

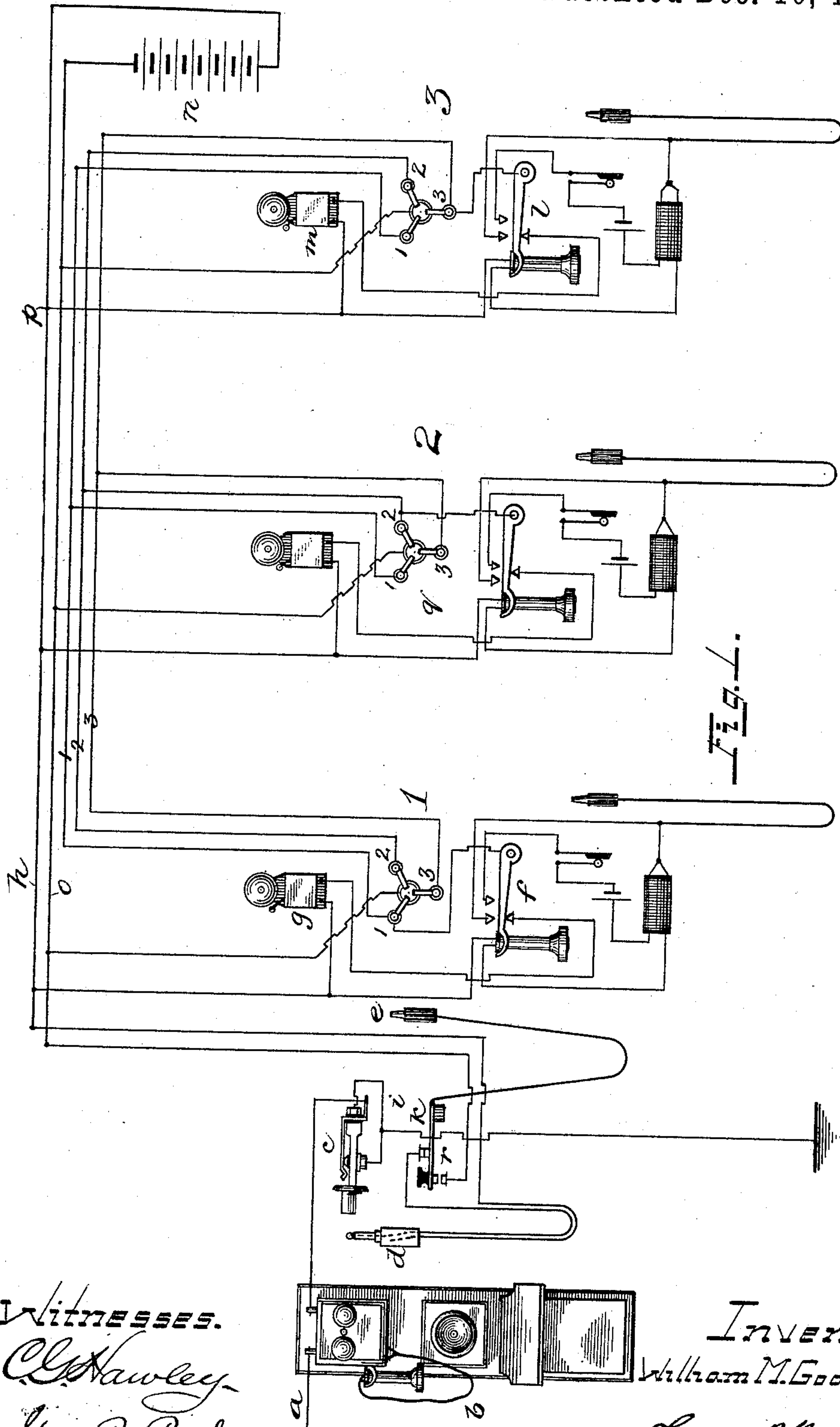
(No Model.)

2 Sheets—Sheet 1.

W. M. GOODRIDGE.
HOUSE TELEPHONE EXCHANGE.

No. 417,018.

Patented Dec. 10, 1889.



Witnesses.

C. Hawley.

Geo. R. Parker.

Inventor.

William M. Goodridge.

By *George P. Barton*
Attorney.

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Fig. 2.

