Jan. 25, 1927. 1,615,256

G. G. BARRY

IGNITION TIMER

Filed Jan. 17, 1925

Fig. 1

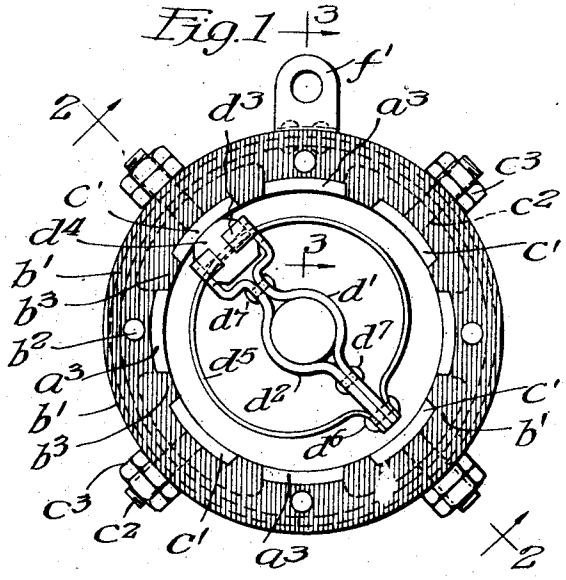


Fig. 2

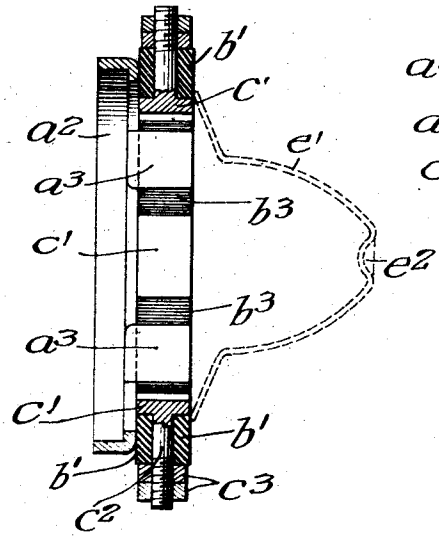
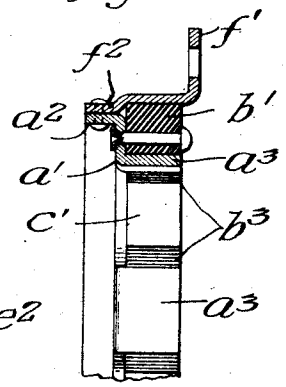


Fig. 3



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IGNITION TIMER.

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This invention relates to electric circuit makers and breakers, and particularly to that type known as "timers," employed in the ignition systems of internal combustion engines. While the invention is susceptible of use in many other connections, it has been devised more particularly as an improvement in the electric ignition system used on the well known Ford automobile and tractor, and will be described in that connection.

It is the purpose of my invention to provide a generally improved structure, which will simplify and reduce the cost of manufacturing, and at the same time furnish a device which may be subjected to long, hard usage and be more efficient and dependable in operation than other devices for the purpose.

The invention consists in the details of construction and arrangement and combination of parts to be hereinafter more fully described and particularly pointed out in the claims.

In the accompanying drawings forming a part of this specification, and in which similar letters or marks of reference designate like parts throughout the several figures:

Fig. 1 is a plan view of the new structure.

Fig. 2 is a vertical section taken on the line 2—2 of Fig. 1, showing the stationary portion of the structure but leaving out the central rotor or brush element.

Fig. 3 is another vertical section detail through the stator element taken on the line 3—3 of Fig. 1.

It is not deemed necessary to illustrate any of the details of the associated engine parts. As is quite well known the Ford engine has four spark plugs and coil units and a magneto or batteries associated therewith, and the timer, which determines the instant at which the spark plugs fire the explosive mixture in the respective cylinders is mounted on the engine housing in front of the timing gear case, the rotating element of the timer being secured upon and operated by the cam shaft, which in turn is gear driven from the main engine shaft.

