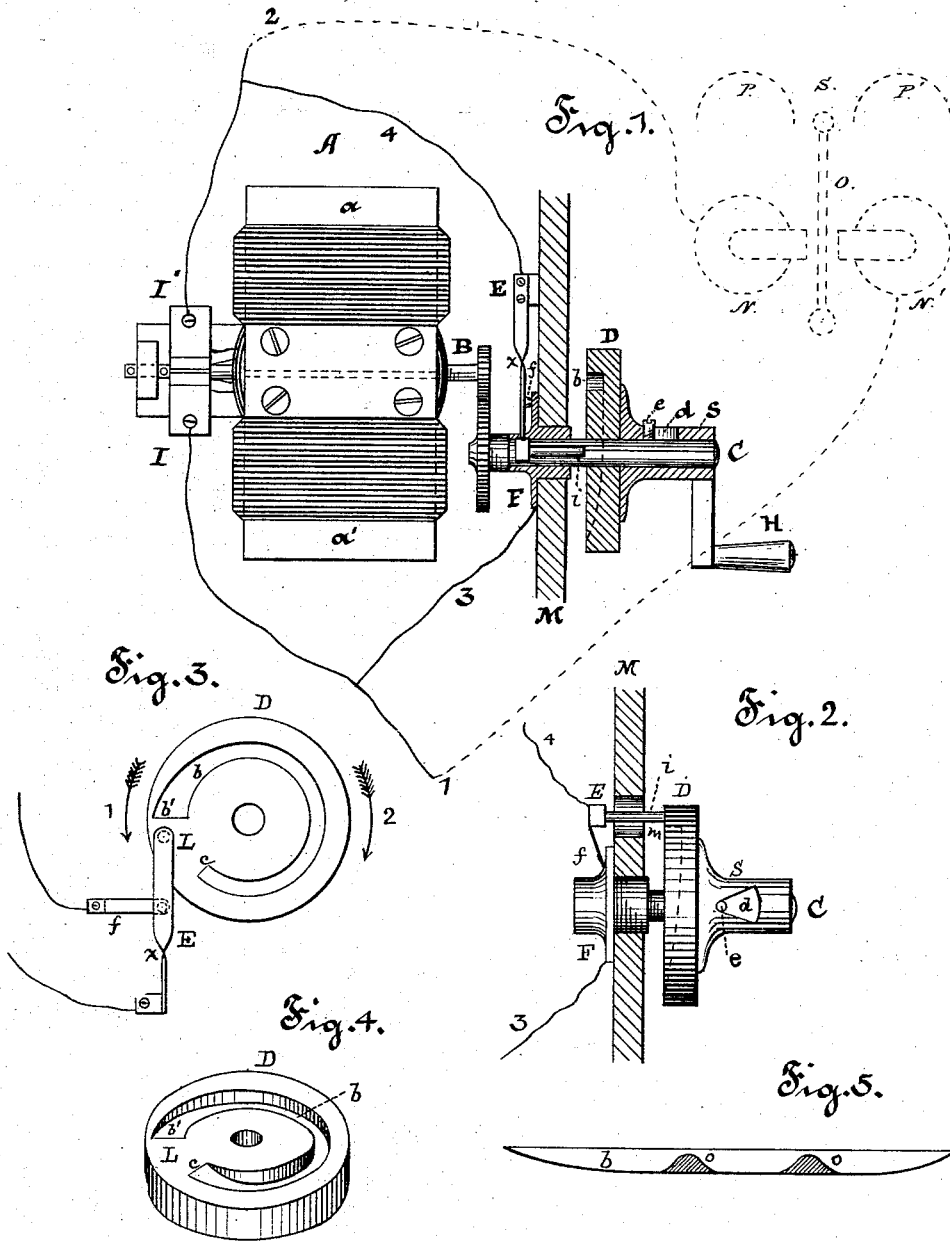


(No Model.)

T. A. EDISON & E. H. JOHNSON.
Magneto Signal Apparatus.

No. 238,098.

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UNITED STATES PATENT OFFICE.

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MAGNETO SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 238,098, dated February 22, 1881.

Application filed November 11, 1880. (No model.)

