

G. T. BROWN.
 COMBINED TIMER AND DISTRIBUTER.
 APPLICATION FILED MAR. 5, 1909.

938,208.

Patented Oct. 26, 1909.

2 SHEETS—SHEET 1.

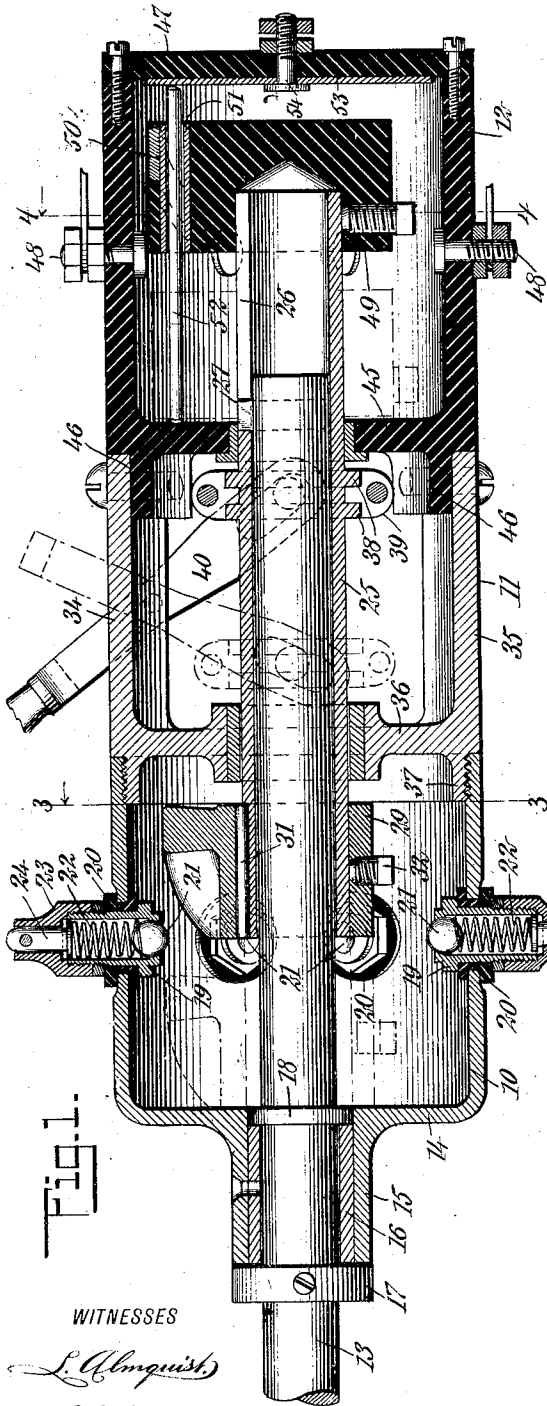


Fig. 1.

WITNESSES

L. Olmquist
C. W. Fairbank

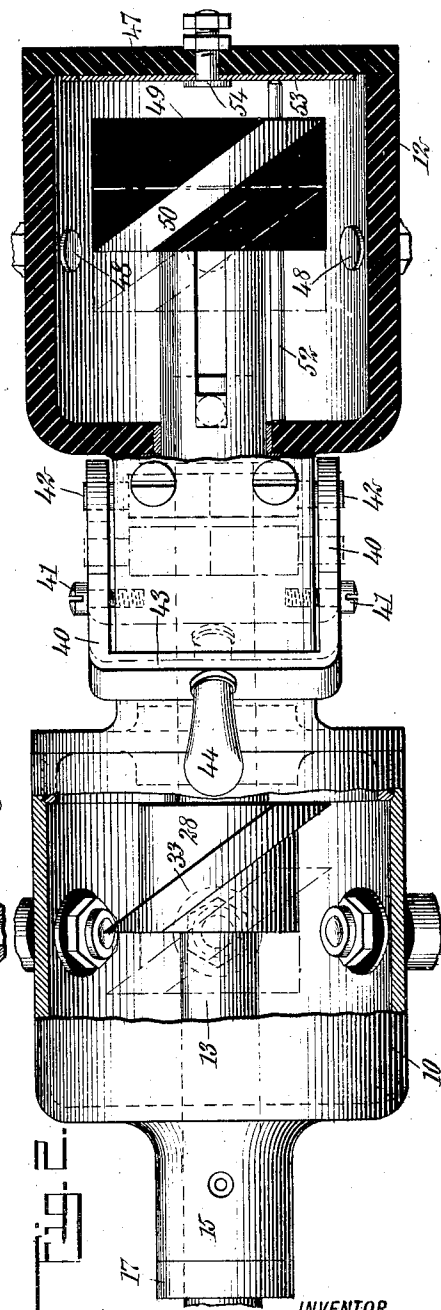


Fig. 2.

