

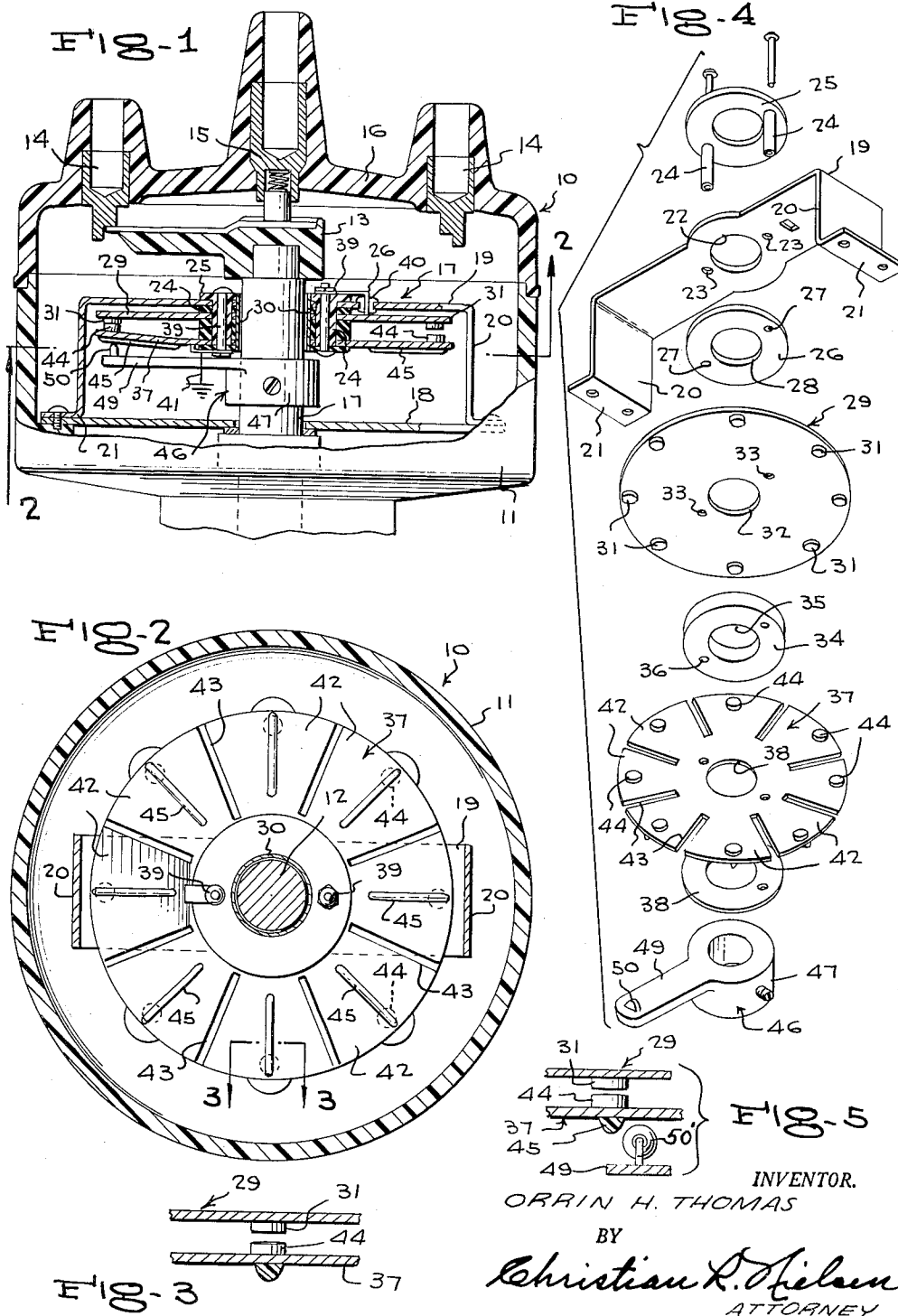
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IGNITION TIMER FOR INTERNAL COMBUSTION ENGINES

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IGNITION TIMER FOR INTERNAL COMBUSTION ENGINES

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This invention relates to an ignition timer for internal combustion engines which embodies constructions in accomplishing the opening and closing of the primary circuit of the ignition coil to the spark plugs of an engine.

