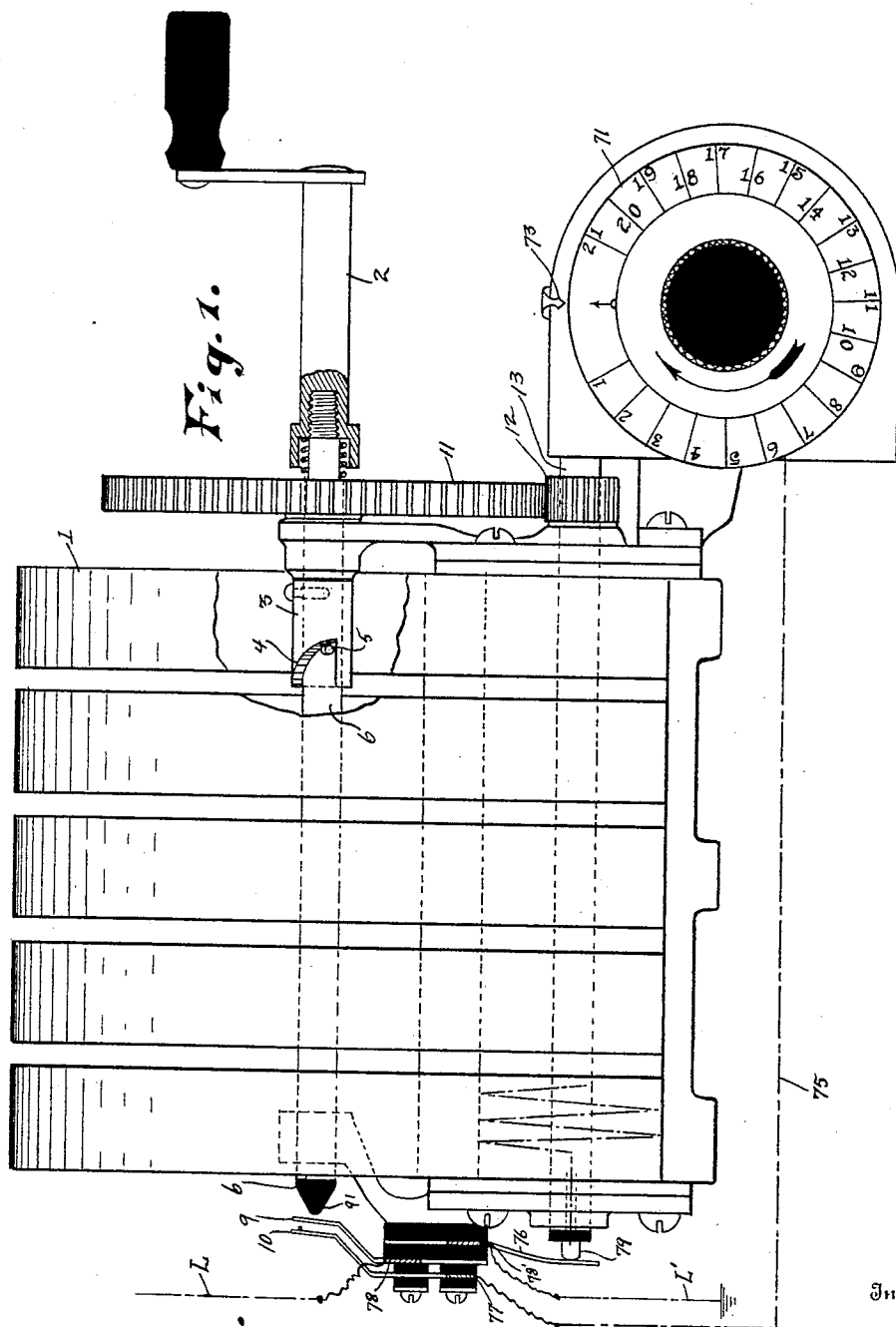


W. S. BURNETT.
ATTACHMENT FOR MAGNETOS.
APPLICATION FILED APR. 12, 1909.

1,063,651.

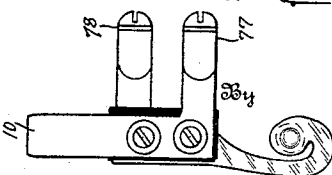
Patented June 3, 1913.

