Nov. 3, 1925. V. SHEARER 1,559,995

IGNITION TIMER FOR INTERNAL COMBUSTION ENGINES

Filed June 21, 1924

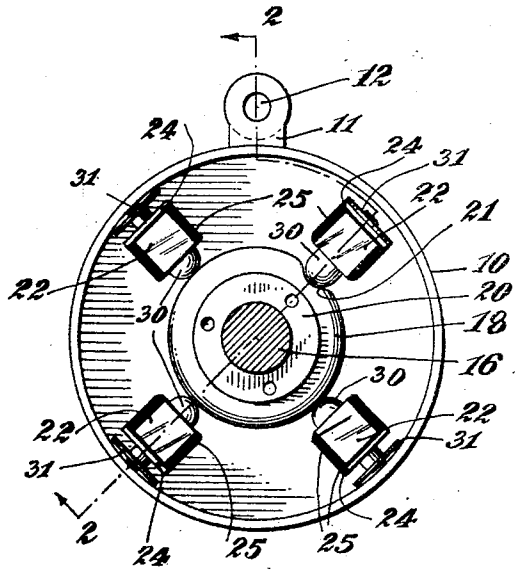


Fig. 1.

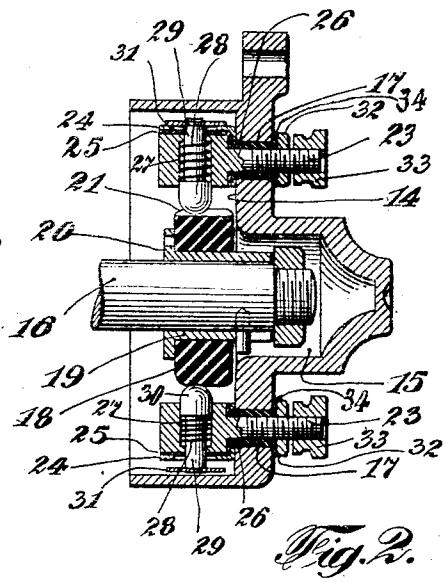


Fig. 2.

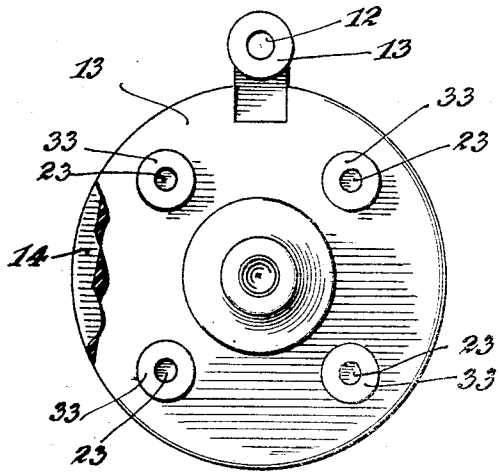


Fig. 3.

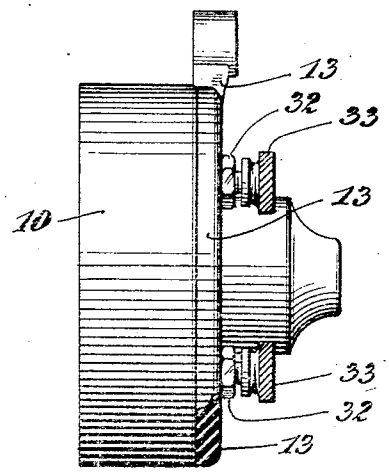


Fig. 4.

INVENTOR
Vance Shearer
BY Serrell & Son
his ATTORNEYS

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UNITED STATES PATENT OFFICE.

VANCE SHEARER, OF NEW YORK, N. Y.

IGNITION TIMER FOR INTERNAL-COMBUSTION ENGINES.

Application filed June 21, 1924. Serial No. 721,392.

To all whom it may concern:

Be it known that I, VANCE SHEARER, a citizen of the United States, residing at the borough of Manhattan, in the city, county, and State of New York, have invented an Improvement in Ignition Timers for Internal-Combustion Engines, of which the following is a specification.

