

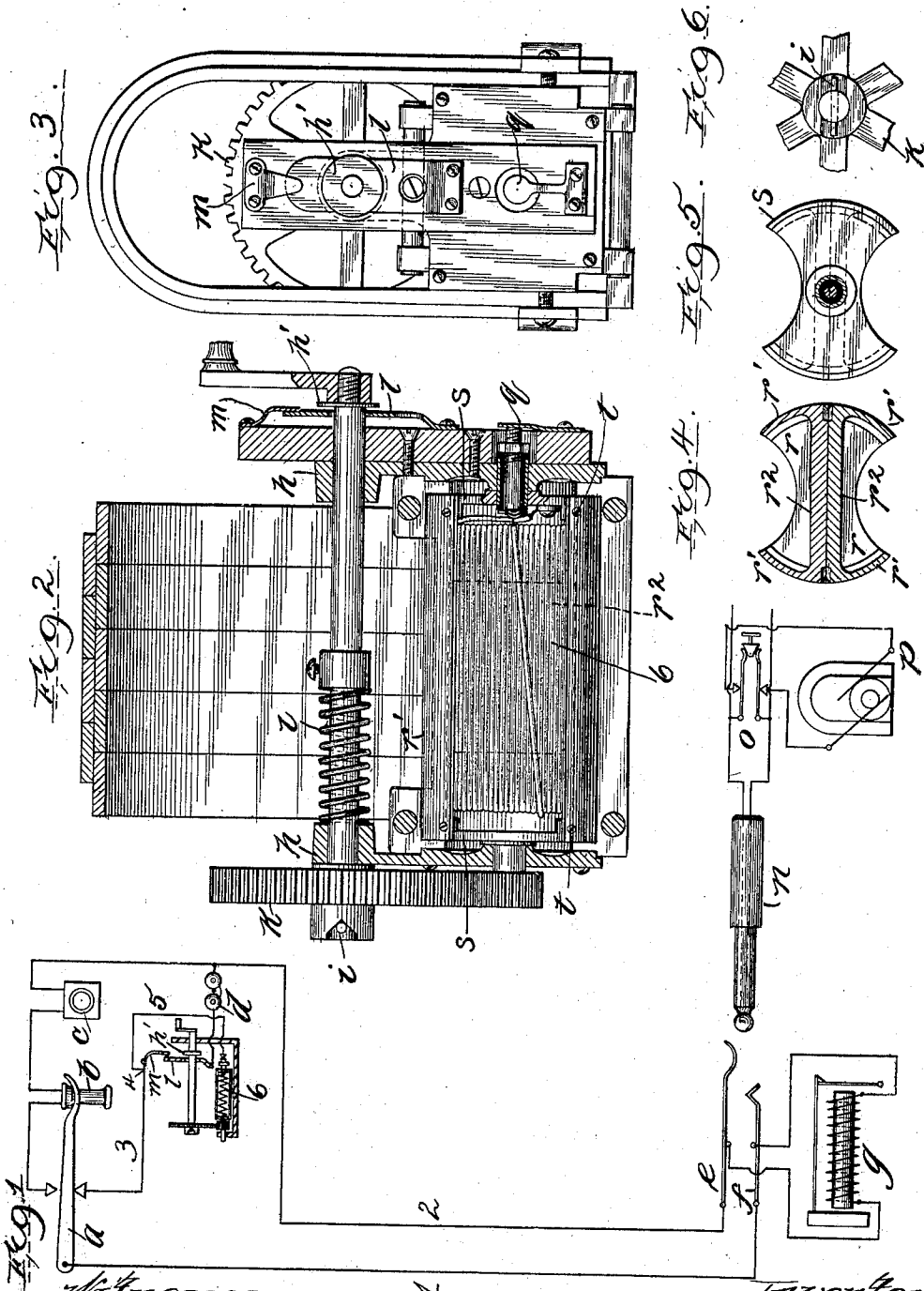
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A. STROMBERG & A. CARLSON.
SIGNALING APPARATUS AND CIRCUIT THEREFOR.

(No Model.)

(Application filed Apr. 26, 1899.)



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UNITED STATES PATENT OFFICE.

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SIGNALING APPARATUS AND CIRCUIT THEREFOR.

SPECIFICATION forming part of Letters Patent No. 655,809, dated August 14, 1900.

Application filed April 26, 1899. Serial No. 714,534. (No model.)

To all whom it may concern:

Be it known that we, ALFRED STROMBERG and ANDROV CARLSON, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Signaling Apparatus and Circuits Therefor, (Case No. 1,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

Our invention relates to telephone substation apparatus, and more particularly to signaling circuits and apparatus employed thereat.

Our invention has for one of its objects the provision of improved means for controlling the association of manually-operated magneto-generators and call-bells with telephone lines and another object the improvement in the construction of magneto-generators to increase the efficiency thereof.

