specification.

This invention relates to a device adapted to be used in connection with gas engines of a type in which the cylinders are arranged to rotate bodily around an axis for enabling the easy detection of a cylinder in which ignition is faulty and to accomplish this without interrupting the running of the engine. This device is useful with an engine of this type in which there is a single secondary for all of the cylinders, there being no individual coils nor vibrators for the respective cylinders. Owing to the absence of vibrators, it would be difficult to detect a cylinder in which ignition was missing and the present device enables this to be readily done.

Referring to the drawings: Figure 1 is a diagrammatic section through the device. Fig. 2 is a section on line x^2-x^2 Fig. 1.

1 designates the timer shaft driven by the engine at half the speed of the engine, the engine being a four-cycle engine and ignition taking place in the cylinder at every other stroke. The end of the shaft 1 projects into a stationary case 2 in which is a series of radially arranged slidable detector pins 3, each having a knurled knob 4 outside the case 2 and being provided with a compression spring 5 inside the case which acts against a pin 6 to normally hold the detector pin 3 inwardly. The inner end of each detector pin is tapered as shown.

On the end of the shaft 1 is a block 7 in which is slidably mounted a contact plunger 8, the contact plunger having a beveled outer end 9, as shown in Fig. 2, and a coil spring 10 serving to normally hold the contact plunger 8 in outward position, a pin 11 acting as a stop to strike against a bushing 12 in which the contact plunger is slidably mounted, the bushing 12 being screwed into the block 7. As the shaft 1 rotates the beveled end 9 of the contact plunger successively contacts with the detector pins 3 and the beveled ends of the latter act in succession to move the contact plunger 8 inwardly, so that the latter is intermittently moved inwardly as the shaft 1 rotates. As the contact plunger 8 is moved inwardly its inner

end is moved into contact with a spring contact blade 13 which is mounted on insulation 14 and in electrical connection with a stud 15, the latter being arranged concentric with shaft 1 and turning therewith and in contact with the end of a stationary binding post 16 which is insulated from the case 2. The circuit is established with the proper cylinder at the proper time by a commutator 17 which is provided with segmental contact plates 18 separated from each other and wiped by spring blade 19. When the contact plunger 9 is moved inward by detector pin 3, one of the segments 18 is in contact with the blade 19 and circuit through the spark plug of the associated cylinder is made, the circuit being established through the binding post 16 to stud 15 to contact blade 13 and contact plunger 8 and from the latter it is grounded. As the contact plunger 9 rides past the edge of the detector pin 3 it snaps back breaking connection from contact plate 13 and opening the circuit, thereby producing a spark at the spark plug in the cylinder. By adjusting the angular position of the casing 2, the detector pins 3 will be angularly advanced or retarded and the time of spark will accordingly be advanced or retarded.

If it be desired to ascertain if one or more of the cylinders are missing fire, this may be done by simply pulling out a detector pin 3 and holding each one out for a sufficient period to determine if the cylinders associated with the other detector pins are regularly working. Thus, when a detector pin 3 is pulled out, the contact plunger 8 will not make contact with the detector pin which is pulled out and will not be moved inwardly into contact with blade 13; so that the cylinder associated with that detector pin will be released from duty and the remaining cylinders will be detected in succession if they do not ignite properly, the method of detection being similar to that employed in holding down a vibrator.

It should be understood that the detector pins 3 do not make electrical connection with the contact plunger 8 nor have electrical connection with the respective cylinders, as their function is purely mechanical, their purpose being to move the contact plunger 8 inwardly at certain angular positions of the shaft 1. Nevertheless, the angular position of the detector pins as determined by the

angular position of the case 2 does determine the time at which the ignition shall take place in the cycle as, although they act mechanically, they perform and regulate the function of making contact between the contact plunger 8 and blade 13.

What I claim is:

1. A shaft, a contact plunger slidable thereon and electrically grounded, a contact blade rotating with the shaft, a stationary terminal electrically connected with the contact blade, and a series of relatively stationary detector pins with which the contact plunger successively coacts and is moved thereby into electrical connection with said contact blade, each of said detector pins being movable out of the path of movement of the contact plunger to escape the same.

2. A case, a series of detector pins slidable in the case, means for yieldingly holding said detector pins inwardly, a shaft ex-

tending in the case, a block on the shaft, a contact plunger slidable radially of the shaft in said block, means for yieldingly holding the contact plunger extended to cause its end to engage with the respective detector pins and be moved inwardly, a contact blade carried by said block with which the contact plunger is moved into electrical connection by the detector pins, a stud rotating with the shaft and connected with the contact blade, a stationary binding post on said case having a stud in contact with the rotating stud.

In testimony whereof I have hereunto set my hand at Los Angeles, California, this 14th day of May, 1910.

THOMAS C. FORBES.

In presence of—

G. T. HACKLEY,
FRANK L. A. GRAHAM.