Referring to the drawings, a^1 is the main metal carrying plate of the stator element of the new invention, and a^2 is an integral flange inwardly directed toward the engine housing and adapted to be seated in the customary circular recess provided on the face of the housing. Said circular receiving recess is adapted to prevent eccentric displacement of the timer structure, and outward displacement is prevented by a spring clamp pressing on the cover and secured to a stud or bolt on the wall of the engine housing. My structure is mounted and secured against displacement in the same way. This portion of the housing wall thus serves as the base of the timer structure. The carrying plate a^1 is spaced away from the engine housing by the flange a^2, and the original plate or sheet metal is blanked with a series of four cut out portions alternating with four centrally directed projecting portions left on the carrying plate as shown. These four centrally directed portions of the blank are then bent to form an integral flange a^3 bent outwardly as shown, but curved and forming segmental parts of the track for the traveling contacting rotor, as presently described.

Carried by and secured upon the plate a^1 is a ring b^1 of any suitable insulating material. This ring b^1 is shown secured by four rivets b^2. This ring b^1 it will be noticed has embedded therein the four distributor or terminal contacts c^1 and also the four track flanges a^3, being cut out to allow of these metal plates being forced into position on the inner face of the ring b^1 and leaving an intervening series of insulating material projections b^3 to complete the even surface of the track. The track is thus made up mostly of metal. After assembling these parts the track surface is given a finishing cut.

The four usual terminal contact plates are marked c^1, and c^2 marks their screw threaded studs which pass through a hole in the insulating ring b^1. c^3 designates the cap nuts for retaining the contact plates and studs in place and also for serving to secure the usual wires leading from the source of current to the contacts. It may be noticed that the insulating ring b^1 is shown in this instance extended a little beyond the plate a^1 and its flange a^2, and that there is no metal band or shell around the insulating ring b^1. This simplifies the fastening and insulating of the studs c^2 and eliminates a point of trouble.

It will be understood that this stationary element of the structure just described is adapted for use with other traveling contactor elements or rotor, whether roller or

wipe contact types. I prefer, and here show, however, a very simple, cheap and efficient rotor. This comprises a sleeve or holder member to be mounted and detachably secured in the usual way upon the end of the cam shaft and which is made in two pressed halves, marked d^1 and d^2, made of flat sheet metal strips and formed, as shown, with oppositely extended projecting ends. One end d^3 on each half is bent over to form when facing each other an enclosing housing for the contact brush d^4, which is positioned but free to move slightly in such housing. The brush d^4 has a hole through the center, through which hole a suitable bent spring d^5 is passed, the two ends of the spring being riveted or otherwise secured to the opposite projecting ends of the holder, as indicated at d^6. The two halves of the holder d^1 d^2 may be riveted or otherwise secured as indicated at d^7.

The dotted outline e^1 indicates a suitable cover, and e^2 an indentation centrally in the outer end to receive one end of the usual spring clamp for holding the timer structure in place against the engine housing. I prefer to make this cover e^1 removable, so that the main stator and rotor elements can be positioned and examined and then the cover placed in position. This metal cover, of course, does not touch any of the contact plates c^1, but the cover rests on the insulating ring b^1. The rivets b^2 which extend through and secure the ring b^1 to the carrying plate a^1 preferably have projecting heads and these may project into corresponding receiving holes on or within the flanged edge of the cover e^1.

A lug f^1 is bent and may be riveted to the flange a^2 at the top of the stator structure, as shown in Fig. 1 and Fig. 3, to receive the rod or other operating means to move the stator in relation to the rotor to advance or retard the spark.

Those familiar with such timers will recognize the advantages of this invention and of its operation without any more extended description. The low tension primary side of the four coils, it will be understood, are connected by wires leading to their proper respective contact plates c^1, which it will be noticed are normally insulated from the balance of the structure. As the rotor is driven around by the cam shaft the brush d^4, which is kept pressed outwardly against the track surface by the spring d^5, successively closes the electric circuit with the contact plates c^1, thus furnishing a ground connection, allowing current to flow through the primary circuit, energizing its connected coil and producing the high tension current which is led to the respective spark plugs. The current through that coil ceases as the rotor breaks the circuit in passing off its terminal plate.

