

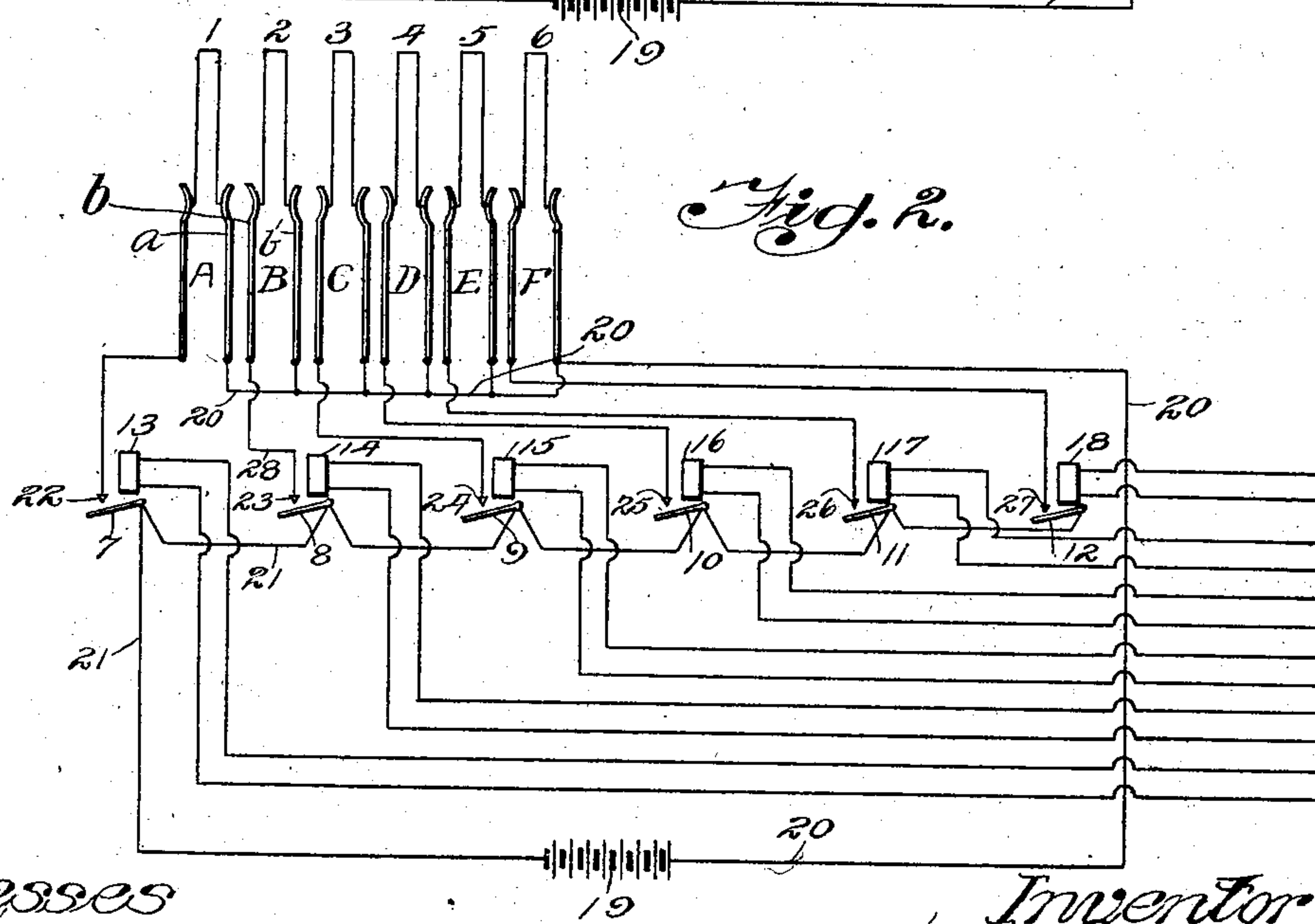
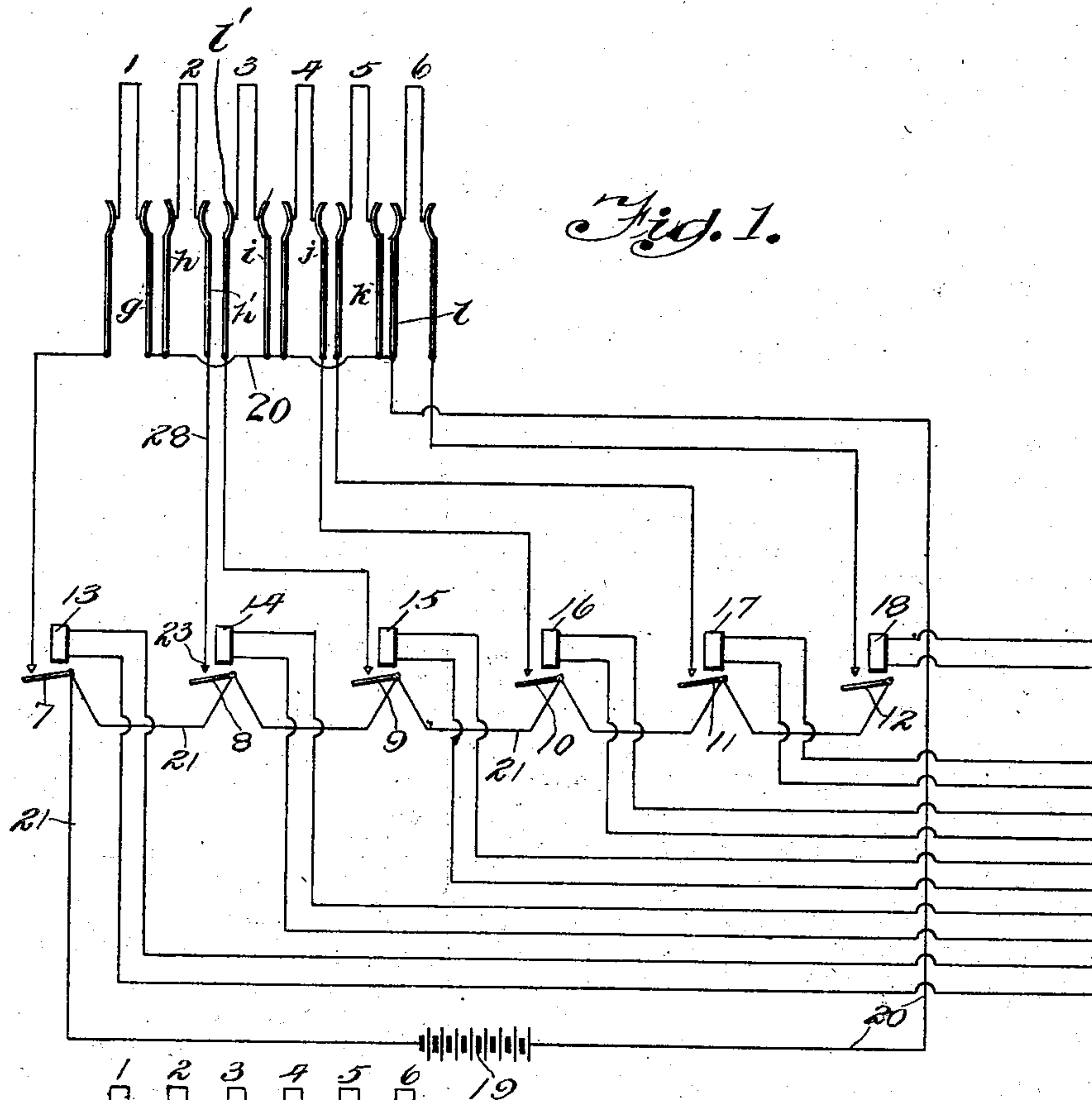
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CIRCUIT ARRANGEMENT FOR LAMP JACKS.

