(No Model.) 2 Sheets—Sheet 1.

C. E. SCRIBNER.

CALLING APPARATUS FOR METALLIC CIRCUIT TELEPHONE EXCHANGE SYSTEMS.

No. 427,194. Patented May 6, 1890.

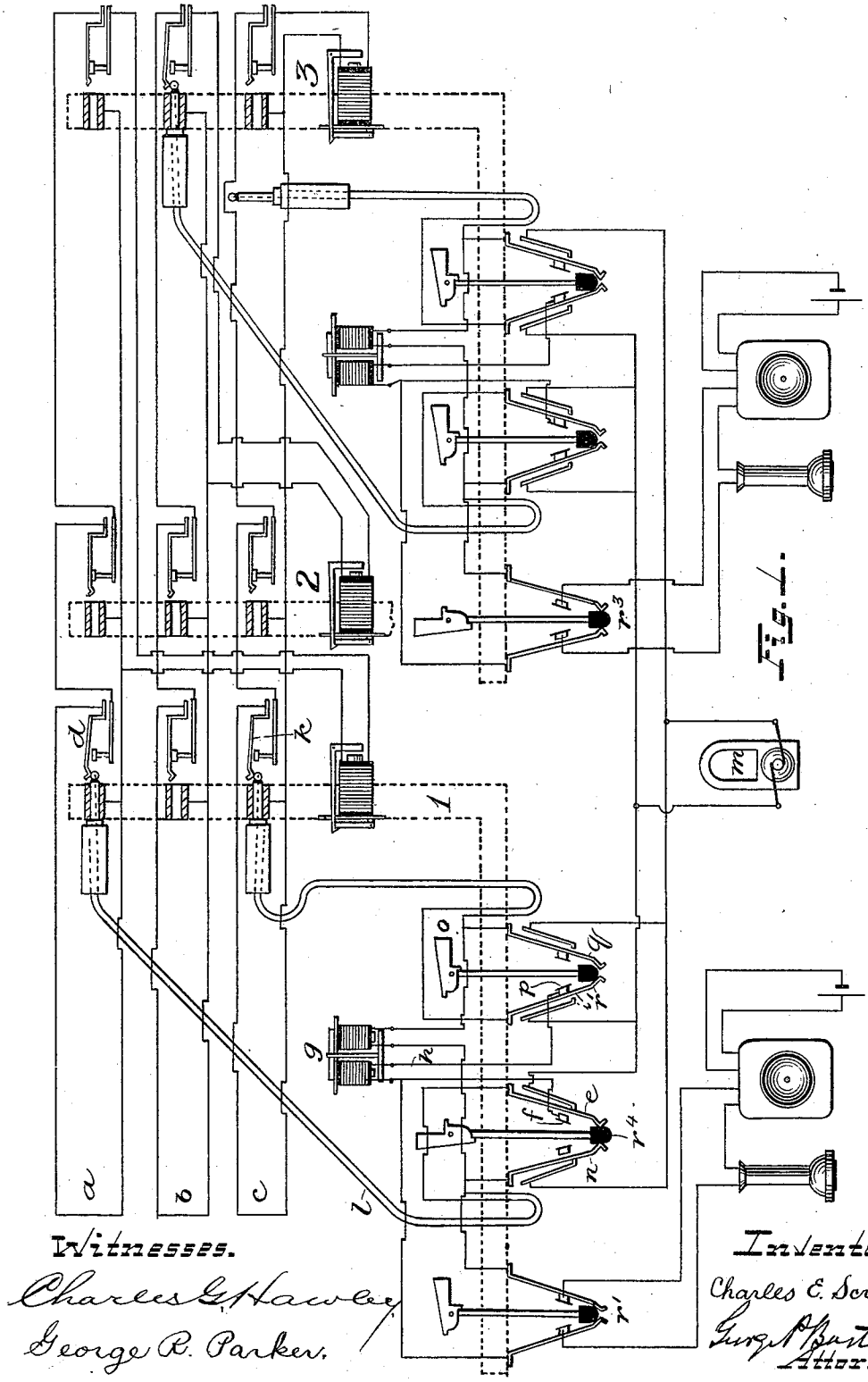

Fig. 1.

(No Model.) 2 Sheets—Sheet 2.

C. E. SCRIBNER.

CALLING APPARATUS FOR METALLIC CIRCUIT TELEPHONE EXCHANGE SYSTEMS.

No. 427,194. Patented May 6, 1890.

