D. W. HARE.

TIMER.

APPLICATION FILED JAN. 18, 1909.

961,407.

Patented June 14, 1910.

Fig. 1.

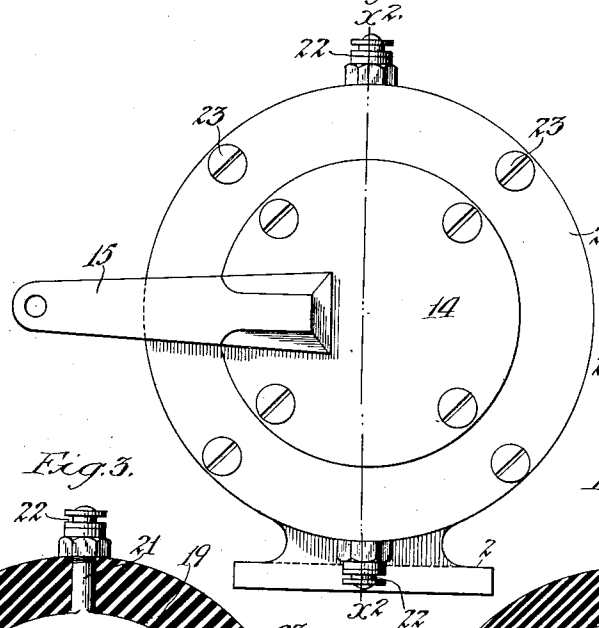



Fig. 5.

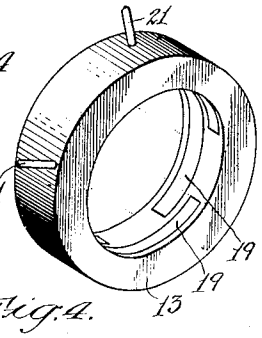



Fig. 3.

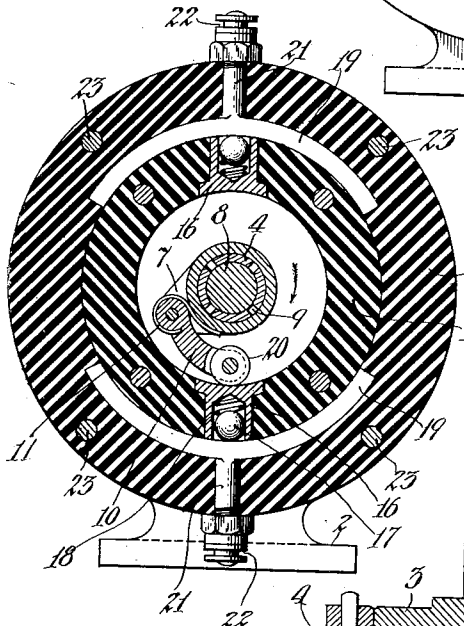



Fig. 4.

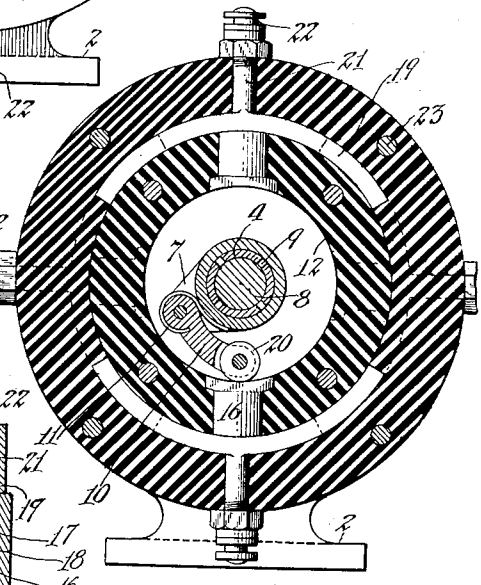
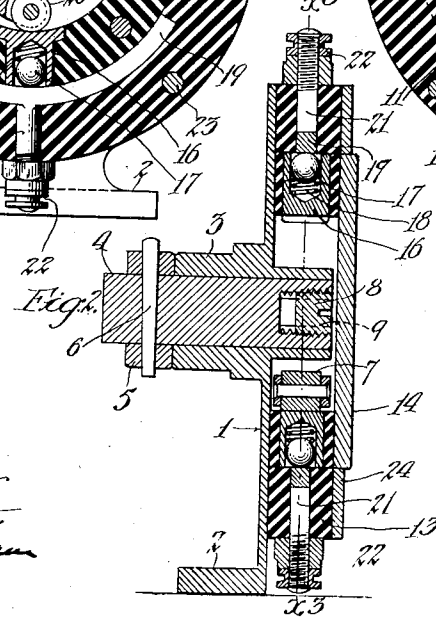



Fig. 2.