INVENTOR

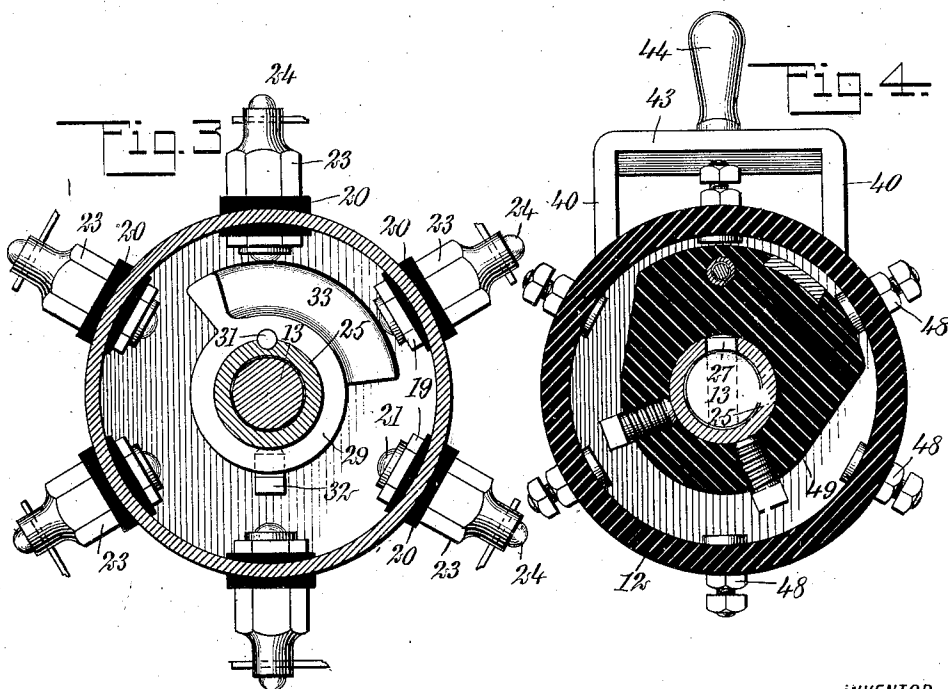
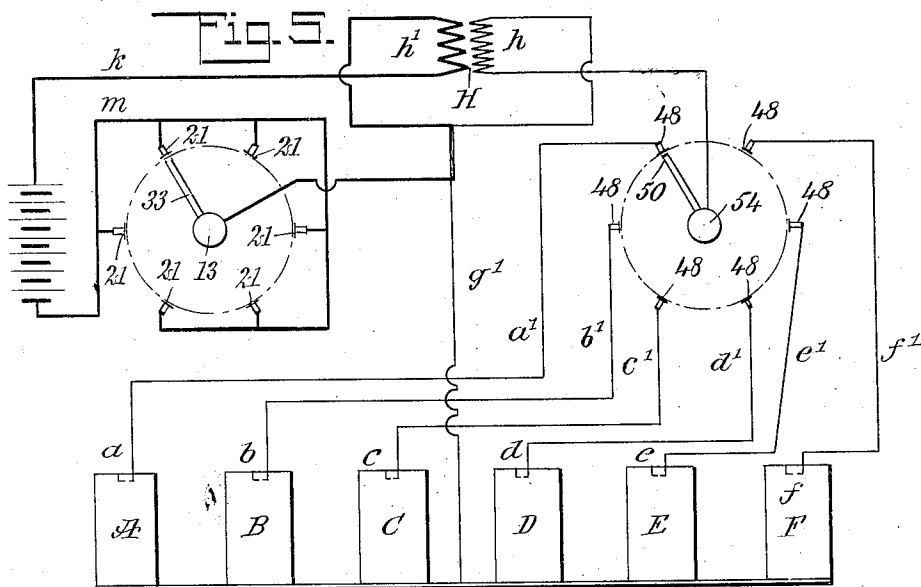
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ATTORNEYS

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UNITED STATES PATENT OFFICE.

GEORGE T. BROWN, OF NEW YORK, N. Y.

COMBINED TIMER AND DISTRIBUTER.

938,208.

Specification of Letters Patent.

Patented Oct. 26, 1909.

Application filed March 5, 1909. Serial No. 481,223.

