Jan. 6, 1948. A. L. BROWNLEE 2,433,888

DISTRIBUTOR

Filed May 3, 1946

Fig. 1.

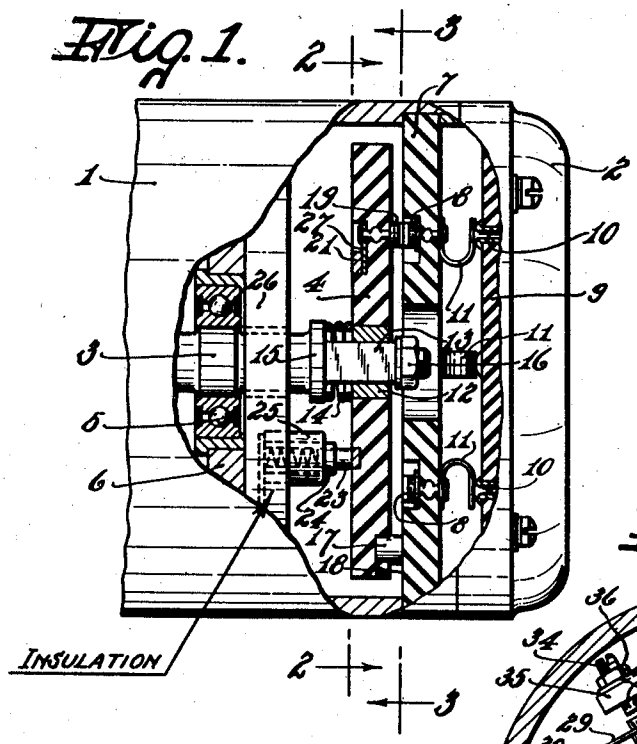


Fig. 2.

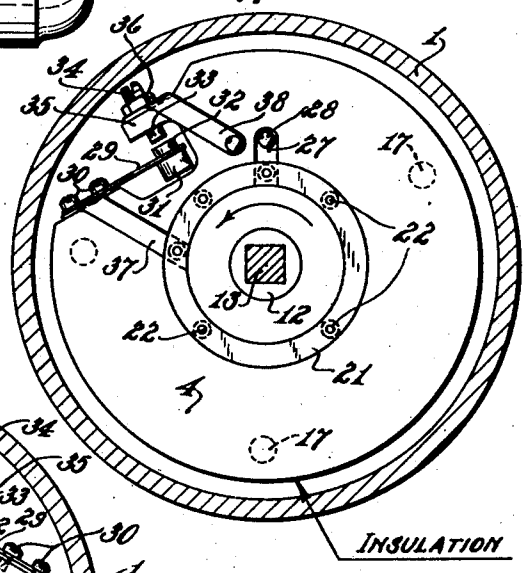
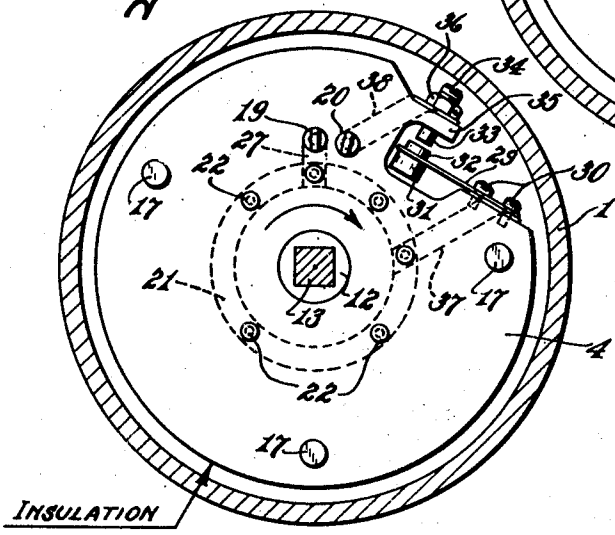


Fig. 3.



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2,433,888

DISTRIBUTOR

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Application May 3, 1946, Serial No. 666,922

3 Claims. (Cl. 200—25)

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The invention relates to improvements in distributors having provisions for automatically shifting from a retarded to an advanced spark accordingly as the speed of the rotor of the distributor is respectively below or above a predetermined value.

