

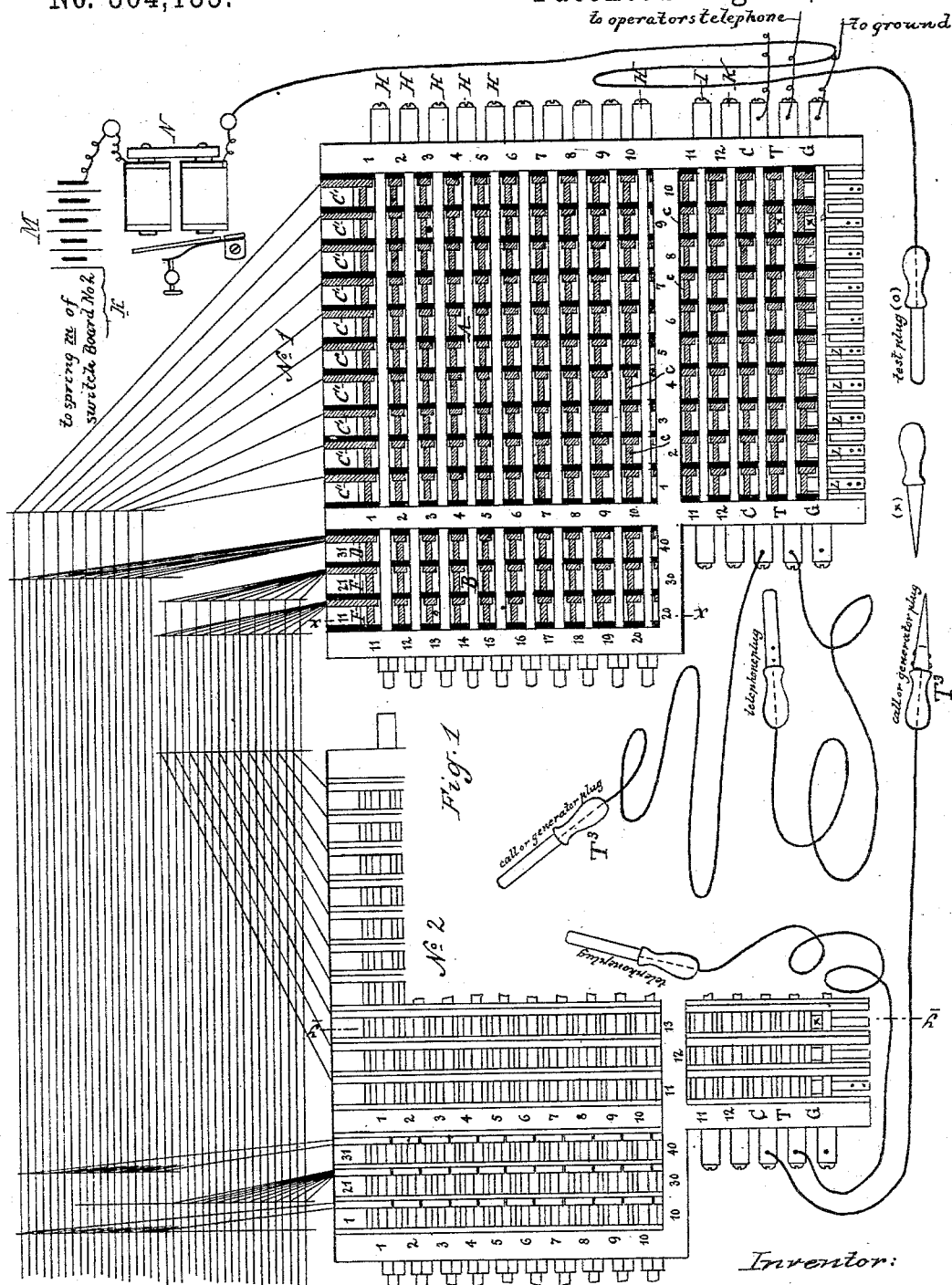
(No Model.)

2 Sheets—Sheet 1.

P. J. ROUSSEAU.
TELEPHONE SWITCH BOARD.

No. 304,135.

Patented Aug. 26, 1884.



Attest:

A. Barthel
E. Sully.

Inventor:

P. J. Rousseau

per. W. L. Sprague
Atty.