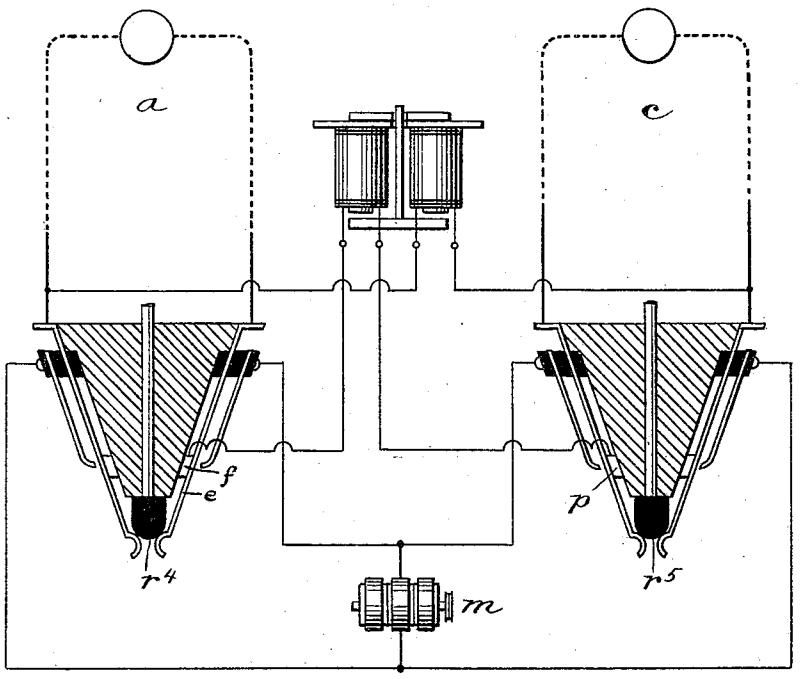

Fig. 2.

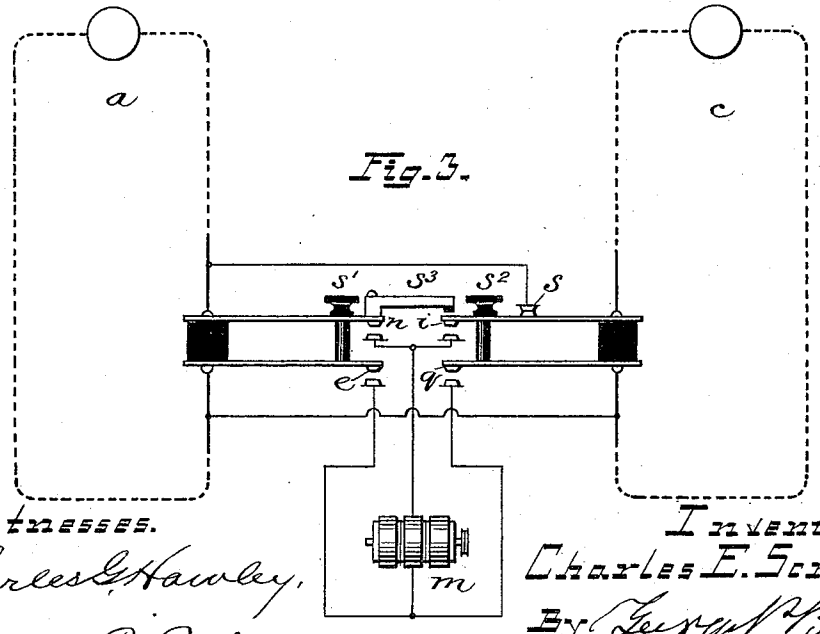

Fig. 3.

Witnesses.
Charles G. Hawley,
George R. Parker.

Inventor.
Charles E. Scribner.
By Geo. P. Barton
Attorney

UNITED STATES PATENT OFFICE.

CHARLES E. SCRIBNER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WESTERN ELECTRIC COMPANY, OF SAME PLACE.

CALLING APPARATUS FOR METALLIC-CIRCUIT TELEPHONE-EXCHANGE SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 427,194, dated May 6, 1890.

Application filed October 14, 1889. Serial No. 326,971. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. SCRIBNER, a citizen 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 Calling Apparatus for Metallic-Circuit Telephone-Exchange Systems, (Case 212,) 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.

My invention relates to telephone-exchange systems in which metallic circuits are employed; and its object is to provide ready means at the central office of calling up any one of two connected subscribers.

Heretofore in order to do this a somewhat complicated switching device has been employed so arranged that when the generator is connected with one of two communicating lines two breaks are made, the other line being opened at both ends of its circuit at the central office.

By the use of my apparatus the switching device is modified so that only one break is made in the united circuit of the two lines when the generator is connected to signal over either one of the two lines, the generator being connected upon one side or the other of this break accordingly as one or the other of the two connected subscribers is to be signaled. In this manner the subscribers, when connected for conversation, have a circuit including a less number of contacts than heretofore.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a diagram of my invention as applied to a multiple metallic telephone-exchange system. Fig. 2 is a diagram illustrative of two telephone-lines connected together and the calling-keys for connecting the generator with either one of the two telephone-lines. Fig. 3 is a modification in which the generator is connected with one side or the other of the same break, according to the direction in which the signal is to be sent.

Like parts are indicated by similar letters of reference in Figs. 1 and 2.

