Oct. 13, 1925. 1,556,909

A. M. BURGHER

IGNITION SYSTEM

Filed June 30, 1921 2 Sheets-Sheet 1

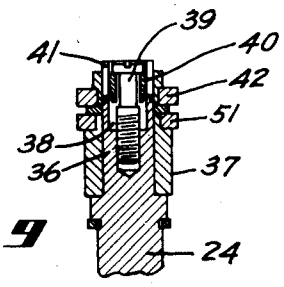


Fig. 9

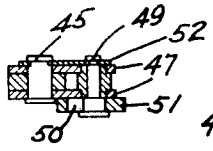


Fig. 10

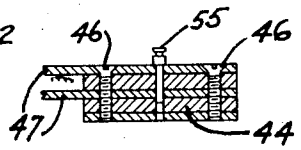


Fig. 11

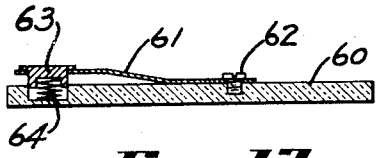


Fig. 12

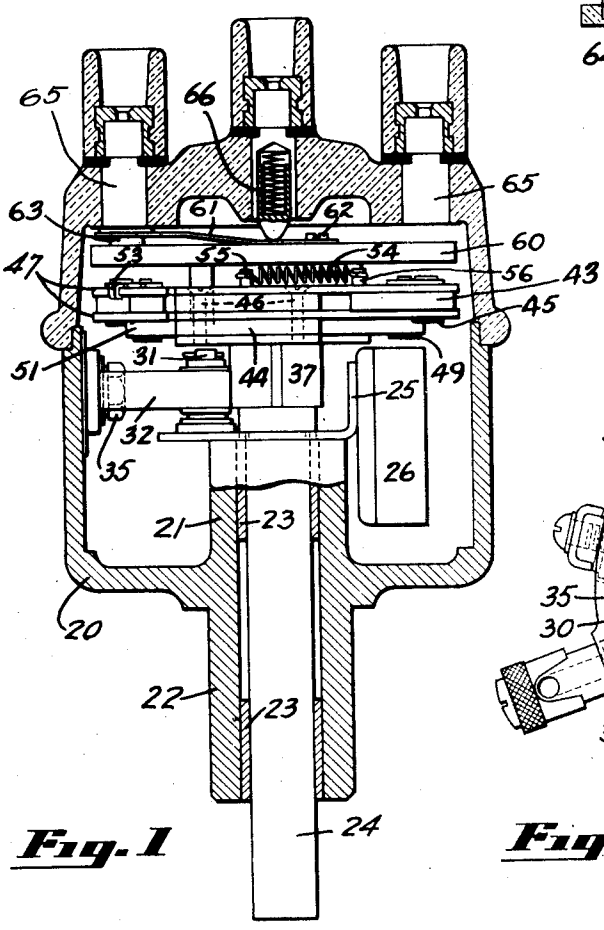


Fig. 1

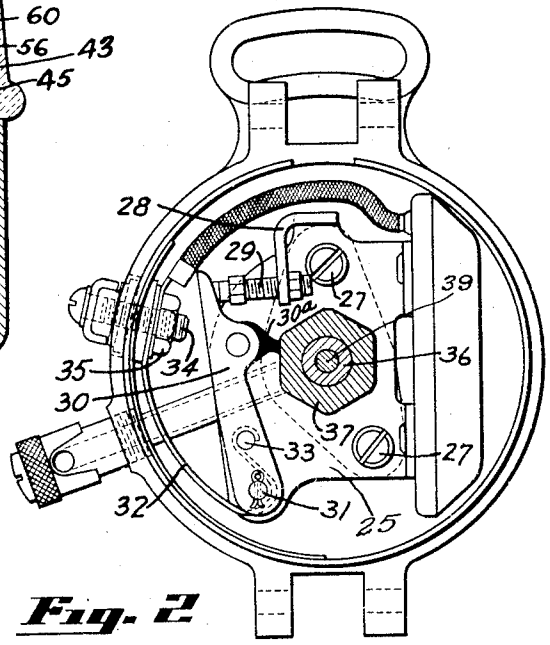


Fig. 2

Witnesses
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Oct. 13, 1925.

