

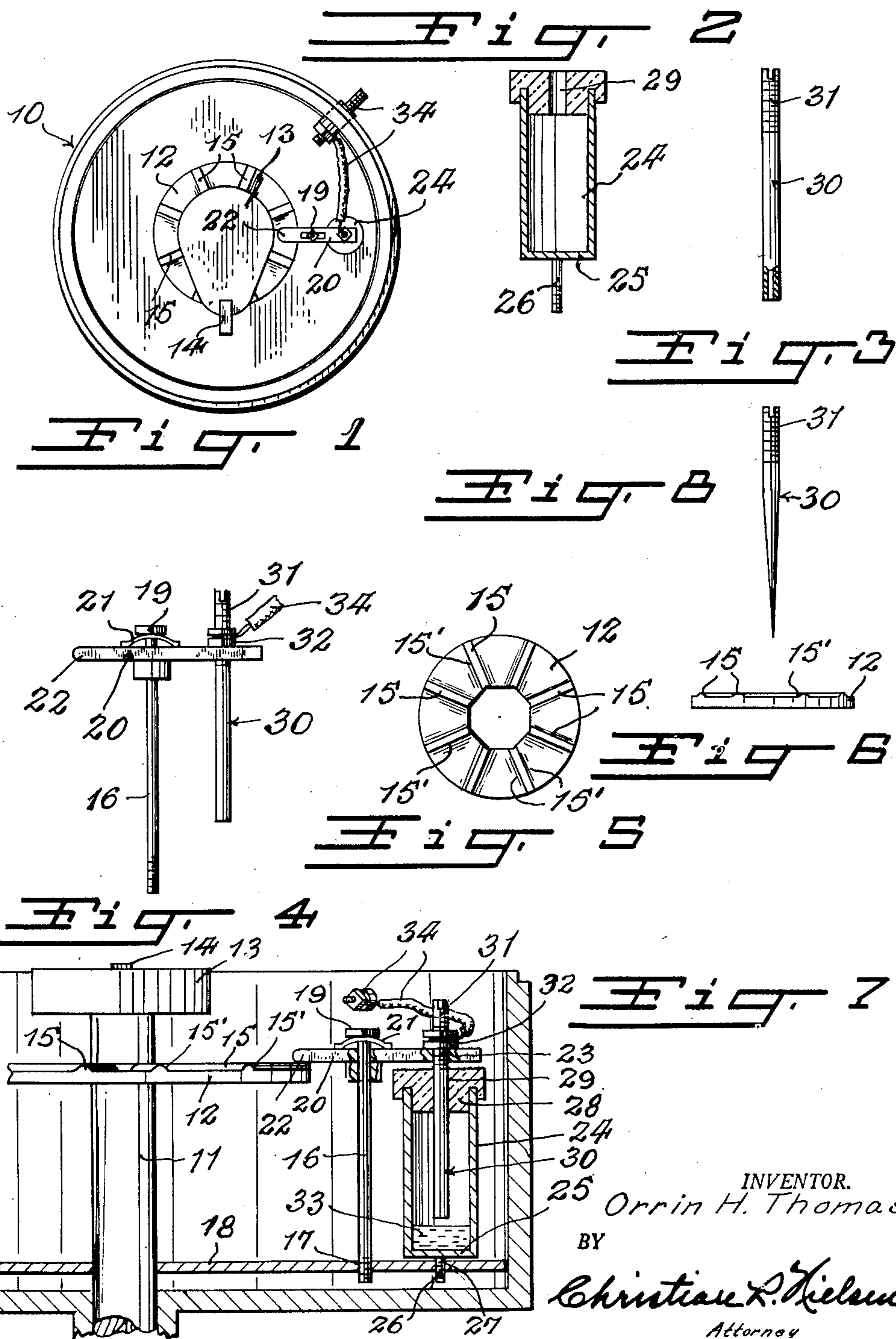
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IGNITION TIMER

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## UNITED STATES PATENT OFFICE

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## IGNITION TIMER

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1 Claim. (Cl. 200—32)

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This invention relates to ignition timers for internal combustion engines and it consists in the constructions, arrangements and combinations herein described and claimed.

The present day ignition timers consist of a breaker point assembly wherein a contact mounted on a swinging arm engages a contact mounted on a stationary arm when its actuating cam is on its low side, and moves away from the stationary arm when the cam is on its high side.

This construction presents a source of motor inefficiency which finally ends in motor failure. The main objection to the construction now in use is that the tungsten carbide contacts do not provide sufficient contact surface for the proper current transmission during the closure time to adequately saturate the ignition coil. It is most difficult, if not impossible, to align two flat surfaces so that they are electrically tight. Therefore, the current will only be transmitted by the high spots or those places where the engagement pressure is sufficient. Examination of contact points taken from ignition systems in use, if for only a short time conclusively prove that only a fraction of the contact area is transmitting the current. The contacts are subject to pitting causing a lump formation to be deposited on the one contact, while the other contact will have a deep recess burned in it. The contacts are exposed to the nitric acid fumes which occur when sparks jump from the distributor rotor to the distributor posts causing an oxide of nitrogen to form which will combine with the moisture present in the air within the distributor and form nitric acid.