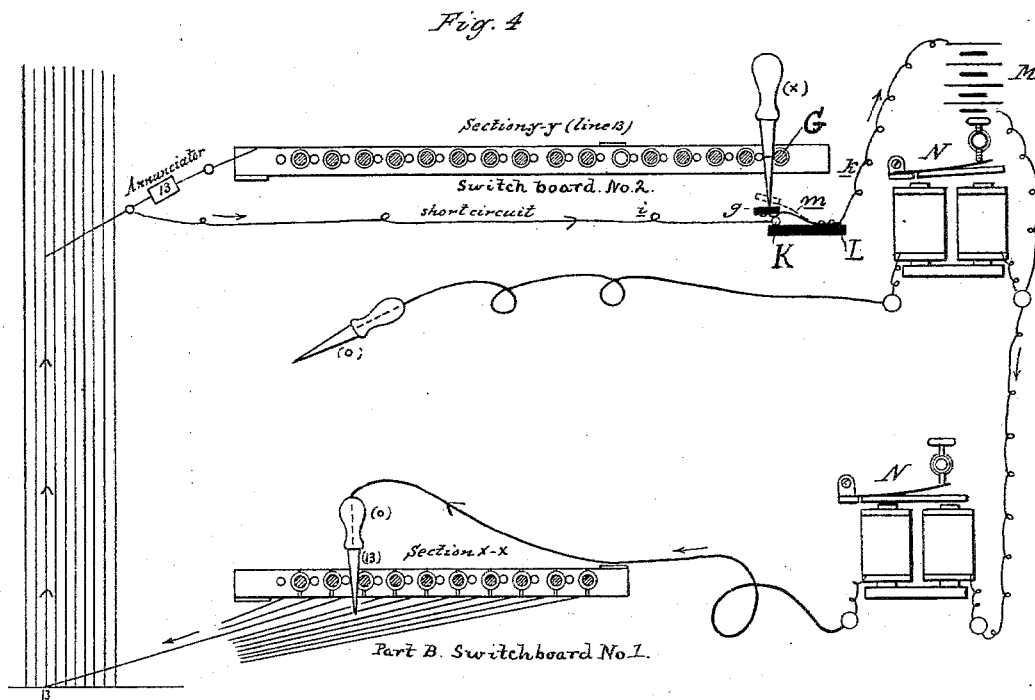
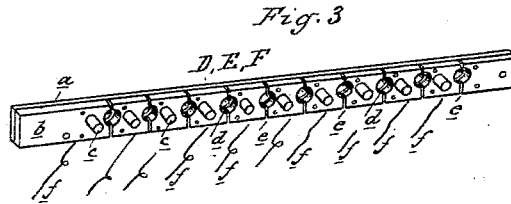
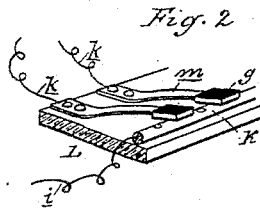
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2 Sheets—Sheet 2.

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TELEPHONE SWITCH BOARD.

No. 304,135.

Patented Aug. 26, 1884.



Attest:
H. Parthel
E. Scully

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UNITED STATES PATENT OFFICE.

PAUL J. ROUSSEAU, OF DETROIT, MICHIGAN.

TELEPHONE SWITCH-BOARD.

SPECIFICATION forming part of Letters Patent No. 304,135, dated August 26, 1884.

Application filed February 11, 1882. (No model.)

To all whom it may concern:

Be it known that I, PAUL J. ROUSSEAU, of Detroit, in the county of Wayne and State of Michigan, have invented new and useful Improvements in Telephone Switch-Boards; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to certain new and useful improvements in the construction and operation of switch-boards for telephonic purposes.

The invention consists in the peculiar construction, combinations, and operation of the parts which form my improved switch-board, as more fully hereinafter described. With the switch-boards which are now in common use, when any subscriber on one board desires to talk with a subscriber on any of the other boards, the operator whose subscriber wants the connection writes upon a check his number and the number the subscriber wishes to talk with, and sends the same by messenger to the operator who has the second subscriber on his board.

The object of my invention is to dispense with the service of a messenger, the necessity of writing such checks, and all the delay and confusion caused thereby, and enable each operator on each board to himself make any connection desired with any other subscriber on another board. For this purpose I have constructed an attachment to each board, which I call a "duplicating attachment;" and it contains the number of each subscribed on the other boards, and is connected and operated as hereinafter described. By the use of my attachment an operator who has the usual switch-board, with fifty subscribers, is enabled to make the necessary connections readily, easily, and quickly with fifty times that number. For the purpose of illustration, I have represented a switch-board with ten subscribers and a duplicating attachment for thirty more subscribers, which, together, represent forty subscribers equally divided on four boards.