My invention relates to timers such as employed to control the ignition in multiple cylinder internal combustion engines, and is well adapted for use in the ignition system of the well known Ford type of automobile, although it has other and more general fields of usefulness.

The object of my invention is to do away with the brass segments or fixed contacts and raceway into which they are embedded, and also to dispense with the traveling contact or brush, thereby greatly lengthening the life of the timer, preventing all liability of pitting, while increasing its efficiency, by the employment of means for making and breaking the electric circuit at the desired intervals, hereinafter described, in which other features of novelty and utility will be observed.

In the accompanying drawing:

Figure 1 is an inner end view of a timer constructed in accordance with my invention, the cam shaft being in section.

Fig. 2 is a sectional view taken on the broken line 2—2 of Fig. 1.

Fig. 3 is a front view of the timer partly in section, and

Fig. 4 is a side elevation of the same also partly in section showing a modification in the construction of the body.

Similar reference characters denote like parts throughout the several views.

Referring to the drawing, the body 10 of the timer is substantially hollow, and externally of a shape similar to the present standard Ford timer, provided with the usual arm 11 having an opening 12 at its free end to receive the connection for adjustment to advance or retard the spark.

This body may be entirely of metal as shown in Figs. 1 and 2, or the rear portion may be made of metal and the cap 13 or front portion may be made of condensite or other insulating material as shown in Figs. 3 and 4. In either case the metallic portion has a flat front 14, with a central opening 15, through which the front end of the cam shaft 16 extends. This flat front 14 is perfectly smooth and even on its rear or inner surface, and is provided with a plurality of equally and predeterminedly spaced holes 17, surrounding its central opening 15 for the purposes hereinafter described.

18 denotes a cam of insulating material provided with a central opening into which is secured a bushing 19, provided with an annular flange 20 at its rear bearing against the rear surface of the cam, while the forward end of the bushing projects a predetermined distance beyond the front surface of the cam, and is keyed or otherwise securely fixed to the cam shaft 16, whereby the said cam revolves with the shaft.

The cam is of uniform diameter throughout its greater portion, but at a predetermined point in its periphery is notched or provided with a transverse recess 21, the edges of which are rounded giving a slight taper to its sides; this recess is of predetermined depth, and the periphery of the cam is a perfectly smooth surface.

This cam serves to make and break the electric circuit between the body 10 and the spark plugs of the engine, by the mechanism next described.

A plurality of metallic blocks 22 are provided, each having a terminal 23, projecting from the interior of the casing 10 through one of the holes 17 in the flat front 14, and insulated therefrom, as shown in Fig. 2.

These terminals are preferably rounded and screw threaded a predetermined distance at their free ends.

Between each of the blocks 22, and the inner surface of the front plate 14 there is a metal strip 24.

This strip is L shape so that a portion of it extends along one side of the block. A strip of insulating material 25 of like shape to the metallic strip 24 is placed between said strips 24 and the blocks 22. Both strips are provided with an opening for the passage of the terminals 23; the openings in the metallic strips being of a size to avoid any possibility of contact with such terminals, but as an additional precaution a washer 26 of insulating material may be placed in said opening surrounding each terminal.

Each block 22 is provided with a central transverse bore 27 which are enlarged within the blocks to form receptacles for the spiral springs 28. These spiral springs sur-

round the shanks of plungers 29, each plunger having a head 30 of a diameter to fit slidably within the recesses containing the springs, and undercut to form a bearing for one end of the spring, the other ends of the springs bearing upon the bottoms of the recesses. The shanks of the plungers 29 are of a diameter to allow them to slide through the smaller part of the bores in each block, that is the portions of such bores back of the recesses containing the spiral springs. To the extreme end of each plunger spindle outside the blocks 22, I securely attach a metallic disk 31, in any suitable manner, preferably by further reducing these ends of the spindles and passing them through holes in the disks, and then upsetting the ends of the spindles upon the disks.