3 SHEETS—SHEET 1.



Witnesses
O. R. Ewing
& D. Bremer.

Fig. 2.



William S. Burnett
Ewing & Wheeler
Attorneys

W. S. BURNETT.
ATTACHMENT FOR MAGNETOS.
APPLICATION FILED APR. 12, 1909.

1,063,651.

Patented June 3, 1913.

3 SHEETS—SHEET 2.

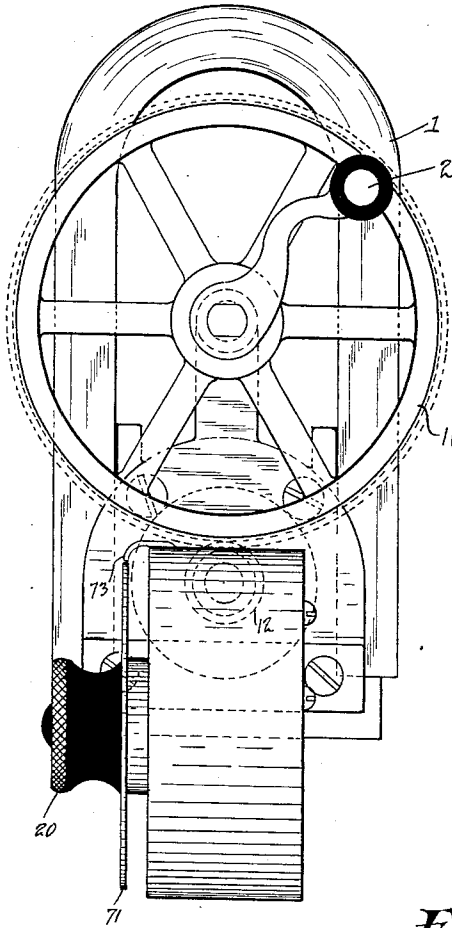
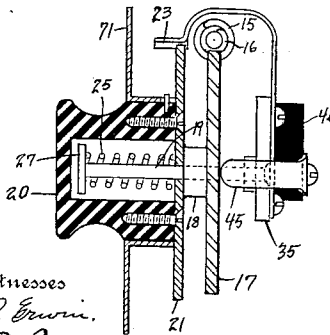


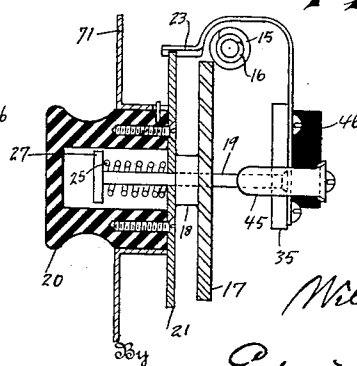
Fig. 3.

Fig. 7.



Witnesses
O. P. Erwin.
J. D. Bremer

Fig. 8.



Inventor
William S. Burnett
Erwin & Wheeler
Attorneys

W. S. BURNETT.
ATTACHMENT FOR MAGNETOS.
APPLICATION FILED APR. 12, 1909.

1,063,651.

Patented June 3, 1913.

3 SHEETS—SHEET 3.

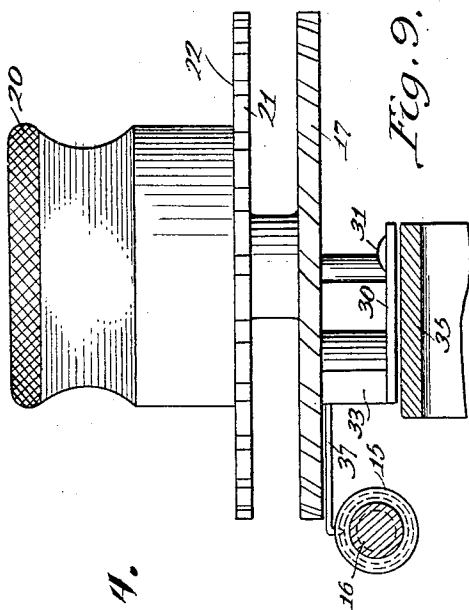


Fig. 4.

