

921,046.

2 SHEETS—SHEET 1.

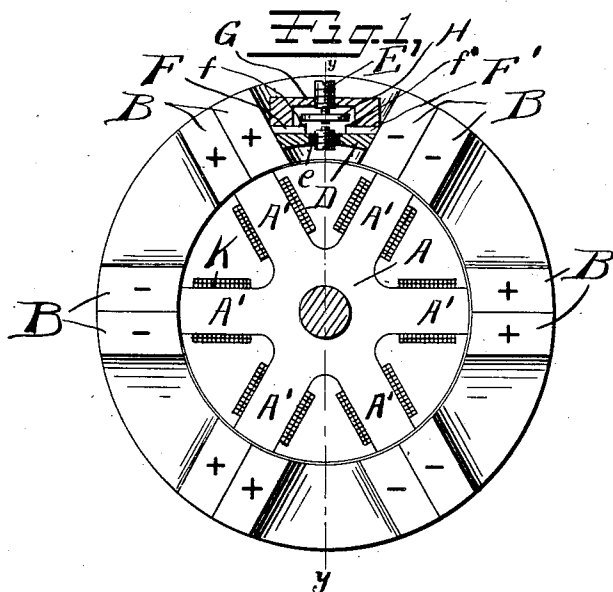
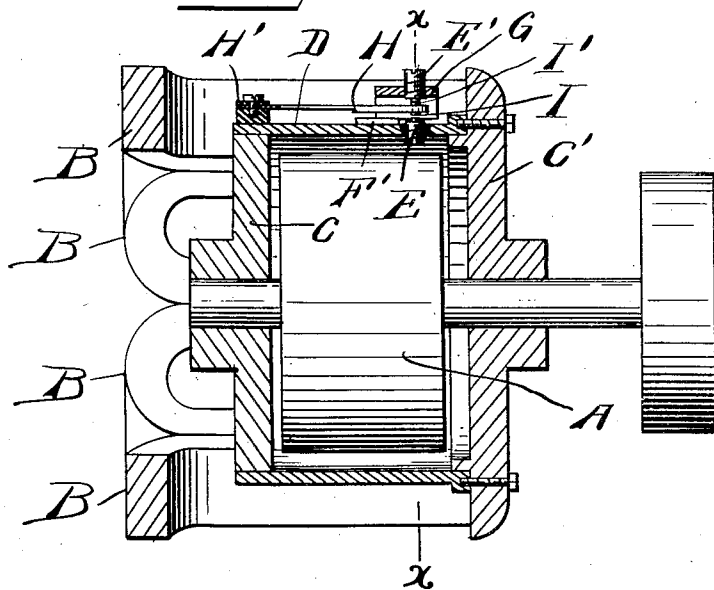


Fig. 2.



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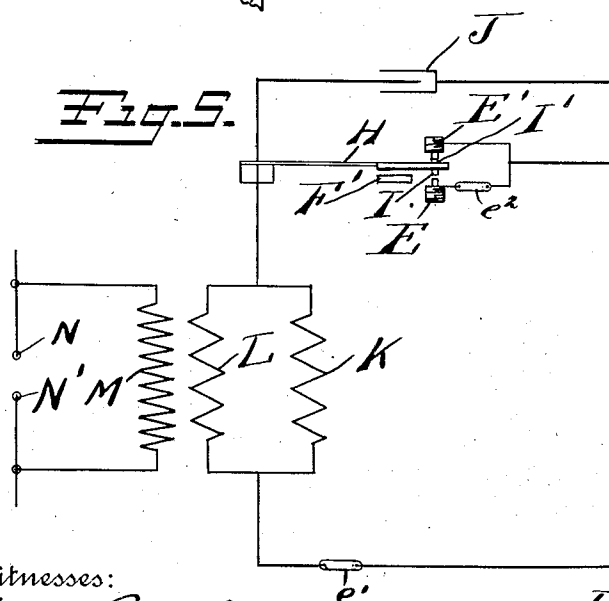
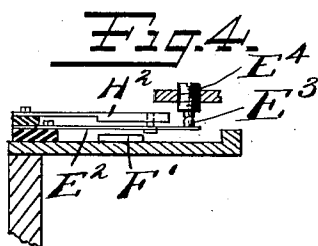
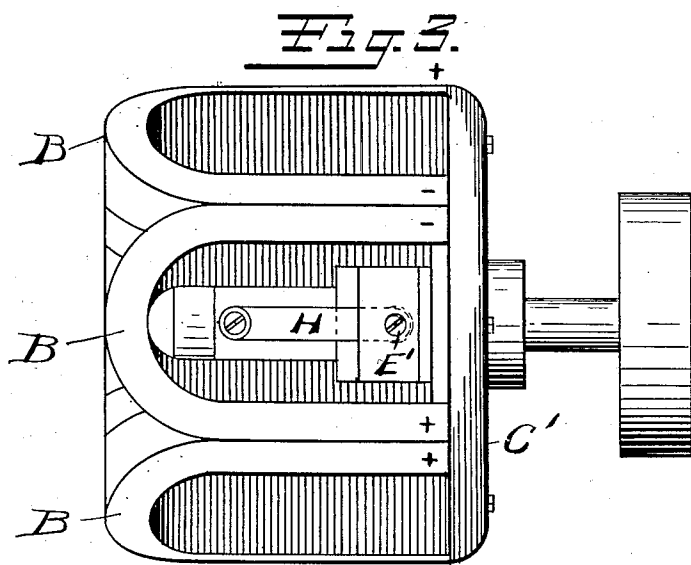
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CIRCUIT INTERRUPTER.
APPLICATION FILED JUNE 16, 1908.