In the accompanying drawings, Figure 1 is a representation of portions of a switch-board with my duplicating attachment applied thereto. Fig. 2 is a perspective view of a portion

of the key-board. Fig. 3 is a perspective view of one of the duplicating-strips. Fig. 4 is a diagrammatic view showing the manner of making and the system of connections in a local circuit.

A represents the switch-board, and B my duplicating attachment, the whole consisting of the strips C' D E F and cross-bars H I K C T G. The strips C' D E F are of like construction; but while each strip C' represents only one line entering the office each of the strips D E F represents ten subscribers or ten lines. In Fig. 3 one of these strips is shown in projection. It consists, like all the others, of the insulating-plate *a*, metal plate *b*, secured thereto, spacing-pins *c*, and holes *d*, for the passage of the cross-bars, all of known construction and operation. For the duplicating attachment these strips are subdivided into sections by the saw-kerfs *e*, which separate the metal plate *b* into ten sections. Each section has a wire, *f*, secured thereto, which connects each section with all the corresponding numbers on the other boards. The cross-bars H are made long enough to pass through the duplicating-strips in the same manner as through the strips C'. Around and on top the duplicating attachment indexing-plates are secured.

On switch-board No. 1 in the drawings the duplicating attachment has as many sections as there are subscribers on the other boards, and they are numbered correspondingly, and the same conditions pertain to the other boards. The strips C' have, in addition to the regular cross-bars H, the bars I K C T G, of which I and K are for the use of the subscribers on the board, so as to put them into connection, and four subscribers can be put into connection in these two bars, although any of the ten bars H might be used for the purpose. Still I provide the two bars I and K, so as to prevent any possible interference with the operation of the duplicating attachment.

C is the call or generator strip. T is the telephone-bar; G, the ground-bar, all connected and operating as usual.

L is a key-board of the construction shown in Fig. 2 in perspective. It is placed under the ground-bar G in such position that when a line is grounded by the plug *x* (see Fig. 4, section *y y*) the key is depressed, thereby elec-

trically connecting the short circuit *i* with the wire K, and to prevent any current passing through the plug the forward end of the spring *m* has a rubber tip, *g*.

5 *i* is a short circuit, which connects each subscriber's line, before it passes to the annunciator, with the contact K of the key *g*, which is under the ground strap or bar G.

10 M is a local battery to which the wire *k* is permanently connected.

N are so-called "sounders," one for each board. One of the poles of the battery M connects with all the sounders, while the other connects by the line K with the key-boards 15 L. Each sounder has attached to that pole which is not connected to the battery a test-plug, *o*, and in addition thereto each subscriber's line is provided with some well-known form of annunciator or visual signal, as indicated at 13, Fig. 4.

20 The arrangement and operation of the test-circuit is as follows. Suppose the operator on board No. 1 is called up by subscriber 9 to make connection with subscriber 13, which is not on his board but on No. 2, first No. 1 25 throws off the ground of No. 9 by taking out the ground-plug *x*. At the end of each subscriber's strap, and below the ground bar, is placed a circuit-breaker, which consists of 30 metal spring *m*, contact-strip K, rubber tip *g*, and insulating-base L. The metal spring *m* is connected to one end of a wire, *k*, the other end of which is connected to the local battery M, and said spring, when depressed, 35 connects with a short-circuit line, *i*, which is connected to the subscriber's line before the latter enters its annunciator.

40 The function of the ground-plug *x* is twofold—first, by being inserted at the ground-bar, as shown in the drawings, it grounds the subscriber's line by making electrical contact between the contact-pin *c* and the ground-bar. As all the lines have to be normally grounded, there is therefor a ground-plug inserted at the end of each strap when the line 45 is in its normal condition. The second function of the ground-plug is a mere mechanical one, and is a co-function of the first one, obtained by placing the circuit-breaker in proper position in relation to the ground-plug, so that the latter, at the same time that it grounds the line, also brings the spring *m* in contact with the contact-piece K, and thereby establishes electrical connection between the bat- 50 tery-wire *k* and the short-circuit wire *i*.

55 The operation of the test-circuit is as follows: Suppose the operator on board No. 1 is called up by subscriber 9 to make connection with subscriber 13, which is not on his board, but 60 on No. 2. First, No. 1 throws off the ground of No. 9 by taking out the ground-plug *x*; then he inserts the test-plug *o* at the proper place on his supplementary switch-board, so as to make electrical connection between the test- 65 plug and the terminal at the trunk-line of subscriber 13. Now, if the line of subscriber 13 is not in use, the ground-plug *x* on this line