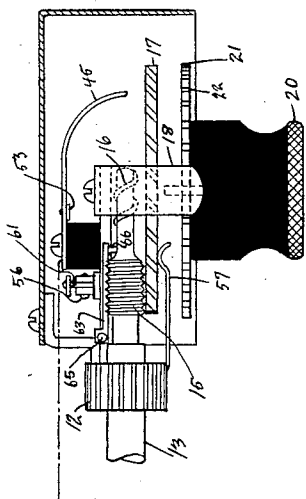


Fig. 5.

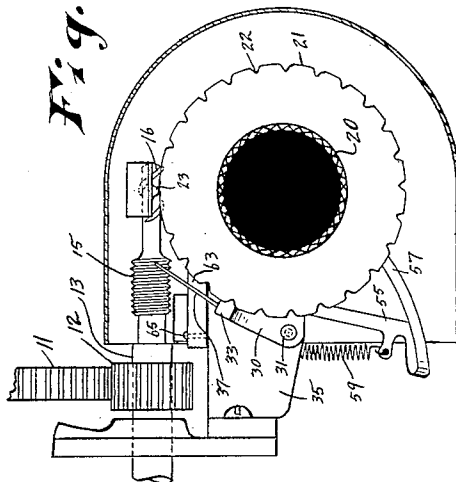


Fig. 6.

Witnesses

O. R. Erwin
L. D. Bremer

Inventor

William S. Burnett

By

Erwin & Schuler

Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM S. BURNETT, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO MORSE CODE SIGNAL CO., OF MILWAUKEE, WISCONSIN, A CORPORATION OF WISCONSIN.

ATTACHMENT FOR MAGNETOS.

1,063,651.

Specification of Letters Patent.

Patented June 3, 1913.

Application filed April 12, 1909. Serial No. 489,320.

To all whom it may concern:

Be it known that I, WILLIAM S. BURNETT, a citizen of the United States, residing at Milwaukee, county of Milwaukee, and State of Wisconsin, have invented new and useful Improvements in Attachments for Magneto, of which the following is a specification.

My invention relates to improvements in selective attachments for magnetos, with especial reference to that class of devices used in signaling different stations along a single line of conduction.

The object of this invention is to provide means, operative in conjunction with a magneto generator, for making and breaking the circuit of such generator at desired intervals and at different intervals manually controlled as to time by a preliminary adjustment of the mechanism, whereby electrical selective instruments at the different sub-stations may be operated to secure results at one station to the exclusion of others.

In the following description, reference is had to the accompanying drawings, in which—

Figure 1 is a side elevation of an ordinary magneto, with my invention applied thereto. Fig. 2 is a detail view of the end binding posts and circuit closer. Fig. 3 is a front end elevation. Fig. 4 is a plan view of the selecting attachment, showing the casing in horizontal section. Fig. 5 is a side view of the same as seen from the same side illustrated in Fig. 1, with the casing shown in section. Fig. 6 is a view of the same as seen from the opposite side, the casing being also shown in section. Fig. 7 is a front view of the same, part in section, showing the parts in normal position. Fig. 8 is a similar view, showing the initial adjustment of the selecting wheels. Fig. 9 is a detail view of the gravity latch 30, showing frame member 35 and shaft 13 in section, the worm wheel 17 and differential wheel 21 being also illustrated as held in retracted position by the gravity latch stop 33.

Like parts are identified by the same reference characters throughout the several views.

A magneto generator 1 of ordinary construction is operated by means of a crank 2, having a sleeve portion 3 provided with a shaft shifting slot 4, into which shaft pin 5 extends, whereby the shaft 6, (when the

