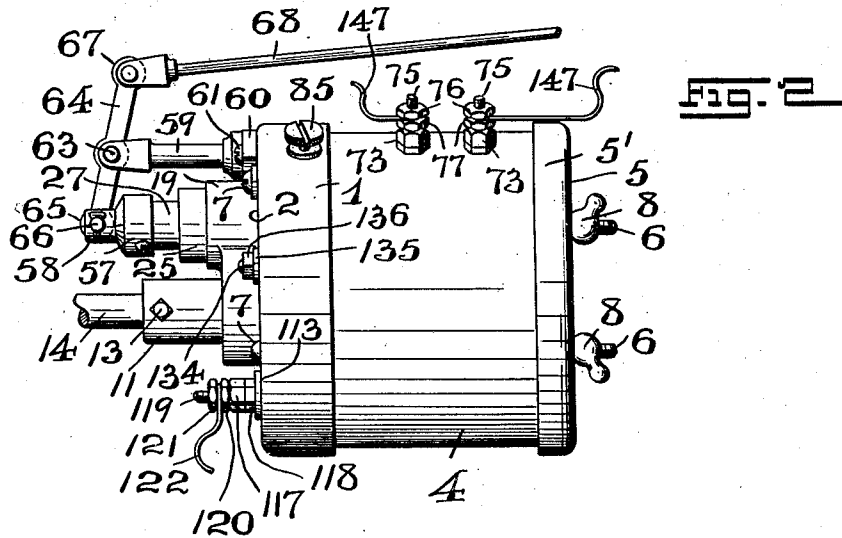
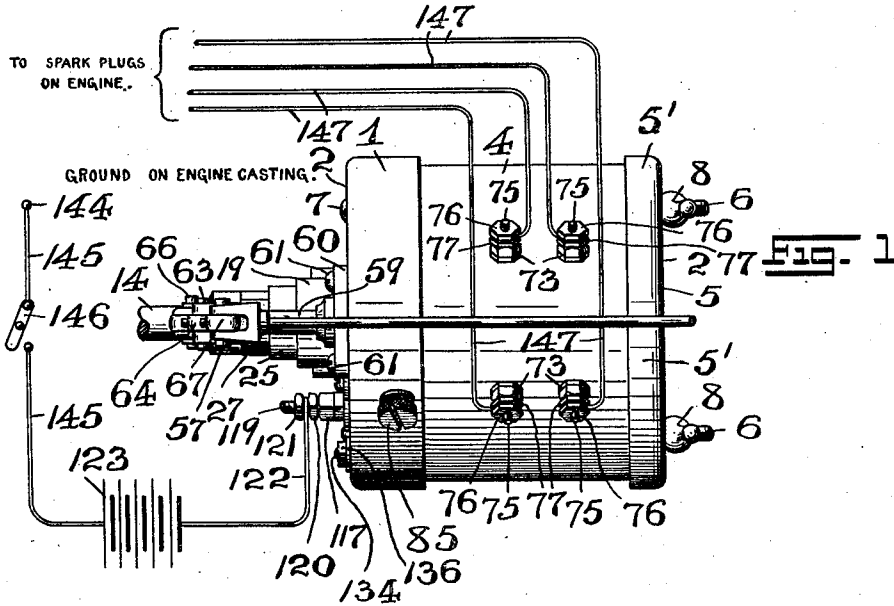


J. M. SMITH.
CURRENT DISTRIBUTER AND TIMER.
APPLICATION FILED JAN. 13, 1909.

950,706.

Patented Mar. 1, 1910.
3 SHEETS—SHEET 1.



WITNESSES:

Frederick H. W. Fraentzel
Anna H. Allen

INVENTOR:

James M. Smith,
BY *Fraentzel and Richards,*
ATTORNEYS.

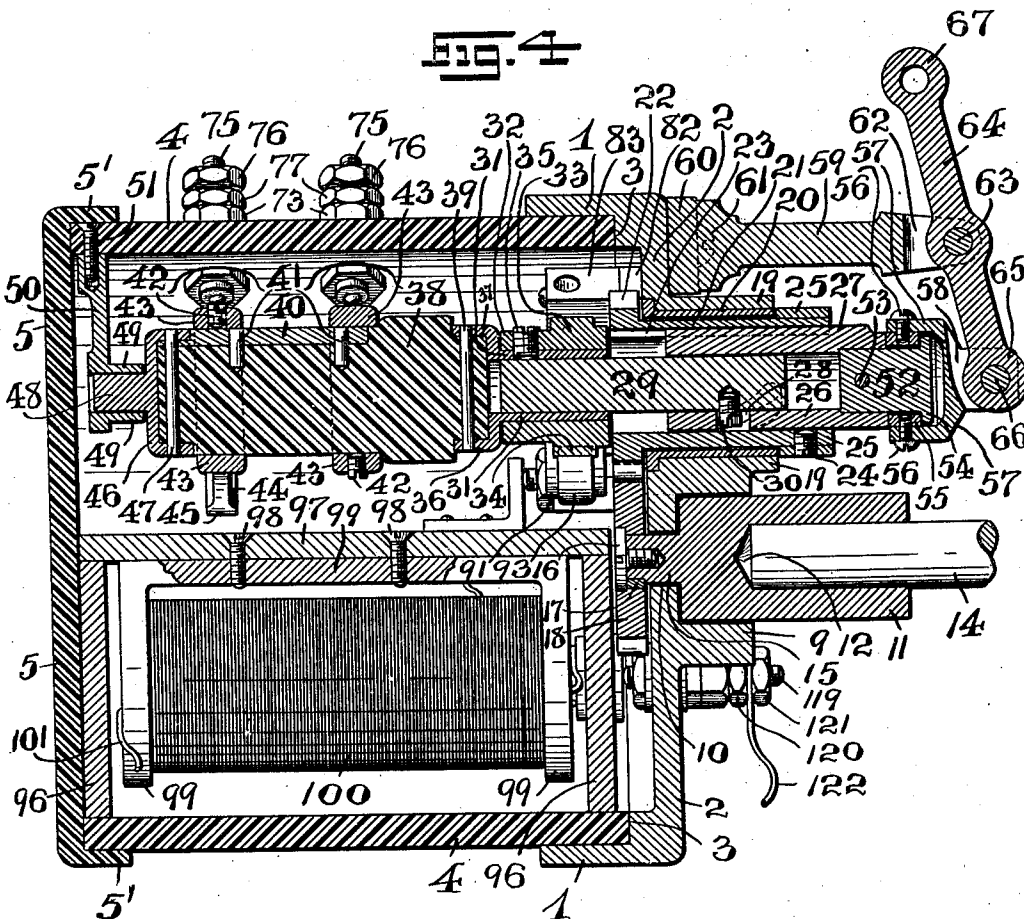
950,706.