921,046.

Patented May 11, 1909.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JAMES M. WILSON, OF MERIDEN, CONNECTICUT, ASSIGNOR TO THE CONNECTICUT TELEPHONE & ELECTRIC COMPANY, OF MERIDEN, CONNECTICUT, A CORPORATION OF CONNECTICUT.

CIRCUIT-INTERRUPTER.

No. 921,046.

Specification of Letters Patent.

Patented May 11, 1909.

Application filed June 16, 1908. Serial No. 438,731.

To all whom it may concern:

Be it known that I, JAMES M. WILSON, a citizen of the United States, residing at Meriden, New Haven county, Connecticut, have invented certain new and useful Improvements in Circuit-Interrupters, of which the following is a full, clear, and exact description.

My invention relates to improvements in circuit interrupters, and has for its object to produce an interrupter which is operated magnetically by diverting magnetism set up by a constant magneto motive force.

It further has for its object to utilize, in the operation of an interrupter, the magnetism set up by the magnet of an ordinary magneto and the variation in the magnetic lines of force produced by the rotation of the armature within the field of force of the magnet.

It further has for its object to produce a vibrator that is automatically cut out of action when its presence is unnecessary, and cut into action as conditions require.

It further has for its object to produce an interrupter which is readily accessible, in which cams or similar mechanical devices are entirely done away with, and in which a rubbing electrical contact is not relied upon.

It further has for its object to produce a device in which the interruption will be definitely timed.

The following is a description of an embodiment of my invention, reference being had to the accompanying drawings, in which—

Figure 1 represents an end elevation of the magnets and armature of a magneto embodying my invention, and, in section, the vibrator contacts and their support. Fig. 2 represents a longitudinal section of the magneto on the line $y-y$ Fig. 1. Fig. 3 represents a plan view of the magneto. Fig. 4 is a modified detail. Fig. 5 represents a diagram of electrical connections.

Referring more particularly to the drawings, A is the armature having polar projections $A'A'$.

B—B are field magnets, which are shown as permanent magnets, as ordinarily used in magnetos.

C—C' are portions constituting the frame in which the armature is mounted and to which the field magnets are secured in any suitable manner, so as to present polar faces to the armature.

Between the arms of one of the field mag-

nets is a bridge or supporting plate D of non-magnetic material, in which is placed a screw-plug E having a suitable contact surface. Above the plate or bridge D are two magnetic portions F—F', in close connection with the opposite poles of the magnet, and having brass stoppers $f-f'$ to prevent sticking. Above these portions is a second bridge G, of non-magnetic material, which carries a second contact screw E'. The plug E is preferably insulated from the machine at e , but electrically connected to the plug E' through the switch e^2 (Fig. 5). These contact screws E—E', in the form shown, are electrically connected to each other and to the field magnets through the bridge G. Between the contact screws and above the magnetic portions F—F' is a spring-actuated member H supported at its far end at H' and properly insulated. This member is of magnetic material, and actuates contacts I—I' in line with the contacts E—E', and by its spring qualities is normally held in engagement with the upper stationary contact E'. When, however, it is subjected to the magnetic influence of the magnet, in the manner hereinafter described, it is drawn down so as to break its engagement with the upper contact E' and make engagement with the lower contact E. The vibrating portion H and the contacts E—E' are preferably shunted by a condenser J and are in series with the armature winding K and with the primary of an induction coil L in parallel therewith and a switch e' . The induction coil has a secondary M provided with suitable spark terminals N—N' for producing a spark upon the interruption of the circuit at either of the contacts E E'.

The operation of the interrupter is as follows: When the armature is in the position shown in Fig. 1, the lines of force from the field magnet pass through the polar projections of the armature to such an extent as to have little or no effect upon the spring-restrained contact actuating member H. When, however, the armature is revolved slightly, so that the polar projections are about to pass entirely out of alinement with the polar faces of the field magnet, the lines of force, which have theretofore been shunted by the armature, pass through the magnetic portions F—F' and act magnetically upon the contact-actuating member H, so as to draw it downward, causing the engagement of the

contact E' to be broken and the engagement with the contact E to be made. As the polar projections approach the next succeeding polar faces of the field magnet and come into partial alinement therewith, the magnetism of the field magnet is again shunted by the armature, with the result that the magnetism through the portions F—F' falls to such an extent that the member H is released, and, being withdrawn by the spring action, engagement with the contact E is broken and engagement with the contact E' is made. These interruptions of the electric circuit through the armature winding K in shunt to the coil L act in a well-known way to cause the current through the coil to rise and fall at definite times, and to induce an electromotive force in the secondary winding M. This winding, when properly proportioned, will create a spark in the terminals N—N' of the spark gap.