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NO MODEL.



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CIRCUIT ARRANGEMENT FOR LAMP-JACKS.

SPECIFICATION forming part of Letters Patent No. 726,215, dated April 21, 1903.

Original application filed October 12, 1901, Serial No. 78,415. Divided and this application filed December 30, 1901. Serial No. 87,744. (No model.)

To all whom it may concern:

Be known that I, HENRY P. CLAUSEN, of Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Circuit Arrangements for Lamp-Jacks, of which the following is a specification.

This application is filed as a division of application No. 78,415, filed by me in the Patent Office October 12, 1901, for improvement in telephone lamp-jacks. In said application I have claimed certain features of improvement relating to lamp-jack construction, while in the present application I have elected to claim a circuit arrangement for lamp-jacks. In certain electrical signaling systems, and particularly in telephone systems, it is the practice to employ small incandescent lamps for signals and to arrange a great number of these lamps in a group or bank upon the switchboard. A lamp-jack consisting of a pair of spring jaws or contacts is provided for each lamp, and these lamp-jacks are all suitably mounted and connected with the circuits for lighting the lamps. In order to secure compactness, the lamp-jacks are usually arranged as close as possible together, and it therefore occasionally happens that the spring of one jack will make contact with the spring of an adjacent jack. With the ordinary circuit arrangement contact between the springs of two jacks in this manner is likely to short-circuit and completely cut out one of the lamps. Should it become desirable to have this lamp respond to a signal—as, for example, a call sent in from the substation of a telephone system—it will be readily seen that the lamp thus short-circuited will not light up or respond to the signal and that in case of a telephone system the subscriber would be unable to attract the attention of the switchboard-operator.

It is the object, therefore, of my invention to provide a simple and effective circuit arrangement whereby a number of lamp-jacks can be arranged closely together side by side and whereby an accidental contact between two or more of the jacks will not render the signaling system incapable of responding to a signal or call. In other words, I provide a

circuit arrangement whereby a signal will always be displayed to attract the attention of the switchboard operator, regardless of whether certain of the spring-jacks are in contact or not.

The operation and advantages of my invention will, however, hereinafter more fully appear.

In the accompanying drawings, Figure 1 is a diagrammatic view illustrating a lamp-jack circuit embodying the principles of my invention. Fig. 2 is a similar view showing the old or ordinary circuit arrangement.

Referring to Fig. 2, the lamps 1, 2, 3, 4, 5, and 6 are shown diagrammatically and are arranged in a row side by side substantially as they are mounted or arranged in a telephone-switchboard. These lamps are inserted in the jacks A, B, C, D, E, and F, which are, it will be understood, of any suitable form of construction and mounted in any suitable or desired manner. In order to secure compactness, these jacks are arranged as closely together as possible and, in fact, so closely that there is often an accidental contact made between the spring or jaw of one jack with the adjacent jaw or spring of another jack. With the arrangement shown in Fig. 2 the springs or jaws of the jacks at one side are all connected up in common—that is to say, all of the jacks have their like terminals connected up in common, while the springs or jaws of the jacks at the other side are connected up with a number of circuit-closing devices. In said Fig. 2 these circuit-closing devices consist of the armatures 7, 8, 9, 10, 11, and 12, controlled by the relays 13, 14, 15, 16, 17, and 18. The springs or jaws of the jacks which are connected up in common are connected with the battery 19 through the medium of a conductor 20, while the said armatures are all connected up in common and connected with the same battery through the medium of a conductor 21. The armatures are provided with contact-points 22, 23, 24, 25, 26, and 27, which are connected, as shown, with the jaws or springs of the jacks which are connected in common. The coils of the said relays are shown as having ter-

