April 12, 1927. H. E. NORVIEL 1,624,113

IGNITION APPARATUS

Filed Nov. 20, 1923

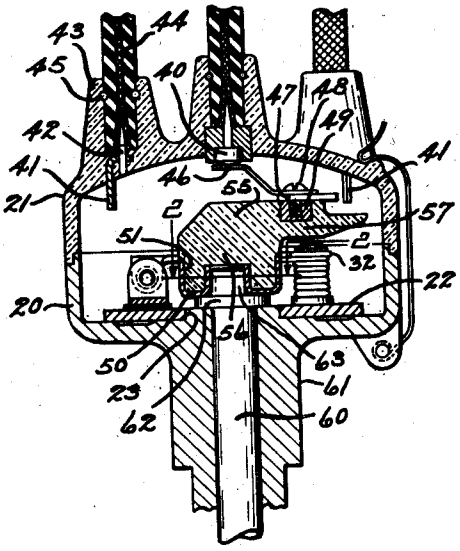


Fig. 1

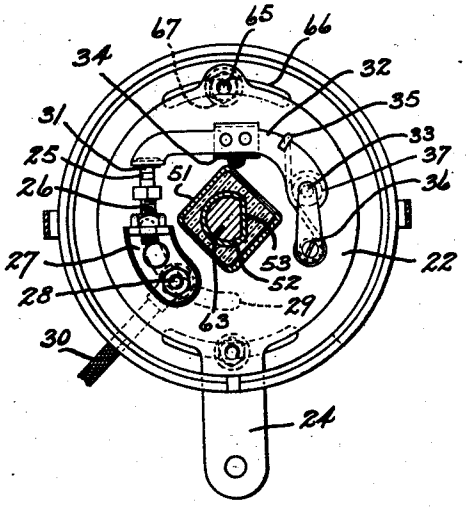


Fig. 2

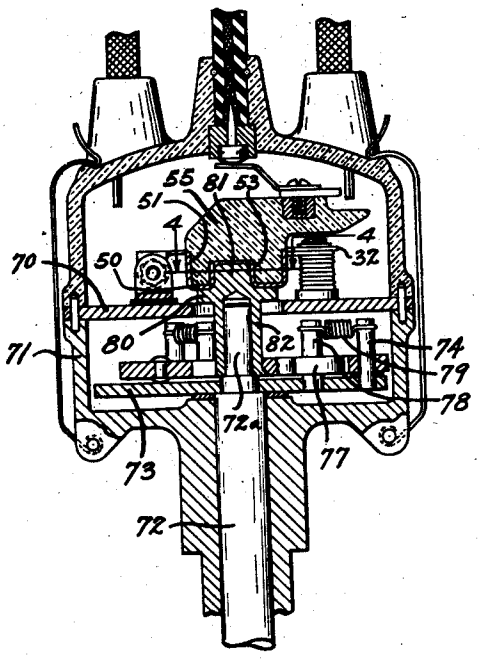


Fig. 3

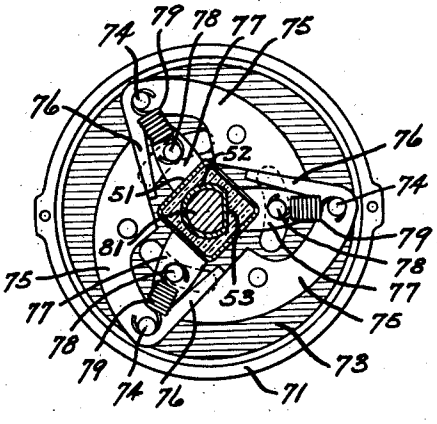


Fig. 4

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UNITED STATES PATENT OFFICE.

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IGNITION APPARATUS.

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This invention relates to ignition apparatus for internal-combustion engines, and has among its objects to simplify the construction of an ignition timer and distributor unit in order that the cost of manufacture may be reduced.

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 one form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a longitudinal sectional view of a timer distributor unit constructed in accordance with the present invention.

Fig. 2 is a plan view with the distributor head removed, certain parts being shown in section taken on the line 2—2 of Fig. 1.

Fig. 3 is a longitudinal sectional view of a timer provided with speed responsive mechanism for controlling the timing of the spark, certain parts of the apparatus being common to the apparatus shown in Fig. 1.

Fig. 4 is a plan view of the apparatus shown in Fig. 3, with the distributor head and breaker plate removed, certain parts being shown in section taken on the line 4—4 of Fig. 3.

Referring to Figs. 1 and 2, 20 designates a timer cup which cooperates with a distributor head 21 to provide a housing inclosing the timing and distributing mechanism. The timer includes a breaker plate 22 journaled upon a boss 23 projecting up from the bottom of cup 20. The plate 22 is rotated by a handle 24 connected therewith which projects through an opening on the side of cup 20. A stationary timer contact 25 mounted on an adjusting screw 26 is threaded into a bracket 27 which is attached to the plate 22 but insulated therefrom. The bracket 27 is attached to a stud 28 which projects through the plate 22 and through a curved slot 29 in the bottom of the cup 20. The lower end of the stud 28 is connected with a flexible wire 30 for making connection with the primary circuit of an ignition system. The timer contact 25 cooperates with a movable contact 31 carried on the end of a breaker lever 32 which is pivoted at 33 upon the plate 22. The lever 32 carries a rubbing block 34 which cooperates with a timer cam to be described. A spring 35 having one end engaging the lever 32, the other end engaging a post 36 attached to the plate 22, and an intermediate portion coiled around the hub 37 of lever 32 causes the contacts 31 and 25 to be engaged except when separated by the timer cam.

