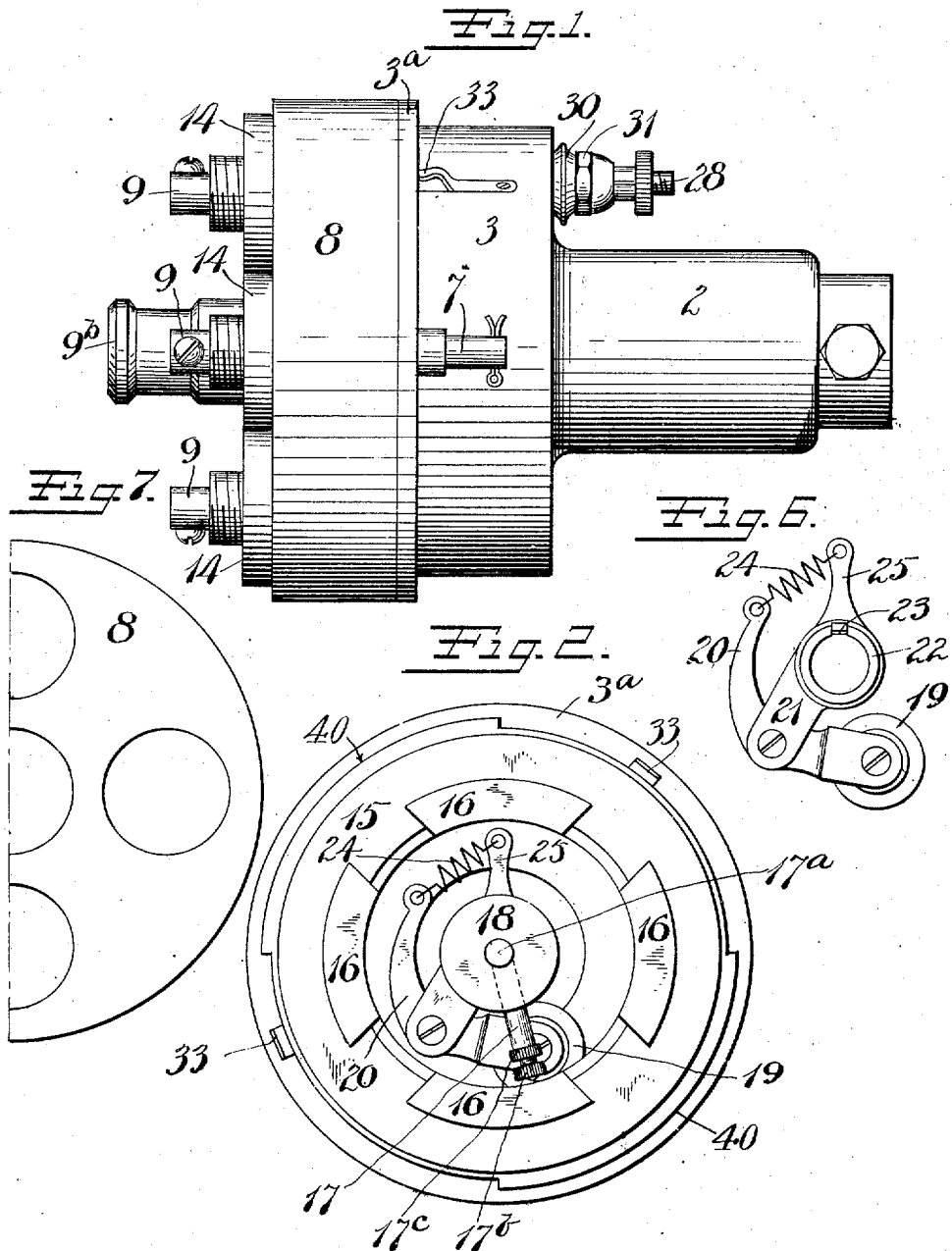


C. CUNO.
 TIMER AND DISTRIBUTER.
 APPLICATION FILED DEC. 21, 1907.

958,908.

Patented May 24, 1910.