minals or connections leading off to a number of switches or circuit-closing devices for closing the circuits, and thereby energizing any one of the said relays. With this arrangement the lamp 2, for example, can be caused to light up or glow by energizing relay 14, so as to attract the armature 8. When this armature 8 makes contact with the contact-point 23, the circuit is immediately completed from the battery through conductor 20 to the jaw or spring *b'* of said lamp, thence through the filament of the latter to the jaw or spring *b*, thence through the conductor 28 to contact-point 23, from the latter through armature 8 to conductor 21, and back to said battery. This of course lights the said lamp 2, and thereby causes a signal to be displayed which attracts the attention of the operator. Suppose, however, that the jaw or spring *b* of jack B should accidentally make contact with the jaw *a* of jack A. In such case there would be a short-circuiting of the current, which would prevent the lamp 2 from lighting. With the springs or jaws *a* and *b* in contact the current, instead of passing through the filament of lamp 2, would short-circuit from the conductor through spring or jaw *a*, thence through spring or jaw *b*, and then back to the battery through conductor 28, contact-point 23, armature 8, and conductor 21. With lamp 2 thus totally cut out or rendered inoperative the subscriber at the substation to which lamp 2 is allotted would be totally unable to attract the attention of the switchboard operator. It is with a view, therefore, to enabling a subscriber at a substation to in some way always attract the attention of the operator at the central station, regardless of whether the lamp-jack allotted to such substation is in contact with another lamp-jack or not, that I provide the matters of improvement hereinafter described. This is accomplished by adopting the circuit arrangement shown in Fig. 1. In this figure the arrangement of the battery, armatures, contact-points, and relays is substantially the same as in Fig. 2. It will also be seen that in this figure, as in the previous view, the relays are shown as having terminals or line connections leading to a number of switches or circuit-closing devices. It will be observed, however, that in this said Fig. 1 the alternate jacks have their like or similar spring-contacts connected up in common with the opposite spring-contacts of the intermediate jacks. In other words, with my improved circuit arrangement the spring-contacts at one side of the alternate jacks are connected up in common with the spring-contacts at the other side of the intermediate jacks. This, it will be understood, is with respect to relative position, and by "like spring-contacts" I mean the spring-contacts which occupy the same relative positions in the various jacks. Also by "opposite spring-contacts" I mean those which have opposite relative positions to those stated to have like

relative positions. This will be understood by reference to Fig. 1, wherein it will be seen that the like spring-contacts *g*, *i*, and *k* of the intermediate jacks are connected up in common with the opposite terminals or spring-contacts *h*, *j*, and *l* of the intermediate jacks. In other words, the spring-contacts or jaws of the intermediate jacks are connected up in common with the springs or jaws at the other side of the intermediate jacks. This arrangement leaves like or similar terminals or spring-contacts of the alternate jacks and also the opposite spring-contacts of the intermediate jacks to be connected up with the contact-points of the circuit-closing devices represented by the armatures. With this arrangement the lamp 2 can be lighted or made to respond to a call or signal by energizing the relay 14, so as to attract the armature 8, and thereby cause the latter to make contact with contact-point 23. This completes a circuit from the battery 19 through conductor 20 to the spring-contact *h*, thence through the filament of lamp 2 through the spring-contact piece or jaw *h'*, thence through conductor 28 to contact-point 23, through armature 8 and conductor 21 to said battery. Suppose, however, that accidental contact is made between contact-springs *h'* and *i*. This does not have the effect of cutting out lamp 2, but merely throws lamp 3 also into circuit, the two lamps 2 and 3 then being connected up in parallel. When the relay 14 is then energized, the current then not only passes from the conductor 20 through the filament of lamp 2, but also passes from said conductor 20 through contact-spring *i'* to the filament of lamp 3, thence from contact-spring *i* to contact-spring *h'*, and from the latter through conductor 28 to contact-point 23 and armature 8, and thence back to the battery through conductor 21. Thus an accidental contact between the jacks of lamps 2 and 3 causes the lighting up of more than one lamp; but it will be seen that this is sufficient to attract the attention of the switchboard operator, and that it does not render the subscriber at the substation, to which lamp 2 is allotted, powerless to attract the attention of the central operator. With the two lamps thus lighted the operator can then readily determine over which line the call came—that is to say, whether the call came from the substation allotted to lamp 2 or to the substation allotted to lamp 3. If a response is obtained from the substation allotted to lamp 2, the central operator then knows that the lighting of lamp 3 is a false signal. If no response is received from the substation allotted to lamp 2, the central operator then knows that the call must have come from the substation allotted to lamp 3 and then acts accordingly.

