

(No Model.)

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BREAK KEY ATTACHMENT FOR MAGNETO ELECTRIC GENERATORS.  
No. 290,709.

Patented Dec. 25, 1883.

Fig. 2.

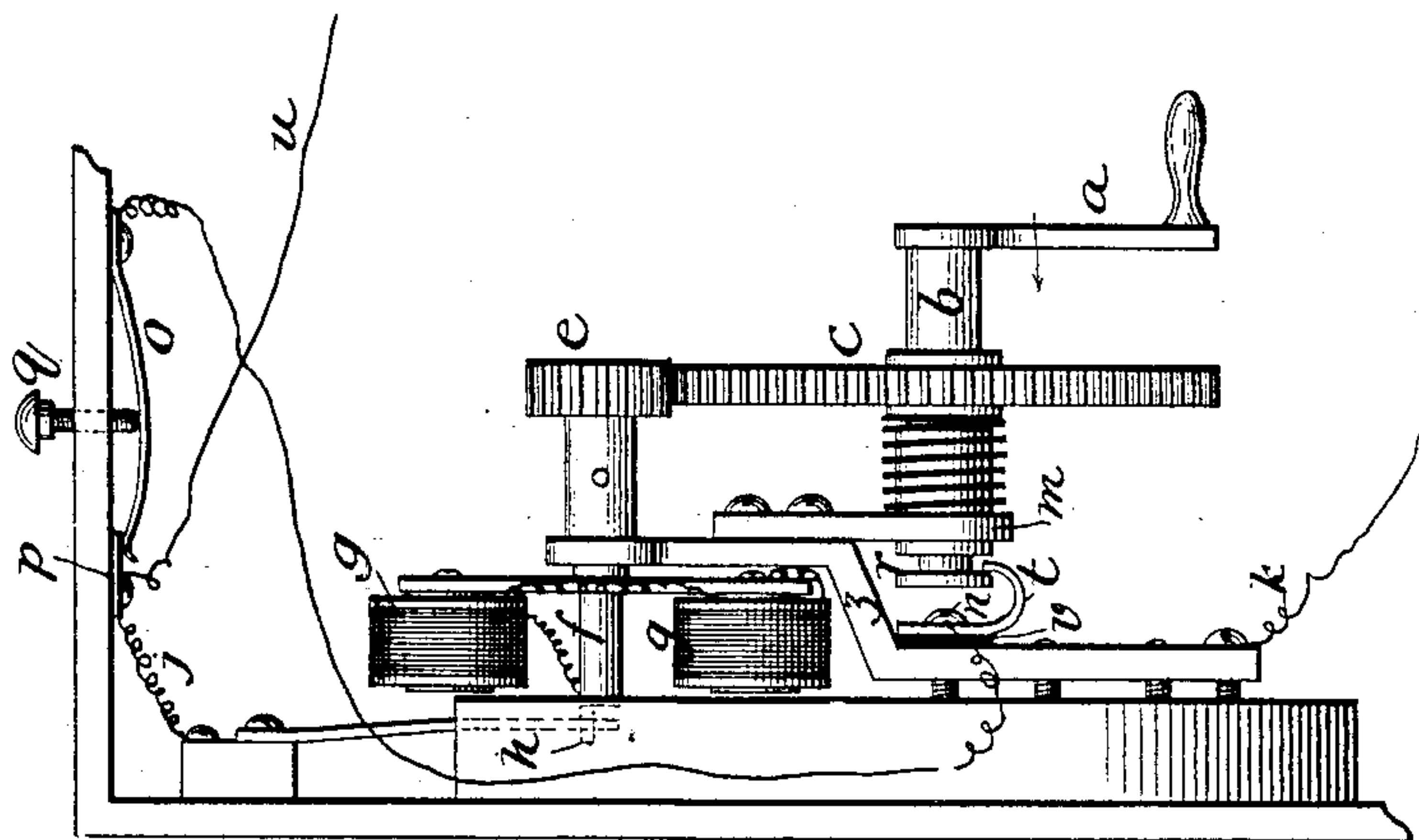
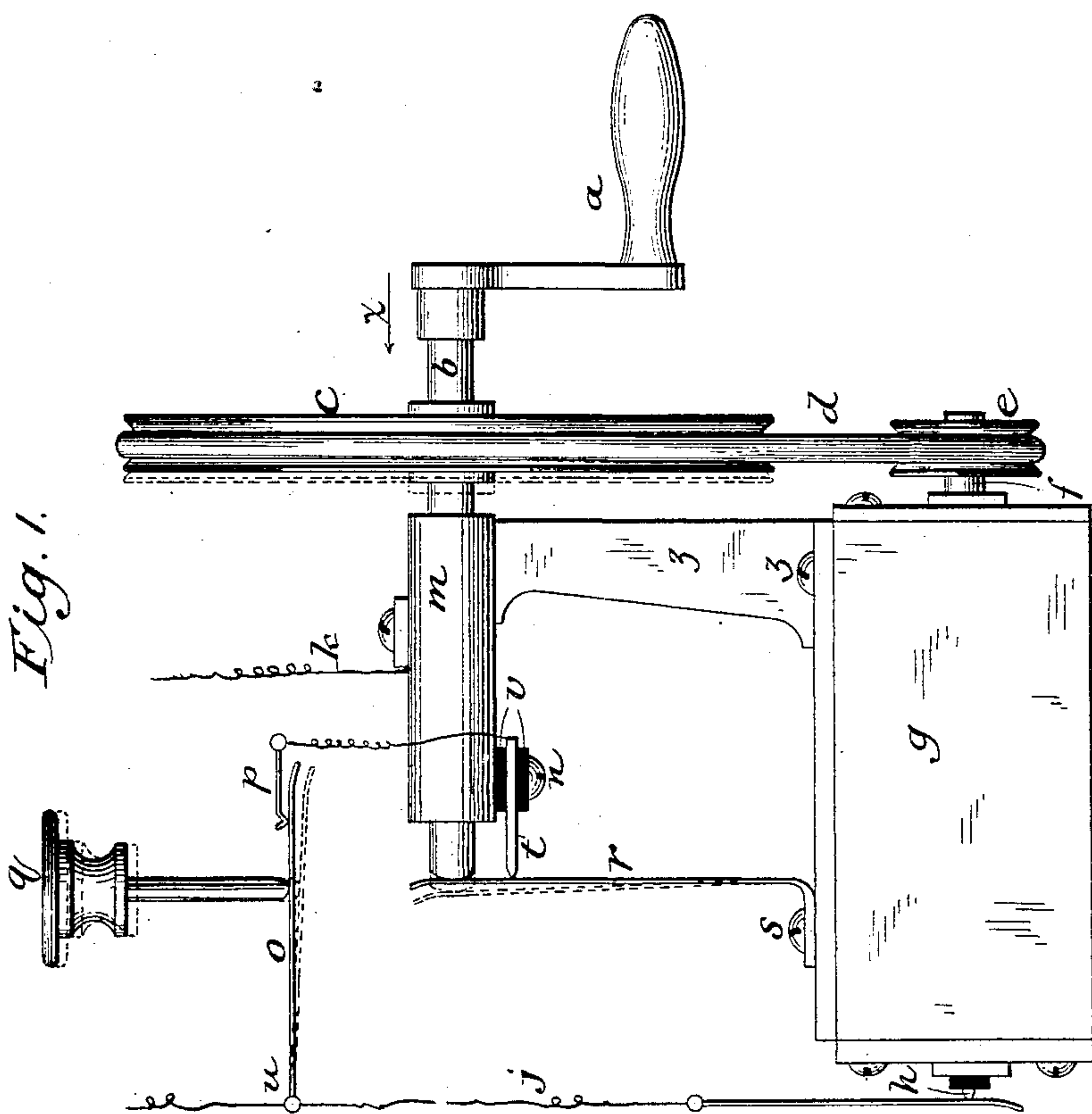