Witnesses:-

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# UNITED STATES PATENT OFFICE.

DONALD W. HARE, OF LOS ANGELES, CALIFORNIA.

## TIMER.

961,407. Specification of Letters Patent. Patented June 14, 1910.

Application filed January 18, 1909. Serial No. 473,015.

*To all whom it may concern:*

Be it known that I, DONALD W. HARE, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Timer, of which the following is a specification.

This invention relates to timers which are employed for controlling the ignition circuit of an explosive engine to produce the spark at the proper time.

In timers which have heretofore been produced the terminals to which the wires were connected were mounted on a movable part of the timer which was adjustable to vary the time of operation of the device and whenever it was adjusted the wires leading therefrom were bent, and in consequence one of the most frequent sources of annoyance with timers thus constructed was the loosening or breaking of the wires at the terminals; and one object of the present invention is to avoid this by so constructing the timer that the wires are connected to a stationary part of the device.

Ordinary timers, as heretofore constructed, were mounted on and supported by the shaft which rotated the revolving parts of the timer, and the stationary parts of the timer were held against rotation by being connected with some stationary part of the engine or structure adjacent thereto, with the result that the rotation of the shaft imparted considerable vibration to the timer and generally caused the timer as a whole to partake of more or less of a wabbling movement which also weakened the attachment of the wires and rendered the operation of the timer uncertain.

Another very important object of the present invention is to obviate this difficulty by rigidly supporting the non-rotating elements of the timer independently of the rotating shaft which operates the timer.

Further objects are to produce a timer which is very simple in construction, effective in operation and durable in use.

Referring to the drawings:—Figure 1 is a plan view of the timer. Fig. 2 is a section on line $x^2$—$x^2$ Fig. 1. Fig. 3 is a section on line $x^3$—$x^3$ Fig. 2. Fig. 4 is a view similar to Fig. 3, but showing a timer as constructed for a four cylinder engine. Fig. 5 is a perspective view of the stationary ring to illustrate the manner in which the segments are overlapped and staggered.

The timer comprises a disk 1 having a foot 2 forming means for attaching the same to the engine or to the dash board of an automobile, or any other stationary structure adjacent the engine. Disk 1 is formed with a journal bearing 3 in which is rotatably mounted a shaft 4, the latter having a retaining sleeve 5 secured to it by a taper pin 6. The inner end of the shaft 4 has mounted thereon a crank 7, the end of the shaft 4 being expanded to tightly fit the crank 7 by means of a taper screw 8 which enters a correspondingly threaded, tapered orifice in the end of the shaft 4, the end of the shaft 4 being slit as at 9 so that when the screw 8 is screwed in tight the shaft will be expanded and tightly grip the smooth bore of the crank 7. This method of fastening, while economical of construction, enables the parts to be easily assembled and also readily permits of adjusting the crank on the shaft 4 to any angular position desired, which is quite advantageous as the shaft 4 is geared with the engine and it is inexpedient to adjust the angular position of shaft 4 with respect to the piston movement, it being much easier to adjust the crank 7 with respect to the shaft 4, as afforded in my construction. Pivoted in the end of the crank 7 is an arm 10 to which is secured a flat spring 11, and the spring 11 bears against the hub of the crank 7 and yieldingly holds the arm 10 outwardly. Secured to the adjusting ring 12 is a cap plate 14 having an arm 15 through the medium of which the adjusting ring may be turned within the casing ring 3.