One feature of our invention may be generally described as consisting of a magneto-generator, a magneto-bell, and a switch automatically controlled by the operation of the generator for including the armature of the generator in circuit with the bell when signals are to be transmitted from a substation and to exclude the armature of the generator from circuit with the said bell by opening the circuit through the armature when the substation apparatus is to be placed in condition to receive signals. By this means we are enabled to accomplish automatically what was heretofore accomplished by manual means, which are extremely objectionable, especially in telephone practice.

In the preferred embodiment of the invention we preferably employ as the circuit-changing portion a strip of spring metal provided with a hole through which the crank-shaft of the generator passes normally without making electrical connection with the said spring. By means of the cam the shaft is moved axially, when rotated, to bring an enlargement thereof in contact with the spring to close the generator-circuit. When the shaft is relieved of rotary effort, the spring

serves to restore the same to its initial position, in which position the said circuit-changing spring is engaged with a normal contact and removed from its alternate contact, the enlargement on the shaft, whereby the generator-circuit is opened and an alternate path through the magneto signal-bell is closed.

We will explain our invention more particularly by reference to the accompanying drawings, illustrating the preferred embodiment thereof.

Figure 1 of the drawings illustrates a telephone-substation connected with apparatus at a central exchange. Fig. 2 is an elevation, partially in section, of a magneto-generator constructed in accordance with our invention. Fig. 3 is an end view of the generator shown in Fig. 2, the handle being removed clearly to show parts concealed thereby. Fig. 4 is a view in cross-section of the armature-core of the magneto-generator. Fig. 5 is an end view of the armature-core. Fig. 6 is an end view showing the cam mechanism for shifting the crank shaft or axle of the generator longitudinally.

Like characters of reference indicate like parts throughout the different figures.

In the drawings we have shown one well-known type of telephone-substation apparatus that may be employed in connection with our invention—namely, a well-known form of telephone spring-switch hook *a*, the receiver *b*, the transmitter *c*, and the magneto call-bell *d*, the receiver when in place upon its hook serving to close circuit through the call-bell and when removed from its hook serving to open circuit through the call-bell and include the telephonic apparatus in circuit with the telephone-line 1 2, extending to the exchange and connected thereat with a well-known form of spring-jack whose line springs *e f* are normally engaged with back contact-terminals of an indicator or drop *g*. The signaling-conductor 3, terminating in the normal contact of the telephone switch-hook, is provided with a branch connection, in the embodiment shown at the point 4, this branch connection 5 including the armature 6 of the generator, the metallic framework of

the generator including the journals *h* of the crank-shaft and the enlargement *h'* upon the said crank-shaft in electrical connection with the said journals. The signaling-conductor 3 includes the circuit-changing spring *i* and the bell *d* when the generator is idle. The shaft of the generator passes through an aperture of a greater diameter, whereby the circuit-changing portion is normally maintained out of connection with the branch 5.

When the crank-shaft of the generator is rotated, a pin *i*, carried upon one end thereof, rides upon the walls of a V-shaped groove provided in the hub of the gear-wheel *k*, the said shaft thus being moved axially against the force of a coiled spring *l*. The enlargement *h'* is thus brought into contact with the circuit-changing spring *i*, which is thus automatically shifted from engagement with its normal contact *m*, which serves normally to complete the continuity of the conductor 3 in engagement with its alternate contact *h'*, the portion *m* of the conductor 3 thus being replaced by the branch generator-conductor 5, including the armature-coil of the generator, the framework thereof, the shaft, and its enlargement.

It will be seen that we provide a signaling-conductor which is normally composed in part of a conducting portion of low resistance serving to complete circuit through the magneto-bell, which portion of low resistance is replaced by the branch including the generator-coil, which is of high resistance, when it is desired to transmit signaling-current over the line, the generator-coil being normally in open circuit.

We will now describe the operation of the signal-receiving devices illustrated in Fig. 1. When it is desired to ring the magneto-bell *d*, the plug *n* is inserted, whose contact members are engaged with the springs *e* and *f*. By pressing the ringing key *o* the generator *p* is included in circuit with the signal-bell through the conductor 3 and the low-resistance portion *m* of the said conductor. If it should be desired to operate the indicator *g*, the plug *n* being withdrawn from its socket, the crank-shaft of the generator is rotated to separate the circuit-changing spring *l* from its normal contact *m*, whereby the low-resistance portion *m* of the conductor 3 is replaced by the armature 6 of the generator and its contact, which are thus included in series between the normal contact of the telephone-hook and the magneto-bell *d*. The generator is preferably constructed as illustrated in Figs. 2, 3, 4, 5, and 6. The circuit-changing spring *l* is preferably mounted upon an insulating-support, at the upper end of which is disposed the normal contact *m* and at the lower end of which is placed the contact-spring *q*, engaging one end of the armature-shaft forming a terminal of the generator-coil, which terminal is preferably thus connected with the normal contact *m*. The armature-shell is formed in two sections *r r*, which may be rolled or pressed into