To all whom it may concern:

Be it known that we, THOMAS A. EDISON and EDWARD H. JOHNSON, of Menlo Park, in the county of Middlesex and State of New Jersey, have invented a new and useful Magneto Signal Apparatus; and we do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Magneto-electric machines as signal apparatus are often used in such relation to other devices that it is desirable that they should be cut out of circuit when not in use, being thrown into the circuit only when in use.

It is often desirable that they should, without any change at the time of use, be capable of giving two distinct signals—as, for instance, a continuous ring and an intermittent ring, indicating two distinct wants or operations or things. The accomplishment of both these results in one organization is the object of this invention. The arrangement for accomplishing generally the first result above noted is not herein claimed, *per se*, as such is the subject of a prior application for a patent made by us jointly; but such is claimed herein only in connection with the other novel arrangements, by which both results in one instrument are rendered practicable.

In carrying the invention into effect a shunt-circuit is formed around the magneto machine or generator, connected to the main circuit upon each side of the generator, a portion of which circuit is a contact spring or lever, taking against an anvil or contact-point. The actuating handle or pulley is attached to a sleeve which is loose upon the main driving-shaft, but secured thereto by a pin on the shaft taking in a triangular opening or slot in the side of the sleeve. Upon the inner end of the sleeve is a disk, which takes against a rod whose other end bears against the contact spring or lever. The force of the contact-spring, or that of a special spring, is used to normally hold the rod pushed against the disk, so that the sleeve is as far out on the shaft as the slot and pin permit, in which condition the spring impinges on the anvil or contact-point, closing the shunt-circuit, thus practically cutting the generator out of circuit. Upon rotation the sleeve turns loosely upon the shaft until the outer end of the slot reaches the pin,

when sleeve and shaft turn together. The slot being triangular causes the carrying inward of the sleeve and disk, pushing the rod against the contact-lever or spring, causing it to leave the contact-point or anvil, breaking thereby the shunt or short circuit, compelling the current from the generator to traverse the main circuit. Upon cessation of use the parts return to their normal position, closing the shunt or short circuit. By the arrangement thus described the first of the objects noted is accomplished.

To accomplish the second object the arrangement noted is modified, as follows:

The contact-spring referred to is made with a twist about its center, so as to be capable of motion in either direction. To it is attached directly the pin which takes against the disk upon the sleeve. In the inner face of the disk a groove is cut, extending partly around the disk, and whose outer edge normally is out of the path of the pin. One end of this groove is broadened somewhat by its outer edge being carried by an easy curve into the path of the pin. At both ends the descent from the face of the disk to the bottom of the groove is by an incline, so that the pin may enter or emerge from the groove without jar. As before stated, the groove extends only partially around the face of the disk, leaving a "land" of the normal plane of the disk between the ends of the groove. If the sleeve be turned in the direction of the narrow end of the groove, the pin takes against the face of the disk outside of the groove and is simply pressed in, breaking the shunt-circuit, as before explained, causing continuous waves of current to be sent upon the line, and a continuous signal to be made—say a continuous ringing of a bell. If, however, the sleeve be turned in the opposite direction, the pin is hit by the outer edge of the broadened end of the groove and carried inward slightly, the pin taking in the groove, leaving the shunt closed so long as the pin is in the groove, the pin being forced inward, and the shunt consequently broken, only when the pin passes out of the groove and rides upon the land. By this means the current is sent upon the line during a part of each revolution only, with the result that an intermittent signal, or a signal composed of sounds with intervening pauses, is given. In the bottom of the groove referred

to could be made a series of inclined or cam faces, following each other in any desired sequence, so that a regular dot and dash or any other arbitrary signal could be given. This arrangement permits of two distinct signals being given without change of apparatus or any operation on the part of the operator, except the mere change of direction of rotation. This may be better understood by reference to the drawings, in which—

Figure 1 is a plan view of an apparatus embodying the invention; Fig. 2, a side view; and Figs. 3, 4, and 5, views of details.

A is a magneto-machine with field-magnets *a a'*, between whose polar extensions rotates the armature B, which is provided with commutators I I', from which lead the wires 1 2 of the main circuit. This magneto-machine may be of any desired description, the one here represented being used simply as a type of that class of machines.