J. M. SMITH.
CURRENT DISTRIBUTER AND TIMER.
APPLICATION FILED JAN. 13, 1909.

950,706.

Patented Mar. 1, 1910.

3 SHEETS—SHEET 3.



WITNESSES:

Frank H. W. Fraentzel
Anna H. Acton

INVENTOR:

James M. Smith,

BY

Fraentzel and Richards,
ATTORNEYS

UNITED STATES PATENT OFFICE.

JAMES M. SMITH, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO
WILSON D. CRAIG WRIGHT, OF PHILADELPHIA, PENNSYLVANIA.

CURRENT DISTRIBUTER AND TIMER.

950,706.

Specification of Letters Patent.

Patented Mar. 1, 1910.

Application filed January 13, 1909. Serial No. 472,098.

To all whom it may concern:

Be it known that I, JAMES M. SMITH, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Current Distributors and Timers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to characters of reference marked thereon, which form a part of this specification.

The present invention relates, generally, to improvements in ignition systems for explosive-gas-engines; and, the present invention has reference, more particularly, to a novel construction of combination timing, distributing and spark-coil apparatus, for controlling an electric current, to intermittently make and break the electric circuit thereof, and successively connect the sparking terminals or devices of a number of engine-cylinders with the proper circuit of said spark-coil, to thereby successively ignite or explode the charges of the explosive medium within the explosion-chambers of a multi-cylinder engine.

My present invention has for its principal object to provide a novel, simple and compact mechanism of the general character herein-above set forth, adapted to be so geared with the main shaft of an explosive-engine, that its parts operate in proper time-relation to the movement of the different pistons within the cylinder-chambers, and in so doing properly time and distribute the electric current successively to the sparking-terminals or devices of the said engines.

A further object of the present invention is to provide a compact arrangement of timer, distributor and spark-coil, which form the chief elements of the ignition system, and are arranged so as to be easily accessible for repairs, and for adjustment and regulation of the mechanism when in use.

A still further object of my invention is to provide an automatic timing and distributing mechanism, and means for compactly and simply connecting in operative relation therewith a single spark-coil, whereby the electric energy generated in said coil may be properly timed, so as to provide said elec-

trical energy at moments when the same is needed, to ignite the explosive charges in the engine-cylinders, but breaking the circuit when the electrical energy is not needed, so that a great saving of battery-energy, which is the primary source of said electrical energy, is obtained; and, furthermore, the mechanism is adapted to distribute successively, at proper intervals, the electrical energy of said coil to a plurality of sparking-terminals or devices upon the explosive-engine.

A still further object of my present invention is to provide such a novel arrangement of mounting and operating mechanism, that the weight of the apparatus is carried by a main driving spindle, adapted to be geared with the main shaft of said explosive-engine, whereas the distributor and timer-shaft or spindle is separate and independent of said main driving spindle, carrying only its own weight and thus assuring positive contacts and operation and preventing objectionable wobbling or vibration which interferes with a proper and satisfactory operation of the timer and distributor mechanism.

Other objects of the present invention not at this time more particularly enumerated will be clearly evident from the following detailed description of my present invention.

With the various objects of my present invention in view, the same consists, primarily, in the novel combination spark-coil, timer and distributor hereinafter set forth; and, the invention consists, furthermore, in the novel arrangements and combinations of devices and parts, as well as in the details of the construction of the same, all of which will be more fully described in the following specification, and then finally embodied in the clauses of the claim which are appended to and which form an essential part of this specification.

The invention is clearly illustrated in the accompanying drawings, in which:—

Figure 1 is a top view of the novel combination spark-coil, timer and distributor embodying the principles of the present invention, and illustrating in connection therewith, in diagrammatic representation, the electrical connections and circuits. Fig. 2 is a side elevation of said combination spark-coil, timer and distributor. Fig. 3 is an end view of the apparatus drawn on an enlarged

scale, the cover or face-plate of the same being removed. Fig. 4 is a central longitudinal vertical section of the same, taken on line 4—4 in said Fig. 3, and looking in the direction of the arrow *x*. Fig. 5 is a detail vertical section of the same taken on line 5—5 in said Fig. 3, and looking in the direction of the arrow *y*. Fig. 6 is an enlarged detail vertical section taken on line 6—6, in said Fig. 5. Fig. 7 is a similar enlarged detail vertical section taken on line 7—7, in said Fig. 5. Fig. 8 is an enlarged detail longitudinal section taken on line 8—8 in said Fig. 3.

Similar characters of reference are employed in all of the above described views, to indicate corresponding parts.

Referring now to the several figures of the drawings, the reference-character 1 indicates a cylindrical body-portion or shell formed with an end wall 2. This said body-portion or shell is further provided with an internal off-set or shoulder 3 upon which is arranged, as a base therefor, a tubular member or casing 4, preferably composed of some material which is a non-conductor of electricity. Arranged upon the outer or free end of said tubular member or casing is a cover-member 5, which is provided with an annular flange 5¹ adapted to be fitted over the outer peripheral edges of said tubular member or casing, in the manner of a box-cover. The said cylindrical body-portion 1, the tubular member or casing 4 and the said cover-member 5, are bound or secured together by means of bolts 6, the heads 7 of which bear against the outer surface of the end-wall 2, and the screw-threaded ends of which project through the said cover-member 5 and receive the binding or holding nuts 8. The end-wall 2 of said cylindrical body-portion or shell 1 is provided with a tubular hub 9, and said wall 2 is further provided with a hole or perforation 10 concentrically located in alinement with the opening of said tubular hub 9. Rotatably arranged within said tubular hub 9 is an arbor 11 which is provided with a receiving recess or socket 12 in which is secured by means of a set-screw 13 one end of a main driving spindle 14, the same being adapted to be connected by gearing, or in any other suitable manner, to the main shaft of an explosive-engine. The said arbor 11 is provided with a reduced portion 15 adapted to pass through said hole or opening 10 and penetrates slightly into the interior of the casing. Secured upon the end of said reduced portion 15 by means of a screw 16, and a locking key 17, or in any other suitable manner, is a gear-wheel 18. The said wall 2 of said cylindrical body-portion or shell 1 is further provided with another tubular hub 19, and arranged within the same is a suitable sleeve 20. Rotatably arranged with-

