J. M. SMITH.

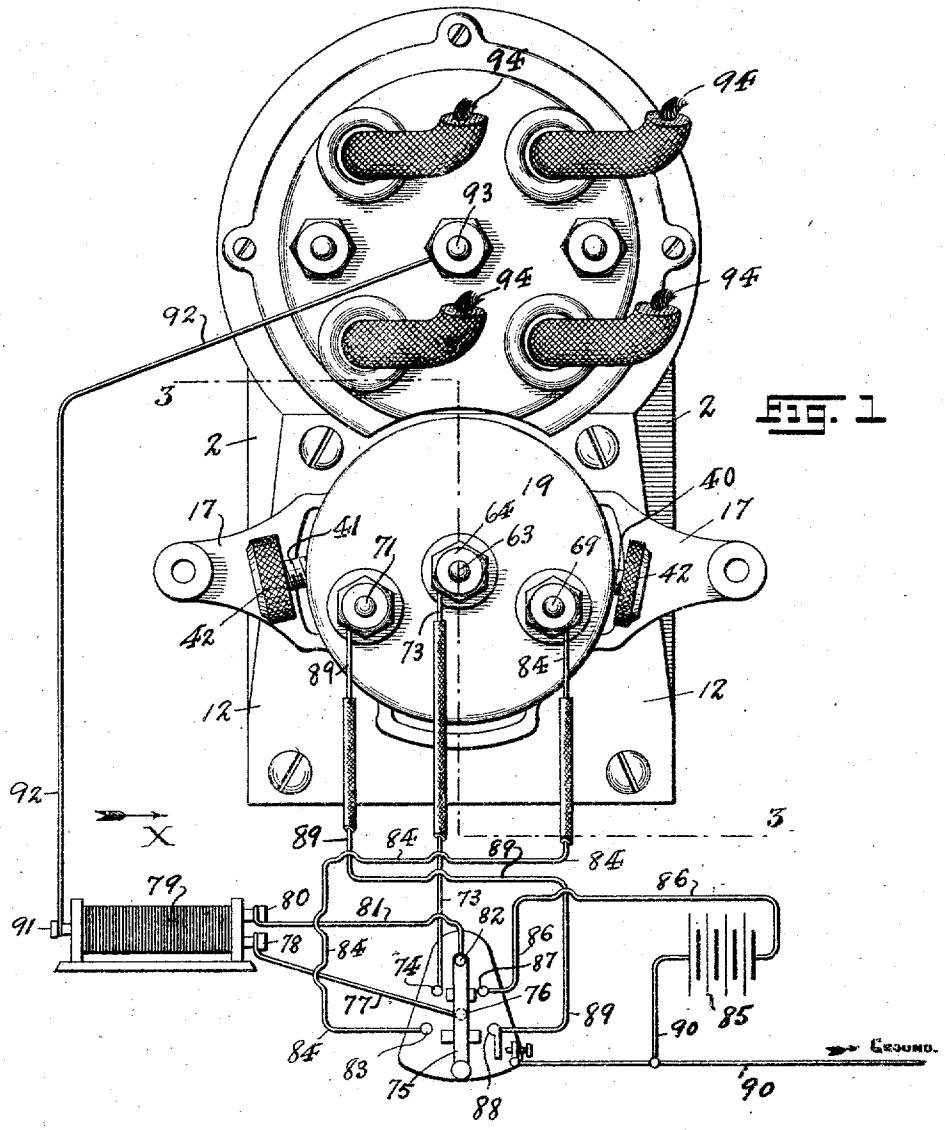
DOUBLE OR TWIN INTERRUPTER FOR IGNITION SYSTEMS.

APPLICATION FILED MAY 25, 1910.

1,018,137.

Patented Feb. 20, 1912.

3 SHEETS—SHEET 1.



WITNESSES:

Fredk W. Fraentzel

Anna H. Alter

INVENTOR

James M. Smith,

BY

Fraentzel and Rowlands.

ATTORNEYS

J. M. SMITH.

DOUBLE OR TWIN INTERRUPTER FOR IGNITION SYSTEMS.