It is the cardinal object of the invention to provide an ignition timer wherein a plurality of opposed contacts are successively actuated during rotation of the rotor shaft of the distributor, thus eliminating the use of a single pair of contacts which are continuously actuated, as is now inherent in present day ignition timers.

More specifically, it is an important object of the invention to provide an ignition timer wherein a pair of contact plates are mounted fixedly with respect to the rotor shaft of the distributor, each plate having secured thereon a plurality of spaced contacts arranged in opposed relation, one of the plates having segmental portions upon which a contact is secured and being movable into contacting engagement with a fixed opposed contact of the other contact plate, under rotation of the rotor shaft.

It is also an important object of the invention to provide a breaker point assembly which may readily replace the breaker assembly of present day distributors.

Additional objects, advantages and features of invention will be apparent from the following description, considered in conjunction with the accompanying drawing, wherein:

FIGURE 1 is a fragmentary vertical section through a distributor embodying the invention,

FIGURE 2 is a cross section on the line 2—2 of FIGURE 1.

FIGURE 3 is an enlarged cross section on the line 3—3 of FIGURE 2, and

FIGURE 4 is a perspective view of the various parts constituting the invention.

FIGURE 5 is a fragmentary section illustrating a modified form of rubbing block.

Referring more particularly to the drawing, there is illustrated a conventional distributor housing generally indicated by the reference character 10. As well understood, the housing 10 comprises a main housing 11, a rotor shaft 12 having a contact rotor 13 for successive engagement with contacts 14 associated with respective spark plugs of an engine, as well as a contact 15 which is electrically connected to the primary of an ignition coil. The contacts 14 and 15 are mounted in a closure cap 16 for detachable mounting upon the housing 11.

The breaker assembly of this invention is indicated at 17, and as shown comprises a base plate 18 which is formed with a medial aperture for passage of the rotor shaft 12, the plate 18 being rigidly mounted within the housing 11. A mounting bracket 19 is employed for securement of the breaker assembly, as will now be described.

The bracket 19, as best seen in FIGURE 4, is of generally U-shaped formation, each leg 20 of which is provided with a laterally extended apertures foot 21 for reception of a suitable fastening means for securement of the bracket to the base plate. The bracket 19 is formed with a medial opening 22 as well as a pair of openings 23, the opening 22 receiving the rotor shaft therethrough, while the openings 23 accommodate respective insulated bushings 24 of an insulator washer 25, the latter also

receiving the rotor shaft therethrough, the washer occupying a position upon the upper side of the bracket.

A second insulator washer 26 is also apertured as at 27 to receive the bushing 24 therethrough, as well as having a medial opening 28 for passage of the rotor shaft. The washer 26 is positioned upon the underside of the bracket 19.

A contact plate 29 formed of current conducting material is employed in the assembly of the breaker point unit 17 and as here shown, is of circular formation and is suitably insulated from the rotor shaft by means of the bushing 30. The contact plate 29, in the present instance, embodies eight circumferentially equally spaced, tungsten contacts 31; a medial opening 32 for the bushing 30 and opening 33 for passage of the bushings 24. An annular insulating washer 34, of a thickness to maintain cooperating contacts in spaced apart relation is employed, for a purpose as will presently appear. The washer 34 is also provided with a medial opening 35 for passage of the bushing 30, as well as openings 36 for accommodation of bushings 24.

The breaker unit 17 is finally assembled by the installation of a contact plate 37 and insulator washer 38, which is also provided with suitable openings for reception of respective bushings 24 and 30. In the present instance, the contact plates 29 and 37 are secured in assembled relation by means of threaded bolts and nuts 39, which also function as binding posts for connection wires 40 and 41 of the electrical circuit.

The contact plate 37 is of circular formation corresponding to the contact plate 29, but is divided into respective segmental sectors 42 by the provision of radially extending slots 43, which terminate inwardly of the medial opening 38. Each sector 42 is thus capable of individual flexing movements toward and away from the contact plate 29, for a purpose presently to be explained.

The upper face of the sectors of the contact plate 37 are each provided with a tungsten contact 44, and in assembled relation with contact plate 29, the contacts of both plates will be in direct alignment one with the other. The under face of the sector 42 is provided with a radiating, raised rib 45, which it will be noted extends on a line from the vertical axis of the rotor shaft through the vertical center of the contacts 44.