It is therefore the cardinal object of the invention to provide an ignition system wherein the conventional breaker point assembly is eliminated and in its stead a reciprocating electrode is employed operated by means of a cam associated with the shaft of the distributor, for intermittently engaging a current conducting substance.

More specifically, it is an object of the invention to provide an ignition timer in the form of a housing having a reciprocating electrode adapted to contact a current conducting substance, such as mercury, the electrode being reciprocable in timed relation with the rotation of a rotor of the distributor, said electrode being adjustable with respect to the depth of the substance within the housing.

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

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Figure 1 is a top plan view of a distributor with the cover removed, illustrating the installation of the timer therein.

Figure 2 is a vertical section through the electrode housing.

Figure 3 is a side elevation of the electrode.

Figure 4 is a side elevation of a mounting means for the electrode and illustrating the adjustability thereof.

Figure 5 is a plan view of the rotary cam employed in the device.

Figure 6 is a side elevation thereof.

Figure 7 is an enlarged fragmentary side elevation of the rotor and timer assembly, partly in section, illustrating the relation of the parts with respect to the rotor shaft of the timer, and

Figure 8 is a side elevation of a modified form of electrode.

Attention is first invited to Figures 1 and 7 of the drawing, wherein a conventional distributor housing 10 is shown, which includes a rotor shaft 11 driven in the usual manner. The shaft 11 has secured thereon an annular cam 12 and a rotor 13 positioned thereabove. The rotor 13 is of conventional construction and includes a blade 14 adapted to engage contacts associated with the cover of the distributor (not shown), as is well understood by those versed in the art.

The cam 12 is formed with a plurality of upstanding ribs 15 upon its upper face, the ribs being equally spaced and extending radially with respect to the rotor shaft 11. The ribs 15 preferably have inclined faces 15' for engaging and disengaging an operating arm as will be described. In the present instance, eight ribs are shown, but the number will vary in accordance with the number of cylinders of the engine equipped with the timer.

As clearly shown in Figures 7, a bolt 16 is threadedly engaged in a tapped opening 17 in the base 18 of the distributor housing. The upper end of the bolt is provided with a head 19 beneath which there is an arm 20 apertured to receive the bolt slidably. An upwardly bowed leaf spring 21 is carried by the bolt interposed between the arm 20 and the head 19 of the bolt. The arm 20 is of a length so as to present an end 22 over the cam 12, the spring 21 urging the arm into engagement with the cam at all times.

The opposite end of the arm 20 is formed with a threaded aperture 23 for adjustable support of an electrode as will be described.

An electrode housing 24 is employed, the lower end 25 of which is closed and integrally formed therewith and projecting therebelow is a threaded stud 26 for engagement with a tapped opening 27

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in the base of the distributor housing. The upper open end of the electrode housing 24 is closed by a cap formed from insulating material, said cap having an annular sleeve 28 adapted to firmly seat in the open end of the housing. The cap and sleeve are formed with an opening 29 aligned with the opening 23 of the arm 20.

An electrode 30 is employed, cylindrical in shape and of a length greater than the length of the electrode housing 24. The electrode 30 is threaded as at 31 for engagement in the threads of the aperture 23. The threads 31 also receive a nut 32 for locking the electrode in adjusted position with respect to a body of mercury 33 in the bottom of the housing 24. The depth of the mercury is such as to be normally below the end of the electrode when the arm 20 is in engagement with one of the ribs 15 of the cam.

The electrode 30 is a solid cylindrical body, but if desired, the electrode may be hollow as shown in Figure 3. Also as shown in Figure 8, the electrode may have a tapered formation.

It will be understood that the electrode 30 is reciprocally mounted within the openings of the closure cap and sleeve so as to intermittently contact the body of mercury 33.

The operation of the timer is as follows, the distributor shaft 11 being rotated as is customary, the cam 12 will be likewise rotated bringing a rib 15 into engagement with the end 22 of the arm 20. At this point the electrode 30 will be in the elevated position as shown in Figure 7, but as the cam continues to rotate, the arm 20 will slide smoothly off of the rib 15 by reason of the inclined face 15' of the rib, thereby gently lowering the electrode into the mercury. The electrode 30 is reciprocated in timed relation with the rotor 13 and current will therefore be distributed through the blade 14 and the connection 34 to the battery (not shown).

While I have shown and described a preferred

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form of the device, 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 claim.

I claim:

A make and break device for the electrical circuit of a distributor having a rotor shaft, a horizontally positioned cam fixed on said shaft for rotation therewith, said cam having a plurality of upwardly disposed, equally spaced ribs extended radial on the upper face of the cam, said ribs each having inclined faces, an upright support mounted within the housing of the distributor, an arm vertically movable of said support and having one end disposed over the face of the cam for successive engagement with the ribs under rotation of the cam member, spring means between the support and the arm urging the arm into engagement with the cam, a conductor housing mounted in the housing of the distributor and arranged parallel to the rotor shaft, a current conducting substance in said conductor housing, a top closure for the conductor housing and having an axial aperture, an electrode adjustably fixed to the other end of said arm and vertically slidable through the axial aperture of the top closure for intermittently engaging said current conducting substance.

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