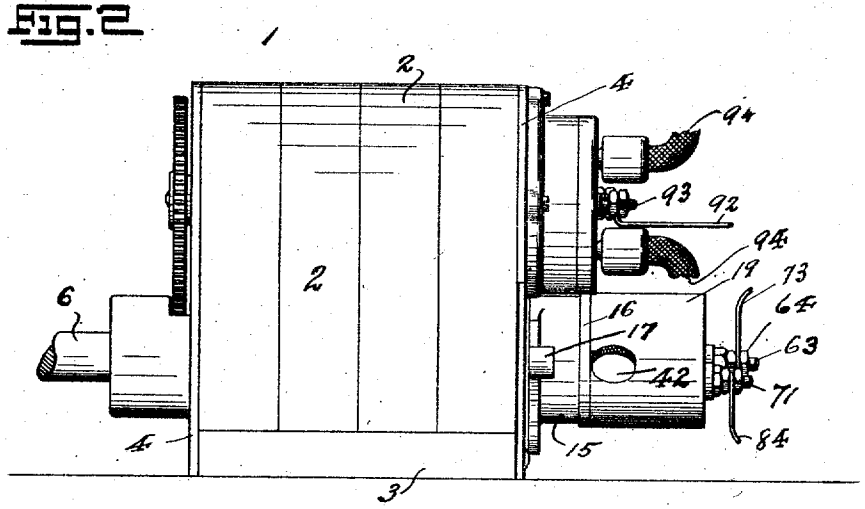
APPLICATION FILED MAY 25, 1910.

1,018,137.

Patented Feb. 20, 1912.

3 SHEETS—SHEET 2.

Fig. 2



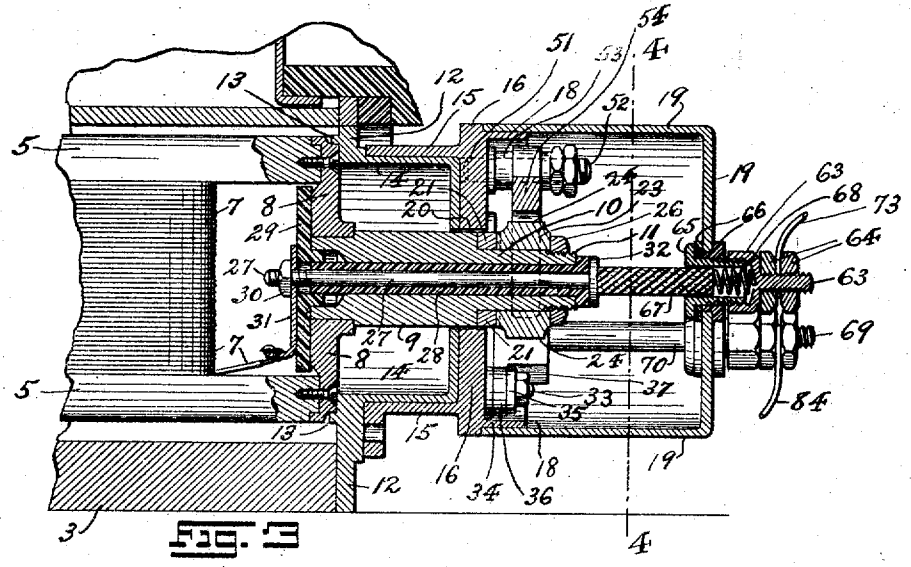


Fig. 3

WITNESSES:

Fredk. W. Praetzel

Anna H. Alter

INVENTOR

James M. Smith,

BY

Praetzel and Richards

ATTORNEYS

J. M. SMITH.

DOUBLE OR TWIN INTERRUPTER FOR IGNITION SYSTEMS.

APPLICATION FILED MAY 25, 1910.

1,018,137. Patented Feb. 20, 1912.