Fig. 1.



Attest.

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# UNITED STATES PATENT OFFICE.

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## BREAK-KEY ATTACHMENT FOR MAGNETO-ELECTRIC GENERATORS.

SPECIFICATION forming part of Letters Patent No. 290,709, dated December 25, 1883.

Application filed July 30, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES S. ROSS, of Nashville, Davidson county, Tennessee, have invented a new and useful Improvement in Break-Key Attachments for Magneto-Electric Generators, of which the following is a specification.

My invention relates to improvements in automatic switches, commonly known in the art as "break-key attachments," by which short circuits are completed between the generator-coils of the magneto-electric call-instrument and any circuit which it is desired shall be relieved of the resistance offered by the coils of the generator when the latter is not in use, the short circuit being broken or discontinued when the generator is in action.

The object of my invention is to provide a more simple and conveniently-operated break-key than those now in use, and one that may be operated in connection with the ordinary press-button short-circuiting switch, so that the generator may be cut in and operated either with one hand, to make ordinary signals, or by the use of the usual press-button, to make distinct and arbitrary signals, without altering the arrangement of the apparatus.

Referring to the accompanying drawings, Figure 1 is a side elevation of my generator in its preferred form. Fig. 2 is a view of the same in a modified form.

The essence of my invention consists in so constructing the circuit-closing devices as to be operated by a lateral motion of the crank which propels the generator, the crank being arranged to move freely in a lateral direction at the will of the operator, and without the assistance of mechanical contrivances for effecting such lateral motion.

Referring to Fig. 1, *a* represents the operating-pinion, attached rigidly to the end of the shaft or spindle *b*, which is sustained in a tubular sleeve or bearing, *m*, at the top of a fixed standard, *z*, the shaft being free to move endwise through its bearing. The shaft is provided, as shown, with a large pulley, *c*, which is connected through the medium of a belt, *d*,

to a smaller pulley, *e*, mounted on the shaft *f*, which carries a rotary armature or coil revolving in the field of a magnet, *g*, as usual, the arrangement mentioned serving to transmit a rotary motion from the crank to the armature in an ordinary manner. The armature will be provided with the usual coil of wire in which the current is induced. One end of the armature-coil is connected through the armature-shaft *f* to the cylinder *g*, and the other opposite end connected with an insulated point, *h*, in the end of the shaft *f*. The spring *i* bears against the point *h* and conducts the electric current thence by the wire *j* to the line or other circuit, the current returning from the circuit to the generator-coils through a wire, *k*, joined to the standard *z*, which is in metallic connection with the cylinder *g*. Currents passing to the apparatus from the line-circuit are relieved from traversing the coils of the generator by being furnished with a short circuit connecting from the point *u* directly to the cylinder *g* of the generator. The closing of the circuit is effected by discontinuing the currents through the main circuit, so that by properly opening and closing the short circuit arbitrary or predetermined signals may be transmitted through the main circuit, the generator remaining constantly in action.

To provide for the convenient opening and closing of the short circuit, I adopt the arrangement represented in Fig. 1, the short circuit being formed through the conducting-spring *o*, which connects with a circuit-wire, *j*, and also with a conducting-finger, *p*, which is in turn connected through an intermediate wire to an insulated conductor, *t*, which is acted upon by a conducting-spring, *r*, connected to the cylinder *g* of the generator. When the parts are in their normal position, the springs *o* and *p* and the spring *r* and conductor *t* are in contact and the short circuit is complete. The end of the spring *r* is extended past the inner end of the driving-shaft *b*, so that when said shaft is moved inward it will force the spring *r* out of contact with the conductor *t*, thus breaking the short circuit and causing the current from the generator to be passed continuously over



the main line. The shaft *b* being free to slide endwise in its bearings, as before mentioned, its longitudinal motion to effect the breaking of the short circuit is secured by simply pressing laterally upon the operating-crank *a* at the same time that it is being rotated to operate the generator. It will thus be seen that by the use of one hand only the operator is enabled to operate the generator and to throw the same into and out of circuit at will. On the parts being released, the spring *r* acts to force the shaft outward and restore the parts to their original condition with the short circuit closed, as in Fig. 1.

It is to be noticed, as a peculiarity of my apparatus, that the end motion of the shaft to break the short circuit is secured by the pressure applied directly thereto by the operator, and without the intervention or employment of mechanical devices for the purpose.