in said sleeve 20 is an elongated hollow hub 21 of a gear-wheel 22, said gear-wheel being adapted to operatively mesh with the previously mentioned gear-wheel 18. The inner surface of said elongated hollow hub 21 is provided with a longitudinally extending channel or groove 23, and secured upon the outer end of said hollow hub 21, by means of a locking screw 24, is a collar 25 which is adapted to retain the said hollow hub 21 and its gear-wheel 22 in proper rotative arrangement with said sleeve 20 and tubular hub 19. Slidably arranged within said elongated hollow hub 21 of said gear-wheel 22 is a sleeve 26, the same being provided upon its outer surface with a longitudinal rib or projection 27 adapted to dove-tail into said channel or groove 23 of said hollow hub 21, so as to impart the rotary movement of said hollow hub 21 to said sleeve 26, while still retaining its sliding relation therewith. The said sleeve 26 is still further provided with a cam-shaped groove or opening 28. Arranged within this sleeve 26 is a spindle or shaft 29 which is provided with a stud 30, this stud being adapted to be operatively engaged by said cam-shaped groove or opening 28 in said sleeve 26. Arranged upon the free end of the said spindle or shaft 29 is a sleeve 31, and arranged upon this sleeve 31 is a hub 32 which is provided with a cam-shaped shoulder 33 having a series of depressions or recesses 34 upon its outer surface. The said sleeve 31 and hub 32 are rigidly secured upon said shaft or spindle 29 by means of a locking screw 35. Connected with the end of said sleeve 31, and preferably forming an integral part thereof, is a cup-like receiving socket or recess 36, adapted to receive the reduced end 37 of a cylindrical contact-carrier 38, said carrier being composed of a suitable material which is a non-conductor of electricity. The said contact-carrier 38 is rigidly secured within said receiving socket or recess 36, by means of a pin 39, which passes transversely through the walls of said receiving socket or recess 36 and said reduced portion or end 37. Arranged upon said contact-carrier 38, and preferably counter-sunk in its surface, is a longitudinally extending contact-bar or bridge 40, secured in place by means of pins 41, or in any other suitable manner. Secured upon said contact-carrier 38, by means of set-screws 42 so as to be in contact with said contact-bar or bridge 40, are a pair of ring-like members 43, each member being provided with a fan-shaped contact making and breaking member 44 upon the free end of which is a contact-shoe 45. These fan-shaped contact making and breaking members 44 are arranged in such a manner so that they extend diametrically in opposite directions with relation to the axis of said contact-carrier 38. Secured upon the free

end of the contact-carrier 38, by means of the transversely extending pin 47, and in contact with said contact-bar or bridge 40, is a metal cap 46. This said cap 46 is provided with a centrally disposed stud or journal 48 which is rotatably arranged in a bearing-member 49, the latter being supported by a bracket-piece 50, secured by means of screws 51, or in any other suitable manner, to the inner side of said tubular member or casing 4. The said sleeve 26 being adapted to slide within the said hollow-hub 21, it will be evident, that the cam-shaped surface-portion of the groove or opening 28 will, during such sliding movement, engage with the stud 30 of the shaft 29; and, owing to the shape of said cam-groove, the action upon the said stud 30 will shift or turn the said shaft 29 slightly in its relation to said sleeve 26. This movement is desirable in order to shift or arrange the position of the said fan-shaped members 44 and their contact-shoes 45, so that the time of contact with the contact-members to be subsequently described with relation to the movement of the piston in the engine-cylinders, will be advanced or retarded, as may be desired, and consequently the sparks at the sparking-terminals or devices may be subject to advancement or retardation with relation to the movement of the pistons in said engine-cylinders. The means for moving or sliding the said sleeve 26, for the above purposes, comprises the following mechanism:—The reference-character 52 indicates a plug, one end of which is adapted to be inserted in the outer end of the sleeve 26 and is secured therein by means of a transversely extending pin 53. This plug 52 is provided with a flanged end 54, arranged so as to leave a space or channel between the flange thereof and the end of said sleeve 26. Arranged within said space or channel is a ring-shaped member 55 which swivels upon said plug 52, and secured to this ring-shaped member 55, by means of screws 56, is a cap-piece 57 which is provided at its outer end with a pair of perforated lugs or ears 58.

The reference-character 59 indicates a pedestal-member 59 provided with a pair of oppositely extending and perforated lugs 60, through which pass holding-screws 61, for securing said pedestal-member to the outer side of the end-wall 2 of the main body-portion or shell 1. The said pedestal-member is further provided at its free end with a pair of perforated lugs or ears 62, between which as a fulcrum is pivoted upon a pintle 63, a lever or member 64, one end 65 of which is pivotally connected between the lugs or ears 58 of said cap-piece 57 with a pivot or pintle 66. The other end 67 of said lever or member 64 is pivotally connected with an operating rod 68.

The said tubular member or casing 4 is

provided with a plurality of contact-members, the same comprising a tubular-portion or sleeve 69 which is provided with an annular flange 70, said sleeve being formed with an externally screw-threaded portion 71 and an internally enlarged portion 72. A chambered or hollow nut-shaped body 73 is screwed upon said externally screw-threaded portion 71, against a washer or nut 74 arranged upon said sleeve or portion 69. The said nut-shaped body 73 is provided with a screw-threaded shank 75 upon which are screwed a pair of binding-nuts 76 and 77, all of which form a binding-post, as will be clearly evident. The inner end of said tubular-portion or sleeve 69 is provided with a cup-shaped perforated end 78 in which is arranged a contact-ball 79, a coiled spring 80 being employed to hold said contact-ball in a proper position so as to make contact with one of said contact-shoes 45 of said fan-shaped contact making and breaking members 44, when the same passes in front of said contact-ball 79. These said contact-members are arranged in an upper and lower bank, two in a bank, and the axes of said contact-members intersect the axis of said contact carrier 38 preferably at right angles, and the angle between said contact member is preferably ninety degrees or approximately so. This arrangement of said contact-members insures a proper contact between a single one of the same and a contact-shoe 45, at every quarter of a revolution of said contact carrier 38, and also insures the contact by one of said contact-shoes 45 of each contact-member, successively, or in other words one after the other.