shape, each section having longitudinal arc-shaped portions *r'* conforming to the space between the poles of the generator, the curved longitudinal portions *r'* being connected by a transverse flat base portion *r²*, beyond both transverse edges of which the arc-shaped portions *r'* extend. In assembling the armature-core the two flat base portions *r²* are placed face to face, as shown most clearly in Fig. 4, and united by end plates *s s*, each supporting an individual shaft projecting outwardly from the armature and supported in suitable bearings. The shaft thus does not extend all the way through the armature, whereby we are enabled to provide increased space for the armature-wire, thereby to increase the effectiveness of the generator. The portions *r²* being shorter than the portions *r'*, sufficient space is afforded between the transverse edges of said portions and the end plates *s s* for the disposition of the armature-wire. Screws *tt* are preferably employed for fastening the plates *s s* to the portions *r'* of the armature-core.

Changes may be made without departing from our invention, and we do not, therefore, desire to be limited to the precise construction shown; but,

Having described our invention, we claim as new and desire to secure by Letters Patent—

1. In a magneto-generator for telephone signaling, the combination with an armature normally disconnected from the signaling-circuit, of an electrically-actuated signal-receiver connected with said signaling-circuit, a contact *m*, a coacting switch-spring *l* normally engaging said contact and maintaining the signaling-circuit closed, a driving-shaft passing through an opening in said switch-spring, a second contact *h'* mounted upon the said shaft, connected with the armature-circuit, and automatic means for securing the longitudinal movement of the shaft, whereby contact *h'* is moved to establish connection with switch-spring *l* and disengage the latter from contact *m*, substantially as described.

2. The combination in a magneto-generator with an armature normally included in a discontinuous circuit, of a bell *d*, an automatically-operated circuit-changing switch-spring *l*, a coacting contact *m* normally engaged thereby to complete the bell-circuit, a driving-shaft having an enlargement *h'* disposed in position for engagement with the said switch-spring, but normally disconnected therefrom, said part *h'* being connected with the armature-circuit, and automatic means for effecting the longitudinal movement of the shaft and enlargement, whereby the latter is caused to engage and actuate the switch-spring and connect the armature in series with the bell-circuit, substantially as described.

3. The combination with a manually-operated generator, of an automatically-operated circuit-changing switch *l*, the operating-shaft of the generator passing through a bore of a

diameter larger than the diameter of the shaft, whereby the shaft is normally maintained out of contact with said circuit-changing switch, an enlargement h' upon the shaft
 5 normally maintained out of contact with the switch, a normal contact m , a bell d included in series with said normal contact m and switch l , one terminal of the generator being connected with the frame thereof and there-
 10 by with the operating-shaft, the other terminal of the generator being connected with the normal contact, and means permitting of the longitudinal movement of the shaft, said generator and bell being located at one station
 15 and a suitable signal-receiver at another station included in series with said bell and upon the operation of the generator with the bell and generator, substantially as described.
 4. The combination with a manually-operated generator, of an automatically-operated circuit-changing switch l , the operating-shaft of the generator passing through a bore of a diameter larger than the diameter of the shaft, whereby the shaft is normally maintained
 25 out of contact with said circuit-changing switch, an enlargement h' upon the shaft normally maintained out of contact with the switch, a normal contact m , a bell d included in series with said normal contact m and
 30 switch l , one terminal of the generator being connected with the frame thereof and thereby with the operating-shaft, the other terminal of the generator being connected with the

normal contact, means permitting of the longitudinal movement of the shaft, and cam
 35 mechanism for moving the shaft longitudinally upon its actuation, said generator and bell being located at one station and a suitable signal-receiver at another station included in series with said bell and upon the
 40 operation of the generator with the bell and generator, substantially as described.

5. In a magneto-generator, the combination with an armature formed of two portions r r each having longitudinal arc-shaped portions
 45 r' r' and a longitudinally-shorter base portion r^2 , a space being provided between each transverse edge of the base portions and the ends of the portions r' , the base portions r^2 r^2
 50 of the sections of the armature-core being placed together, of an armature-winding wound about the united base portions r^2 , plates s secured to the portions r' r' and serving to unite the parts r r , and individual separated shaft-sections carried by said end
 55 plates serving to afford a rotatable mounting for said armature, the armature-winding being interposed between and not inclosing said shaft-sections, substantially as described.

In witness whereof we hereunto subscribe
 60 our names this 24th day of April, A. D. 1899.

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ANDROV CARLSON.

Witnesses:

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