3 SHEETS—SHEET 3.

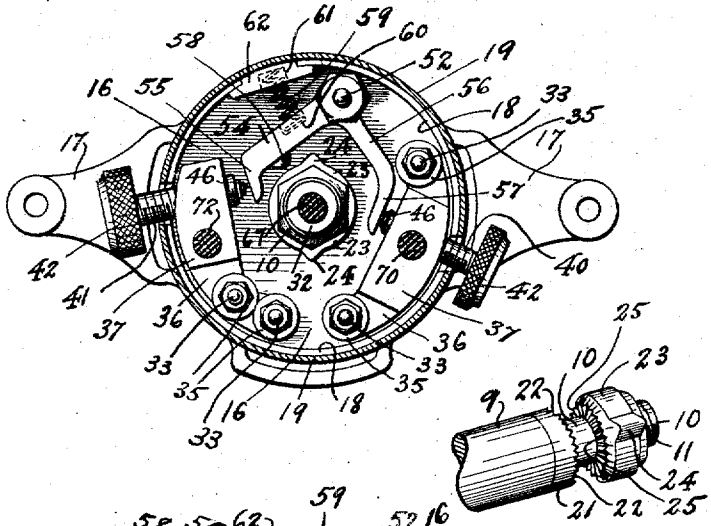


Fig. 4

Fig. 7

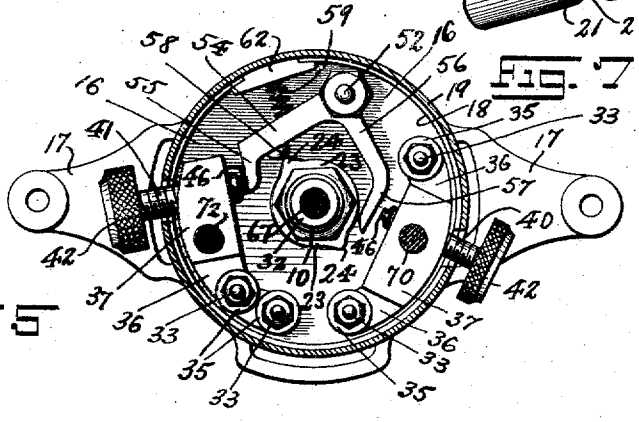


Fig. 5

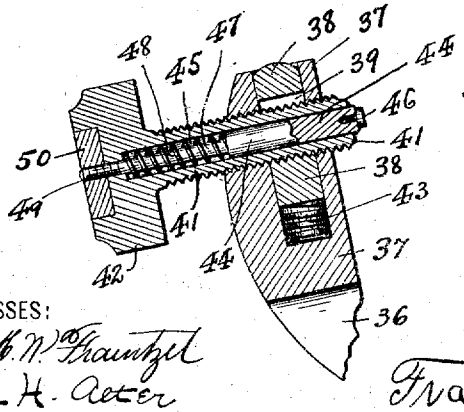


Fig. 6

WITNESSES:

Fredk. W. Frantzel

Anna H. Acker

INVENTOR

James M. Smith,

BY

Frantzel 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.

DOUBLE OR TWIN INTERRUPTER FOR IGNITION SYSTEMS.

1,018,137. Specification of Letters Patent. Patented Feb. 20, 1912.

Application filed May 25, 1910. Serial No. 563,239.

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 Double or Twin Interrupters for Ignition Systems; 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 the characters of reference marked thereon, which form a part of this specification.

The present invention has reference, generally, to improvements in magneto electric generators; and the invention relates more particularly to a magneto electric generator provided with a novel construction of interrupting device or circuit breaker for controlling the flow of electrical current in the circuits of an ignition system for internal combustion motors.

The present invention, therefore has for its principal object to provide a novel construction of double or twin interrupter or circuit-make and break device for controlling the flow of current in a magneto or normally closed circuit the current of which is generated by the magneto generator, and also for controlling the flow of current in a battery or normally open circuit auxiliary to said magneto circuit.

My novel construction of twin or double interrupter or circuit make and break is particularly adapted for use in connection with a novel high tension system of ignition for internal combustion motors, in which are employed two electrical circuits, one circuit being a normally closed circuit, the current of which is supplied by the magneto generator, and the other circuit being a normally open circuit, the current of which is supplied by batteries, both circuits being controlled, at will, by suitable switching means so as to pass either one or the other current, as controlled and timed by my novel interrupter or make and break device, through a single transformer coil and high tension distributing device. Such a system of high tension ignition has been described and claimed by me in an application for a patent filed May 25, 1911, Serial No. 563,237.

A further object of the present invention is to provide a circuit breaker or interrupter for both magneto and battery circuits caused to act by a single cam member, said cam member being provided with the proper number of cam-portions to cause the desired number of interruptions per revolution of the driving spindle. The device being so constructed that the interruptions in both of the respective circuits are positive, but the action of the one being the reverse of the other, the battery circuit being closed and rapidly opened again, and the magneto generated current being rapidly opened and closed again, both operations being simultaneous, hence properly timed no matter which circuit is in use.

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

With the various objects of my present invention in view, the said invention consists, primarily, in the novel construction of double or twin interrupter or make and break device for magneto electric generators hereinafter set forth; and the invention consists, furthermore, in the novel arrangements and combinations of the devices and parts, 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 the said specification.