It will also be observed, as a result of this arrangement, that it is optional with the operator as to whether the generator will be operated in circuit or out of circuit, this fact being of great advantage in connection with the use of the manual signaling-key, which will be hereinafter described.

I am aware that generators which are normally short-circuited have been provided with appliances through which the short-circuit devices were opened by means of the rotation of the crank. Such apparatus is open to the objection of additional complexity and expense.

It will be observed, as a peculiarity of my apparatus, that the lateral motion of the crank and shaft is independent of its rotary motion, and that the lateral movement is not effected automatically, but is dependent wholly upon the pressure applied by the hand of the operator.

Passing now to the manual signaling device, it consists simply of a press-button, *q*, arranged to bear upon the short-circuit spring *o*, so that upon pressing the button the short circuit may be broken. The operator, turning the crank with one hand, may cause a current to be transmitted continuously over the main line or main circuit, except as it is broken by the action of the button *q*, which may be conveniently manipulated by the other hand.

Referring now to the apparatus represented in Fig. 2, it will be found substantially identical with that represented in the first figure, although differing slightly in form. The operating-crank *a* is attached to a revolving shaft, *b*, which is free to move endwise, being urged outward by means of a spiral spring applied around it, as shown. The shaft *b* carries a gear-wheel, *c*, which in turn carries a wheel, *e*, applied to the shaft *f*, carrying the armature-coils *g*, which revolve in the field of a permanent magnet, *h*. The current passes from the end of the shaft *f*, through the usual conducting-finger, through the wire *j*, and

thence through a conducting-finger, *o*, as in the first instance, and back to a conducting plate or point, *t*, which bears against a flange on the inner end of the driving-shaft *b*. In the normal position the insulated finger *t* bears against the collar on the inner end of the shaft *b*, thus completing the circuit, so that the armature-coils are cut out from the circuit. The rotation of the crank operates the armature, and by pressing the crank inward laterally—or, in other words, at right angles to its plane of rotation, as indicated by the arrow in Fig. 2—the end of the shaft *b* is disconnected from the conductor *t*, thereby breaking the short circuit and compelling the current to pass to the main line.

The mechanism represented in Fig. 2 of the drawings is shown in Letters Patent granted to me, No. 246,344, dated August 30, 1881, but forms no part of the invention therein claimed.

The present invention is restricted to those matters and things which are hereinafter claimed; and as to all matters which may be described or shown, but which are not claimed, the right is reserved to make the same the subject of a separate application.

Having thus described my invention, what I claim is—

1. In a magneto-generator, the combination of an operating-crank for the generator, free to move laterally at will independent of its rotary motion, and circuit-controlling devices, substantially as described, connected with said crank, and adapted to be actuated by the lateral motion thereof.

2. In a magneto-generator containing a short circuit, a device to open and close said circuit, and an operating-shaft for a generator, provided with a hand-crank, and movable longitudinally in its bearings at the will of the operator independent of its rotary motion, said shaft arranged to operate the circuit-controlling devices, substantially as described.

3. In a magneto-generator, a hand-crank to propel the generator, a shaft for said crank, movable longitudinally in its bearings at will and independent of its rotary motion, short-circuiting devices adapted and arranged to be opened by the motion of a shaft in an inward direction, and a spring acting to urge the shaft outward, whereby the short circuit is maintained in a normally-closed condition.

4. In a magneto-generator, the combination with an armature and its operating-crank movable laterally and independent of its rotary motion at the will of the operator, of a short circuit past the armature, two circuit-breaking devices in said circuit, one connected with and adapted to be operated by the lateral motion of the hand-crank in the manner described, and the other normally closed and independent of said crank, whereby the apparatus is adapted to be operated by hand for



the transmission to the main line of a continuous current, or of a current broken to give definite signals, and also adapted to permit the generator to remain out of circuit when  
5 the latter is being operated or controlled from the opposite end of the line.

5. In a magneto-generator, the combination of the shaft B, movable freely and independently in a longitudinal direction, the hand-

crank secured to said shaft, driving-wheel *c*, 10 spring *r*, contact-point *t*, and wire *u*, the connections *t* and *u* being in electrical connection with each other.

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Witnesses:

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