1,556,909

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IGNITION SYSTEM

Filed June 30, 1921

2 Sheets-Sheet 2

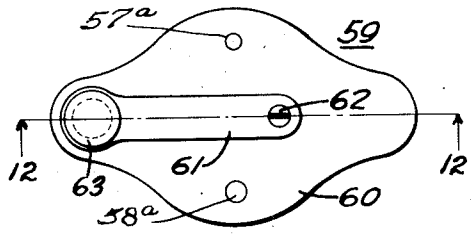


Fig. 3

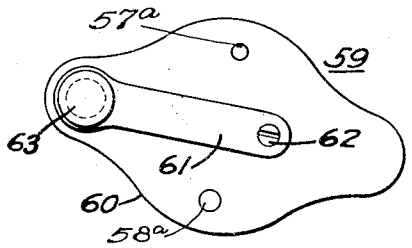


Fig. 6

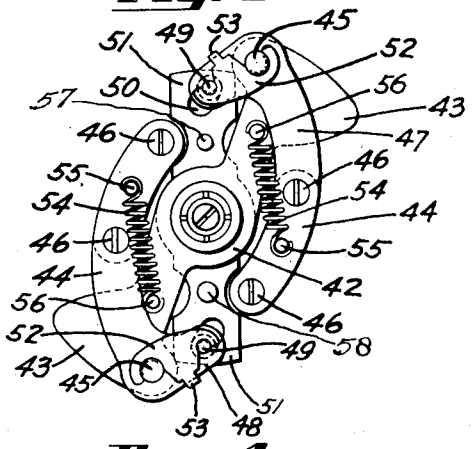


Fig. 4

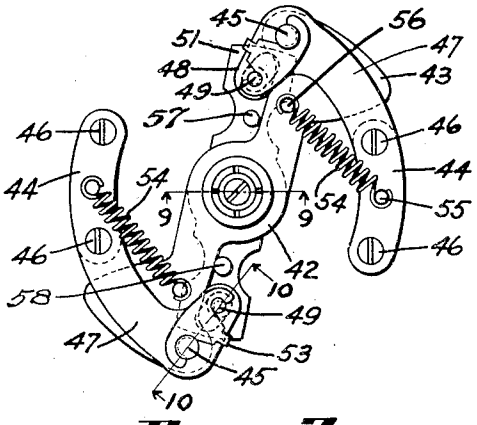


Fig. 7

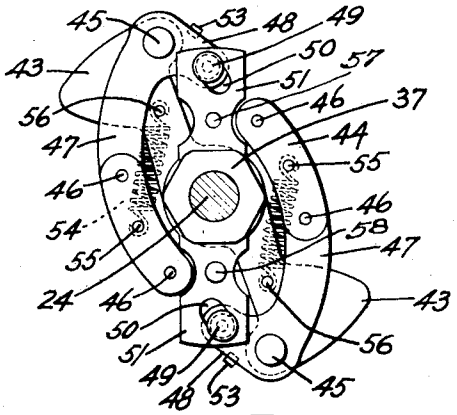


Fig. 5

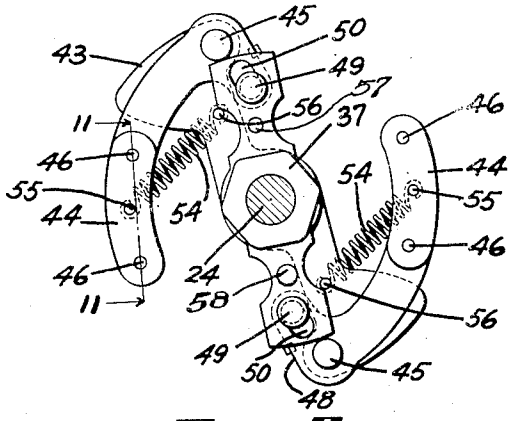


Fig. 8

Witnesses
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Patented Oct. 13, 1925. 1,556,909

UNITED STATES PATENT OFFICE.