crank 2 is turned in the proper direction), will be shifted to the left and bring the switches 9 and 10 into circuit closing contact with each other, the motion of the crank 2 being also transmitted to the armature of the magneto through the gear wheels 11 and 12, the latter being located upon the armature shaft 13. By my improved device, this armature shaft 13 is extended at the front and provided with a screw threaded portion 15, beyond which the shaft is reduced in diameter and provided with a worm thread 16, adapted to transmit motion to a worm wheel 17, mounted upon a sleeve shaft 18 and rotatably supported upon a stationary spindle 19. This sleeve shaft 18 is provided with an actuating knob 20, whereby the sleeve shaft may be either rotated on the spindle 19 or adjusted longitudinally thereof. A differential wheel 21 is mounted upon the sleeve shaft between the knob and the worm wheel 17 and is provided with peripheral notches 22. The sleeve shaft 18 is rigidly connected with the knob 20 and a spring 25 is interposed between a head piece 27 on the spindle 19 and the differential wheel 21, whereby the shaft 18 is normally drawn inwardly to a position with the worm wheel 17 meshing with the worm 16. By pulling outwardly upon the knob, however, the sleeve shaft 18 may be moved to a position where the notches 22 on the differential wheel will be engaged by a spring actuated latch 23 connected with the frame. When in this position, the worm wheel 17 will be out of engagement with the worm 16 and a gravity latch 30 connected with the frame at 31 will drop to a position in which a stop 33 on the latch will be interposed between the worm wheel 17 and the frame member 35, the latch being held in this position by an arm 37, which abuts the spindle 19. The latch 30 is loosely mounted upon its pivotal connection with the frame 31, whereby the retraction of the worm wheel allows the latch to swing outwardly to a sufficient extent to retract latch finger 37 from the threaded portion 15 of the shaft or spindle 13, whereupon the latch swings by gravity to a position with stop 33 interposed between the worm wheel and the frame member 35. But as soon as the operator ceases pulling upon the knob, the reaction of spring 25 causes the side of the worm wheel to move inwardly against the

side of the stop 33, and this swings the gravity latch inwardly until finger 37 engages the threaded portion 15 of the shaft 13, said finger 37 being held in engagement with the screw threads by the pressure of the side face of the worm wheel upon stop 33, while the finger 37 is being retracted. When the gravity latch is retracted, the worm wheel moves inwardly and prevents the latch from dropping to its holding position until the worm wheel is again retracted.

By this means, the differential wheel may be adjusted for engagement with the latch 23 and rotated to engage such latch in any one of the notches 22 and this wheel will thereupon remain in such position until released by the withdrawal of the gravity latch stop 33 from its locking position. Motion for this withdrawal of the gravity latch is derived from the shaft 13, the screw threaded portion 15 of which engages latch finger 37 and moves the same gradually toward the left as the shaft 13 is rotated by turning the crank 2. As soon as the latch 33 is released, spring 25 re-acts to restore sleeve shaft 18 to normal position with worm wheel 17 again meshing with worm thread 16, whereupon the continued motion of the crank 2 and shaft 13 will be transmitted to the worm wheel 17 to rotate this wheel with the sleeve shaft 18 and differential wheel 21 to a point which will be hereinafter designated the zero point. The worm wheel 17 is mutilated at 41 and when the wheel is at the zero point, this mutilated portion is in registry with the worm thread 16, the latter being thus disengaged from the worm wheel, so that the wheels will invariably come to rest at this point. The latch finger 37 will now occupy a position at the left hand end of the screw thread 15.

It will be understood that the latch 30 is sufficiently loose on the pivot shaft 31 to permit it to swing outwardly under the weight of the part 33 to a sufficient extent to retract the finger 37 from the screw threads 15 as soon as knob 20 is pulled out, for when knob 20 is pulled out, the worm wheel 17 will be withdrawn from its bearing against the thinner portion of the latch 30. As soon as finger 37 is retracted from the screw threads, the latch will also swing by gravity to the position in which it is shown in Fig. 5, carrying stop 33 behind worm wheel 17, said stop 33 being then partially interposed between said worm wheel and frame member 35, preventing an inward movement of the knob until the stop is retracted by the worm thread 15, acting upon the finger 37, said finger having again engaged the worm thread as soon as the pressure of worm wheel 17 is applied to stop 33 as above explained.