Secured in any suitable manner to the inner side of the wall 2 of said main body or shell 1 is a plate 81, the same being insulated from electrical contact with said wall 2 by means of a plate of insulating material 82. Arranged upon the plate 81 is a supporting member 83 which adjustably supports a contact-screw 84, the shank of which passes through said main body or shell 1, and is insulated therefrom, and terminates upon the outer side of said shell 1, in a head 85, adapted to be used in manipulating said contact-screw 84 for the purpose of adjusting the same. Suitably secured to the inner side of the said wall 2 is a post 86, and pivotally secured thereon by means of a retaining nut 87 is a hub 88 of a contact-making and breaking-element. Extending from the said hub 88 is an arm 89 which is adapted to be brought in contact with the end of the contact-screw 84. A second arm 90 extends from said hub 88, said arm being made with a bifurcated or yoke-shaped end 91 across which extends a pin or pintle 92 upon which is mounted a roller 93. Suitably secured on said wall 2 is a socketed post 94 in which is secured a

coiled spring 95, said spring having a portion extending from said socketed post and engaging with the sides of the arms 90, so that the roller 93 will be forced into rolling contact with the cam-shaped shoulder 33 and the depressions 34 thereof, and thereby at proper times causes the arm 89 to be brought against the end of the contact screw 84.

Arranged within the said tubular member 10 or casing 4 are a pair of semi-circular supporting-members 96 which are connected by means of a longitudinally extending partition or member 97. Secured to the inner side of said longitudinal partition or member 97, by means of screws 98, or the like, is a bracket-portion 99 forming part of a spark-coil 100. The wire 101 of the secondary winding of said spark-coil is secured between the head 102 of a screw 103, and a washer 104, the shank of said screw 103 passing through longitudinal partition or member 97, and a contact-bridge or conductor 105 is secured upon said screw 103 by means of a nut 106, the free end of said contact-bridge or conductor 105 engaging with the bracket-piece 50, and thereby passing the secondary current of said spark-coil through the intervening metal parts into the contact-shoes 45, as will be clearly evident from an inspection of Fig. 3 of the drawings. One of the wires 107 of the primary winding of said spark-coil is secured to a contact-plate 108. The said contact-plate 108 is placed upon the under side of one of said semi-circular portion members 96, and is held in place by means of a screw 109 which passes through said partition-member 96, and has arranged upon the free end thereof a nut 110 and washer 111, between which the said wire 107 is secured.

Arranged in a suitable perforation or hole in said wall 2 of the main body-portion or shell 1 is a socketed element or sleeve 112, which is insulated from said wall 2, by means of a collar and washer 113, of a suitable material which is a non-conductor of electricity. The said socketed element or sleeve 112 is provided with an annular-flange 114, an externally screw-threaded part 115, and an internally enlarged portion 116. A chambered or hollow nut-shaped body 117 is screwed upon said externally screw-threaded part 115, against a screw-threaded washer 118, the said nut-shaped body 117 being provided with a screw-threaded shank 119 upon which is arranged a pair of binding nuts 120 and 121, and between which is secured a wire or electrical-conductor 122 leading from one pole of a battery 123. Arranged in the internally enlarged portion 116 of the sleeve 112, is the head 124 of a contact-pin or plug 125, a coiled spring 126 being employed to force the free end of said contact pin or plug 125 in constant contact with the above-described contact-plate 108 as illustrated

more particularly in Fig. 6 of the drawings, and thereby making one of the battery connection with the primary circuit of said spark-coil 100. The other wire 127 of the primary circuit of said spark-coil 100 is secured between a pair of washers 128 and 129, which are arranged upon a screw 130. This screw 130 passes through said longitudinal partition or member 97 and serves to secure upon the outer side thereof a contact-plate 131, as well as to make electrical contact therewith. The contact-plate is further secured by means of a second screw 132, and said contact-plate is provided with an outwardly extending lug or projection 133. The said plate 81 is secured at one end by means of a screw-shank 134 which passes through the wall 2 of said main body-portion or shell 1, but is insulated therefrom by means of an insulating collar and washer 135, a nut 136 being screwed upon the free end of said screw-threaded shank 134 for binding the same in its holding engagement. The said screw-threaded shank 134 is provided at its inner end with a hollow nut-shaped member 137 formed with an internal screw-thread 138. Screwed to said nut-shaped member, by means of said screw-thread 138, is a screw-threaded sleeve 139 which is provided with an internally enlarged portion 140, and arranged in this internally enlarged portion 140 is the head 141 of a contact-pin or plug 142, a coiled spring 143 being employed to force the same in constant contact with the end or projection 133 of said contact-plate 131, as illustrated more particularly in Fig. 7 of the drawings, thereby carrying the primary circuit of said spark-coil 100 to said contact-screw 84 and closing the primary circuit through said make and break device, the engine-shaft and casing as a ground, which is indicated in Fig. 1 of the drawings by the reference-character 144, and thence by a wire or electrical conductor 145 through a cut-off switch 146, when desired, to the other pole of said battery 123. Secured between the nuts 76 and 77 of said contact-members of which said nuts form a part, are the wires or electrical conductors 147, which serve to conduct the secondary current of said spark-coil 100 to the several sparking terminals or devices arranged in the respective engine-cylinders. The sparking terminals are grounded in the usual manner within the cylinder-casting, and the secondary current is completed with the battery 23 through the engine-ground 144 and wire or conductor 145.

Having thus described the general construction of the combined timer, distributor and spark-coil embodying the principles of the present invention, I will now briefly set forth its use and operation in connection with the battery 123.

