

UNITED STATES PATENT OFFICE.

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TIMER FOR IGNITION SYSTEMS.

Application filed July 17, 1922. Serial No. 575,481.

To all whom it may concern:

Be it known that I, ERRETT LUCAS MORSE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Timers for Ignition Systems, of which the following is a specification.

My invention relates to the construction of timers for use in connection with ignition systems of internal combustion engines, and more especially relates to that portion of a timing system known as a distributor and to the genus of distributors involving a rotor or a brush, mounted upon a shaft driven by the timing gears of a motor, and equipping with an annulus of insulating material in which contact or conductors have been embedded, which contacts or conductors are connected by suitable leads to the induction coils of the ignition system. The friction of the rotor upon the annulus occasions considerable wear upon these parts which has heretofore been provided for, in a manner, by constructing the rotor with an anti-friction wheel and making the insulating annulus of especially tough and wear resisting material without special reference to the conducting and insulating qualities of these elements, the complete insulation of the distributing contact and the posts leading therefrom, or without reference to the absorption properties of the insulator and its ability to withstand shrinkage or distortion under service.

My present invention involves the conception of interposing between the contacts leading to the coils grounded metal inserts spaced from the distributing contacts at such short intervals that the rotor is continuously in contact with metal. This permits me to employ an insulator of the phenolic type of very high insulating efficiency which has hitherto been regarded as too soft and wearable to sustain service in a timing distributor of this type. With such an insulating material which does not absorb moisture to an appreciable extent and does not shrink, I am enabled to insulate the distributor posts more effectively from the exterior casing and secure a structure of greater efficiency, permanency of form and lasting qualities than can be obtained with usual insulation. This practically continuous metallic face also permits me to use

copper for contact members which has considerably more efficient conductive properties. As will be hereafter described, the distributing contacts and the ground contacts forming the track of the rotor are secured permanently in position and the distributor contacts fully insulated by casting or molding the insulating material about them, and the insulating material is further reinforced and the intermediate metallic pieces are grounded by die casting thereabout a metallic casing. This construction is not only very strong, but also increases the efficiency of the functioning of the device and materially lessens the sparking and arcing of the rotor when it makes and breaks contact with the conductors leading to the respective coils.

I have also provided a suitable closure or cap for the timer which is constructed in a manner so that it may be used in connection with different types of presser-arms or spring retaining members such as are usually installed upon the Ford automobile and the Fordson tractor. I have also provided means for draining the oil which may find its way into the timer shell through the bearing for the rotor shaft. Further objects of my invention reside in providing a timer structure that is strong and durable in construction; that will not readily get out of order; which is effective and dependable in its operation, and which will not be subject to the missing or skipping action so frequently incident in other types of timers after the same have been in use for a given period of time and have become worn. I prefer to carry out my invention in substantially the manner hereinafter described, and as more particularly pointed out in the claims, reference being now had to the accompanying drawings that show a preferred or typical embodiment of my invention.

In the drawings:

Fig. 1 is a vertical axial section of my improved timer structure mounted upon the forward or front plate of the timing gears box.

Fig. 2 is a transverse section thereof taken on line 2—2, Fig. 1.

Fig. 3 is a top plan of the structure shown in Fig. 1, and

Fig. 4 is a perspective of one of the contact blocks or plates.

I prefer to employ my present invention in connection with the rotor structure disclosed in my prior application filed December 17, 1921, Serial No. 522,977, but it will be understood it is well adapted for use in connection with other types of rotors. In the rotor shown in said prior application the brush or shoe A is moved bodily in a rotative direction in socket B forming a radial embossment upon the rotatable disk C, and brush A is kept normally pressed outwardly in the socket by means of a bowed spring D, substantially as shown in Fig. 2 hereof, so that the brush has a yielding engagement with the contact plates in the casing. The rotor structure is mounted upon the end of timing-gear shaft E by means of a transverse pin F that enters a notch or recess in the hub of the rotor and extends into shaft F, while a cup-washer G is fitted over the adjacent outer portion of the hub to retain pin F in position; said cup washer being retained by means of a nut H screwed upon the outer threaded end of shaft E.