Referring to Fig. 6, which shows the opposite side of the attachment from that

above described and illustrated in Fig. 5, it will be observed that a circuit closing brush 45 is adjustably mounted upon an insulating block 46 and is adapted to bear upon the side face of the worm wheel 17, except when the latter is at zero point, when it registers with a worm wheel slot 47. This brush may be adjusted longitudinally so as to bear, either upon an annulus 49, composed of alternate insulating and conducting segments *a* and *b* respectively, or upon the portion 51 of the worm wheel, which is wholly composed of conducting material. The purpose of this adjustment will hereinafter be explained. In either case, however, a circuit established through this brush and the worm wheel will be broken when the worm wheel reaches the zero point, since the slot 47 is of sufficient width to receive the brush at either adjustment. This brush is provided with a contact arm 53 and a circuit closing lever 55 is pivoted to the frame at 56 and provided at its lower end with a resilient curved arm 57, which is adapted to bear upon the inner face of the worm wheel, *i. e.*, between the worm wheel and the differential wheel 21. A spring 59 connecting lever 55 with the frame, tends to draw the lower end of the lever in the direction of the magneto and out of contact with contact arm 53, the latter occupying such a position that a forward movement of the lever will bring it into sliding engagement with the lower end portion of said arm. This lever is loosely hung upon its supporting pivot bearing 56 and is not only adapted to swing along the surface of the worm wheel, but is also adapted to swing upon said pivot bearing at right angles to the plane of such surface for a limited distance. The upper end of this lever carries a finger 61, which is adapted to engage the screw thread 15.

When the knob 20 is pulled outwardly, the worm wheel 17 draws upon the curved arm 57 and pulls the lower end of the lever 55 inwardly in the direction of the worm wheel, thus swinging the upper end of the lever 55 outwardly and retracting the pin 61 from the threaded portion 15 of the shaft 13, so that it can swing forwardly, without engaging the screw threads 15. The lever 55 will be swung in this direction by the reactionary pull of spring 59. When the knob 20 returns to normal position with the worm wheel 17 engaging the thread 16, the pin 61 will still be held out of engagement with the thread 15 by a pivotal guide member 63 connected with the frame at 65 near one end and having a pin 66 near the other end, adapted to bear upon the surface of the worm wheel 17. But as this worm wheel revolves to restore the differential wheel 21 to zero position, the pin 66 drops into a socket in the side of the worm wheel at zero position and this permits a lateral

swinging movement of the member 63 of sufficient extent to allow pin 61 to move into engagement with the screw threads 15, the lever being held in such engagement by
 5 spring 59, the upper end of which is secured to the frame so as to pull both outwardly and rearwardly upon the lower end of the lever 55. When the pin 61 is thus brought into engagement with the threads
 10 15 on shaft 13, the continued revolution of crank 2 transmits motion through said screw thread and pin 61 to actuate the upper end of the lever rearwardly in the direction of the magneto generator, thus swinging
 15 the lower end of the lever 55 forwardly in opposition to the tension of spring 59 and into sliding engagement with contact arm 53. This again closes the circuit of the generator, which circuit has been broken from the time that brush 45 registered with the
 20 slot 47.

The operation of the device is as follows: Assuming that the generator is connected with a line wire L leading to a plurality of
 25 stations, each provided with selective mechanism (not shown), of any ordinary type,—requiring, for signaling connection, a specific number of electrical impulses different from the number of such impulses required
 30 for connecting up the circuit for any other station,—the magneto operator will first pull outwardly upon the knob 20, withdrawing the worm wheel 17 from the worm 16 and adjusting the differential wheel 21 into registry
 35 with the latch 23, the differential wheel being then rotated from zero position until the number of the desired station on a dial 71, (carried by said wheel) registers with a pointer 73, indicating the position of latch
 40 23, which then engages a corresponding notch 22 on the differential wheel. The crank 2 is then revolved, whereupon the finger 37 is moved to the left by the screw thread 15 on shaft 13 and withdraws the
 45 gravity stop 33 from the position to which it has fallen back of worm wheel 17. When the gravity stop is thus withdrawn, the reaction of knob spring 25 moves the worm wheel 17 into engagement with the worm
 50 thread 16 and withdraws differential wheel 21 from the latch 23. The worm wheel 17 and differential wheel 21 will then receive a rotary motion from the crank 2 through the thread 16 and will be thus rotated until
 55 the differential wheel reaches zero position, with the worm thread 16 in registry with the mutilated portion of the worm wheel 21. The interval required for this movement to take place depends upon the distance to
 60 which the differential wheel 21 has been rotated from its normal position and as the interval required for restoring it is represented by the number of revolutions of crank 2, it is obvious that this interval will cor-
 65 respond with the number of impulses gen-