It is to be noted that in the apparatus described, the movable contact bearing member is actuated magnetically in one direction and spring-actuated in the other direction, the movement being produced by the periodic shunting of the magnetism of the field magnet. This periodic shunting is furthermore due to the movement of the armature of the magneto. It is further to be noted that for each alternation of the current, the vibrator will interrupt the circuit twice, once as the polar projections leave the magnetic fields, and once as they enter the magnetic fields. If it is desired to have only one interruption during this period, the contact E may be removed or disconnected by the switch e^2 . It is to be noted that the contacts E and E' being stationary, may be made always accessible and easily adjustable, even when the magneto is running.

I have shown the movable contacts as insulated, and the plugs E—E' as uninsulated from the frame, it being necessary in the form shown that either the movable or the stationary contact be insulated from the frame.

When the lower contact is cut out by opening the switch E^2 , only one interruption for each alternation is obtained, and in some relations this is all that is desired. When the magneto is speeded up so that the armature revolves sufficiently fast, the member H is held away from the upper contact E' continuously, on account of the short period during which any shunt exists and armature reaction. With this speed, however, the electro-motive force generated in the armature windings is such that the alternating current produced thereby in the coil produces a secondary electromotive force high enough to produce a flame across the spark gap terminals N—N'. The vibrator is thus automatically cut out of action when the electro-motive force of the armature current

is so high that a make and break is no longer necessary. Conversely, it is automatically brought into action when the armature electro-motive force falls. This automatic cutting out of the vibrator results in automatically doing away with all the sparking and destructive action that is ordinarily due to the breaking of a circuit carrying current. At the time the vibrator is cut out, the armature potential has become high and the sparking that would be present if the interrupter remained in action would be particularly disastrous. When the lower contact E is cut out, the interrupter, on account of the constant spring action, retards the break automatically, so that it takes place at the most efficient point of the wave.

In conditions where the current generated is comparatively small, the interrupter will be operated without a construction employing the well-known hammer blow feature, and for simplicity I have shown it without that feature in the principal figure.

The hammer blow construction is shown in Fig. 4, in connection with a single stationary contact. In this figure, H^2 is a spring magnetic portion mounted in proximity to the two extension pieces F—F'. E^2 is a phosphor bronze spring carrying a contact E^3 engaging a stationary contact E^4 and electrically connected to H^2 . When unshunted by the armature, the portion H^2 is drawn down quickly and hits the spring E^2 a hammer blow, forcing it away from the contact E^3 , thus insuring separation under all circumstances.

My invention is particularly useful for producing ignition in explosive engines, the number of poles or the driving connections being varied so as to produce the proper relative rotations. When the relations are proper, the circuit connections can be made as shown in Fig. 5, without the interposition of any timing device, and give the desired sparks properly timed.

Various modifications can be made in the embodiment of my invention such as will suggest themselves to those skilled in the art, without departing from the broad principle involved.

What I claim is:

1. The combination of a stationary source of continuous magneto motive force, a normally retracted movable member attracted by the magnetism produced thereby, an electric circuit having contacts controlled by said movable member, and means for periodically shunting said magnetism away from said movable member.

2. The combination of a stationary source of continuous magneto motive force, a movable member attracted by the magnetism produced thereby, an electric circuit having cooperating contacts controlled by said movable member, means for periodically shunt-

ing said magnetism away from said movable member, means for retracting said movable member, said means also operating to permit said contacts to remain open for a certain periodicity of said shunting action.

3. The combination of a field magnet, an armature having polar projections rotating in the field thereof, a normally retracted movable magnetic member in a position to be attracted by said field magnet when its lines of force are unshunted by the armature, and to be released thereby when said lines of force are shunted by the armature, and an electric circuit including the windings on said armature and contacts controlled by said movable member.

4. The combination of a field magnet, an armature having polar projections rotating in the field thereof, a movable magnetic member in a position to be attracted by said field magnet when its lines of force are unshunted by the armature and to be released thereby when said lines of force are shunted by the armature and an electric circuit including the windings on said armature and

two contacts, one actuated by said movable member and engaging the other when said movable member is retracted, and means for retracting said movable member, said means also operating to permit said contacts to remain open for a certain periodicity of said shunting action.

5. The combination of a field magnet, an armature having polar projections rotating in the field thereof, a normally retracted movable magnetic member in a position to be attracted by said field magnet when its lines of force are unshunted by the armature, and to be released thereby when said lines of force are shunted by the armature, an electric circuit including the windings on said armature, and two contacts, one actuated by said movable member and engaging the other when said movable member is retracted.

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Witnesses:

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