2 SHEETS—SHEET 1.



Witnesses:
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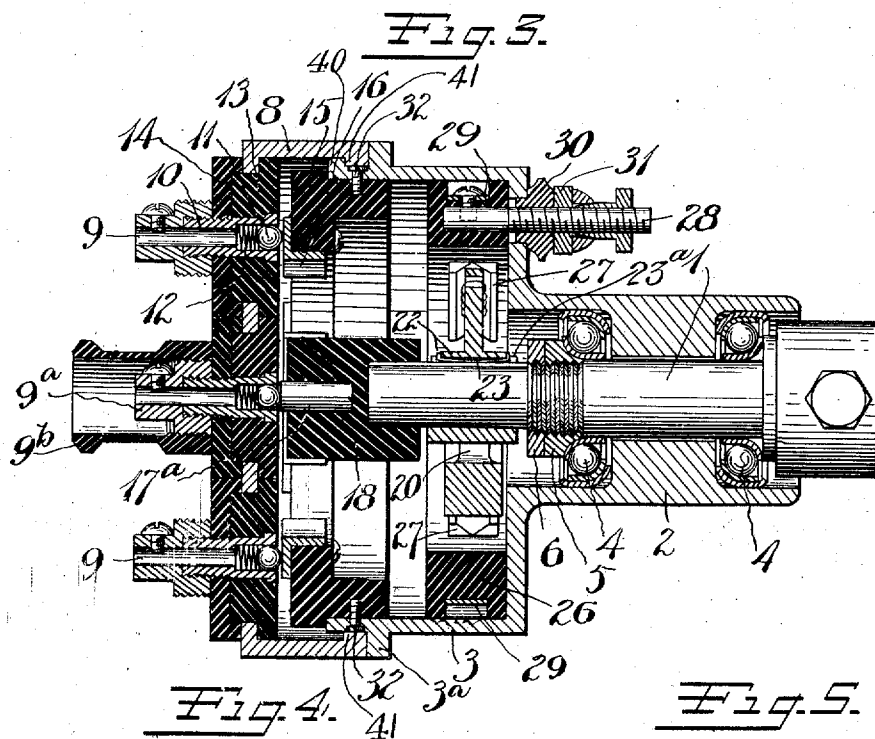
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2 SHEETS-SHEET 2.



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TIMER AND DISTRIBUTER.

958,908.

Specification of Letters Patent.

Patented May 24, 1910.

Application filed December 21, 1907. Serial No. 407,515.

To all whom it may concern:

Be it known that I, CHARLES CUNO, a citizen of the United States, residing at Meriden, county of New Haven, Connecticut, have invented certain new and useful Improvements in Timers and Distributers, of which the following is a full, clear, and exact description.

My invention relates to an improvement in timing and distributing apparatus for use in connection with jump-spark igniters for internal combustion engines having one or more cylinders. In the particular form shown herein the apparatus is designed for a four-cylinder engine.

The object of this invention is to simplify apparatus of this type to secure more perfect insulation and to so arrange the parts that the danger of leakage of the high tension current is substantially eliminated, this being accomplished in the preferable construction by an arrangement which permits the user to advance or retard the spark without rotating that part of the apparatus from which the secondary or high tension wires project, thus avoiding the danger of weakening or disturbing the various terminal connections by reason of the repeated working of the parts to and fro. These and other advantages will be apparent to a mechanic skilled in this art from a reading of the following description.

In the drawings Figure 1 is a side elevation of my improved timing and distributing apparatus. Fig. 2 is an end view of the same, looking from left to right, the cover and associated parts being removed. Fig. 3 is a longitudinal section of Fig. 1. Fig. 4 is a view of one of the details of construction detached and shown partly in section. Fig. 5 is a view of another of the details of construction detached. Fig. 6 is a view of certain parts of the timing apparatus detached. Fig. 7 is a front view of a portion of the cover.

1 represents a shaft which is driven by the engine (not shown) in the usual manner, for example, in a four-cycle engine this part is usually driven from the so-called cam shaft.

2 is a hub mounted on shaft 1, the said hub 2 having its forward end extended to form a case or closure 3. The hub 2 is mounted on suitable antifriction bearings 4-4 adjusted by means of a cone take-up 5,

which in turn may be locked by a suitable nut 6. The weight of the structure is carried by the antifriction bearings, in this instance ball bearings, so that the shaft 1 may turn freely therein. Projecting from the case 3 is a suitable arm or connecting device 7, by means of which the case 3 may be held against rotation or by which said case may be given a movement in either direction for the purpose of advancing or retarding the spark.

8 is a cover and secondary terminal carrier which makes connection with the case 3 by any suitable coupling means such as the interlocking segmental flanges 40-41 which will permit the part 3 to be turned partially relatively to the part 8 without uncoupling said members. It is by this or an equivalent connection that I am permitted to advance or retard the spark without disturbing the position of the secondary terminals and the carrier therefor. The cover 8 constitutes the carrier for the secondary terminals, these latter being indicated at 9-9-9^a. In this instance the terminals 9 may represent outgoing secondary connections and the terminal 9^a the return secondary. The front of the cover member 8 has perforations through which the terminals pass, and these perforations are of such size that suitable insulation may be introduced for each of said terminals. For a clear understanding it will be necessary to describe only one of these terminals and the insulation therefor.