will be in place and a closed battery-circuit be found to exist, which is indicated on the drawing by arrow-heads marked along the 70 line of said circuit. The fact of the existence of this closed battery-circuit is made evident to the operator of No. 1 board by the operation of the sounder N. Then operator No. 1 removes the test-plug *o* and puts the generator- 75 plug T in its place. As this circuit is completed through the ground, it will pass through subscriber 13's trunk-line, enter through the annunciator, and pass through the strap and ground-plug of subscriber 13's ground. No. 2 80 operator, upon seeing the shutter of subscriber 13's annunciator drop, removes the ground-plug *x*, and thereby gives the operator on No. 1 board possession of subscriber 13's line. The operator on No. 1 table proceeds then as usu- 85 al—that is, he connects subscribers 9 and 13 on a corresponding talking-bar by plugging in. The operator on No. 2 table cannot be mistaken about the nature of the call which has operated the annunciator of No. 13, as the 90 continued action of the armature, which is under the influence of a generator-current, tells him plainly that the call is for a local connection, which requires no further attention from him than the removal of the ground- 95 plug and its ultimate replacing when the subscribers are through talking. The operator at board No. 1, after having kept his generator-plug in place the usual ten or fifteen seconds, takes it out and puts an ordinary plug 100 in its place, leaving the two subscribers' lines connected through the office by one plug from the entering or calling subscriber's strip to the transverse talking-bar H, and by another plug 105 from said transverse bar to the proper section of the duplicating-strip, which is permanently connected to the second or called subscriber's strip, and so completes the connecting of the two lines when the ground-connections are removed. 110

Although I have shown in the drawings my duplicating attachment so combined with the switch-board as to make an integral part thereof, this need not necessarily be the case, as my attachment may form a separate board, 115 being only connected with the switch-board by wires representing the cross strips or bars.

I also do not desire to confine myself to the construction of the duplicating-strips shown in Fig. 3, as a number of equivalent constructions 120 may be employed; but for the sake of simplicity and uniformity I prefer to form my duplicating-strips in imitation of switch-board strips, so as to allow the whole to be readily combined in one board by simply ex- 125 tending the transverse bars therethrough.

What I claim as new is—

1. A telephone switch-board and circuit-connecting apparatus divided into separate sections, each section composed partly of par- 130 allel strips, each representing one entering or subscriber's line, and partly of similar parallel and auxiliary strips divided into sections, each of said sections representing a line en-

tering a different division of the apparatus, and a series of conducting or talking bars extending transversely through the entire parallel series, and adapted to connect any two of the parallel strips or sections by the insertion of suitable plugs between said strips and bars, and an additional transverse bar, to which all of the entering-lines are normally connected and grounded, substantially as set forth.

2. A telephone switch-board and circuit-connecting apparatus divided into separate sections, each section composed partly of parallel strips normally grounded, and each representing an entering or subscriber's line, and partly of similar and auxiliary strips divided into sections, each section forming part of a circuit common to all the divisions of the apparatus and including a subscriber's line entering a different division of the apparatus, and a series of conducting or talking bars extending transversely through the entire series of parallel strips or sections, and an independent testing-circuit including a sounder and battery, and adapted to be connected from one division of the apparatus to the subscriber's line-wire of another division through the corresponding auxiliary section, and a local short circuit controlled by the grounding device of the entering-strip, substantially as described.

3. A connecting-strip for telephone switch-boards, consisting of the insulating foundation-strip *a* and the metal strip *b*, divided into two or more sections, and provided with pins *c*, secured thereto, and the transverse apertures *d*, substantially as shown and described.

4. The combination of the apertured strips *C'* and transverse talking-bars *H* with the key-board *L*, local short-circuit wire *i*, the grounding-bar *G*, and suitable contact-plug, and the local battery-sounder and independent testing-line, substantially as shown and described.

5. In a telephone system, a series of mechanical circuit-breakers arranged below each line of straps of the switch-board, and adapted to be operated in combination with the ground-plugs, all so arranged that the insertion of the latter to ground or unground the lines also operates the circuit-breaker, substantially as and for the purposes described.

6. The local short-circuiting device consisting of the key-board *L*, having keys or springs *m*, provided with insulated tips located below the grounding-bar *G* and permanently connected to the wire *k* of the local battery, in combination with the contact *K*, wire *i*, and suitable trunk-line, whereby the insertion of the grounding-plug will depress said key until it rests upon the contact *K*, and thereby close the local short circuit, as set forth.

7. The normally-grounded entering or subscribers' strips *C'*, in combination with the transverse connecting-bars *I K*, grounding-bar *G* and suitable plug, and the bar *T* and suitable annunciator, substantially as shown and described.

PAUL J. ROUSSEAU.

Witnesses:

H. S. SPRAGUE,
E. SCULLY.