The invention is particularly useful in a distributor which also serves as a timer, such for example as is used in the breakerless ignition system disclosed in the copending application of Kenneth A. Harmon and Allen L. Brownlee, filed December 7, 1944, under Serial No. 567,092, and assigned to the assignee of the present application.

The invention has for an object the provision on the rotor of the distributor of two contacts, one set somewhat ahead of the other with respect to the direction of rotation of the rotor and both adapted to successively engage the fixed contacts of the distributor, together with current supply connections to both contacts on the rotor and a speed-responsive switch carried by the rotor and interposed in the connections to the leading contact on the rotor, said switch being operable to interrupt said connections until the rotor attains a predetermined speed when the switch closes and allows current to be supplied to the leading contact.

The invention will be disclosed with reference to the accompanying drawings, in which,

Fig. 1 is a fragmentary sectional elevational view of an ignition apparatus showing a distributor embodying the invention; and

Figs. 2 and 3 are cross sectional views taken on the lines 2—2 and 3—3 of Fig. 1, respectively.

Referring to these drawings; there is shown in Fig. 1 a casing 1 and a cover 2 which together form a housing for the distributor. This housing, which is shown only in part, may also contain other elements of an ignition system, which may for example be of the kind disclosed in the above identified application. There is a driving shaft 3, adapted to be driven in timed relation with the engine served by the distributor and carrying the rotor 4 thereof. This shaft is rotatably supported in any suitable way, as indicated in part by the ball bearing 5 fixed in a member 6 of the casing. Also fixed in the casing is a disk 7, which is made of suitable insulating material and carries a circular series of contacts 8, suitably fixed thereto, as indicated. This disk is held in place by cover 2, as indicated. In the cover, is a disk 9 of insulating material, carrying a circular series of terminals 10, one for and located opposite each contact 8. A spring 11, connected to each contact as indicated, engages the adjacent terminal

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10. These terminals 10 are adapted for connection to the distribution wires in the usual or any suitable manner (not shown).

The distributor rotor 4, as herein shown, is mounted to move toward the disk 7. It has fixed centrally therein a metallic sleeve 12 having a square or other form of non-circular opening therethrough adapted to slide on a portion 13 of like form on shaft 3. A spring 14 acting between a flange 15 on shaft 3 and the rotor, presses the latter toward disk 7. A nut 16, threaded on the outer end of shaft 3, limits the extent of movement of the rotor toward disk 7. Fixed to the rotor in any suitable way are three brushes 17, which may for example be of carbon graphite and which ride on the contact-bearing face 18 of disk 7 as a track—being pressed thereagainst by the spring 14. The rotor 4 carries contacts 19 and 20, suitably fixed thereto as indicated. The engagement of these brushes with the track serves to position the outer and contacting end face of each of the contacts 19 and 20 in the same plane in which the contacting face of each of the fixed contacts 8 lie. This particular mounting of the distributor rotor forms the subject matter of a copending application of Kenneth A. Harmon filed on even date herewith, under Serial No. 667,069, and assigned to the assignee of the present application. Other mountings of the distributor rotor may be used, if desired, as the invention is independent of the particular mounting used—that shown being an illustrative example of one form which is desirable and preferred when the distributor is used for timing purposes as in an ignition system of the type shown in the first-named pending application.

The electrical supply to the distributor rotor may likewise take any suitable form. As shown in Fig. 2, the rotor carries on its rear face a collector ring 21, suitably fixed thereto as by a series of rivets 22. Engaged with this ring (Fig. 1) is a brush 23, mounted in the outer end of a spring-pressed metallic plunger 24, which is slidably mounted in a guide 25. This guide is fixed to a support 26 of insulating material, mounted in casing 1. The plunger is connected in any suitable way (not shown) to the electrical supply.

The contacts 19 and 20 (Fig. 3) are mounted in angularly-spaced relation on the front face of rotor 4 and project toward the contacts 8 on disk 7. The contact 20 is set in advance of contact 19 with respect to the direction of rotation of the rotor 4. The contact 20 is so positioned that it engages each contact 8 at the proper time for an advanced spark for normal running speeds of

the engine. The contact 19 is so positioned that it engages each contact 8 at a time such as to give a retarded spark for starting purposes.