The contact plates 29 and 37 will be assembled upon the bracket 19 as a unit prior to installation within the distributor housing 11 and then only after installation of an operating means 46 for successively actuating the contact sectors 42. The operating means 46 comprises a collar 47 adapted to embrace the rotor shaft and is secured thereto by means of a set screw 48, the securement being such that the arm 49 is in direct vertical alignment with the rotor 13.

Inwardly of the free end of the arm 49, a rubbing block 50 of insulating material is secured, positioned in a vertical plane so as to successively engage the ribs 45 to effect a flexing action of the sectors 42 under rotation of the rotor shaft, to close the electrical circuit between opposed contacts 31 and 44.

In FIGURE 5, a modified form of the rubbing block 50 is illustrated, here shown as a ball or roller 50'.

With the ignition unit installed upon the rotor shaft of the ignition housing, which will include the conventional circuits such as a source of current, condenser, high tension coil and leads to respective spark plugs, the operation of the device will be substantially as follows:

Upon rotation of the rotor shaft 12, the rotor 13 and the operating means 46 will be rotated in unison, the contact of the rotor 13 engaging contacts 14 successively, and simultaneously therewith, the rubbing block carried by the arm 49 will engage a rib 45, imparting an upward

flexing movement of the sectors 42, effecting a closed position between contacts 31 and 44 and closing the primary circuit to the coil.

In this case, I have described the ignition unit as applied to an eight cylinder motor and thus it will be seen that eight separate breaker units are inherent, which are brought into contacting relation but once in a complete rotation of the rotor shaft. The life of the contacts 31 and 44 is therefore greatly increased over that involved in a system where a single pair of contacts control opening and closing of a primary circuit to the coil. It will also be appreciated that since a direct thrust is imparted between the contacts, bouncing or fluttering motion between the contacts is eliminated, thereby avoiding the "pitting" between contacting surfaces of the contacts; and since the bounce or flutter between the contacts is overcome, a longer dwell period between the contacts is obtained, insuring full coil saturation and therefore efficient operation of the engine is assured.

While I have shown and described a preferred construction, this is by way of illustration only, and I consider as my own, all such modifications in construction as fairly fall within the scope of the appended claims.

I claim:

1. In an ignition apparatus, means for successively making and breaking an electric circuit in accordance with operation of an internal combustion engine, comprising a housing in combination with a rotor shaft, spaced parallel upper and lower plate members supported by the housing of said distributor and circumscribing said rotor shaft, each plate having a plurality of circumferentially spaced contact members arranged in spaced apart opposed pairs, said lower plate member being divided to provide a plurality of sector members, the contact on said sector members being positioned medially thereof, inwardly of the outer periphery of the sector members for registry with a correspondingly located contact of said upper plate, said sector members further having a projecting rib upon the underside thereof, a contact rotor fixed to the upper end of said rotor shaft, an operating means connected to said rotor shaft positioned beneath said lower plate and having a lateral extension, said extension being in direct vertical alignment with said contact rotor, a wiper block on an outer portion of said lateral extension for intermittently engaging the ribs of

said sector members to flex said sectors in the direction of a cooperating contact on the upper plate under rotation of said rotor shaft.

2. The structure of claim 1, in which the rib on the sector member extend on a line from the vertical axis of the rotor shaft through the vertical center of the contacts.

3. In an ignition apparatus, means for successively making and breaking an electrical circuit in accordance with operation of an internal combustion engine, comprising in combination with a housing having a rotor shaft, a U-shaped frame mounted within the distributor housing, spaced parallel upper and lower plate members supported by said U-shaped frame, said plates circumscribing said rotor shaft, said plate members being insulated from each other, said lower plate member being divided to provide a plurality of sector members, the contact on said sector members being positioned medially thereof, inwardly of the outer periphery of the sector for registry with a correspondingly located contact of said upper plate, said sector members further having a projecting rib upon the underside thereof, a contact rotor fixed to the upper end of said rotor shaft, an operating means connected to said rotor shaft positioned beneath said lower plate and having a lateral extension, said extension being in vertical alignment with said contact rotor, a wiper block on an outer portion of said lateral extension for intermittently engaging the ribs of said sector members to flex said sector members of said lower plate in the direction of a cooperating contact on the upper plate under rotation of said rotor shaft.

4. The structure of claim 3, in which the rib on the sector members extends on a line from the vertical axis of the rotor shaft through the vertical center of the contacts.

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