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

Figure 1 is a face view of a magneto electric generator provided with my novel construction of twin or double interrupter or make and break device wired in connection with said novel system of high tension ignition for internal combustion motors. Fig. 2 is a side elevation of said magneto electric generator and novel twin or double interrupter or make and break device. Fig. 3 is a detail vertical longitudinal section taken on line 3—3 in said Fig. 1 looking in the direction of the arrow *x*, and illustrat-

ing more particularly the arrangement of my novel twin or double interrupter or circuit breaker as combined with said magneto-electric apparatus for use in said high tension ignition system. Fig. 4 is a detail cross section taken on line 4—4 in said Fig. 3 to further illustrate the detailed construction of my novel twin or double interrupter or circuit-breaker. Fig. 5 is a similar view illustrating, more particularly, the operation of my novel twin or double interrupter or circuit breaker. Fig. 6 is a detail horizontal section, drawn upon an enlarged scale, of one of the adjustable contact-pieces forming a part of my novel twin or double interrupter or circuit breaker. Fig. 7 is a detail perspective view of a portion of a driving spindle and a cam-member for operating said twin or double interrupter device.

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

Referring, now, to the several figures of the accompanying drawings, the reference-character 1 indicates a magneto electric apparatus comprising the usual construction of field magnets 2 supported upon the base-plate 3, and provided with the end-plates 4. Mounted between the poles of said field magnets 2 is a revoluble armature core 5, the same being connected with and driven by the shaft 6. Said armature core 5 is provided with the usual winding of wire 7. Secured to and supported by a journal-plate 8, which is secured to one end of said armature-core 5, is an outwardly extending spindle 9, the free end 10 of which is of suitably reduced diameter and provided at its extreme end with screw-threads 11. Secured to one end of said magneto-electric apparatus is a bearing plate 12, provided upon its inner side with a concentric rib 13 which forms a bearing for said journal-plate 8. Extending outwardly from the outer side of said bearing-plate 12 is a hollow cylindrical portion forming a bearing member 14, upon which is movably journaled the supporting hub 15 of a carrier-plate 16 adapted to support the novel twin or double interrupting or circuit-breaking device to be subsequently described. Said carrier-plate 16 is provided with outwardly extending arms 17 to which may be connected the usual lever connections for shifting said carrier-plate 16 and the devices supported thereon, to so change their relation with the operating devices therefor, that the delivery of electrical current to the spark-plugs in the internal combustion motor may be advanced or retarded as desired. Said carrier-plate 16 is provided with an outwardly projecting annular extension or shoulder 18 adapted to receive and support an inclosing casing 19. Said carrier-plate 16 is further provided with a centrally disposed hole or opening 20 adapted to permit the passages therethrough of said outwardly extending spindle 9.

The reference-character 21 indicates a coupling member adapted to be secured to the reduced free end 10 of said spindle 9 so as to be revolved thereby. Said coupling-member 21 is provided upon its outer face with a plurality of serrations or holding-members 22. Loosely mounted upon said reduced free end 10 of said spindle 9 is a cam-member 23 provided with the oppositely extending cam-portions 24. The inner face of said cam-member 23 is provided with a plurality of serrations or holding members 25 corresponding with the said serrations or holding members 22 of said coupling-member. The said serrations or holding members 22 and 25 serve a double purpose, first as a means for connecting said cam-member 23 with the coupling-member 21 so that the said cam-member will revolve with said spindle 9, and, second, to permit of a proper adjustment of said cam-member in its coupled relation to bring its cam-portions 24 in proper and timely operative relation with the devices said cam-portions are caused to operate, as will be hereinafter described. A nut 26 is secured upon the screw-threads 11 of said reduced free end 10 of said spindle 9, to retain said cam-member 23 in its coupled relation with said coupling-member 21. The said spindle 9 is provided with a longitudinally extending opening or passage through which extends a contact-rod or conductor 27, the same being separated from electrical contact with said spindle 9 by means of an insulator-sleeve 28. The inner end of said insulator-sleeve projects into the centrally disposed opening of an insulator-disk 29 arranged upon the inner side of said journal-plate 8, and said contact rod or conductor 27 projects through to the inner side of said insulator-disk 29, and the free end of said contact rod or conductor 27 is provided with screw-threads for the reception of a nut 30, which serves to connect with said contact-rod or conductor 27 a terminal-plate 31, to one end of which is secured by solder, or any other suitable fastening means, one end of the said armature-winding 7. The outer end of said contact-rod or conductor 27 is provided with a contact-head 32.