To all whom it may concern:

Be it known that I, GEORGE T. BROWN, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, county and State of New York, have invented a new and Improved Combined Timer and Distributer, of which the following is a full, clear, and exact description.

This invention relates to certain improvements in timers and distributers for use in connection with multi-cylinder internal combustion engines for controlling the passage of the spark at the igniter.

It is common practice to vary the speed of internal combustion engines by varying the time of the passage of the spark in respect to the position of the piston. In the most common form of timing devices for multi-cylinder engines, the casing is provided with a plurality of terminals which contact in succession with an inner rotatable member, and the casing is mounted to oscillate for a limited distance in order to vary the time at which the central rotatable contact comes into engagement with any one of the peripheral contacts. Devices of this character possess certain disadvantages in that the casing itself being rotatable and usually supported upon the shaft, cannot be held rigid and the time of the spark cannot be accurately controlled when the engine is operating at very high speed.

In my improved construction I support the casing rigidly so that there can be no movement whatsoever, and upon the central rotatable shaft I provide a helical contact member movable longitudinally of the shaft and rotatable therewith. The pitch of the helix and the position of the helical member on the shaft, determine the time of closing of the electric circuit.

Another important feature of my invention involves the provision of a double series of circuit closers, one of which acts as the timer and the other of which acts as the distributer in a system in which primary and secondary circuits and an induction coil are employed. Both the timer and the distributer involve a helical contact member, and the two members are so connected to each other as to operate simultaneously.

Other features of my invention will be referred to hereinafter and particularly pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this speci-

cation, in which similar characters of reference indicate corresponding parts in all the figures, and in which—

Figure 1 is a longitudinal section through a device constructed in accordance with my invention: Fig. 2 is a top plan view of my improved device, portions of the end casing being broken away; Figs. 3 and 4 are transverse sections on the lines 3—3 and 4—4, respectively, of Fig. 1; and Fig. 5 is a diagram illustrating one system of wiring which may be used with my improved device.

In the specific form of combined timer and distributer illustrated in the accompanying drawings, I provide a casing formed of three separate sections 10, 11 and 12, in axial alinement and concentric with a central rotatable shaft 13. The three casing sections are rigid in respect to each other and in use are rigidly secured to the engine frame or to any other suitable stationary support, so that the casing is positively held against rotation or oscillation. The shaft 13 is geared to the engine shaft and in the specific form illustrated, would be geared to rotate at the same speed for a two-cycle engine and at one-half the speed for a four-cycle engine. The casing section 10 carries the timer portion of the device, while the opposite casing section 12 carries the distributer portion. The intermediate casing section 11 serves merely to connect the other two casing sections and supports the means for advancing or retarding the spark simultaneously at the distributer and at the timer. The casing section 10 is formed with a closed end 14 and a sleeve portion 15 which constitutes a bearing for the shaft 13. The bearing sleeve may have an anti-friction lining 16, and collars 17 and 18 may be provided at the ends of the sleeve for holding the shaft against longitudinal movement in respect to the casing. The outer peripheral wall of the casing is provided with an annular row of contacts, the number depending upon the number of cylinders in the engine or the number of points to which the current is to be delivered. The special construction of these contacts does not involve any important feature of my invention, as they may be of any suitable character but insulated from each other preferably by being insulated from the casing. As shown, each contact includes a tube 19 extending through an opening in the casing wall and insulated therefrom by an outer sleeve 20 of insulating ma-

terial. Disposed within the tube is a ball 21 fitting against a seat in the inner end of the tube, so that a portion of the ball extends beyond the end of the tube, and a spring 22 within the tube serves to hold the ball in this position. As the movable contact herein-
 5 after referred to engages with the ball, the latter may recede slightly within the tube against the action of the spring. A sleeve
 10 nut 23 has threaded engagement with the outer end of the tube, locking the latter in place, and an electric wire may be secured to the outer end of this sleeve nut or to a per-
 15 forated plunger 24 engaging with the outer end of the spring and capable of a sliding movement within the sleeve nut 23.

Within the casing and extending into all three casing sections is a sleeve 25 fitting the shaft 13 and movable longitudinally thereof.
 20 The sleeve extends beyond the end of the shaft in the casing section 12 and is there provided with a slot 26 through which a pin 27 on the shaft may extend, so that the sleeve may move longitudinally of the shaft, but
 25 is positively prevented from rotating in respect thereto.