Referring to the sectional view, Fig. 3, the terminal includes the outside member 9 to which the secondary wire is directly connected. It also includes a sleeve 10 adapted to be screwed into the part 9. This sleeve 10 has a head or flange at its inner end and is also centrally bored to receive a contact ball 11 pressed outwardly by means of a spring 12, the entrance to the ball cavity being sufficiently contracted to prevent the ball from being forced entirely out and yet permitting one surface of the ball to project beyond the flanged head of the sleeve. 13 is a flanged washer of insulating material, preferably porcelain. 14 is another washer of insulating material. One of these washers is adapted to pass through an opening in the face of the cover 8 (see Fig. 7) and bear against the inner wall around said opening. The other cooperating insulating

member 14 is adapted to overstand the reduced portion of the insulation 13. The insulation 13 is suitably bored to permit the sleeve 10 to pass therethrough and is counterbored to receive the flange thereof. It follows that when the parts 9 and 10 are screwed together, the two insulating members 13-14 will be brought together, as shown in Fig. 3, so as to clamp upon the cover 8 around the front perforation therein, and thus perfectly insulate the sleeve 10 and terminal 9. The several terminals 9 and 9^a may be secured in this manner, and the usual hard rubber sleeve extension 9^b may be provided for each of said terminals, although one only is shown in the drawing. 15 is a ring of suitable insulating material, preferably porcelain. This ring is shouldered and adapted to rest on the forward edge of the case 3. This ring carries segments 16-16, the same being suitably secured thereto so as to be completely insulated from the case and from each other (see Figs. 2, 3 and 5).

The segments 16 are preferably angular so as to face up with the ball terminals 11 and also with the distributor arm 17. This distributor arm 17 is carried by a block 18 of insulating material fixed upon the extremity of the shaft 1 in such a manner as to completely insulate the distributor arm 18 therefrom. The block 18 carries a central forward extension 17^a from the distributor arm 17, the said extension 17^a furnishing a contact with the return high tension terminal 9^a. When the shaft 1 is rotated, the distributor arm 17 is rotated so that its end will traverse the several segments 16 successively, although it is not essential that it should engage therewith. The distributor arm 17 is preferably tubular so as to carry a threaded extension 17^b to permit relative adjustment of the end of the arm, which, when properly ascertained, may be secured in place by lock nut 17^c. Mounted on the shaft 1 is the contact for the timer. In the preferable construction this contact is in the form of a bevel-edged timer wheel 19 yieldingly carried by a hinged lever 20 mounted on an arm 21 having a hub 22 arranged to slide upon the shaft 1. This shaft is provided with a suitable spline 23^a and a key-way is formed in the inner wall of the hub 22, in which key-way is located by preference a spring 23 to guarantee a superior electrical connection. This spring 23 is preferably flat and extends longitudinally of said key-way and is turned up at the ends to prevent detachment when the parts are assembled (see Figs. 3 and 6.) This same spline on the shaft 1 serves to rotate the insulating block 18.

A spring 24 connected at one end to the hinged lever 20 and at the other end to an arm 25 fixed on hub 22, furnishes the means

to yieldingly press the contact roller 19 outwardly. 26 is a ring of insulating material mounted in the case 3 and carrying segments 27, each of which may be connected to a common terminal 28 through the medium of a band 29. The segments 27 are grooved to receive the beveled edge of the contact roller. The segments 27-27 are for the primary circuit. The primary current may enter through the shaft 1 from any suitable source of electrical energy and may proceed thence through the contact 19 and the segments 27 successively to the return primary terminal 28, the latter being connected to each of the segments 27 by the connecting band 29. It follows, therefore, that as the shaft 1 is rotated, the contact wheel 19 will traverse each of the segments 16 successively, closing the primary circuit intermittently.

The position of the timer contact 19 should be such relatively to the distributor arm 17 that the current will be distributed properly to the several high tension terminals 9, the proper relation of said parts being well understood. The terminal 28 is insulated from the case 3 by means of the insulating sleeve 30. The insulating ring 26 for the timer segments 27 is neatly fitted to the inside of the case 3 and is held therein by means of the terminal 28, which may perform the additional function of a post, said post being provided with a nut 31 screw-threaded thereon. The insulating ring 15 for the distributor segments 16 is held in the case 3 against rotation in any suitable manner, as by a screw or screws 32. 33-33 are spring clips carried by the case 3, the ends of the same passing through the flange 3^a and serving to limit the degree to which the case 3 may be rotated relatively to the cover 8 after the parts are assembled. In assembling the parts these springs 33 are pressed down until the cover is slipped into place and turned. When turned sufficiently far to make the proper engagement, the springs 33 are released and stand up substantially as shown in Fig. 2, thus serving as an abutment to engage the ends of the segmental flanges on the cover 2 and check the relative rotation of the parts 3 and 8. Other suitable means may be substituted to limit this relative rotary movement between the parts 3 and 8.