Thus it will be seen that I provide an improved circuit arrangement whereby accidental contact between the spring-jacks will not cut off a substation as far as signaling is concerned and whereby the subscriber at such

substation will not be rendered powerless to in some way attract the attention of the central operator. Heretofore, as shown and explained, the practice has been to connect up a bank of lamp-jacks in such manner that accidental contact between the jacks often-times results in the complete cutting out of some of the lamps and in a consequent cutting off of the substations as far as signaling is concerned. With my improved circuit arrangement, however, the only effect produced by contact between jacks is the lighting up of one or more lamps in addition to the one which it is desired to light. This, however, as explained, is sufficient to attract the attention of the central operator and enables the operator to locate the call with practically as little trouble as when only one lamp responds to the signal.

What I claim as my invention is—

1. An electrical signaling system, comprising a plurality of lamp-jacks arranged close together in a row or series, lamps in said jacks, the like spring-contacts of the alternate jacks being connected up in common with the opposite spring-contacts of the intermediate jacks, a suitable source of current-supply, suitable connection between the spring-contacts thus connected up in common and one terminal of said source of current-supply, a plurality of circuit-closing devices connected up in common with the other terminal of said source of current-supply, and suitable connections between said circuit-closing devices and the unconnected spring-contacts of said jacks.

2. In an electrical signaling system, the combination of a plurality of signaling-lamps arranged closely together in a row or series, a plurality of circuit-closing devices, a suitable source of current-supply, the alternate lamps having their like terminals or contact-pieces connected up in common with the opposite terminals or contact-pieces of the intermediate lamps, the terminals thus connected up in common being suitably connected with the source of current-supply, and the remaining or unconnected terminals or contact-pieces of said lamps being suitably connected with said source of current-supply through the medium of said circuit-closing devices.

3. In an electrical signaling system, the combination of a plurality of lamp-jacks arranged closely together in a row or series, lamps in said jacks, a source of current-supply, circuit-closing devices, the alternate jacks having their like springs or contact-pieces connected up in common with the opposite springs or contact-pieces of the intermediate jacks, the springs or contact-pieces thus connected up in common being suitably connected with the said source of current-

supply, and the remaining springs or contact-pieces being connected with the said source of current-supply through the medium of said circuit-closing devices.

4. In an electrical signaling system, the combination of a plurality of lamps arranged closely together in a row or series and a battery and suitable circuit-closing devices connected and adapted for causing any one of said lamps to glow, the alternate lamps having their like terminals or contact-pieces connected up in common with the opposite terminals or contact-pieces of the intermediate lamps, whereby accidental contact between the terminals or contact-pieces of two of the lamps will throw the two lamps into parallel and cause both lamps to glow.

5. In a telephone system, the combination of a plurality of lamp-jacks, calling signal-lamps arranged in said jacks, the latter being arranged closely together in a row or series, a source of current-supply, a plurality of circuit-closing devices, electromagnets for operating said circuit-closing devices, the like springs or contact-pieces of the alternate jacks being connected up in common with the opposite springs or contact-pieces of the intermediate jacks, suitable connection between the springs or contact-pieces thus connected up in common and the said source of current-supply, the remaining or unconnected springs or contact-pieces of the jacks being also connected with said source of current-supply through the medium of said circuit-closing devices.

6. In a telephone system, the combination of a plurality of lamp-jacks arranged closely together in a row or series, lamps in said jacks, the like springs or contact-pieces of the alternate jacks being connected up in common with the opposite springs or contact-pieces of the intermediate jacks, a suitable source of current-supply, and relays and circuit connections for closing the current through any one of said lamps.

7. In a telephone system, the combination of a plurality of lamp-jacks arranged closely together in a row or series, lamps in said jacks, and a plurality of circuit-closing devices and a source of current-supply, the like springs or contact-pieces of the alternate jacks being connected up in common with the opposite springs or contact-pieces of the intermediate jacks, and the remaining springs or contact-pieces being connected with the said circuit-closing devices.

Signed by me at Chicago, Cook county, Illinois, this 26th day of December, 1901.

HENRY P. CLAUSEN.

Witnesses:

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HARRY P. BAUMGARTNER.