Referring now to Fig. 1, I have shown metallic circuits *a b c* connected in the ordinary manner with switches on each of three multiple switch-boards, the operator's outfit, including my invention, being shown at boards 1 and 3. At board 1 the metallic telephone-circuits *a c* are shown looped together. Thus beginning at the station of subscriber's line *a* the circuit may be traced to spring *d* of the switch of the line on the first board, thence through the tip of the loop-plug inserted therein to contact *e* of the calling-key, and from thence normally to contact *f* thereof, and thence through one spool of the clearing-out annunciator *g* and by line *h* to spring *i* of the other calling-key, and thence to the tip of the plug inserted in the switch of line *c* on board 1, and thence to the spring *k* of said switch, and thence through the station of line *c* back to the sleeve of said switch, and thence by the other strand of the cord connected with the loop-plug through the other spool of clearing-out annunciator *g*, and thence to the strand *l* of the plug inserted in the switch of line *a* on board 1, and thence from the sleeve of said plug to the frame of the said switch with which said sleeve is in contact, thus completing the metallic circuit. Now, as shown at the key-table of board 1, the contact *f* is open to spring *e*, said spring *e* being closed to one pole of the generator *m*. The other spring *n* of this key is closed to the other pole of the generator. Thus by tracing the circuits it will be seen that one opening at *f* is made when the generator is thus looped into the circuit of line *a*. In case the cam-lever *o* of the other key were thrown up instead it is evident that a break would be made at *p* and spring *i* closed to one pole of the generator and spring *q* to the other pole thereof, in which case the generator would be looped into the circuit of line *c*. The listening-keys r' r^3, as shown at boards 1 and 2, are of usual construction and need no description.

Referring now to Fig. 2, lines *a* and *c* are shown looped together in connection with the calling-generator and my switching device for connecting the generator into circuit with either of said lines and automatically opening the other line at one point only when the connecting-call is made. As the wedge or plunger r^4 in Fig. 2 is raised, the spring *e*

rests upon its normal contact *f*, and thus the telephone-lines *a c* are united in metallic circuit. When two lines are thus connected through a set of signaling-keys, the generator *m* may be connected with either of said lines by simply depressing the wedge or plunger of the proper key. Thus on depressing the wedge r^4, as shown in Fig. 1, the generator *m* is looped into the circuit of line *a*. If, however, the plunger r^5 of the other key is depressed, the generator will be looped into the circuit of the other line *c*. In the first instance—that is to say, when the generator is looped into the circuit of line *a*—line *c* will be open at contact *f*. On the other hand, when plunger r^5 is depressed to loop the generator into the circuit of line *c* one end of the metallic circuit of line *a* will be open at contact *p*. Thus when a signal is sent over one of the two lines a simple break is made in one branch of the circuit of the other line.

In Figs. 1 and 2 I have shown the contacts *f* and *p*. Instead, however, of having two breaks, one for one circuit and the other for the other, as those shown, a single contact *s* may be provided, as illustrated in Fig. 3, and the key so arranged as to open this same contact when either is depressed, and to connect the generator with one side or the other of this brake at the same time, accordingly as one key *s'* or the other key s^2 is depressed. Thus suppose the key *s'*, corresponding to plunger r^4, is depressed the arm r^3 strikes against key s^2 so as to open contact *s*, and the contacts *n e* are closed upon the generator-contacts, thus looping the generator into the circuit of line *a*. The circuit of line *c* being open at contact *s*, a signal will be sent over the line *a* only. Suppose now the key s^2 (corresponding to plunger r^5) is depressed. The contact at *s* is broken. Contact-springs *i* and *q* of said key s^2 will be closed to the different poles of the generator, thus looping the generator into the circuit of line *c*, the line *a* being opened at the point *s*.

It will be observed that my invention is adapted for use in multiple systems of telephone exchange or to systems in which single switch-boards are employed. In either case each pair of connecting-cords includes my switching apparatus, so arranged that the generator may be looped into either one of two united telephone-lines to signal over one of them while only one break is made in the circuit of the line over which the signal is not sent.

I do not limit my invention, therefore, to any particular system of running the metallic circuits.

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

1. The combination, with two metallic-circuit telephone-lines and loop-plugs and cords uniting said lines in metallic circuit at the central office, of a pair of calling-keys included in the circuit of said cords, and a generator with which the two springs of each of said keys are adapted to be connected, each of said keys, when depressed, serving to loop the generator into one line, either key on being thus depressed acting upon a single contact included in one side of the circuit of the other line to open the said other line at said single contact, substantially as and for the purpose specified.

2. The combination, with two metallic-circuit telephone-lines, of a pair of calling-keys included in the circuit of the said lines at the central office, and a generator with which the two springs of each of said keys are adapted to be connected, each of said keys, when depressed, serving to loop the generator into one line, either key on being thus depressed acting upon a single contact included in one side of the circuit of the other line to open the said other line at said single contact, substantially as and for the purpose specified.

In witness whereof I hereunto subscribe my name this 2d day of October, A. D. 1889.

CHARLES E. SCRIBNER.

Witnesses:
C. G. HAWLEY,
ELLA EDLER.