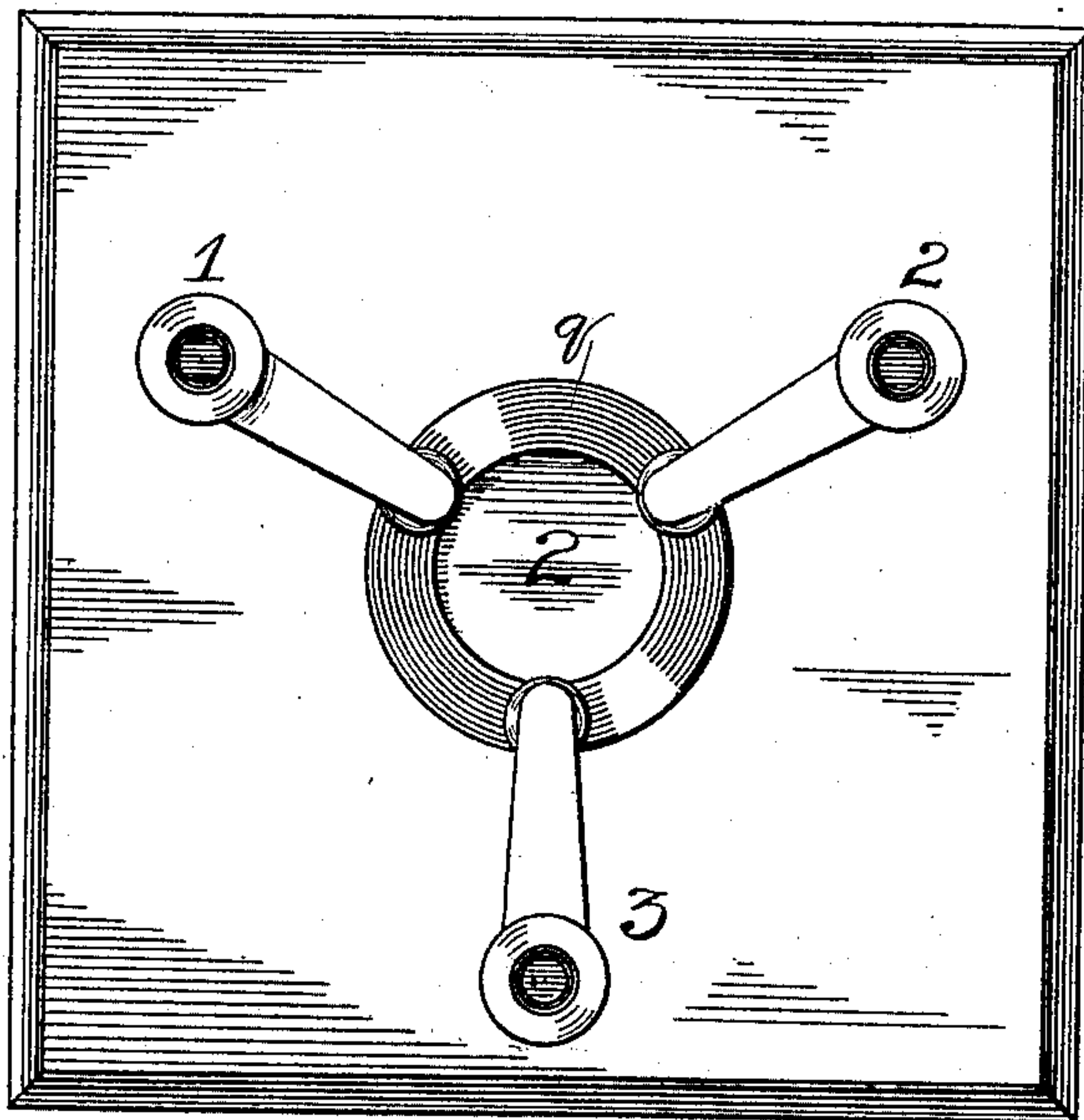


Fig. 3.