The electric current starting from the battery enters the primary circuit of the spark coil 100, as above described, and thence passes to the contact-screw 84. As the shaft 29 is revolved, the make and break device above described is operated, and when the roller 93 enters or drops into a depression 34 of the cam-shaped shoulder 33, carried by said shaft 29, the arm 89 touches the end of the contact-screw 84, whereby the primary circuit of said coil 100 is closed through the ground 144 and the circuit-wire 145. The primary circuit being thus completed, the secondary current of the coil is excited and the current so generated passes in the manner above described to a contact sleeve 45 upon said contact-carrier 38. The moment the primary circuit is closed or completed, the contact-carrier 38 which is practically a part of the shaft 29, inasmuch as it revolves simultaneously therewith, brings in contact with a contact-ball 79 of one of the above described contact-member, one of the said contact-shoes 45, and thereby passes the secondary current through said contact-member and electrical conductor 147 connected therewith to a sparking-terminal or device in one of the engine-cylinders, generating at that time a spark, and igniting the explosive charge in said engine-cylinder, as will be clearly evident, and so on, as the make and break intermittently closes the primary circuit of said spark-coil 100, the secondary-circuit is completed successively through each one of the said contact-members and the sparking terminals or devices of a plurality of engine-cylinders.

From the foregoing description it will be clearly evident, that I have produced a novel, compact and efficient apparatus for timing and distributing and controlling an electrical current for the purpose of operating the ignition system of an internal combustion or explosive-engine, having a plurality of cylinders, but it will be readily understood that various changes may be made in the general arrangements and combinations of the devices and parts, without in any way departing from the scope of my present invention, as set forth in the foregoing specification, and as defined in the claims which are appended thereto. Hence I do not limit my present invention to the exact arrangements and combinations of devices and parts as set forth in the said specification, nor do I confine myself to the exact details of the construction of the said parts as illustrated in the accompanying drawings.

I claim:—

1. A current-distributor and timer for the ignition system of explosive-engines comprising a casing, an arbor rotatively arranged in said casing, a gear-wheel upon said arbor, a gear-wheel provided with a hollow hub rotatively arranged in said cas-

ing and adapted to mesh with the gear-wheel on said arbor, a sleeve slidably arranged in said hollow hub and adapted to rotate therewith, a shaft or spindle connected with said sleeve and adapted to rotate therewith, a make and break device within said casing, means connected with said shaft or spindle for operating the same, a current distributing mechanism within said casing, a spark-coil arranged within said casing, and means for connecting electrically the said spark-coil with the said make and break device and said distributing mechanism, substantially as and for the purposes set forth.

2. A current-distributor and timer for the ignition system of explosive-engines comprising a casing, an arbor rotatively arranged in said casing, a gear-wheel upon said arbor, a gear-wheel provided with a hollow hub rotatively arranged in said casing and adapted to mesh with the gear-wheel on said arbor, a sleeve slidably arranged in said hollow hub and adapted to rotate therewith, a shaft or spindle connected with said sleeve and adapted to rotate therewith, a hub secured upon said shaft or spindle, a cam-shaped shoulder upon said hub provided with a plurality of depressions therein, a metal supporting member secured within said casing, an adjustable contact-screw mounted in said supporting member, a post mounted within said casing, a contact-making and breaking device pivoted upon said post, comprising a pair of arms, one of which is adapted to make contact with said contact-screw, a roller carried by the other arm, adapted to be maintained in rolling contact with the peripheral surface-portions and depressions of said cam-shoulder, a current distributing mechanism within said casing, a partition-member arranged within said casing, a spark-coil supported by said partition-member, and means for electrically connecting said spark-coil with the supporting member of said contact-screw and with said distributing mechanism, substantially as and for the purposes set forth.

3. A current-distributor and timer for the ignition system of explosive-engines comprising a casing, an arbor rotatively arranged in said casing, a gear-wheel upon said arbor, a gear-wheel provided with a hollow hub rotatively arranged in said casing and adapted to mesh with the gear-wheel on said arbor, a sleeve slidably arranged in said hollow hub and adapted to rotate therewith, a shaft or spindle connected with said sleeve and adapted to rotate therewith, a hub secured upon said shaft or spindle, a cam-shaped shoulder upon said hub provided with a plurality of depressions therein, a metal supporting member secured within said casing, an adjustable contact-screw

mounted in said supporting member, a post mounted within said casing, a contact-making and breaking device pivoted upon said post, comprising a pair of arms, one of which is adapted to make contact with said contact-screw, a roller carried by the other arm, adapted to be maintained in rolling contact with the peripheral surface-portions and depressions of said cam-shoulder, a current distributing mechanism within said casing, a pair of semi-circularly formed supporting members, a partition-member mounted upon said supporting members and arranged within said casing, a spark-coil supported by said partition-member, means for electrically connecting said spark-coil with the supporting member of said contact-screw and with said distributing mechanism, means for connecting the primary winding of said spark-coil with a battery, comprising a socketed element connected with said casing, a binding-post connected therewith, insulating collars for electrically separating said socketed element and said binding-post from said casing, a spring-controlled contact-plug within said socketed element, a contact-plate secured to one of said semi-circularly formed supporting members adapted to receive the contact of said contact-plug, and means for connecting a primary wire of said spark coil to said contact-plate, substantially as and for the purposes set forth.

4. A current-distributor and timer for the ignition system of explosive-engines comprising a casing, an arbor rotatively arranged in said casing, a gear-wheel upon said arbor, a gear-wheel provided with a hollow hub rotatively arranged in said casing and adapted to mesh with the gear-wheel on said arbor, a sleeve slidably arranged in said hollow hub and adapted to rotate therewith, a shaft or spindle connected with said sleeve and adapted to rotate therewith, a hub secured upon said shaft or spindle, a cam-shaped shoulder upon said hub provided with a plurality of depressions therein, a metal supporting member secured within said casing, an adjustable contact-screw mounted in said supporting member, a post mounted within said casing, a contact-making and breaking device pivoted upon said post, comprising a pair of arms, one of which is adapted to make contact with said contact-screw, a roller carried by the other arm, adapted to be maintained in rolling contact with the peripheral surface-portions and depressions of said cam-shoulder, a partition-member arranged within said casing, a spark-coil supported by said partition-member, means for connecting the primary winding of said spark-coil with said supporting member of said contact-screw, comprising a socketed element connected with said supporting member, a spring-con-

trolled contact-plug within said socketed element, a contact-plate secured to said partition-member, adapted to receive the contact of said contact-plug, means for connecting the primary wire of said spark-coil to said contact-plate, a current distributing mechanism within said casing, and means for electrically connecting the same with said spark-coil, substantially as and for the purposes set forth.