erated in the magneto. During this rotation of the worm wheel 17, the circuit of the magneto is closed from one pole of the armature through the frame, worm wheel 17, brush 45, conductor 75, and switches 9
 70 and 10 connected with the binding posts 78 and 77 respectively. The armature pole 79 is also connected by brush 76 with binding post 77 at 78', and the line wire L is secured to the binding post 78 or to the switch
 75 9 adjacent to its connection with said post. The number of impulses will therefore be sent out along the line corresponding with the number of revolutions of crank 2 required for rotating worm wheel 17 and differential wheel 21 back to zero position.
 80 But as soon as these wheels reach the zero position, the circuit will be broken by the registry of brush 45 with slot 47 in the worm wheel. At the zero point, however, the pin
 85 66 on guide member 63 enters the socket 69 in the worm wheel and permits the upper end of lever 55 to swing inwardly to engage pin 61 with the screw thread 15. The continued revolution of crank 2 will now produce
 90 no current in the line until the lever 55 has been actuated through the screw thread 15 and pin 61 to swing the lower end of said lever into engagement with contact arm 53, whereupon the circuit will
 95 be reestablished from the frame through lever 55, contact arm 53, brush 45, conductor 75, switches 9 and 10 and brush 76. The circuit thus reestablished is the working or signaling circuit for the local or sub-
 100 station, which has been selected by the impulses transmitted to the line during the first circuit closing period, or during the period covered by the return rotation of the differential wheel.

It will be observed that the crank shaft 6 is provided with an insulated tip 91, which prevents circuiting from the frame or crank shaft to the brush 9, either as a short circuit or as an alternative circuit when the
 110 brush 45 registers with slot 47.

Referring again to the sections *a-b* on the portion 49 of the worm wheel, it will be observed that if the brush 45 is adjusted to bear upon this portion of the wheel, then,
 115 when the wheel is rotated, the circuit will be interrupted whenever an insulation segment *a* registers with the brush. These interruptions may be of such frequency as to cut out all negative or all positive impulses,
 120 or they may be arranged to break the circuit during each alternate revolution of the armature. In the first instance, an interrupted direct current will be produced in the line wire. In the latter case, the effect will be
 125 merely to delay the several operations.

While I have described my invention as it would be employed for selective signaling, I do not illustrate or describe any specific
 130 form of signaling apparatus, and it is not

essential that it be used for signaling purposes, since it may obviously be used in any relation where it is desirable to close an electrical circuit with a view of sending a variable number of impulses, preliminary to a final circuit closing operation.

It will be observed that the worm wheel 17 and differential wheel 21, together with the tubular shaft 18 upon which they are mounted, constitute a rotary circuit controlling member and these parts, on connection with the gravity latch and axially shifting spring also constitute a trip which initially holds the parts in an inoperative position until the gravity latch 30 is withdrawn by the engagement of the traveling finger 37 with the threaded portion of the armature shaft. The latch 30 is loosely pivoted to the frame and finger 37 drops away from the armature shaft, except when held in engagement with the shaft threads by the pressure of worm wheel 17 upon latch stop 33. The latch is therefore free to drop by gravity back of the worm wheel 17, when the latter is manually retracted. The operation of my device is therefore divided into the following periods: 1st. The trip setting period or manual operation of the circuit controlling differential member, which is axially shifted or pulled out and then rotated to a distance from zero point represented by the station to be called. 2d. The trip releasing period controlled from the armature shaft by the gravity latch and traveling finger 37. 3d. The station selecting period, during which the circuit is closed for a succession of impulses, depending upon the number of revolutions required to turn the differential member or circuit controlling trip back to zero point. 4th. A circuit breaking period commencing with the zero point registry of brush 45 with the slot 47, and ending with the movement of lever 55 into engagement with contact arm 53. 5th. A circuit closing or signal operating period of any desired length following the contact of lever 55 with arm 53. The latch retracting or trip releasing period permits the generator armature to acquire a steady motion, preparatory to closing the selective circuit. The 4th interval or circuit breaking period, permits the selective instrument at the station called, to resume a signaling position, preparatory to the delivery of the signaling impulses thereto.