ALBERT M. BURGHER, OF DAYTON, OHIO, ASSIGNOR TO THE DAYTON ENGINEERING LABORATORIES COMPANY, OF DAYTON, OHIO, A CORPORATION OF OHIO.

IGNITION SYSTEM.

Application filed June 30, 1921. Serial No. 481,655.

To all whom it may concern:

Be it known that I, ALBERT M. BURGHER, a citizen of the United States of America, residing at Dayton, county of Montgomery, State of Ohio, have invented certain new and useful Improvements in Ignition Systems, of which the following is a full, clear, and exact description.

This invention relates to improvements in ignition devices and more particularly to such devices adapted to control the time of sparking impulses provided for internal combustion engines.

It is among the objects of the present invention to provide an ignition device of simplified structure and design in which the various operating elements are easily accessible for adjustment or repair.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred embodiment of the present invention is clearly shown.

In the drawings:

Fig. 1 is a part sectional, part elevational side view of the ignition unit;

Fig. 2 is a top plan view of the unit shown in Fig. 1 with the cover removed, certain parts of the speed responsive adjusting device being shown in section for the sake of clearness;

Fig. 3 is a top plan view of the rotor;

Fig. 4 is a top view of the speed responsive adjusting device and the drive shaft removed from the ignition unit;

Fig. 5 is an inverted view of the device shown in Fig. 4;

Figs. 6, 7 and 8 are similar to Figs. 3, 4 and 5, the elements however being shown in fully distended positions;

Fig. 9 is a fragmentary sectional view showing the driving shaft and method of securing the speed responsive device thereto;

Fig. 10 is a section taken along line 10—10 of Fig. 7;

Fig. 11 is a sectional view taken along line 11—11 of Fig. 8, and

Fig. 12 is a sectional view of the rotor taken along line 12—12 of Fig. 3.

Referring to the drawings and more particularly to Figs. 1 and 2, the ignition unit is shown comprising a housing 20 having a central boss, the upper portion 21 of which projects into the interior of the housing while the lower portion 22 projects outside of the housing and forms a mounting for securing the ignition unit to the engine (not shown). This central boss is hollowed out to receive the bearings 23 in which the drive shaft 24 is journalled. The upper or inside boss portion 21 supports a bracket 25 which in turn supports the condenser 26. This bracket is held in position on the boss portion 21 by screws 27. An angular portion 28 of the bracket 25 has a stationary contact 29 screwed thereinto. Cooperating with this stationary contact 29 is a movable contact arm 30 pivotally attached to but insulated from the bracket 25 at the point 31. This movable contact arm 30 is urged to engage the stationary contact 29 by the leaf spring 32, one end of which is anchored to the pin 33 on movable contact 30, while the other end of said spring is secured to the terminal post 34 by nut 35. The spring 32 not only acts as a means for urging the movable contact arm to engage with the stationary contact, but also forms a conductor for current to pass from the terminal post 34 to the movable contact arm 30. The arm 30 has a cam rider block 30^a secured thereto, said block being adapted to engage with a cam 37.

Referring to Fig. 9, the drive shaft 24 is shown having a reduced shank portion 36 on which the timer cam 37 is adapted to be rotatably supported. The end of this reduced shank portion of the shaft is hollowed out as at 38, a portion of said hollowed out part being screw threaded to receive a screw 39. A wedge shaped bushing 40 is carried by the screw 39 and is adapted to engage the thin walls of the shank portion 36 when the screw is screwed down into the hollowed out threaded portion. This portion of the shank being slotted as at 41, the action of the wedge bushing 40 will tend to force the shank portion between the slots in an outwardly direction, thus securely gripping a supporting element 42 of the speed responsive device which encompasses the shank 36 at this point.