5. A current-distributor and timer for the ignition systems of explosive engines comprising a casing, an arbor rotatively arranged in said casing, a gear-wheel upon said arbor, a gear-wheel provided with a hollow hub rotatively arranged in said casing and adapted to mesh with the gear-wheel on said arbor, a sleeve slidably arranged in said hollow hub and adapted to rotate therewith, a shaft or spindle connected with said sleeve and adapted to rotate therewith, a hub secured upon said shaft or spindle, a cam-shaped shoulder provided with a plurality of depressions therein, a metal supporting member secured within said casing, an adjustable contact screw mounted in said supporting member, a post mounted within said casing, a contact-making and breaking device pivoted upon said post, comprising a pair of arms, one of which is adapted to make contact with said contact-screw, and means upon the other arm in engagement with said cam-shaped shoulder, a current-distributing mechanism within said casing, comprising a contact-carrier secured to and revolved by said shaft or spindle but electrically insulated therefrom, a pair of distributing fan-shaped members provided with contact-shoes mounted on said contact-carrier, a plurality of contact-members arranged in said casing adapted to be successively engaged by said contact-shoes, binding-posts connected with said contact-members, a spark-coil arranged within said casing, and means for connecting electrically said spark-coil with said make and break device and with said distributing mechanism, substantially as and for the purposes set forth.

6. A current-distributor and timer for the ignition systems of explosive engines comprising a casing, an arbor rotatively arranged in said casing, a gear-wheel upon said arbor, a gear-wheel provided with a hollow hub rotatively arranged in said casing and adapted to mesh with the gear-wheel on said arbor, a sleeve slidably arranged in said hollow hub and adapted to rotate therewith, a shaft or spindle connected with said sleeve and adapted to rotate therewith, a hub secured upon said shaft or spindle, a cam-shaped shoulder provided with a plurality of depressions therein, a metal supporting member secured within said casing, an adjustable contact screw mounted in said

supporting member, a post mounted within said casing, a contact-making and breaking device pivoted upon said post, comprising a pair of arms, one of which is adapted to make contact with said contact-screw, and means upon the other arm in engagement with said cam-shaped shoulder, a current-distributing mechanism within said casing, comprising a contact-carrier secured to and revolved by said shaft or spindle but electrically insulated therefrom, a pair of distributing fan-shaped members provided with contact-shoes mounted on said contact-carrier, a plurality of contact-members arranged in said casing adapted to be successively engaged by said contact-shoes, binding-posts connected with said contact-members, a spark-coil arranged within said casing, means for connecting electrically said spark-coil with said make and break device and with said distributing mechanism, and means for controlling or adjusting said distributing mechanism to advance or retard the time of distribution of the electrical current in relation to the operation of the engine-pistons, substantially as and for the purposes set forth.

7. A current-distributor and timer for the ignition systems of explosive engines comprising a casing, an arbor rotatively arranged in said casing, a gear-wheel upon said arbor, a gear-wheel provided with a hollow hub rotatively arranged in said casing and adapted to mesh with the gear-wheel on said arbor, a sleeve slidably arranged in said hollow hub and adapted to rotate therewith, a shaft or spindle connected with said sleeve and adapted to rotate therewith, a hub secured upon said shaft or spindle, a cam-shaped shoulder provided with a plurality of depressions therein, a metal supporting member secured within said casing, an adjustable contact screw mounted in said supporting member, a post mounted within said casing, a contact-making and breaking device pivoted upon said post, comprising a pair of arms, one of which is adapted to make contact with said contact-screw, and means upon the other arm in engagement with said cam-shaped shoulder, a current-distributing mechanism within said casing, comprising a contact carrier secured to and revolved by said shaft or spindle, a pair of distributing fan-shaped members provided with contact-shoes mounted on said contact-carrier, a plurality of contact-members arranged in said casing adapted to be successively engaged by said contact-shoes, binding-posts connected with said contact-members, a spark-coil arranged within said casing, means for connecting electrically said spark-coil with said make and break device and with said distributing mechanism, and means for controlling or adjusting said distributing mechanism to advance or retard

the time of distribution of the electrical current in relation to the operation of the engine-pistons, comprising the provision in said sleeve of a cam-shaped groove, a stud on said shaft or spindle engaging said cam-shaped groove, and means for sliding back and forth said sleeve, comprising a swiveling cap-piece secured to said sleeve, a pedestal-member mounted on said casing, and a lever pivotally mounted on said pedestal-member, one end of said lever being pivotally secured to said swiveling cap-piece, substantially as and for the purposes set forth.

8. A current-distributor and timer for the ignition system of explosive-engines comprising a casing, an arbor rotatively arranged in said casing, a gear-wheel upon said arbor, a gear-wheel provided with a hollow hub rotatively arranged in said casing and adapted to mesh with the gear-wheel on said arbor, a sleeve slidably arranged in said hollow hub and adapted to rotate therewith, a shaft or spindle connected with said sleeve and adapted to rotate therewith, a hub secured to said shaft or spindle, a cam-shaped shoulder upon said hub, provided with a plurality of depressions therein, a metal supporting member secured within said casing, an adjustable contact-screw mounted in said supporting member, a post mounted within said casing, a contact-making and breaking device pivoted upon said post, comprising a pair of arms, one of which is adapted to make contact with said contact-screw, a roller carried by the other arm, adapted to be maintained in rolling contact with the peripheral surface-portions and depressions of said cam-shaped shoulder, a partition-member arranged within said casing, a spark-coil supported by said partition-member, means for connecting the primary winding of said spark-coil with said supporting member of said contact-screw, comprising a socketed element connected with said supporting-member, a spring-controlled contact-plug within said socketed element, a contact-plate secured to said partition-member, adapted to receive the contact of said contact-plug, means for connecting the primary wiring of said spark-coil to said contact-plate, a current distributing mechanism, comprising a contact-carrier secured to and revolved by said shaft or spindle, a metallic journal upon the end of said contact-carrier, a bearing-bracket secured to said casing and supporting said journal, a contact-bar connected with said journal, fan-shaped members secured upon said contact-carrier in contact with said contact-bar, contact shoes on said fan-shaped members, contact-members arranged in said casing, each comprising a socketed element, binding-posts connected therewith, and spring-controlled contact-balls arranged in said socketed ele-

ments, and means for connecting said fan-shaped members with the secondary wires of said spark-coil, substantially as and for the purposes set forth.