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

1. The combination with a magneto generator provided with an armature driving mechanism, of an axially movable, rotary member adapted in one position of adjustment to be actuated from the driving mechanism of the generator, means for automatically shifting the rotary member into such

position of adjustment when manually retracted therefrom, a stop to prevent such shifting movement, and means connected with the generator for retracting the stop from holding position after a given number of revolutions of the generator armature, together with circuit closing means in operative relation to said rotary member during its interval of rotary movement, said rotary member being formed to break the circuit on completing such movement.

2. The combination with a magneto generator provided with an armature driving mechanism, of an axially movable, rotary member adapted in one position of adjustment to be actuated from the driving mechanism of the generator, means for automatically shifting the rotary member into such position of adjustment when manually retracted therefrom, a stop to prevent such shifting movement, and means connected with the generator for retracting the stop from holding position after a given number of revolutions of the generator armature, together with circuit closing means in operative relation to said rotary member during its interval of rotary movement, said rotary member being formed to break the circuit on completing such movement, together with an independently operated circuit closer and means for actuating the same when said rotary member is in circuit breaking position.

3. The combination with a magneto generator, provided with an armature and armature driving mechanism, of an axially shiftable rotary member adapted to be differentially rotated to various positions with reference to a normal position, means connected with the armature driving mechanism for releasing the member and driving connections adapted to rotate the member to normal position when so released, together with a brush controlling the circuit of the magneto generator and arranged for circuit closing contact with the member only when released and out of normal position, and means connected with said driving mechanism for closing an electrical circuit of said generator independently of the member after the same has reached its normal position.

4. The combination with a magneto generator having an armature shaft provided with a traveler actuating threaded portion, an axially adjustable rotary switch member, means, adapted to initially control the generator circuit, a switch member engaging latch, means for releasing the latch from the switch member, a contact brush in the path of the switch when released, a circuit closer independent of the switch member, and means, dependent upon the number of shaft revolutions, for releasing the latch.

5. The combination with a magneto generator provided with an armature and driv-

ing mechanism therefor, of a circuit closing brush electrically connected in circuit with one pole of said armature, an axially movable rotary member electrically connected with the other pole of said armature, a spring arranged to push said member axially in the direction of normal position, a latch adapted to engage and hold said member against the tension of the spring, and means, connected with the driving mechanism of the armature, for retracting the latch, and rotating said member to normal position from any position of rotative adjustment,—said member being arranged to rotate in contact with said brush to a position out of contact therewith.

6. The combination with a magneto generator, of a circuit controller, comprising an axially shiftable rotary member, a latch adapted to hold the same in a manually adjusted position requiring both axial and rotary movements to restore it to normal position, a spring adapted, when the latch is released, to shift said member axially toward normal position, a circuit closing brush in the path of said member when shifted by the spring, a circuit closing lever, movable into and out of contact with said brush, and generator actuating means arranged to transmit motion successively to the latch, the member and the circuit closing lever, said member having a slot in a position for registry with the brush when the member is in normal position.

7. The combination with a magneto generator and a circuit controlling mechanism therefor, of a generator shaft having a

threaded portion, and a latch for the circuit closing mechanism provided with a traveling finger adapted to engage said shaft thread, and to be actuated therefrom to retract the latch.

8. The combination with a magneto generator, and a circuit controlling mechanism, of a circuit closer, a threaded magneto shaft, and a finger connected with the circuit closer and adapted to engage the threaded portion of the shaft, said finger being held out of engagement with the threaded portion of the shaft except when the circuit controlling mechanism is in one position of adjustment.

9. The combination with a magneto generator, and a circuit controlling mechanism, of a circuit closer, a threaded magneto shaft, and a finger connected with the circuit closer and adapted to engage the threaded portion of the shaft, said finger being held out of engagement with the threaded portion of the shaft except when the circuit controlling mechanism is in one position of adjustment, together with means dependent upon the number of revolutions of the shaft, for rotatively actuating the circuit controller to normal position, when manually adjusted to a different position, and means for temporarily closing a circuit of the generator during such movement.

In testimony whereof I affix my signature in the presence of two witnesses.

WILLIAM S. BURNETT.

Witnesses:

O. R. ERWIN,
LEVERETT C. WHEELER.