The adjusting ring 12 is provided, if the timer is for a two cylinder engine, with two contact blocks 16, the inner face of each being curved flush with the inner face of the adjusting ring, and each contact block being hollow and having therein a contact ball 17 behind which is a coil compression spring 18 which presses the ball outward against a segment 19 in the casing ring 13, and thus a continuous contact is maintained which is not broken when the adjusting ring is turned to adjust the spark and the full range of adjustability is afforded. There are two blocks 16 and two segments 19 for a two cylinder engine, four for a four cylinder engine, and so on, there being one segment and one block for each cylinder. The arm 10 has a roller 20 which rides against the inner face of the adjusting ring 12 and over the contact blocks 16, and thus as the

shaft 4 makes each complete revolution the roller 20 will successively make contact with both contact blocks 16 and thus close the circuit therethrough. The casing ring 13 and the adjusting ring 12 are constructed of an insulating material, preferably hard fiber, so that while the roller 20 is operating against the adjusting ring 12 the circuit is broken, the circuit being established only when the roller 20 is in contact with either of the contact blocks 16. A post 21 extends from each segment 19 through the casing ring 13 and is provided with a terminal 22 for the attachment of the wires. The other pole of the circuit is grounded through the roller 20, arm 10, crank 7, shaft 4 and engine.

The casing ring 13 is secured by screws 23 to the disk 1. The diameter of the cap 14 is slightly less than the outer diameter of the adjusting ring 12, and to cover the crack between the adjusting ring 12 and casing ring 13 is a thin flat ring 24 which is secured by the same screws 23.

Where the timer is used for a four cylinder engine, four segments 19 are employed. Fig. 5 shows how the segments 19 overlap each other and are staggered so that they are insulated from each other. By overlapping them in this manner I am enabled to still retain the full range of adjustability of the adjusting ring 12. The respective contact blocks 16 are arranged so that their respective balls 17 have contact with the segments associated therewith. While the contact blocks 16 may thus not all be in the same plane, they are all nevertheless within the path of movement of the contact rollers 20.

In the operation of the device the roller 20 makes contact with the contact blocks 16 in successive order, thereby making the circuit and producing the sparks. The time of the spark is regulated by causing the roller 20 to contact with the blocks 16 relatively with respect to the movement of the piston. This is effectuated by adjusting the adjusting ring 12. For example, if it is desired to "advance" the spark, the adjusting ring 12 will be adjusted in a direction opposite to the arrow Fig. 3, and the roller 20 will thus contact with the respective blocks 16 earlier in the stroke. If it is desired to "retard" the spark, the adjusting ring 12 will be adjusted in the direction of the arrow Fig. 3 accordingly. Any intermediate timing of the spark may obviously be obtained by adjusting the ring 12 to the desired point.

What I claim is:—

1. In a timer, a stationary casing, terminals thereon, four segments in the casing connected with the respective terminals, said segments being staggered and each embracing more than a quarter circle, an adjusting ring revoluble in the casing, contact blocks in the adjusting ring having contact with the respective segments, a shaft, and means carried by the shaft for making contact with the respective blocks as the shaft rotates.

2. In a timer, a stationary casing, terminals thereon, four segments in the casing, said segments being staggered and each embracing more than a quarter circle, an adjusting ring revoluble in the casing, contact blocks in the adjusting ring, a ball in each contact block, a spring in each contact block pressing the ball against the associated segment, a shaft, and means carried by the shaft for successively contacting with the contact blocks as the shaft rotates.

3. In a timer, a stationary casing, terminals thereon, four segments thereon connected to the respective terminals, said segments being staggered and each embracing more than a quarter circle, an adjusting ring revoluble in the casing, contact blocks in the adjusting ring, a shaft, a crank on the shaft, an arm pivoted to the crank, a contact roller on the arm, and a spring for pressing said arm outwardly to cause the roller to make contact with the respective contact blocks as the shaft rotates.

4. In a timer, a stationary casing comprising a disk having a foot, a shaft journaled in said disk, a casing ring secured to said disk, posts disposed radially in said casing ring, terminals on the outer ends of said posts, curved segments inlaid in the casing ring and connected with the respective posts, an adjusting ring revolubly mounted within the casing ring, a cap on the adjusting ring, an adjusting arm extending from the cap, hollow contact blocks in the adjusting ring, a spring pressed ball in each contact block making contact with the associated segment, a crank on the end of said shaft, an arm on said crank, a roller on said arm for making contact with the inner faces of the respective contact blocks, and a spring for pressing said arm outwardly.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 13th day of January 1909.

DONALD W. HARE.

In presence of—
F. M. TOWNSEND,
FRANK L. A. GRAHAM.