5 9. A current-distributor and timer for the ignition system of explosive-engines comprising a casing, an arbor rotatively arranged in said casing, a gear-wheel upon
10 said arbor, a gear-wheel provided with a hollow hub rotatively arranged in said casing and adapted to mesh with the gear-wheel on said arbor, a sleeve slidably arranged in said hollow hub and adapted to rotate therewith, a shaft or spindle connected with said sleeve and adapted to rotate therewith, a hub secured to said shaft or spindle, a cam-shaped shoulder upon said hub, provided with a plurality of depressions therein, a metal supporting member secured within said casing, an adjustable contact-screw mounted in said supporting member, a post mounted within said casing, a contact-making and breaking device pivoted upon said post, comprising a pair of arms, one of which is adapted to make contact with said contact-screw, a roller carried by the other arm, adapted to be maintained in rolling contact with the peripheral surface-portions and depressions of said cam-shaped shoulder, a partition-member arranged within said casing, a spark-coil supported by said partition-member, means for connecting the primary winding of said spark-coil with said supporting member of said contact-screw, comprising a socketed element connected with said supporting-member, a spring-controlled contact plug within said socketed element, a contact-plate secured to said partition-member, adapted to receive the contact of said contact-plug, means for connecting the primary wiring of said spark-coil to said contact-plate, a current distributing mechanism, comprising a contact-carrier secured to and revolved by said shaft or spindle, a metallic journal upon the end of said contact-carrier, a bearing-bracket secured to said casing and supporting said journal, a contact-bar connected with said journal, fan-shaped members secured upon said contact-carrier in contact with said contact-bar, contact shoes on said fan-shaped members, contact-members arranged in said casing, each comprising a socketed element, binding-posts connected therewith, and spring-controlled contact-balls arranged in said socketed elements, and means for connecting said fan-shaped members with the secondary wires of said spark-coil, comprising a contact-bridge secured to said partition-member, the free end thereof bearing upon the said bearing-bracket, and means for connecting said secondary wiring of said spark-coil to said contact-bridge, substantially as and for the purposes set forth.

65 10. A current-distributor and timer for

the ignition system of explosive-engines comprising a casing, an arbor rotatively arranged in said casing, a gear-wheel upon said arbor, a gear-wheel provided with a hollow hub rotatively arranged in said casing and adapted to mesh with the gear-wheel on said arbor, a sleeve slidably arranged in said hollow hub and adapted to rotate therewith, a shaft or spindle connected with said sleeve and adapted to rotate therewith, a hub secured to said shaft or spindle, a cam-shaped shoulder upon said hub, provided with a plurality of depressions therein, a metal supporting member secured within said casing, an adjustable contact-screw mounted in said supporting member, a post mounted within said casing, a contact-making and breaking device pivoted upon said post, comprising a pair of arms, one of which is adapted to make contact with said contact-screw, a roller carried by the other arm, adapted to be maintained in rolling contact with the peripheral surface-portions and depressions of said cam-shaped shoulder, a pair of semi-circularly formed supporting members, a partition-member mounted upon said supporting members and arranged within said casing, a spark-coil supported by said partition-member, means for connecting the primary winding of said spark-coil with said supporting member of said contact-screw, comprising a socketed element connected with said supporting-member, a spring-controlled contact-plug within said socketed element, a contact-plate secured to said partition-member, adapted to receive the contact of said contact-plug, means for connecting the primary wiring of said spark-coil to said contact-plate, a current distributing mechanism, comprising a contact-carrier secured to and revolved by said shaft or spindle, a metallic journal upon the end of said contact-carrier, a bearing-bracket secured to said casing and supporting said journal, a contact-bar connected with said journal, fan-shaped members secured upon said contact-carrier in contact with said contact-bar, contact shoes on said fan-shaped members, contact-members arranged in said casing, each comprising a socketed element, binding-posts connected therewith, and spring-controlled contact-balls arranged in said socketed elements, means for connecting said fan-shaped members with the secondary wires of said spark-coil, comprising a contact-bridge secured to said partition-member, the free end thereof bearing upon the said bearing-bracket, and means for connecting said secondary wiring of said spark-coil to said contact-bridge, means for connecting said spark-coil with a battery, comprising a socketed element connected with said casing, a binding-post connected therewith, insulating collars for electrically separating said socketed-element and said binding post from said

casing, a spring-controlled contact-plug within said socketed element, a contact-plate secured to one of said semi-circularly formed supporting members adapted to receive the contact of said contact plug, and means for connecting the primary wire of said spark-coil to said contact-plate, substantially as and for the purposes set forth.

11. A current-distributor and timer for the ignition system of explosive-engines comprising a casing, an arbor rotatively arranged in said casing, a gear-wheel upon said arbor, a gear-wheel provided with a hollow hub rotatively arranged in said casing and adapted to mesh with the gear-wheel on said arbor, a sleeve slidably arranged in said hollow hub and adapted to rotate therewith, a shaft or spindle connected with said sleeve and adapted to rotate therewith, a hub secured to said shaft or spindle, a cam-shaped shoulder upon said hub, provided with a plurality of depressions therein, a metal supporting member secured within said casing, an adjustable contact-screw mounted in said supporting member, a post mounted within said casing, a contact-making and breaking device pivoted upon said post, comprising a pair of arms, one of which is adapted to make contact with said contact-screw, a roller carried by the other arm, adapted to be maintained in rolling contact with the peripheral surface-portions and depressions of said cam-shaped shoulder, a partition-member arranged within said casing, a spark-coil supported by said partition-member, means for connecting the primary winding of said spark-coil with said supporting member of said contact-screw, comprising a socketed element connected with said supporting-member, a spring-controlled contact-plug within said socketed element, a contact-plate secured to said partition-member, adapted to receive the contact of said contact-plug, means for connecting the primary wiring of said spark-coil to said contact-plate, a current distributing mechanism, comprising a contact-carrier secured to and revolved by said shaft or spindle, a metallic journal upon the end of said contact-carrier, a bearing-bracket secured to said casing and supporting said journal, a contact-bar connected with said journal, fan-shaped members secured upon said contact-carrier in contact with said contact-bar, contact shoes on said fan-shaped members, contact-members arranged in said casing, each comprising a socketed element, binding-posts connected therewith, and spring-controlled contact-balls arranged in said socketed elements, means for controlling or adjusting said distributing mechanism to advance or retard the time of distribution of the electrical current in relation to the operation of the engine-pistons, comprising the provision in

said sleeve of a cam-shaped groove, a stud on said shaft or spindle engaging said cam-shaped groove, a means for sliding back and forth said sleeve, comprising a swiveling cap-piece secured to said sleeve, a pedestal-member mounted on said casing, and a lever pivotally mounted on said pedestal-member, one end of said lever being pivotally secured to said swiveling cap-piece, and means for connecting said fan-shaped members with the secondary wires of said spark-coil, substantially as and for the purposes set forth.