Within the casing section 10 the sleeve carries a contact member for engagement with the balls 21 of the annular row of con-
 30 tacts carried by the casing section, and this contact member 28 involves an important feature of my invention. The contact member as shown, includes a hub or sleeve 29 locked on the sleeve 25 by a key 31 and a set
 35 screw 32, which together positively prevent any longitudinal or rotary movement of the hub 29 in respect to the sleeve 25. The hub 29 carries a helically-disposed flange 33 leading from one end of the hub to the other
 40 end and forming approximately one-third of a complete helical turn. The outer surface of the helical flange forms a portion of a cylindrical surface and this outer surface is adapted to contact with the several balls
 45 21 as the shaft 13 rotates. With the sleeve 25 and contact member 28 in any predetermined position in respect to the shaft 13, it is evident that during each revolution of the shaft, one portion of the rotary contact mem-
 50 ber 28 will come into engagement with each and all of the annular row of contact members, and as all of these last-mentioned contact members lie in the same plane at right angles to the axis of rotation, the same por-
 55 tion of the surface of the helix will contact with all of the balls. By moving the helix longitudinally of the shaft, a different portion of the helical surface will come into the plane of the annular row of contact mem-
 60 bers, and the time of the closing of the contact will be advanced or retarded dependent upon the longitudinal direction in which the sleeve 25 is moved.

For controlling the position of the sleeve 25 and the helix contact member 28, I pro-

vide the central casing section 11 with large openings in the opposite sides thereof, so that in reality the central casing section includes only two longitudinally-extending bars 34 and 35, connected to a transverse
 70 plate 36, serving as a partition between the casing sections 10 and 11, and also serving as a bearing for the sleeve 25. The casing section 10 may be secured to the casing section 11 in any suitable manner, as, for in-
 75 stance by threading the former to an outwardly-extending flange 37 on the latter. The sleeve 25 is provided with two annular flanges 38, 38, which hold a collar 39 against longitudinal movement in respect to the
 80 shaft, but permit of the rotation of the sleeve independently of the collar. Two lever arms 40, 40, are secured to the opposite sides of the casing bar 34 by pivot pins 41, and the lower ends of these lever arms are
 85 secured to outwardly-extending studs 42 on the collar 39. The outer ends of the lever arms 40, 40, are connected together by a transverse bar 43, and this bar may be provided with a handle 44 for moving the lever
 90 arms simultaneously. The lever arms swing about the pivot pins 41 and operate to move the sleeve 25 longitudinally of the casing and the shaft, and to hold the sleeve in any pre-
 95 determined position in respect to the shaft. Thus, by means of the handle 44, the contact member 28 may be moved longitudinally of the casing 10 and the times of the closing of the several contacts may be advanced or re-
 100 tardated at will.

The distributor portion of my improved device is disposed within or carried by the casing section 12, and is operable simultaneously with the timer portion above described. The casing section 12 is preferably formed
 105 of hard rubber or any other suitable insulating material, and is provided with an end wall 45 serving as a partition between the casing sections 11 and 12, and provided with lugs 46 extending into the end of the casing
 110 section 11 and held in place by suitable screws. At the opposite end the casing section is provided with a removable cover 47, also of insulating material, held in place by suitable screws. The peripheral wall por-
 115 tion of the casing carries an annular row of terminals 48 spaced at equal distances apart and corresponding in number to the contacts carried by the casing section 10. As the distributor portion is utilized for high poten-
 120 tial currents, these terminals need not be of the same complicated character as the contacts carried by the casing section 10. The terminals 48, as shown, involve mere studs extending through the peripheral wall and
 125 having their outer ends serving as binding posts for the attachment of wires.

Within the casing section 12, the sleeve 25 has rigidly secured to the end thereof a block 49 of insulating material, a portion of 130

which presents a peripheral wall parallel to but spaced from the inner surface of the peripheral wall of the casing. This outer peripheral portion of the block has inserted therein a helically-disposed strip 50, corresponding in length, pitch and width to the outer surface of the helical flange 33 of the timer. This strip is inserted in the insulating block 49, so that the latter serves to insulate the strip from the sleeve 25. For providing electric connections to this helical circuit-closing strip 50, I provide a metallic tube 51 extending through the block substantially parallel to the shaft and at one side thereof, and through this sleeve extends a rod 52 of a length substantially equal to the interior length of the casing section 12. The tube and block are free to slide along the rod, and the latter is rotated about the sleeve 25 by the block. The end wall 47 of the casing carries an inner contact plate 53, which engages with one end of the rod 52 during the rotation of the latter. A bolt 54 extends through the end wall 47 to hold the plate 53 in position, and the outer end of this bolt constitutes a binding post to which a wire may be connected. As the terminal 54 is at all times electrically connected to the helical strip 50, and as the latter comes adjacent the terminals 48 in succession, it is evident that a circuit may be closed from the terminal 54 to each of the terminals 48 in succession during the rotation of the shaft, and as the block 49 is carried by the sleeve 25 and movable longitudinally with the latter, the time at which the circuit will be closed may be varied.