Both contacts 19 and 20 are electrically connected to the collector ring 21. The trailing contact 19 is permanently connected thereto by a thin brass strap 27 (Figs. 1, 2 and 3) one end of which is connected to the contact by its rivet 28 and the other end of which underlies and is engaged by the ring. The leading contact 20 (Figs. 2 and 3) is connected to the collector ring 21 by means which include a speed-responsive switch. This switch may, for example, consist of a flat spring 29, fixed at one end to a portion of the peripheral wall of the rotor, as by two screws 30, and bearing at its other end a weight 31 and a switch contact 32. A cooperating switch contact 33 is carried by the inner end of a screw 34, which is threaded into and extends through a projection 35 on said peripheral wall and is held in its various positions of adjustment by a lock nut 36. Conductors 37 and 38 which may be thin brass strips, electrically connect the collector ring 21 to the switch contacts 32 and 33, respectively. As shown, the inner ends of each of the strips 37 and 38 underlie and are engaged by the ring 21. The outer end of strip 37 underlies the fixed end of spring 29 and is held thereto by screws 30. The outer end of strip 38 underlies the lock nut 36 and is clamped thereby to the projection 35.

In operation, when the rotor 4 is stationary, the switch contacts 32 and 33 are spaced apart, as shown in Fig. 2. Consequently, the leading distributor contact 20 is disconnected from the electrical supply and cannot function, when it engages the fixed contacts 8, to time or distribute electrical, spark-producing charges. The trailing contact 19 then acts and serves, when it engages the fixed contacts 8, to time and distribute electrical charges to produce late or retarded ignition sparks. When, however, the rotor 4 acquires a predetermined speed, the weight 31 is moved outwardly by centrifugal force, deflecting outwardly the outer end of switch arm 29 and carrying the switch contact 32 into engagement with the switch contact 33. The engagement of these switch contacts closes the connection between ring 21 and the leading distributor contact 20 so that the latter, when it engages the fixed contacts 8, times and distributes electrical charges to produce ignition sparks for normal advance running speeds of the engine. The ensuing engagement of contact 19 with the contacts 8 will cause no ignition sparks because there are no means active at such times to produce electrical charges. As one specific illustration, in the ignition system of the first-named copending application, a capacitor is gradually charged and then instantaneously discharged by and when the movable distributor contact engages a fixed contact 8. If the capacitor is discharged by the engagement of the leading distributor contact 20 with a fixed contact 8, then the engagement of the contact 19 with the same contact 8 will occur so soon afterward that there will not be time for the capacitor to become charged.

I claim:

1. A rotor for a distributor, having two contacts set one in advance of the other in the direction of rotation of the rotor and a conductor to which current is adapted to be supplied, circuit connections between said conductor and each contact, and a speed-responsive switch in the circuit connections to the leading contact, said switch operable to close only after the rotor has acquired a predetermined speed.

2. In a distributor, a circular series of fixed contacts, a rotor, two contacts carried by the rotor one slightly in advance of the other in the direction of rotation of the rotor and each adapted to successively engage the contacts of said series, relatively-rotatable brush and contact elements for conducting current to the rotor, the rotatable one of said elements being carried by the rotor, an electrical connection between the element on said arm and the rearward contact on said arm, a speed-responsive switch carried by the rotor and operable to close only after the rotor attains a predetermined speed, and electrical connections one between the element on said arm and one terminal of said switch and another from the terminal of said switch to the forward contact on the arm.

3. A rotor for a distributor, having two contacts set one in advance of the other in the direction of rotation and a conductor to which current is adapted to be supplied, circuit connections between said conductor and each contact, and a speed-responsive switch in the circuit connections to the leading contact; said switch including a leaf spring, fixed at one end to the rotor and carrying near its other end a switch contact and a weight, and a fixed switch contact on said rotor spaced from the other switch contact when the rotor is at rest and adapted to be engaged by the other switch contact when, during rotation of the rotor, said weight is moved by centrifugal force to flex said spring sufficiently for the purpose.

ALLEN L. BROWNLEE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,334,868	Laycock	Mar. 23, 1920