The distributing mechanism includes a center contact 40 and a circular row of contacts 41 which are each connected with a pointed member 42 projecting into a sleeve 43 extending from the head 21. Each sleeve 43 receives an insulated cable 44 which is retained by means of a wire split ring 45. The stranded conductor of the cable is engaged by the pin 42. In order to conduct a sparking impulse from the center of the contact 40 to any of the contacts 41, there is provided a leaf spring member 46 held in engagement with a distributing segment 47 by means of a screw 48 which is threaded in a metallic body 49.

In order to provide the timer cam and a rotating support for the body 49 and parts attached thereto, there is provided a metallic member 50 having an outer flange 51 which is polygonal in contour. If the apparatus is constructed for a four-cylinder engine, the flange 51 will be substantially rectangular as shown in Fig. 2; for a six-cylinder engine, this flange would be hexangular. The body 50 is provided with an internal flange 52 which includes an arcuate portion and a flat portion 53. This metallic body 50 is permanently attached to a non-conducting rotor 55 which includes a hub 56 and an arm 57 which carries the insert 49. Preferably, the rotor 55 is constructed of molded material preferably a phenolic condensation product such as bakelite. The parts 49 and 50 are placed in the mold and the material forming the rotor 55 is introduced into the mold so that when the rotor 55 has become a solid body by methods usually employed in molding articles from bakelite, the parts 49 and 50 will be permanently attached to the rotor 55.

A shaft 60 is journaled in the shank 61 of the cup 20 and is provided with a shoulder 62 which rests upon the end of the boss 23 and supports the rotor 55. The shaft 60 is provided with a portion 63 which is shaped so as to be received by the socket in the rotor 55 provided by the internal flange 52 of the member 50. The portion 63 is provided with a flat surface engaging the flat portion 53 of the flange 52 to provide a driv-

ing connection between the shaft 60 and the rotor 55. The member 50 is so related to the arm 57 and insert 49 that the cam member provided by flange 51 will produce separation of the contacts 31 and 25 at the time the segment 47 is opposite one of the distributor posts 41.

To change the time of separation of contacts 31 and 25, the plate 22 is rotated by means of the handle 24. Plate 22 is retained from the bottom of the surface of cup 20 by means of screws 65 extending through curved slots 66 formed in the bottom of cup 20 and threaded into the plate 22. A spring washer 67 is located between the head of the screw 65 and the bottom of the timer cup.

By making the timer cam integral with the distributing rotor, the number of parts has been reduced and the relation between the timer cam and distributing segment can be permanently fixed so that during the use of apparatus there is no liability that this relation will be changed.

The rotor 55 is susceptible of use with different types of ignition timing apparatus, and one other type is shown in Figs. 3 and 4. In this form of timer the braker plate 70 which carries the timer contacts and braker lever 32, is fixed with relation to timer cup 71, and variation of the timing ignition is effected by changing the relation of the rotor 55 with respect to the driving shaft 72. This change of relation is effected in response to variations in speed by mechanism which includes a weight plate 73 attached to the shaft 72 and carrying a plurality of studs 74, each providing a fulcrum for a weight member 75. Each weight member 75 has a tail portion 76 for engaging an arm 77 projecting radially from a hub 82 which is journaled upon a reduced portion 72^a of the shaft 72. Each arm 77 carries a stud 78 connected by a spring 79 with a stud 74. The hub 82 is provided with a shoulder 80 which supports the member 50 of the rotor 55 and is provided with an extension 81 which has the same function as the portion 63 of shaft 60 shown in Fig. 1. The hub 78 drives the rotor 55 and is driven by the shaft 72 by means of the engagement of the tail portion 76 with the arm 77. As the speed of the shaft 72 increases, the weights 75 will move away from the shaft and cause arm 77 to be rotated clockwise with relation to the shaft 72, as viewed in Fig. 4. In this manner, the timing of the ignition is advanced as the speed of shaft 72 increases. As the speed decreases the mechanism is restored to position shown in Fig. 4 through the action of springs 79.

While the form of embodiment of the present invention as herein disclosed, constitutes a preferred form, 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. Ignition timing and distributing apparatus comprising, in combination, a driving shaft, a breaker lever, a distributor head, a metallic cupped member detachably engageable with the end portion of said shaft and directly driven thereby and having an annular flange shaped to provide a timer cam, a non-conducting distributor rotor body having a hub projecting within the cupped member and driven thereby, and a distributing conductor attached to said body.

2. Ignition timing and distributing apparatus comprising, in combination, a driving shaft, a breaker lever, a distributor head, a metallic cupped member detachably engageable with the end portion of said shaft and directly driven thereby and having an annular flange shaped to provide a timer cam, a body of phenolic condensation product molded to said cupped member, and a distributing conductor attached to said body.

3. Ignition timing and distributing apparatus comprising, in combination, a driving shaft, a breaker lever, a distributor head, a metallic cupped member having an internal annular flange shaped to directly receive and be driven by an end of said shaft, and having an external annular flange shaped to provide a timer cam, a non-conducting distributor rotor body having a hub located between the flanges of said cupped member and driven thereby, and a distributing conductor attached to said body.

4. Ignition timing and distributing apparatus comprising, in combination, a driving shaft, a breaker lever, a distributor head, a metallic cupped member having an internal annular flange shaped to directly receive and be driven by an end of said shaft, and having an external annular flange shaped to provide a timer cam, a body of phenolic condensation product having a hub portion molded between said flanges and having an arm portion, and a distributing conductor attached to said arm.

In testimony whereof I hereto affix my signature.

HARRY E. NORVIEL.