It should be noticed, however, that not only does the stator here provide a better track surface for the rotating circuit maker and breaker, but that where a wipe contact brush of the type shown here is used, a much better ground connection is provided. The face of the brush d^4 is preferably longer than the face of the insulating surfaces b^3 between the terminal contact plates c^1 and the flanged track plates a^3. Thus as the brush d^4 travels around it bridges across the insulated spaces b^3 and furnishes a ground connection not only via brush and metal carrying parts to the cam shaft, but also makes a connection via the brush from the terminal contact plate c^1 to the adjacent track plates a^3 and thence via the integral supporting plate a^1 and flange a^2 to the engine housing on which the structure is mounted.

Some changes may be made in the structure of my invention without departing from its spirit and scope, as set forth in the claims, and I do not desire any undue limitation therein. For example, the insulation b^1 is shown and referred to herein as being in the form of a ring, secured by rivets b^2, and the cover e^1 is removable. However, I also contemplate making the cover to enclose the insulation, that is, instead of detachably resting on the insulating ring b^1, it may extend down over the outer edge and be more permanently fastened in a forced fit. The cover can touch the carrying plate a^1, but, of course, be insulated from the contact plates c^1 and their terminal connections Thus the insulation will be held tight between this outer cover shell and the carrying plate flanges a^3, and need not be riveted. I may also eliminate the fibre insulation between such shell and the flanges a^3, and make the insulation in four separate pieces. This will not only save the part back of the flanges a^3, where it is not needed, but actually save much more, due to the fact that in forming such fibre rings the center is wasted in the broaching operation, while these four insulation segments can be more readily and economically formed.

Having described the invention in its preferred embodiment, what I claim as new and desire to protect and secure by Letters Patent is the following:

1. In a device of the character described, a metal supporting member spaced apart from but having an inwardly directed flange adapted for mounting the structure against the front of an engine timing gear box, the said supporting member having a series of cut out portions and a series of integral outwardly directed flanged projections curved and forming a portion of the track on which the rotor member travels, insulating material secured to said metal supporting member, a series of terminal contact plates al-

ternating with the said flanged projections also in said track but insulated from the supporting member and its projecting portions, and rotating means, mounted on and operated by the engine cam shaft, for making and breaking electrical connection between the terminal contact plates and engine structure.

2. In a device of the character described, the combination of a metal supporting plate, having a mounting flange and a plurality of integral outwardly directed curved track plates and suitable insulating material, a plurality of terminal contact plates, an alternating series of track plates and terminal plates embedded in the inner surface of said insulating material, the said track plates, insulating material and contact plates being assembled to provide a smooth surfaced circular track for the rotating member, and a cover adapted to be seated against said insulating material.

3. In a device of the character described, a supporting plate for carrying terminal contacts and insulation therefor, said supporting plate spaced apart from an engine housing, but having an integral circular flange directed toward and adapted to be seated against said housing and also a series of oppositely bent integral flanges alternating with the terminal contacts and arranged to form a part of the track surface on which the rotor member travels.

4. In a device of the character described, the combination of a suitable base, a metal supporting member spaced apart from the base but having an integral flange adapted for mounting against the base, the said supporting member formed substantially as herein described, having a series of cut-out portions and a series of integral flanged projections, an alternating series of metal terminal plates, each adapted for electrical connection with a source of current and insulated from said other flanged projections, the said metal terminal plates and said flanged projections to be similarly suitably curved and arranged to form respectively portions of the track on which the rotor member travels, and a rotor member for successively making and breaking electrical connection with said terminal plates.

5. In a device of the character described, the combination of a supporting member formed from a metal plate, having a series of cut out portions, leaving a series of integral outwardly directed curved flanged projections to form a portion of the track on which the rotor member travels, insulating material secured to said supporting member, a series of curved terminal contact plates arranged at the said cut out portions and alternating with the said flanged projections, the terminal contact plates to be embedded in the insulating material and electrically separated from each other and the balance of the structure, and means for successively making and breaking electrical connection with said terminal contact plates.

In testimony whereof, I have hereunto signed my name to this specification.

GERALD G. BARRY.