Suitably secured upon said carrier-plate 16 in suitable locations by means of bolts and nuts 33, and insulated from electrical contact with any portion of said carrier-plate 16 by the insulator-plates 34 and insulator sleeves 35 around said nuts and bolts 33, are suitable plates 36 which are formed with boxes 37, in each of which is slidably arranged a bar 38 having an elongated opening or slot 39. Suitably screwed into

screw-threaded holes in the sides of each box 37 is a contact-screw. One of said contact-screws 40 providing the contact for the magneto or closed circuit of my novel high tension system, and the other of said contact-screws 41 forming the contact for the battery or open circuit of my novel high tension system. Each of said contact-screws are formed with a knurled head 42 for manipulating said screws to adjust the same. The said contact-screws extend through the elongated opening or slot 39 of the bar 38 of their respective boxes 37, and the respective bars 38 are forced in frictional binding relation with their respective contact-screws by means of coil-springs 43, as shown more particularly in Fig. 6 of the drawings. The purpose of this arrangement is, that while the said contact-screws can be readily turned to adjust the same, still the frictional engagement of said bar 38 is sufficient to maintain said contact screw in its fixed or adjusted position without danger of the same jarring or shaking loose, or otherwise departing from its adjusted position. Each contact-screw is further provided with a yieldable contact-carrier 44 slidably arranged in a tubular opening 45 of each contact-screw. This contact-carrier 44 is cylindrical in form and its free end projects beyond the end of said contact-screw, and has secured in any suitable manner, thereto a contact-point 46, preferably made of platinum. The rear end of said contact-carrier 44 is provided with a rearwardly extending shank 47, around which is arranged a coil-spring 48 which bears against said contact-carrier 44 and retains the same in its normal initial position. Said shank 47 passes through a hole or perforation of reduced diameter in the head 42 of said contact-screw and is provided, preferably, with a screw-thread 49 adapted to receive and connect, with said shank a disk or head 50, which engages with the head 42 of said contact-screw, and serves to limit the outward movement or projection of said contact carrier 44, as will be clearly seen from an inspection of Fig. 6 of the drawings. Secured upon said carrier-plate 16, in a suitable location, by means of its screw-threaded end 51, is an arbor or spindle 52. Pivotally mounted upon said arbor or spindle 52 is a hub-portion 53. Extending outwardly from one side of said hub-portion 53 is a contact arm 54 provided with a contact-shoe 55, and in like manner, extending oppositely, approximately, is another contact-arm 56 the free end of which is formed to provide a contact-shoe 57. The said contact-arm 54 is provided with a projection 58, suitably located so as to be engaged by the cam-portions 24 of said cam-member 23 to operate said contact-arms 54 and 56. The said contact arm 54 is arranged to make contact with said battery or open circuit contact-screw 41 being normally disengaged therefrom, and the said contact-arm 56 is arranged to make contact with said magneto or closed circuit contact-screw 40, being normally engaged therewith. To maintain said contact-arms respectively in their normal positions there is provided a coil-spring 59, one end of which is seated in a receiving socket 60 upon the outer side of said contact-arm 54, and the other end of which is seated in a receiving socket 61 of a spring supporting member 62 secured in a suitable location and manner to said carrier-plate 16. The outer wall of said inclosing-casing 19 is provided with a centrally disposed binding-post 63 upon which are arranged the usual nut-members 64 for securing thereto circuit wires. Said binding-post 63 is connected to a supporting sleeve or socket 65 which passes through a suitable opening in said inclosing-casing 19, and which is insulated therefrom, by an insulator sleeve and washer 66. Arranged in said supporting sleeve or socket 65 is a brush-member 67 which extends inwardly and makes electric contact with the contact-head 32 of said contact rod or conductor 27, the said brush-member being maintained in such contact by a coil-spring 68 arranged within said supporting sleeve or socket 65. Arranged in connection with said inclosing casing 19 is another binding post 69, having a similar brush supporting means supported and insulated therefrom as above described, for the purpose of supporting a brush-member 70 which makes electrical contact with one of the said boxes 37 and the magneto or closed circuit contact-screw 40 connected therewith. And in like manner there is another binding-post 71, also having a similar brush-supporting means supported and insulated therefrom as above described, for the purpose of supporting a brush-member 72 which makes electrical-contact with the other of said boxes 37 and therethrough with the battery or open circuit contact-screw 41. The said brush-members 67, 70 and 72 are all preferably made of carbon, but any other material or substance capable of freely conducting an electrical current may be used if desired.

