June 14, 1927. 1,632,167

Z. C. BRADFORD

IGNITION TIMER

Filed March 27, 1924

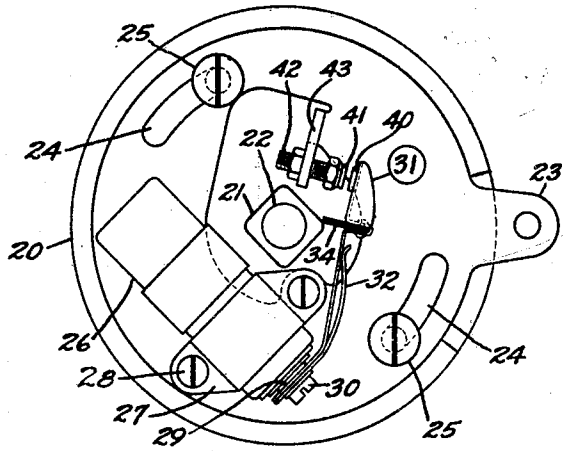

Fig. 1

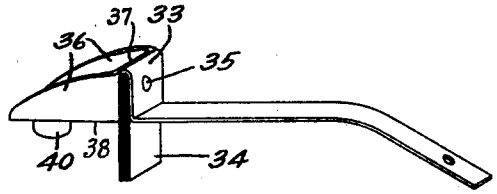

Fig. 2

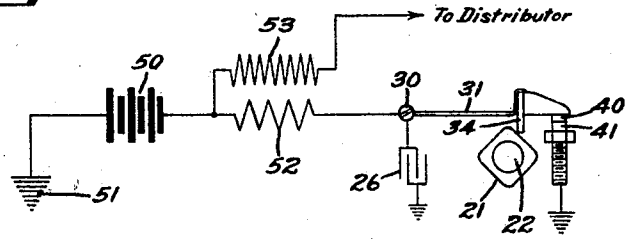

Fig. 3

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UNITED STATES PATENT OFFICE.

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IGNITION TIMER.

Application filed March 27, 1924. Serial No. 702,459.

This invention relates to periodic circuit closers, and particularly to timers for ignition apparatus.

Among the objects of the invention is the provision of an ignition timer which is exceedingly simple in construction and may be produced at very low cost.

A further object is the provision of a circuit breaker which may be operated at relatively high speed to produce a rapid succession of sparking impulses in the cylinders of an internal combustion engine.

Further objects and advantages of the present invention will be apparent from the following description, of one form thereof, reference being made to the accompanying drawings.

In the drawings:

Fig. 1 is a plan view of an ignition timer embodying the present invention.

Fig. 2 is a perspective view on an enlarged scale of the breaker lever included in the ignition timer.

Fig. 3 is a wiring diagram showing the use of the circuit breaker in an ignition system.

Referring to the drawings, the ignition timer housing 20 is a cup-shaped member adapted to contain the timer mechanism which includes a timer cam 21 mounted on timer shaft 22 which is rotatably supported by the housing 20. A circuit breaker plate 23 is rotatably supported within the flange of the timer housing or cup 20 and is provided with arcuate slots 24 concentric with the shaft 22. Screws 25 extend through the slots 24 and threadedly engage the bottom of the timer cup 20. Hence the breaker plate 23 is secured for rotation about the cam shaft 22.

A condenser 26, of a cylindrical type, is attached to the plate 23 by a bracket 27 and screws 28. The condenser material is wound upon a metallic core which provides one of the condenser terminals. The other condenser terminal is provided by the metallic condenser casing which is attached to the bracket 27. One end of the condenser core projects through the casing and is indicated at 29 in Fig. 1. The core 29 receives a screw 30 which attaches to the condenser a breaker lever 31 and a leaf spring 32. The lever 31 is formed from thin sheet material and includes adjacent its free end a scoop-shaped portion having side walls 36, a back wall 37 and a bottom wall 38. This scoop-shaped portion is channel shape in cross-section and provides a relatively rigid part of the breaker lever. Intermediate its ends lever 31 is provided with a U-shaped loop 33, including the back wall 38 of the scoop-shaped portion, embracing a portion of a rubbing block or cam follower 34 which is attached to the loop 33 by a rivet 35. The scoop-shaped portion is made preferably by a drawing operation, and the portion of the lever 31 between the loop 33 and the end remote from the scoop-shaped portion is heat treated to develop the elastic properties of the material. Hence between the rubbing block 34 and the free end of the lever 31 is relatively rigid, whereas the portion of the lever included between the block 34 and the condenser 26 is relatively flexible.

The bottom wall 38 of the scoop-shaped portion of lever 31 carries a contact 40 engageable with a contact 41 mounted on screw 42 which threadedly engages an ear 43 bent at right angles to the main portion of lever 23 and formed integrally therewith.

Fig. 3 shows an ignition system including the ignition timer described in the foregoing paragraphs. A battery or other source of current 50 grounded at 51 is connected with an ignition coil including a primary 52 and a secondary 53, the latter being connected with the ignition distributor not shown. One end of the primary 52 is connected with the condenser core 29 in any suitable manner, for example by means of the screw 30. Since the lever 23 carrying the contact 41 is electrically connected to the housing 20 which is grounded, it is apparent that the battery 50, the primary 52 and the contacts 40 and 41 are connected in series. Since the condenser case is connected with the housing 20 it is apparent that one terminal of the condenser is grounded. In a well known manner, the rotation of the shaft 22 will produce intermittently the separation of contacts 40 and 41 which results in a succession of sparking impulses being generated in the secondary 53. To adjust the timing of the ignition impulses relative to the operation of an engine, the lever 23 is rotated to change the angular relation of the rubbing block 34 relative to the shaft 22.

By supporting the breaker lever 31 directly by the condenser 26 the usual support for

the breaker lever mounted upon the plate 23 has been eliminated. It has been found that by making the breaker lever relatively rigid between the contact 40 and the rubbing block 34, motion imparted by the cam to the follower 34 immediately produces separation of contact 40 from contact 41 without first producing unflexing of the lever 31. Hence the separation of the timer contacts is more responsive to the action of cam 21 than in case the lever 31 were relatively flexible throughout its entire length.

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 I claim is as follows:

1. A breaker lever for an ignition timer comprising in combination, a flexible portion adapted to have its one end secured to a support; a rigid portion formed integral with the other end of the flexible portion; a rubbing block; means formed between the flexible and the rigid portions for supporting said rubbing block, the flexible portion extending from the point of support to the rubbing block and the rigid portion extending beyond the rubbing block; and a contact carried by said rigid portion.

2. A breaker lever for an ignition timer comprising in combination, a flexible, flat portion adapted to be secured at its one end to a support and having an integral rigid portion of channel-shape cross-section at its other end; a U-shaped portion formed between the flat portion and the channel-shaped portion; the rubbing block within said U-shaped portion; and a contact carried on said rigid portion.

In testimony whereof I hereto affix my signature.

ZERBE C. BRADFORD.