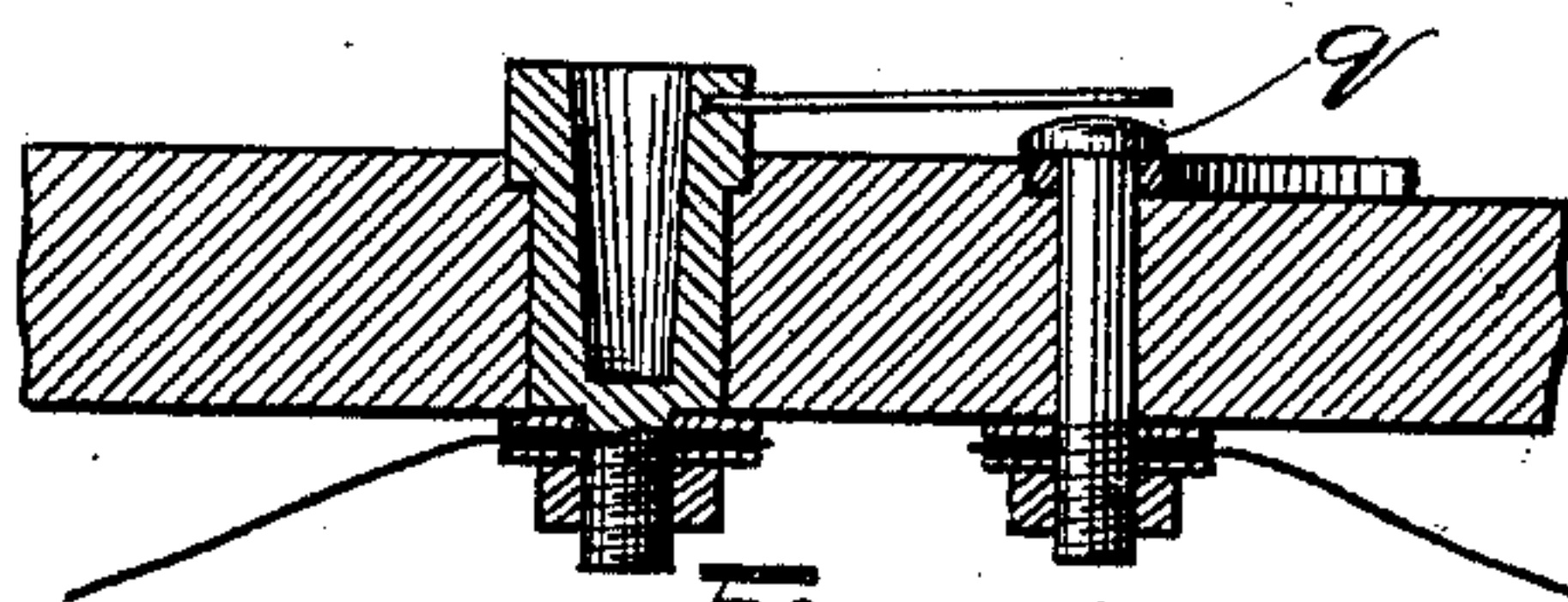


Fig. 4.

Witnesses.

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UNITED STATES PATENT OFFICE.

WILLIAM M. GOODRIDGE, OF HIGHLAND PARK, ASSIGNOR TO THE WESTERN
ELECTRIC COMPANY, OF CHICAGO, ILLINOIS.

HOUSE TELEPHONE-EXCHANGE.

SPECIFICATION forming part of Letters Patent No. 417,018, dated December 10, 1889.

Application filed September 5, 1887. Serial No. 248,825. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM M. GOODRIDGE, a citizen of the United States, residing at Highland Park, in the county of Lake and State of Illinois, have invented a certain new and useful Improvement in House Telephone-Exchange Apparatus, (Case 6,) 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 factory telephone-exchange systems; and its object is to provide facilities for connecting any station in the factory with the station of the city exchange, so that a single wire extending from the factory to the central exchange may be extended to any one of the factory stations.

My invention consists in switching apparatus and circuits for looping into the general wire of the city telephone any one of the stations in the factory.

As to the state of the art prior to my invention reference is made to Letters Patent No. 356,427, granted Charles E. Scribner, January 18, 1887, Case 116.

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

Figure 1 is a diagram illustrative of the circuits of the factory system and the apparatus for making connection with the city exchange. Fig. 2 is a detailed sectional view of the loop-plug in the cord at the factory station near the city telephone. Fig. 3 is an enlarged front view of a set of metallic sockets and the springs connected therewith for closing the signal-circuit. Fig. 4 is a detailed sectional view on line *xx* of Fig. 3.

Like parts are indicated by similar letters and figures of reference throughout the different figures.

I have shown three factory stations 1, 2, and 3. The telephone-line *a* comes from the city exchange, and is connected in the usual manner with the subscriber's outfit *b*. This line after passing through the subscriber's outfit is shown connected with the ground.

My invention relates more particularly to the apparatus whereby this telephone-line *a*