12. A current-distributor and timer for the ignition system of explosive-engines comprising a casing, an arbor rotatively arranged in said casing, a gear-wheel upon said arbor, a gear-wheel provided with a hollow hub rotatively arranged in said casing and adapted to mesh with the gear-wheel on said arbor, a sleeve slidably arranged in said hollow hub and adapted to rotate therewith, a shaft or spindle connected with said sleeve and adapted to rotate therewith, a hub secured to said shaft or spindle, a cam-shaped shoulder upon said hub, provided with a plurality of depressions therein, a metal supporting member secured within said casing, an adjustable contact-screw mounted in said supporting member, a post mounted within said casing, a contact-making and breaking device pivoted upon said post, comprising a pair of arms, one of which is adapted to make contact with said contact-screw, a roller carried by the other arm, adapted to be maintained in rolling contact with the peripheral surface-portions and depressions of said cam-shaped shoulder, a pair of semi-circularly formed supporting members, a partition member mounted upon said supporting members and arranged within said casing, a spark-coil supported by said partition-member, means for connecting the primary winding of said spark-coil with said supporting member of said contact-screw, comprising a socketed element connected with said supporting-member, a spring-controlled contact-plug within said socketed element, a contact plate secured to said partition-member, adapted to receive the contact of said contact-plug, means for connecting the primary wiring of said spark-coil to said contact-plate, a current distributing mechanism comprising a contact-carrier secured to and revolved by said shaft or spindle, a metallic journal upon the end of said contact-carrier, a bearing-bracket secured to said casing and supporting said journal, a contact-bar connected with said journal, fan-shaped members secured upon said contact-carrier in contact with said contact-bar, contact shoes on said fan-shaped members, contact-members arranged in said casing, each comprising a socketed element, binding-posts connected therewith, and spring-controlled contact-

balls arranged in said socketed elements, means for controlling or adjusting said distributing mechanism to advance or retard the time of distribution of the electrical current in relation to the operation of the engine-pistons, comprising the provision in said sleeve of a cam-shaped groove, a stud on said shaft or spindle engaging said cam-shaped groove, a means for sliding back and forth said sleeve comprising a swiveling cap-piece secured to said sleeve, a pedestal-member mounted on said casing, and a lever pivotally mounted on said pedestal-member, one end of said lever being pivotally secured to said swiveling cap-piece, and means for connecting said fan-shaped members with the secondary wires of said spark-coil, comprising a contact-bridge having the free end thereof bearing upon the said bearing-bracket, and means for connecting said secondary wire of said spark-coil to said contact-bridge, substantially as and for the purposes set forth.

13. A current-distributor and timer for the ignition system of explosive-engines comprising a casing, an arbor rotatively arranged in said casing, a gear-wheel upon said arbor, a gear-wheel provided with a hollow hub rotatively arranged in said casing and adapted to mesh with the gear-wheel on said arbor, a sleeve slidably arranged in said hollow hub and adapted to rotate therewith, a shaft or spindle connected with said sleeve and adapted to rotate therewith, a hub secured to said shaft or spindle, a cam-shaped shoulder upon said hub, provided with a plurality of depressions therein, a metal supporting member secured within said casing, an adjustable contact-screw mounted in said supporting member, a post mounted within said casing, a contact-making and breaking device pivoted upon said post, comprising a pair of arms, one of which is adapted to make contact with said contact-screw, a roller carried by the other arm, adapted to be maintained in rolling contact with the peripheral surface-portions and depressions of said cam-shaped shoulder, a partition-member arranged within said casing, a spark-coil supported by said partition-member, means for connecting the primary winding of said spark-coil with said supporting member of said contact-screw comprising a socketed element connected with said supporting-member, a spring-controlled contact-plug within said socketed element, a contact-plate secured to said partition-member, adapted

to receive the contact of said contact-plug, means for connecting the primary wiring of said spark-coil to said contact-plate, a current distributing mechanism comprising a contact-carrier secured to and revolved by said shaft or spindle, a metallic journal upon the end of said contact-carrier, a bearing bracket secured to said casing and supporting said journal, a contact-bar connected with said journal, fan-shaped members secured upon said contact-carrier in contact with said contact-bar, contact shoes on said fan-shaped members, contact-members arranged in said casing, each comprising a socketed element, binding-posts connected therewith, and spring-controlled contact-balls arranged in said socketed elements, means for controlling or adjusting said distributing mechanism to advance or retard the time of distribution of the electrical current in relation to the operation of the engine-pistons, comprising the provision in said sleeve of a cam-shaped groove, a stud on said shaft or spindle engaging said cam-shaped groove, a means for sliding back and forth said sleeve comprising a swiveling cap-piece secured to said sleeve, a pedestal-member mounted on said casing, and a lever pivotally mounted on said pedestal-member, one end of said lever being pivotally secured to said swiveling cap-piece, means for connecting said fan-shaped members with the secondary wiring of said spark-coil, comprising a contact-bridge having the free end thereof bearing upon the said bearing-bracket, and means for connecting said secondary wiring of said spark-coil to said contact-bridge, means for connecting said spark-coil with a battery, comprising a socketed element connected with said casing, a binding-post connected therewith, insulating collars for electrically separating said socketed-element and said binding-post from said casing, a spring-controlled contact-plug within said socketed element, a contact-plate adapted to receive the contact of said contact plug, and means for connecting the primary wire of said spark-coil to said contact-plate, substantially as and for the purposes set forth.

In testimony, that I claim the invention set forth above I have hereunto set my hand this eighth day of January, 1909.

JAMES M. SMITH.

Witnesses:

FREDK. C. FRAENTZEL,
FREDK. H. W. FRAENTZEL.