I have illustrated my novel construction of magneto electric generator provided with the novel twin or double interrupter or circuit-make and break device in connection with a novel ignition system for internal combustion motors such as described and claimed in an application filed contemporaneously herewith. When so connected the magneto or normally closed circuit is completed as follows:—The electrical current generated by the magneto generator is collected from the armature winding by means of the brush-member 67 and delivered by the

wire-conductor 73 to a switch terminal 74. Assuming the switch-arm 75 of said switch to be shifted to the left the current is bridged by means of a contact-plate carried by said switch-arm to another switch-terminal 76, and thence by way of a wire-conductor 77 to one of the terminals 78 of the primary winding of a transformer coil 79, returning from the other terminal 80 of said primary winding of said transformer-coil 79 by way of a wire-conductor 81 to another switch-terminal 82, thence through the switch-arm 75 to a switch terminal 83, and thence by a wire-conductor 84 to said binding-post 69 and brush-member 70 to the magneto circuit interrupter, and ground.

The electrical current generated by the auxiliary battery set 85 passes along a wire-conductor 86 to a switch terminal 87. Assuming the switch-arm 75 of said switch to be shifted to the right, the current is bridged by means of a contact-plate carried by said switch-arm to another switch terminal 76, and thence by way of said wire-conductor 77 to one of the terminals 78 of the primary winding of said transformer-coil 79, returning by way of the other terminal 80 by way of said wire-conductor 81 to another switch terminal 82, thence through said switch-arm 75 to a switch-terminal 88, and thence by way of a wire-conductor 89 to said binding post 71 and its brush-member 72 to the battery circuit interrupter or make and break, being completed through ground and wire conductor 90. The current delivered to the primary winding of said transformer coil by either of the above-mentioned circuits is of low tension or potential; but when either circuit is interrupted by the action of said novel interrupter or make and break device above described, a current of high tension or potential is induced at the moment of said generating circuit interruption in the secondary winding of said transformer coil. This high tension current is induced by either the magneto or battery generating circuit dependent upon which is switched into the transformer coil line common to both of said generating circuits. The secondary current thus generated in the said transformer coil 79 is delivered from the terminal 91, by way of the wire-conductor 92 to the distributer-arm terminal 93 of a high tension distributing device. The said secondary current of high tension is thus delivered through the several wire conductors 94 to their respective spark plugs in the cylinders of the internal combustion motor, in the usual manner, returning by way of the ground, also in the usual manner.

The magneto generated current when completed by the action of switching means is of low tension and flows so long as the contact shoe 57 is in contact with the contact screw 40, this being the normal position of the magneto current interrupter, and a current of low tension passes through the primary winding of said transformer coil 79 creating a static condition of magnetizing current therein. At the moment the contact shoe 57 is separated from the contact screw 40 by the action of the cam member 23 upon the arm 56, the said low tension current is broken or interrupted, causing a quick reaction or pulsation in said primary winding of said transformer coil, which induces in the secondary winding of said transformer coil a current of high voltage or potential which flows through the high tension distributer to the spark plugs of the internal combustion motor.

It will be clearly understood that since the interrupter arms 54 and 56 are of one piece so arranged that the contact-shoe 55 of the battery current interrupter is normally open or out of contact with the contact screw 41, that it is only at the moment that the cam member 23 operates said arms 54 and 56 to engage the contact shoe 55 with the contact screw 41, that the battery circuit is completed, but the closing of the battery circuit serves to create in the primary winding of the said transformer coil 79 a flow of magnetizing current, which when interrupted by the return of said contact shoe 55 to its normal initial position out of contact with said contact screw 41 causes a quick break in said circuit and a consequent reaction or pulsation in said primary winding of said transformer coil 79, which induces in secondary winding of said transformer coil a current of high voltage or potential which flows through the high tension distributing devices to the spark-plugs of the internal combustion motor. The said interrupter arms being of one piece are operated by the single cam-member 23 at the same moment, but one or the other circuit is inactive being grounded by the action of a switch in their line. The said cam-member is provided with the number of cam portions 24 desired to cause the number of interruptions desired in one revolution of the outwardly extending spindle 9. The operation of both arms 54 and 56 is positive and sure; on the battery side, in operation, an exceedingly short contact is made for closing the battery circuit, thus being economical and while permitting a full flow of battery current of full voltage and amperage is of duration only sufficiently long to induce high voltage in the secondary winding of the transformer-coil. On the magneto-generator side, the circuit being normally closed, is opened or interrupted by the action of said cam-member for only a brief period. Said interrupter arms 54 and 56 acting together, it makes no difference which circuit is being used the interruption or make and break is properly timed, and

either circuit will operate through the same transformer-coil at will.