My improved timer may be used by itself for low potential ignition systems, or the distributor may be used by itself in certain high potential ignition systems, and certain features of either may be incorporated in the other, but I preferably employ the device substantially as illustrated.

A system in which my improved device may be used is illustrated diagrammatically in Fig. 5. In this system I employ six engine cylinders A, B, C, D, E and F, and having spark plugs or other electric ignition means *a, b, c, d, e, and f*, respectively. Wires *a', b', c', d', e'* and *f'* connect the several igniters to the several terminals 48 of the distributor. A wire *g'* leads from the engine frame through the secondary *h* of an induction coil *H*, and thence to the terminal 54 and the helical strip 50. A battery *I* is connected by a wire *k* to the primary *h'* of the induction coil and thence to the engine frame, which is, of course, electrically connected to the shaft 13 of the helical flange 33. The other wire *m* leads from the battery to each of the contact balls 21 of the timer. As the shaft 13 is rotated to bring the helical flange 33 in contact with one of the contact balls 21, the battery circuit may flow through this contact of the

timer and through the primary of the induction coil. A secondary current is instantly generated in the secondary circuit, and the high potential current may flow to the distributor and through one of the terminals 48 to the corresponding igniter and thence back to the secondary. The secondary circuit is closed at substantially the same time that the primary circuit is closed, so that sparks pass at the several igniters in succession during the rotation of the shaft 13. The particular system illustrated involves the use of only a single induction coil and the use of the engine frame as a portion of both the primary and the secondary circuit, but it is, of course, evident that all of the circuits may be formed independently of the engine frame and that separate induction coils may be used for each igniter.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A device of the class described, comprising a casing of insulating material, a shaft extending therinto, a block of insulating material carried by said shaft and rotatable therewith and movable longitudinally in respect thereto, a helically-disposed contact strip carried by said block at the outer face thereof, a plurality of contacts carried by said casing and terminating adjacent the path of travel of said contact strip, a rod carried by said block and electrically connected to said contact strip and held against longitudinal movement, a terminal and a member electrically connecting said terminal with said rod during the rotation of the shaft.

2. A combined timer and distributor, comprising three casing sections in axial alignment, a shaft concentric therewith, a sleeve encircling said shaft and movable longitudinally in respect thereto, contact members carried by said sleeve in the terminal casing sections, a plurality of terminals carried by said last-mentioned casing sections and each serving to close a separate circuit therethrough, and a lever pivoted within the center casing section and having engagement with said sleeve for moving the same longitudinally.

3. A combined timer and distributor, comprising three casing sections in axial alignment, a shaft concentric therewith, a sleeve encircling said shaft and movable longitudinally in respect thereto, contact members carried by said sleeve in the terminal casing sections, and each presenting a helically-disposed contact face, a plurality of terminals carried by said last-mentioned casing sections and each serving to close a separate circuit therethrough, and a lever pivoted within the center casing section and having engagement with said sleeve for moving the same longitudinally.

4. A device of the class described, comprising a substantially stationary casing of insulating material and including a circumferential wall and a detachable end wall, a shaft extending into said casing, a sleeve slidable upon said shaft, a block of insulating material within said casing and rotatable with said shaft and movable longitudinally of the casing with said sleeve, a helically-disposed contact strip carried by said block substantially concentric with the inner surface of the peripheral wall of said casing, an annular row of contacts carried by said peripheral wall, a terminal on said casing; and electrical connections from said terminal to said helical strip and unaffected by the longitudinal movement of said insulating block.

5. A device of the class described, comprising a casing of insulating material, a block of insulating material within said casing, means for rotating said block, means for moving said block longitudinally, a helical contact strip carried by said block, an annular row of contacts carried by said

casing, a plate carried by said casing upon the inner wall thereof, and a rod extending through said insulating block, having sliding connections therewith and maintained in contact with said plate during the rotation of said block.

6. A combined timer and distributor, comprising three casing sections in axial alignment, a shaft concentric therewith, contacting members disposed within the terminal casing sections and movable longitudinally thereof and rotatable with said shaft, a plurality of terminals carried by said last-mentioned casing sections and each serving to close a separate circuit therethrough, and means within the center casing section for moving said contact members longitudinally of their respective casing sections.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE T. BROWN.

Witnesses:

F. W. HANAFORD,
JOHN P. DAVIS.