When the parts are all assembled, as shown in Fig. 3, it will be seen that each of the ball contacts 11 will bear against the terminals carried by the insulating ring 15 and the center terminal 17^a, pressing against the same yieldingly and maintaining a uniform contact. The pressure of the springs behind the balls 11 is just sufficient to hold the cover 8 properly in engagement with the case 3.

When the device is in operation, the high

tension wires may be suitably connected, in fact, may be rigidly connected close up to the terminals 9—9. When the engine is started, the shaft 1 is revolved in proper time therewith, and the contact 19 and distributor arm 17 are caused to revolve and cooperate with their respective contacts in the usual manner. If it is desired to change the time of the spark this may be accomplished by merely shifting the angular position of the case 3 without disturbing the position of the cover 8 or the high tension wires leading therefrom. This shifting of the part 3 relatively to the part 8 will not disturb the secondary circuit connections, because the length of the segments 16 is such as to always face up in front of the ball contacts 11 at the rear of the secondary terminals 9 (see Fig. 2), the length of said segments 16 being sufficient to afford the maximum range of spark adjustment. By these arrangements and since the time of the spark is frequently changed, the rubbing of the balls 11 against the face of their respective terminals 16 will always keep the contacts bright and effective. By providing a means in which it is not necessary to shift the secondary circuit terminals, the secondary wires are not disturbed. This is a decided advantage, because the working of the secondary wires to and fro frequently results in an impairment of the insulation and leakage of current. By this arrangement the secondary connections may be made so positive and rigid as to attain the highest efficiency at all times.

The construction as a whole is exceedingly simple, not only from the standpoint of operation, but also from the standpoint of manufacture. Various parts may be completed separately and then readily assembled in a most expeditious manner. The various insulations may, by this arrangement, be formed of such material as guarantees the greatest efficiency, for example, some vitreous material such as porcelain or glass. The particular construction of the timer element has many advantages, but since the same independently considered is made the subject-matter of another application filed by me, it is unnecessary to more fully describe the construction of this particular feature or set forth the advantages gained thereby. If desired, suitable antifriction bearing may be employed between the case 3 and the cover 8, so that the part 3 may be rotated to change the time of the spark independently of the part 8 with the least possible friction. This employment of an antifriction bearing is so obvious, however, as to require no illustration, and it should be understood that any suitable form may be selected and employed without materially

altering the construction or method of operation, or avoiding the scope of this invention.

It is, of course, understood that in the drawings I have elected to illustrate one of the preferred forms of the invention and the various parts thereof, but this may be modified in various ways.

What I claim is:

1. In a timer and distributor, a shaft, a case having a bearing thereon, timer segments and distributor segments carried by said case, a timer contact and distributor arm carried by said shaft, means for insulating said sets of segments from each other, a cover for said case, secondary terminals carried by but insulated from said cover, said terminals making operative connection with said distributor segments.

2. In a timer and distributor, a shaft, a case having a bearing thereon, a timer contact carried by said shaft, and timer segments carried by said case, a distributor arm carried by said shaft, and distributor segments carried by said case, a cover for said case detachably connected thereto, the latter having relative rotary movement independent of the cover, secondary contacts carried by said cover and making a sliding connection with said distributor segments to permit the case to be partially rotated relatively to said cover or vice versa, without interrupting the electrical connection of the secondary terminal with said segments.

3. In a timer and distributor, a case, a cover, timer mechanism, distributor mechanism, the timer mechanism being carried by the case, the distributor mechanism by the cover, a shaft entering said case, bearings between said shaft and case, and means to permit a rotary movement of the case relatively to the cover and to said shaft.

4. In a device of the character described, a shaft, a contact device carried thereby, including a hub fitted to said shaft, a spline for preventing the independent rotation of said hub on said shaft, and a flat contact spring within the hub carried thereby and bearing against said spline to hold it against said shaft.

5. In a timer and distributor, a case, a carrier, timer mechanism, distributor mechanism, the timer mechanism being carried by the case, the distributor mechanism by the carrier, a shaft entering said case, bearings between said shaft and case, and means to permit a rotary movement of the case relatively to the carrier and to said shaft.

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