The supporting element 42 comprises a body portion provided with oppositely disposed arms 43, upon which the speed responsive adjusting members 44 are pivotally mounted by means of pins 45. The adjusting members 44 are made up of a series of flat discs held together by screws 46. Two of these discs 47, not contiguously arranged,

are of longer dimensions than the others and have the arms 43 operatively fitting therebetween and, as has been mentioned heretofore, are pivotally secured to said arms by the fulcrum pins 45. These two longer discs 47 have ears 48 formed thereon, through which a pin 49 projects. This pin also projects into an angular slot 50 formed in the ends of the oppositely disposed arms 51 secured to or formed integral with the timer cam 37. The pins 45 and 49, associated with the long discs 47 of adjusting members 44, are provided with enlarged head portions at one end, while the opposite ends thereof are annularly slotted. A clip 52 is adapted to fit in said slots, thus preventing removal of the pins. The clip 52 has an ear 53 bent around the edges of the disc ears 48 to prevent accidental removal thereof.

Coil springs 54 are provided, these springs being interposed between posts 55, carried by each adjusting member 44 and posts 56, secured to each arm 43, said springs tending to normally hold the adjusting members 44 in a position as illustrated in Figs. 4 and 5.

The arms 51 of timer cam 37 support a pair of posts 57 and 58 which are adapted to support a distributing rotor 59. These posts are of different diameters and are adapted to fit in holes 57^a and 58^a, of correspondingly different diameters provided in rotor 59, thus preventing the rotor from being placed in incorrect position. The rotor 59 comprises a body portion 60 made up of any suitable insulating material. A spring conductor 61 is secured to the central portion of the rotor body 60 by means of a screw 62. The spring conductor 61 has an upward bend away from the rotor body 60, and carries a conductor button 63 which is urged upward and away from the rotor by a coil spring 64. As can be seen in Fig. 1, this button engages with the distributor head terminals 65, the spring conductor being in turn in electrical engagement with a spring pressed plunger 66 centrally arranged in the head. By this arrangement, the sparking impulses are directed from the source (not shown) through central terminal and plunger 66, spring conductor 61, button 63 to the various concentrically arranged terminals 65 in sequential order, and then to the cylinders of the engine (not shown).

When the engine is running at a comparatively slow speed, the adjusting devices will tend to remain in the position shown in Figs. 4 and 5, due to the effect of the springs 54. However, if the engine should increase its speed, the adjusting elements would, at a certain determined speed, tend to move outwardly from the axis of the drive shaft 24 due to centrifugal force, and assume a position as shown in Figs. 7 and 8 at comparatively high engine speeds.

The action of the adjusting element 44 is governed by the tension of the spring 54 or by the relative positioning of the spring posts 55 and 56.

As has been mentioned before, when the engine is operating at comparatively low speeds, the springs 54 will hold the adjusting elements in position as shown in Figs. 4 and 5. However, as soon as the engine reaches a predetermined speed, centrifugal force will overcome the effect of the spring 54, tending to move the adjusting element 44, attached to pivotal pin 45, outwardly or away from the axis of the drive shaft 24. This moving of the adjusting element will also move the pin 49 secured thereto, said pin in turn moving the cam arm 51, being connected therewith through the slot 50. This movement of the cam arm 51, and consequently the cam 37, being rotational and in addition to that transmitted by the engine driven shaft 24, will cause the spark to be advanced.

From the foregoing description it may be seen that one advantage of the present invention resides in the fact that after the unit is assembled, the various adjustable members thereof are easily accessible, thus permitting final adjustments to be made when the unit is completely assembled and ready for actual service.

The mode of construction also tends to eliminate the necessity of disassembling the unit for replacing any parts that have proved imperfect after being in service.

Another feature or advantage of the present invention includes the idea of assembling the entire speed responsive spark controlling mechanism before inserting it in the ignition unit, then slipping it on the drive shaft and providing driving connections between said shaft and the spark control mechanism by operating a single screw, designated by the numeral 39.

