

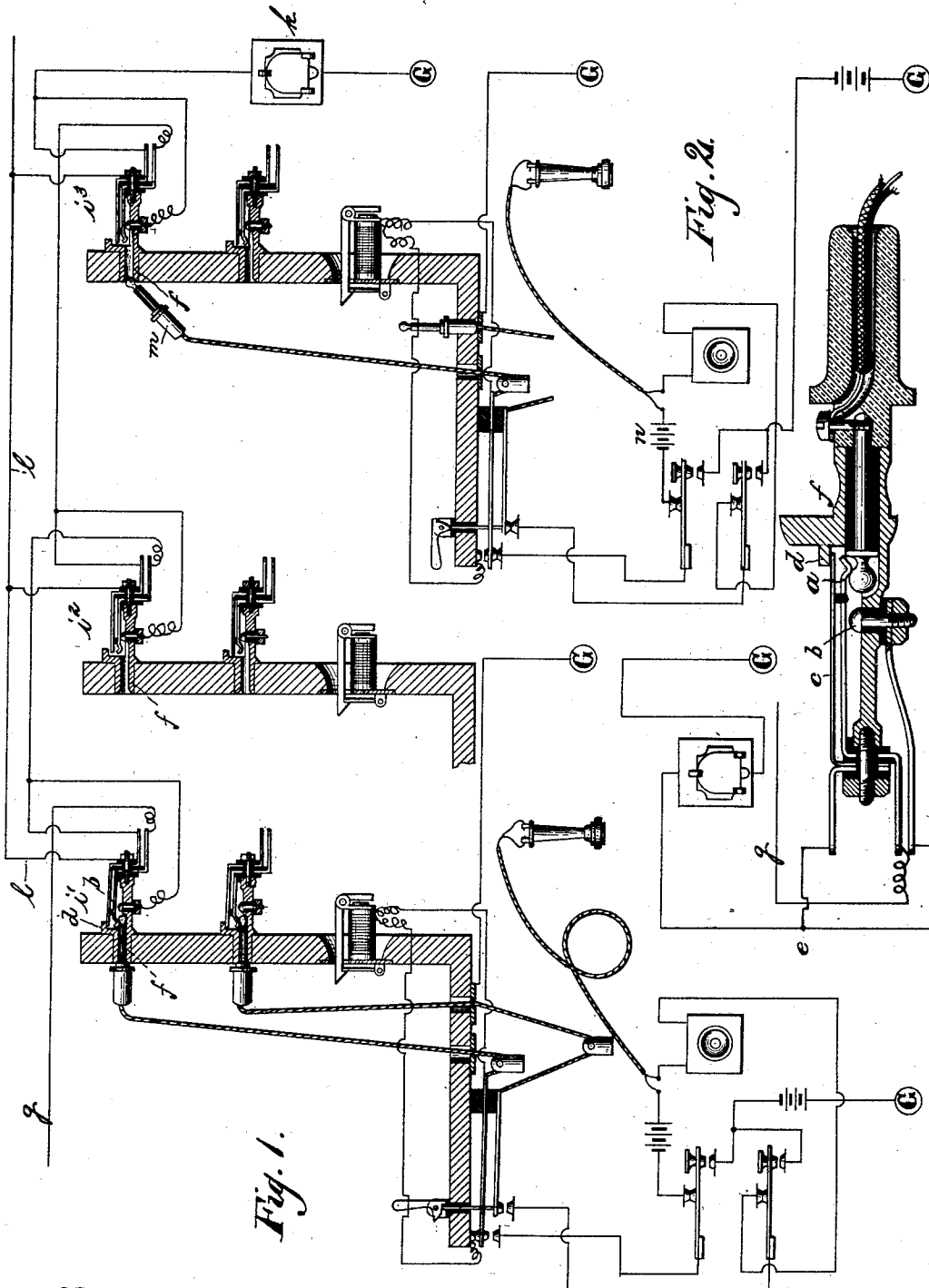
(No Model.)

C. E. SCRIBNER.

MULTIPLE SWITCH BOARD TEST CIRCUIT.

No. 374,907.

Patented Dec. 13, 1887.



Witnesses.
Henry Paul Jones.
Sam B. Dover.

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UNITED STATES PATENT OFFICE.

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

MULTIPLE-SWITCH-BOARD TEST-CIRCUIT.

SPECIFICATION forming part of Letters Patent No. 374,907, dated December 13, 1887.