The structure of the present invention comprises a ring 5 of insulating material surrounding and spaced from the rotor disk C upon the inner surface of which ring is embedded a plurality of contact plates or blocks 6 and 7 arranged with their adjacent edges in spaced relation to each other and provided, respectively, with serrated or threaded spindles 6^a and 7^a, the former being slightly longer than the latter. These spindles form with the blocks or plates substantially T-shaped contact elements the spindles or shanks of which extend through the insulating material forming a ring 5 in the manner shown in Figs. 1 and 2. The insulating ring 5 is provided with radially disposed lateral stubs or embossments 8, preferably of a number corresponding to the number of cylinders of the motor with which the timer is associated to receive the alternate longer spindles 6^a of the respective blocks 6 which are embedded therein during the molding operation. These spindles 6^a project beyond the outer ends of stubs 8 and provide, with nuts 6^b, terminals or binding posts which afford means for connecting the respective conductors to the coil or coils.

After the structure above described has been fabricated, the unit is placed in a die-casting machine and a metallic annular ring or casing 9, is cast around the same so that stubs 8 will project through said ring or casing 9, and the shorter spindles 7^a will be embedded in the wall of this casing. This construction and arrangement of the parts prevents the loosening of the contact plates or blocks with respect to both the insulating ring 5 and casing 9. A lateral tubular embossment is formed from the edge of casing

9 to which the usual rod or other operating device is connected for the purpose of bodily rotating the timer casing to advance or retard the spark. A small shoulder 11 is formed in the outer edge of casing 9 to receive a cap or cover which consists of a disk 12 that is seated on shoulder 11 and has a centrally disposed outwardly extending embossment 13 of conical shape which will accommodate the nut and adjacent portions of the rotor. This cap at its apex is provided with an inwardly projecting recess 14 to receive a correspondingly shaped teat 15 upon the adjacent end of the retaining spring 16 of the usual type found on a Ford automobile. This spring at its opposite end is secured to a post 17 extending laterally from the end plate I of the timing gear box. By forming the embossment of the closure plate conical shape in the manner shown the spring employed upon the timer of the Fordson tractor may be brought into co-operative relation with the cover of the timer so that my timing structure may be used on both types of vehicles.

The shell or casing 9 is provided in its lower segment with an elongated transverse slot 18 which, as seen in Fig. 1 of the drawings, is disposed normally below timing-gear shaft E so that the oil thrown out of the bearing in the timing-gear casing will gravitate to the lower portion of the shell or ring 9 where it will find egress and be eliminated from the casing of the timer, thus avoiding the accumulation of oil and grease within the structure and a consequent breaking of the circuit. This slot also permits of an air circulation within the shell which prevents any condensation due to heating of the parts. As will be observed in Fig. 2 of the drawings, the spaces between the successive contact plates or blocks 6, 7, are less than the width of the rotor brush A so that as the latter rotates it will come into contact with the edge of one block before leaving contact with the adjacent edge of a preceding block. This prevents the sparking of the timer during operation and therefore increases the longevity of the device, as well as materially increases the efficiency of its functioning.

The method hereinbefore described of molding the segmental rotor contacting elements within a ring of fusible insulating material and die-casting around the insulating ring a casing of metal of a higher melting point than the insulating material is, so far as I am aware, new; because, heretofore, it has been generally believed with reason that the heat of the fluid metal of which the outer casing is formed would at least distort the ring of insulating material of a lower melting point. I have found that when the outer casing is cast under pressure, as is the practice in die-casting, it will permit

of an immediate chilling before the heat from the fluid metal has had an opportunity to fuse or distort the insulating material.

While I have herein illustrated and described a single embodiment of my invention, it will be obvious to others that the structure may be modified without materially departing from the principles herein shown, and I therefore desire it understood that such changes are contemplated within the scope of the appended claims.

What I claim is:

1. In a timer structure, a ring of insulating material, a plurality of contact plates embedded in the inner surface of said ring, serrated spindles on said plates extended through the opposite side of said ring, and a metal casing cast around said ring in which alternate spindles are embedded, the remaining spindles projecting through said casing and insulated therefrom.

2. In a timer structure a ring of insulating material having spaced radial stubs

projecting outwardly therefrom, a plurality of contact plates embedded in the inner surface of said ring, serrated spindles on said plates and extended through said ring, alternate spindles projecting through said stubs, and a metal casing cast around said ring through which the stubs and said alternate spindles project and the remaining spindles being embedded in said casing.

3. In a timer, in combination with a rotor, an annulus consisting of a ring of insulating material and segmental elements of conducting material comprising inserts in and about which said insulating material is molded, and a metallic shell cast around said annulus in which the portions of alternate conducting elements are embedded.

Signed at Chicago, county of Cook, and State of Illinois, this 7th day of June, 1922.

ERRETT LUCAS MORSE.

Witness:

FLORENCE MITCHELL.