It will be seen that the expansion of the spiral springs 28 will draw these disks 31, into contact with the metal strips 24, by pressure upon the heads of the plungers, and that pressure upon the heads of the plungers outside the blocks will compress the springs and break such contact.

The plunger heads 30 contact with the periphery of the cam 18, and unless one of such heads is brought into alignment with the recess 21, in the cam, the diameter of the cam is such as to force the plunger heads into the recesses in the blocks 22 against the tension of the spiral springs 28, thereby pushing the contact disks 31 away from the blocks 22 and metal strips 24, holding the electric circuit open, but during the revolution of the shaft 16, carrying the cam 18, the plungers will be brought successively into alignment with the recess 21, when the spiral springs will expand forcing the plunger head in that position into the recess in the cam, and draw the contact disk 31, connected with that plunger into contact with the metal strip 24 connected with that block, thus closing the electric circuit between the body of the timer and the terminal of that block.

Upon the threaded ends of the terminals 23 extending beyond the front of the casing, are lock nuts 32, which securely hold the blocks 22 in their proper position, and above these lock nuts there are binding nuts 33, for clamping the ends of conductor wires. Insulating washers 34 are placed between the lock nuts 32 and the casing, where the casing is entirely of metal.

It will be apparent, that where the casing is made of two parts as shown in Figs. 3 and 4, the lock nuts 32, will securely hold the front member or cap 13, to the metal portion of the body, the cap being provided with holes registering with the holes in the front of the metal portion through which the terminals 23 pass.

I claim as my invention:

1. An ignition timer, comprising a casing, a plurality of plungers within the same, blocks for supporting the plungers and provided with terminals extending through the front of the casing, lock nuts secured to said terminals exterior of the casing, a rotary shaft extending into the casing, and a cam of insulating material keyed to said shaft and coacting with the plungers to make and break the electric circuit.

2. An ignition timer, comprising a casing, a plurality of metallic blocks within the same in spaced circular relation to each other and provided with terminals extending through the front of the casing, lock nuts secured to said terminals, a plurality of plungers supported in recesses in said blocks, spiral springs surrounding said plungers within such recesses, a metallic disk secured to one end of each plunger, a rotary shaft extending into the casing, and a cam of insulating material keyed to said shaft and coacting with said plungers to make and break the electric circuit.

3. An ignition timer, comprising a casing, a plurality of metallic blocks within the same in spaced circular relation to each other and provided with terminals extending through the front of the casing, lock nuts secured to said terminals, a plurality of plungers supported in recesses in said blocks, spiral springs surrounding said plungers within such recesses, a metallic disk secured to one end of each plunger, a rotary shaft extending into the casing, and a cam of insulating material keyed to said shaft and provided with a depression in its periphery, the heads of said plungers being pressed into said recesses in the blocks by said cam during the rotation of the shaft until said depression in the cam comes into alignment with a plunger head.

4. An ignition timer, comprising a casing, a plurality of metallic blocks within the same in spaced circular relation and provided with terminals extending through the front of the casing, lock nuts secured to said terminals, a metallic strip between each block and the front of the casing provided with an opening for the passage of the terminals, said metallic strips extending along one side of the blocks, a strip of insulating material between said metallic strips and the blocks, a plurality of plungers provided at one end with a head and having reduced shanks supported in recesses in said blocks, spiral springs surrounding the shanks of said plungers within said recesses, a metallic disk secured to the end of each plunger shank beyond said metallic strips through which said shanks extend, a rotary shaft extending into the casing and a cam of insulating material keyed to said shaft provided with a depression in its periphery and coacting with said spiral springs to intermittently move said metallic disks into and out of contact with said metallic strips.

5. An ignition timer comprising a metallic body provided with a cap of insulating material, a plurality of plungers within the metallic body, blocks for supporting the plungers and provided with terminals extending through holes in said body and cap, lock nuts secured to said terminals, a rotary shaft extending through said body and into said cap, and a cam of insulating material keyed to said shaft coacting with the plungers to make and break the electric circuit.

Signed by me this 16th day of June 1924.

VANCE SHEARER.