Application filed May 12, 1885. Serial No. 165,277. (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 Multiple-Switch-Board Test-Circuits, (Case 96,) 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 multiple switch-board-testing apparatus, and is an improvement upon the system described and claimed in my patent, No. 305,021, dated September 9, 1884. Instead of finding a test-circuit to line, as in said patent, I provide switching apparatus and circuits whereby the portion of a busy line which is cut off at the central office forms a portion of the circuit to ground when a test is made at any of the boards. I thus avoid interfering with the circuit formed between two subscribers when a test is made to determine whether either of the said connected lines is busy.

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

Figure 1 shows partial sectional views of three multiple switch-boards provided with my improved circuits. Fig. 2 is a detail view of one of my double spring-jack switches with a plug inserted and the line and test-circuit connections.

I will first describe the spring-jack as shown in Fig. 2. The shank of the plug, except the tip, is provided with a sleeve of insulating material, so that when the plug is inserted, as shown, there is no electrical connection between the plug and the frame or test portion of the spring-jack. The tip of the plug, however, comes against the spring *a*, with which the line is connected, and lifts said spring from ground-contact point *b*. Connection of the line with point *b* is thus broken, and a new connection formed through the medium of the plug to the flexible cord. The auxiliary spring *c*, which is insulated from spring *a*, is forced against the point *d* when the plug is inserted. This spring *c* is permanently connected with the portion of the telephone-circuit between point *b* and the ground, as shown at *e*. The test-circuit is connected with the insulated frame or test portion *f*, as shown; hence when spring *c* is

brought against point *d* of frame *f* said frame, and consequently the test-circuit, will be connected or "crossed" with the portion of the telephone-circuit which has been cut off at point *b*.

In Fig. 1 the telephone-line *g* is connected through spring-jacks *i*¹, *i*², and *i*³, and an annunciator, *k*, to ground. The frames or test portions of said spring-jacks are connected together by the test-circuit *l*. The plug inserted in spring-jack *i*¹ cuts off the line *g* from the ground at point *b*, while at the same time connection is made at point *d* between the cut-off portion of the telephone-circuit and the test-wire *l*. Circuit is thus formed from all test-pieces *f* of the series of switches *i* to ground at the central office through the cut-off portion of telephone-line *g*. When, therefore, the tip of a plug, *m*, touches frame *f* of switch *i*³, the circuit of battery *n* will be closed to ground at the central office if line *g* is connected at any other board, as shown.

If the line is not busy, no circuit will be formed through the operator's telephone when he touches the tip of the plug to the test-piece of the switch of a line upon his board.

By listening at the telephone and tapping the tip of a plug to the test-piece of the switch of a line called for the operator may determine whether a line is busy.

I claim as my invention and desire to secure by Letters Patent—

1. The combination, with the plug having its shank, except the tip, insulated, of a spring-jack switch consisting of the insulated spring *a*, opposing contact *b*, auxiliary insulated spring *c*, the contact *d* upon insulated test portion *f*, and the permanent connection *e* between point *b* and spring *c*, substantially as shown and described.

2. The combination, with the telephone-lines, of spring-jack switches, one switch on each multiple board for each line, test-circuits, one for each telephone-line, connecting the test-pieces of the spring-jacks of its line, and electric apparatus whereby a circuit will be closed between the cut-off portion of a line and the test-circuit thereof when a connection is made at any one of the spring-jacks of the line upon either of the multiple-boards.

3. The combination, with a telephone and battery included in a ground-circuit, of a mul-

tiple switch-board to which telephone-lines are connected, test-circuits, one for each line, connected with test-pieces of the different spring-jacks, and switching apparatus whereby the
5 operator may close the circuit of the battery and telephone to the cut-off portion of a busy line.

4. In a telephone-exchange, the combination, with multiple switch-boards, of telephone-lines
10 connected thereto, and test-circuits, one for each line, each test-circuit being connected with the test portion of each spring-jack switch of its line, and switching apparatus whereby the test-circuit of a line is connected with the cut-
15 off portion of said line when said line is connected or in use at either of the boards.

5. The combination, with the insulated frame *f*, of the spring *a*, opposing ground-contact *b*, auxiliary spring *c*, and contact or lug *d* upon the frame, whereby, when a plug is inserted, 20 the spring *a* is lifted from contact *b*, while at the same time connection is made between the auxiliary spring and said frame, substantially as shown and described.

In witness whereof I hereunto subscribe my 25 name this 5th day of May, A. D. 1885.

CHARLES E. SCRIBNER.

Witnesses:

GEORGE P. BARTON,
F. H. McCULLOCH.