(No Model.)

W. M. GOODRIDGE.

TELEPHONE EXCHANGE APPARATUS.

No. 367,754. Patented Aug. 2, 1887.

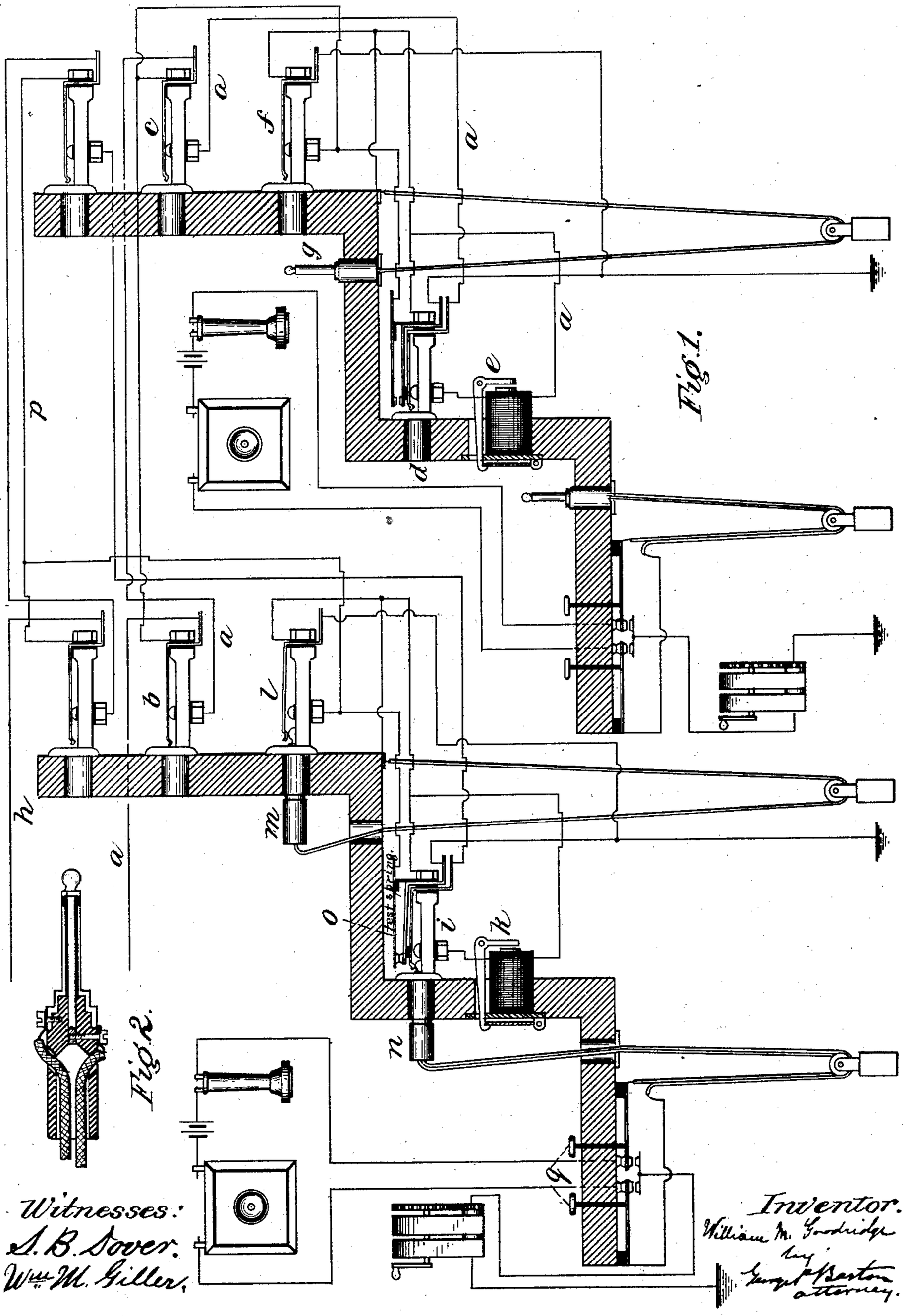

Fig. 1.