I am aware that some changes may be made in the various arrangements and combinations of the various parts as well as in the details of the construction of the same, without departing from the scope of my present invention, as defined in the appended claims. Hence, I do not limit my invention to the exact arrangements and combinations of the various devices and parts as illustrated in the accompanying specification, nor do I confine myself to the exact details of the construction of the said parts.

I claim:—

1. The combination with a magneto generator of a twin interrupter device for controlling a magneto or normally closed circuit and a battery or normally open circuit, comprising a carrier-plate, a contact means for said magneto circuit supported upon said carrier-plate, a contact means for said battery circuit supported upon said carrier-plate, means for pivotally supporting upon said carrier-plate an interrupter member provided with two interrupter arms, one arm normally contacting with said magneto circuit contact means, the other arm normally disengaged from said battery circuit contact means, and means, connected so as to rotate with the armature of said magneto generator, for engaging said interrupter member to oscillate its interrupter arms to break the magneto or closed circuit and close the battery or open circuit in a single movement of said interrupter-member, substantially as and for the purposes set forth.

2. The combination with a magneto generator of a twin interrupter device for controlling a magneto or normally closed circuit and a battery or normally open circuit, comprising a carrier-plate, a contact means for said magneto circuit supported upon said carrier-plate, a contact means for said battery circuit supported upon said carrier-plate, means for pivotally supporting upon said carrier-plate an interrupter member provided with two interrupter arms, one arm normally contacting with said magneto circuit contact means, the other arm normally disengaged from said battery circuit contact means, a spindle connected with the armature of said magneto generator so as to rotate therewith, a cam-member adjustably connected with said spindle, cam-portions on said cam-member adapted to engage with said interrupter member to oscillate its interrupter arms to break the magneto or closed circuit and close the battery or open circuit in a single movement of said interrupter-member, substantially as and for the purposes set forth.

3. The combination with a magnetic generator of a twin interrupter device for controlling a magneto or normally closed circuit and a battery or normally open circuit, comprising a carrier-plate, a contact means for said magneto circuit supported upon said carrier-plate, a contact means for said battery circuit supported upon said carrier-plate, means for pivotally supporting upon said carrier-plate an interrupter member provided with two interrupter arms, one arm normally contacting with said magneto circuit contact means, the other arm normally disengaged from said battery circuit contact means, a means for retaining said interrupter member in its normal position and means connected so as to rotate with the armature of said magneto generator, for engaging said interrupter member to oscillate its interrupter arms to break the magneto or closed circuit and close the battery or open circuit by a single movement of said interrupter-member, substantially as and for the purposes set forth.

4. The combination with a magneto generator of a twin interrupter device for controlling a magneto or normally closed circuit and a battery or normally open circuit, comprising a carrier-plate, a contact-means for said magneto circuit supported upon said carrier-plate, a contact means for said battery circuit supported upon said carrier-plate, means for pivotally supporting upon said carrier-plate an interrupter member provided with two interrupter arms, one arm normally in contact with said magneto circuit contact means, the other arm normally disengaged from said battery circuit contact means, means for retaining said interrupter member in its normal position, a spindle connected with the armature of said magneto generator so as to rotate therewith, a cam-member adjustably connected with said spindle, cam-portions on said cam-member adapted to engage with said interrupter member to oscillate its interrupter arms to break the magneto or closed circuit and close the battery or open circuit in a single movement of said interrupter-member, substantially as and for the purposes set forth.

5. The combination with a magneto generator of a twin interrupter device for controlling a magneto or normally closed circuit and a battery or normally open circuit, comprising a carrier-plate movably supported in connection with said magneto generator, a contact-means for both circuits supported upon said carrier-plate, means for pivotally supporting upon said carrier-plate an interrupter member provided with two interrupter arms, one of said arms normally engaging a contact means to close said magneto circuit, the other of said arms being normally disengaged from the other contact means to interrupt said battery circuit, means for oscillating said interrupter member to move its interrupter arms and

respectively break and close said closed and open circuits, substantially as and for the purposes set forth.