may be connected with either of the stations 1 2 3. It will be seen that I have placed a loop spring-jack switch *c* in this line *a* between the outfit *b* and the ground-connection at the factory. The circuit may be traced from the spring of switch *c* to the contact-point of said switch, and thence directly to ground. When the city telephone-exchange is thus connected directly through switch *c* to ground, the outfit may be used in the ordinary manner without reference to the factory system, and, on the other hand, the factory system may be used, as heretofore, the same as if there were no means of connecting with the city wire—that is to say, communication may be had between any two of the stations 1, 2, and 3 without confusion and without reference to the telephone-line *a*. The loop-plug *d*, when inserted in the spring-jack switch *c*, lifts the spring of said switch *c* from its ground-contact, connecting said spring with the tip of the plug and the frame or body of said switch with the sleeve of the plug. The tip of said plug, it will be seen, is connected through the ringing-key to the plug *e*, which plug *e* is adapted to be inserted in any one of the metallic sockets 1 2 3 of station 1. Ordinarily the socket 1 in station 1 will not be used, since the outfit *b* and station 1 will be so near together that it will not be necessary to use the outfit of station 1 in talking over the city line. When, however, it is desirable to use the outfit of station 1 for this purpose, the plug *e* will be inserted in the socket 1. Now, loop-plug *d* being in spring-jack switch *c* and plug *e* inserted in socket 1 of station 1, the circuit of line *a* may be traced to the spring of switch *c*, thence to the tip of loop-plug *d*, thence to plug *e* and socket 1, thence to the switch *f* of station 1, and thence, when the telephone is on the switch, by the lower contact of said switch *f* to bell *g*, and thence by the common return-wire *h* to the sleeve of loop-plug *d*, thence to the frame of loop spring-jack switch *c*, and thence by wire *i* to ground. Thus we have the bell *g* of station 1 included in the circuit of the telephone-line *a*. On removing the telephone from switch *f* of station 1 the

bell *g* will be disconnected and the telephone will be brought into circuit. Thus, if desired, the telephone outfit of station 1 may be connected with the city line *a* for communication. Ordinarily, however, the connection will be desired between some station at a distance from the outfit *b*—as, for example, station 3. In such case the plug *e* will be inserted in the appropriate socket 3 of station 1. The loop-plug *d* being in the loop-switch *c*, as before described, the circuit formed by inserting plug *e* in socket 3 may be traced through the spring of switch *c* to tip of loop-plug *d*, and thence through the ringing-key *k* to said plug *e*, and thence from socket 3 by wire 3 to switch 1 of station 3, and thence, when the telephone is on the switch 1, through bell *m*, and thence to the common return-wire *h* and back to the sleeve of loop-plug *d* and to ground, as before described. The attendant at the city-telephone outfit *b*, after making this connection, will signal upon bell *m* at station 3 by closing the ringing-key *k*, thus closing the circuit of battery *n* through said bell *m*. The circuit thus closed may be traced from the pole of the battery over wire *o* to the lower contact of key *k*, and thence to plug *e*, and thence from socket 3 over line 3 to switch 1, and thence through bell *m* to the common return-wire *h* at *p*, and thence to the pole of the battery. The signal will thus be sounded at station 3, and the one who is called, on taking down his telephone from switch 1, will disconnect the bell *m* and bring his telephone into the circuit of line *a*. In like manner connection may be made between the telephone-line *a* and station 2 by inserting the plug *e* in socket 2. When the city line is connected with any one of the factory stations, the other two may communicate with one another in the ordinary manner, there being no interference on account of the connection with the city line.

I have shown at each of the stations 1, 2, and 3 three sockets. It will be understood that with three stations only two such sockets, with their corresponding keys, are required. Thus the key of the same number as the station, as shown in the drawings, may be considered simply as a dummy, ready, however, to be connected with circuits of a new station when a new station is added to the system.

We will consider the sockets and springs 1 2 3 of Fig. 3 as corresponding to the sockets and springs indicated by 1, 2, and 3 of station 2, Fig. 1. The central ring *q* is the terminal of one pole of the battery. The springs normally stand away from contact with this terminal *q*, as shown in Fig. 4. The sockets and springs of the other stations are of the same construction.

It is evident that my invention admits of various modifications as to details of construction which would readily suggest themselves to those skilled in the art, and I therefore do not limit myself to precise constructions shown.

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

1. The combination, with the factory telephone-exchange system, of a subscriber's outfit of the city exchange, the telephone-line of said subscriber's outfit extending normally through the spring and insulated contact of a loop-switch to ground, a connection *i* between the frame of said switch and the ground, a loop-plug *d*, adapted to be inserted in said switch, and a plug *e*, in combination with the switches and circuits of several factory-stations, whereby any one of said stations may be connected with the city telephone-line.

2. The combination, with the telephone-line extending through the subscriber's outfit to ground, of a loop-switch included in said ground-circuit, said loop-switch having its insulated contact and frame connected together; a loop-plug, and strands of a cord connected with the terminals thereof, one of said strands being provided with a terminal plug *e* and the other strand being connected with a line *h*, extending to several stations, each of said other stations being connected with circuits, as 2 3, extending to different sockets, with either of which sockets the terminal plug *e* is adapted to be connected, whereby either one of said stations may be connected with the telephone-line, substantially as and for the purpose specified.

In witness whereof I hereunto subscribe my name this 13th day of July, A. D. 1887.

WILLIAM M. GOODRIDGE.

Witnesses:

GEORGE P. BARTON,
WM. M. GILLER.