Fig. 2.

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TELEPHONE-EXCHANGE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 367,754, dated August 2, 1887.

Application filed March 4, 1887. Serial No. 229,668. (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 Telephone-Exchange Apparatus, 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 the different telephone-lines are each provided with a flexible cord and plug, so that any two lines may be connected together by simply inserting the plug of any line in a spring-jack or terminal connection of another line.

My invention relates more particularly to telephone-exchange apparatus in which multiple switch-boards are employed.

My invention will be readily understood by reference to the accompanying drawings, in which—

Figure 1 is a diagram illustrative of my invention, showing two telephone-lines connected with two sections of a multiple switch-board, and the circuits and apparatus at the different sections for receiving and making the calls and connecting and disconnecting the lines. Fig. 2 is a sectional view of the loop-plug for looping the telephone into circuit.

Line *a* is shown connected through its spring-jacks *b c*, one on each of the sections, and from the switch *b* on the last section to the answering spring-jack *d* of the line, and thence through individual annunciator *e* to the frame of spring-jack *f*. Plug *g* normally is inserted in spring-jack *f*, thus forming connection, through the medium of the plug, between said frame and the spring, and hence normally the circuit of line *a* may be traced from said frame of spring-jack *f* through the metallic point of the plug *g*, thus inserted, to the spring of said switch, and from said spring to ground.

One of the novel features of my invention herein consists in providing an extra spring-jack, *f*, in the circuit of the telephone-line in which the plug *g* is normally inserted to close the circuit of the line to ground. When thus inserted, it will be seen that the flexible cord of said plug *g* does not form a portion of the telephone-line circuit.

The circuit of line *h* may be traced in a similar way through a spring-jack on each board and through the special answering spring-jack *i* of the line through its individual annunciator *k*, extra spring-jack *l*, and plug *m*, inserted therein, to ground.

The loop-plug *n* is shown inserted in answering spring-jack *i*, thus looping the telephone into the circuit and cutting off the line from the annunciator and ground at the said answering spring-jack, as shown. Thus the operator, on seeing a shutter fall, at once loops his telephone into the line. When the loop-plug is thus inserted, it will be seen that the test-key *o*, operated by the lever of the answering spring-jack, is closed, and thus the test-wire *p* of the line is connected with ground, as shown, so that the line will test busy as soon as the loop-plug is inserted in the answering spring-jack. The operator, being thus in connection with the subscriber, finds out what connection is wanted, and he thereupon withdraws plug *m* from the spring-jack *l* and inserts said plug in the spring-jack of the subscriber called for, and the two subscribers are thus connected together, the circuit being completed from the frame of the answering spring-jack *i* to the flexible cord, and thence to the tip of the plug *m*, which, inserted in the spring-jack of the called subscriber, is closed to the spring on line terminal of said called subscriber. The operator, by means of one of the calling-keys *q*, throws current to line, and then removes the loop-plug and is ready for the next call.

The loop-plug being removed, the test-key *o* will be opened, but the test-wire *p* will remain connected to ground through switch *l*. Thus at all times the busy-test is maintained.

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

1. The telephone-line, in combination with a different switch on each section of the multiple-board, an answering spring-jack on one of the sections of the switch-board included with an annunciator in the line and an additional spring-jack in the line between the said annunciator and ground, and a flexible branch

from said line and a terminal plug, said plug being normally inserted in said extra spring-jack and serving to close the line to ground while the flexible branch or cord is shunted, substantially as described.

2. The combination, in a multiple switch-board system of telephone-exchange, of telephone-lines, each provided with a separate switch on each section of the board, and on one of the sections in each line an answering spring-jack, an annunciator and an extra spring-jack, and a flexible cord with its terminal plug normally inserted in the extra spring-jack of its line, said plug on being removed taking off the ground and on being inserted in the switch of another line serving to connect the two lines together.

In witness whereof I hereunto subscribe my name, this 6th day of January, A. D. 1887.

WILLIAM M. GOODRIDGE.

Witnesses:
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