C is the main driving-shaft, connected to the shaft of the armature B by gearing, although it is evident that the shaft C may be the shaft of the armature.

Upon the shaft C is a loose sleeve, S, to which is attached the handle H; or a pulley or other equivalent may be substituted for the handle.

In the side of the sleeve S is the recess or slot *d*, in which takes the pin *e*, secured in shaft C, uniting the shaft and sleeve, but allowing a limited motion of the sleeve upon the shaft, determined by the size of the recess.

Upon the inner end of the sleeve is the disk D, in whose inner face is the groove *b*, extending partially around the disk, as more clearly shown in Figs. 3 and 4. As shown, one end, *b'*, of the groove is wider than the other end, *c*, the widening being effected by a curving outward of the outer edge of the groove. At both ends the bottom of the groove comes up to the land L between the ends of the groove by a gradual incline. The disk D takes against the pin *i* on spring E, a part, *f*, of which normally makes contact with the contact-point or anvil F. The pin *i* passes through a slot, *m*, in the side of the box or framing. The spring E is twisted at *x*, so that its flat surface lies in two planes at right angles to each other, but having a common axis, so that it has a movement in two directions.

A shunt-circuit is formed by conductors 3 and 4—3 from 1 to the anvil F, and 4 from 2 to the spring E. In the main-line circuit any number of suitable signal devices are placed, one being shown in dotted lines as a type, N N' being the magnets thereof, between whose polar extensions plays the polarized armature-lever O, whose outer end, S, strikes upon the bells P P'. Normally the parts are in the position shown in Figs. 1, 2, and 3, the stress of spring E, acting through pin *i*, forcing the sleeve outward and keeping closed the shunt-circuit at *f*, Fig. 1. If, now, the sleeve be turned in the direction of arrow 2, Fig. 3, the

sleeve at first turns loosely on the shaft C; but the pin *e*, taking against the inclined face of the opening *d*, causes it to move inward, forcing back the pin *i* and spring E', breaking the shunt-circuit. The shaft and sleeve then move together, and as the pin *i* takes upon the plane of the disk outside of the groove, the shunt-circuit is kept broken and a continuous current is sent, which may be utilized for a continuous signal-call or other purpose. If, however, the sleeve be turned in the direction of arrow 1, Fig. 3, the pin *i* is caught by the enlarged end *b'* of the groove, and remains in the groove during a part of the rotation. During such part the shunt is not broken and no current goes to the line. As the pin rises up out of the groove and passes over the land L, the shunt is broken during the time of its passage over such land and a current is sent to line. Thus during each revolution of the disk there is a period of current and a period of no current, so that a signal given is intermittent or broken up.

Fig. 5 is a diagrammatic representation of a groove straightened out. In the bottom of the groove inclined or cam surfaces *o o* could be made in such order, sequence, or relation to each other as might be desired, so that a definite number, letter, or other arbitrary signal could be given.

While in this arrangement the sleeve is shown as mounted upon the main driving-shaft, it is evident that it need not always be placed thereon, but that it may be mounted upon any other shaft, or on a special shaft driven from the main driving-shaft.

What we claim is—

1. The combination, with a magneto machine and its main circuit, of a shunt or short circuit, and means for automatically breaking such short circuit entirely upon movement in one direction, and intermittently breaking it upon movement in the other direction, substantially as set forth.

2. The combination of the driving-shaft of a magneto-electric machine, a sleeve mounted thereon in such manner as to have a determinate longitudinal movement thereon, and a circuit-breaker automatically operated by such sleeve, to break a circuit entirely during movement in one direction and intermittently during movement in the other direction, substantially as set forth.

3. The combination, with a magneto machine, of means, substantially as described, for producing a definite audible signal upon rotation of the driving-shaft in one direction and a definite different audible signal upon rotation of the driving-shaft in another direction, substantially as set forth.

This specification signed and witnessed this 21st day of October, 1880.

THOS. A. EDISON.
EDWD. H. JOHNSON.

Witnesses:

JOHN F. RANDOLPH,
WM. CARMAN.