6. The combination with a magneto generator of a twin interrupter device for controlling a magneto or normally closed circuit and a battery or normally open circuit, comprising a carrier-plate movably supported in connection with said magneto generator, a contact-means for both circuits supported upon said carrier-plate, means for pivotally supporting upon said carrier-plate an interrupter member provided with two interrupter arms, one of said arms normally engaging a contact means to close said magneto circuit, the other of said arms being normally disengaged from the other contact means to interrupt said battery circuit, means for oscillating said interrupter member to move its interrupter arms and respectively break and close said closed and open circuits, comprising an adjustable cam-member having a suitable number of cam-portions adapted to engage said interrupter member to oscillate its arms, substantially as and for the purposes set forth.

7. The combination with a magneto generator of a twin interrupter device for controlling a magneto or normally closed circuit and a battery or normally open circuit, comprising a carrier plate movably supported in connection with said magneto generator, a pair of boxes supported upon said carrier-plate but insulated therefrom so they do not contact with ground, a magneto circuit contact-screw adjustably supported in one of said boxes, a battery circuit contact-screw adjustably supported in the other of said boxes, means for electrically connecting said boxes and their respective contact screws in the line of their respective circuits, a pivotally supported interrupter member electrically connected to ground, said interrupter member being provided with two interrupter arms, one of said arms normally engaging said magneto circuit contact screw, the other of said arms being normally disengaged from said battery circuit contact screw, a suitably arranged spring-means for maintaining said interrupter member in its normal initial position, and means for oscillating said interrupter member to move its arms and respectively break and close said closed and open circuits, substantially as and for the purposes set forth.

8. The combination with a magneto generator of a twin interrupter device for controlling a magneto or normally closed circuit and a battery or normally open circuit, comprising a carrier-plate movably supported in connection with said magneto generator, a pair of boxes supported upon said carrier-plate but insulated therefrom so that they do not contact with ground, a magneto circuit contact-screw adjustably supported in one of said boxes, a battery circuit contact-screw adjustably supported in the other of said boxes, means for electrically connecting said boxes and their respective contact-screws in the line of their respective circuits, a pivotally supported interrupter member electrically connected to ground, said interrupter member being provided with two interrupter arms, one of said arms normally engaging said magneto circuit contact screw, the other of said arms being normally disengaged from said battery circuit contact screw, a suitably arranged spring-means for maintaining said interrupter member in its normal initial position, and means for oscillating said interrupter member to move its arms and respectively break and close said closed and open circuits, comprising an adjustable cam-member having cam-portions adapted to engage a projection on one of said interrupter arms, substantially as and for the purposes set forth.

9. In a twin interrupter device, the combination of a pair of contact-screws insulated from ground, an interrupter-member electrically connected with ground, outwardly extending arms connected with said interrupter member, said arms being adapted to make and break contact one with each contact-screw, and means for oscillating said interrupter member and its arms, substantially as and for the purposes set forth.

10. In a twin interrupter device the combination of a pair of contact-screws insulated from ground, an interrupter member electrically connected with ground, outwardly extending arms connected with said interrupter member, said arms being adapted to make and break contact one with each contact-screw, and means for oscillating said interrupter member and its arms, comprising a revolving spindle, a cam-member adjustably secured thereto, cam-portions upon said cam-member adapted to engage said interrupter member, substantially as and for the purposes set forth.

11. In a twin interrupter device the combination of a pair of contact-screws insulated from ground, a pivotally supported interrupter-member electrically connected with gr und, outwardly extending arms connected with said interrupter member, contact-shoes upon each of said arms adapted to make and break contact one with each of said contact-screws, a spring means engaging one of the arms of said interrupter member to maintain the same in its normal position, and means for oscillating said interrupter member and its arms, substantially as and for the purposes set forth.

12. In a twin interrupter device the combination of a pair of contact-screws insulated from ground, a pivotally supported

interrupter-member electrically connected with ground, outwardly extending arms connected with said interrupter member, contact-shoes upon each of said arms adapted to make and break contact one with each of said contact-screws, a spring means engaging one of the arms of said interrupter member to maintain the same in its normal position, a projection upon one of said interrupter arms, an adjustable revolving cam-member provided with cam-portions adapted to successively engage said projection upon one of said interrupter arms to oscillate said interrupter member and its arms, 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 19 day of May 1910.

JAMES M. SMITH.

Witnesses:
W. D. CRAIG WRIGHT,
JOHN A. STEER.