While the form of mechanism herein shown and described constitutes a preferred form of embodiment of the invention, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. In an ignition timer, the combination with a housing; of make and break devices supported within said housing; a timer cam; a drive shaft; and a speed responsive adjusting device supporting said timer cam and including a relatively shiftable member having the timer cam connected thereto on one side and a rotor on the other side thereof.

2. In an ignition timer, the combination with a housing; of make and break devices supported within said housing; a timer cam; a drive shaft; and a speed responsive adjusting device supporting said timer cam and including a relatively shiftable member, said member being connected with and support-

ing the timer cam on one side thereof and a rotor on the opposite side.

3. In an ignition timer, the combination with a distributor including a rotor; of a drive shaft; a speed responsive adjusting device located below the rotor and including a plate attached to the drive shaft, a weight member pivotally mounted upon said plate; a second plate supporting said rotor suspended from the weight member and shifted angularly relative to the drive shaft by the weight member.

4. In an ignition timer, the combination with a rotatable circuit controlling member; of a drive shaft; and a speed responsive adjusting device including a mounting plate attached to the drive shaft, a weight member supported by the mounting plate, a second plate supported by the weight member, removable pins for respectively connecting said plates and said weight member, said pins provided with grooves, and a common clip member adapted to cooperate with the grooves in said pins for holding the pins in place.

5. In an ignition timer, the combination with a rotatable circuit controlling member; of a drive shaft; and a speed responsive adjusting device including a mounting plate attached to the drive shaft, a weight member supported by the mounting plate, a second plate supported by the weight member, removable pins for respectively connecting said plates and said weight member, said pins provided with grooves, and a common clip member cooperating with the grooves in said pins for holding said pins in place, said clip provided with an ear adapted for engagement with the weight member for holding said clip in place.

6. In an ignition timer, the combination with a distributor including a rotor; of a drive shaft; and a speed responsive adjusting device located below the rotor and including a plate adjustable with respect to the drive shaft, and means carried by said plate for supporting the rotor and locating the rotor with respect to the shaft.

7. In an ignition timer, the combination with a distributor including a rotor; of a drive shaft; and a speed responsive adjusting device including a plate adjustable with respect to the drive shaft, and diametrically opposed pins of different diameters carried by said plate and adapted to cooperate with diametrically opposed holes in the rotor for supporting the rotor and locating the rotor with respect to the shaft.

8. In an ignition timer, the combination with a circuit make and break device; of a cam for operating said device; a drive shaft; a distributor including a rotor; and a speed responsive device located between said rotor and cam for adjusting the cam and rotor with respect to the shaft.

9. In an ignition timer, the combination with a circuit make and break device; of a drive shaft; a speed responsive adjusting device including a plate relatively movable with respect to the drive shaft; and a timer cam and a distributor rotor supported by said plate, each having an independent connection with said plate.

10. In an ignition timer, the combination with a circuit make and break device; of a drive shaft; a cam; a speed responsive adjusting device located below the rotor and including a plate mounted on the drive shaft, a second plate, weight members for adjusting the second plate with respect to the first, and springs for moving the weight members, said springs being located above the first plate; and a distributor rotor mounted on the second plate and spaced from the first plate to permit location of the springs therebetween.

11. In an ignition timer for an internal combustion engine, in combination, an engine driven shaft, a plate supported by the shaft, means for detachably securing said plate in various positions of adjustment relative to said shaft, a weight movably supported by said plate, a timer cam co-axial with said shaft and actuated relative thereto by said weight, and connections between the plate, the weight, and the cam whereby said parts are removable as a unit from the engine driven shaft.

12. In an ignition timer for an internal combustion engine, in combination, an engine driven shaft, a plate supported by said shaft, means for clamping said plate to said shaft in various positions of adjustment relative thereto, a weight movably supported by said plate, a second plate rotatable with the first plate and movable angularly with respect to the first plate by movement of the weight, a timer cam attached to the second plate, means carried by the second plate for supporting and driving a distributor rotor, and connections between the plates and the weight whereby the plates, the weight and the cam may be removed as a unit from the engine driving shaft.

In testimony whereof I hereto affix my signature.

ALBERT M. BURGHER.