

(No Model.)

O. A. BELL.

METHOD OF PREPARING CABLES FOR MULTIPLE SWITCHBOARDS.

No. 501,859.

Patented July 18, 1893.

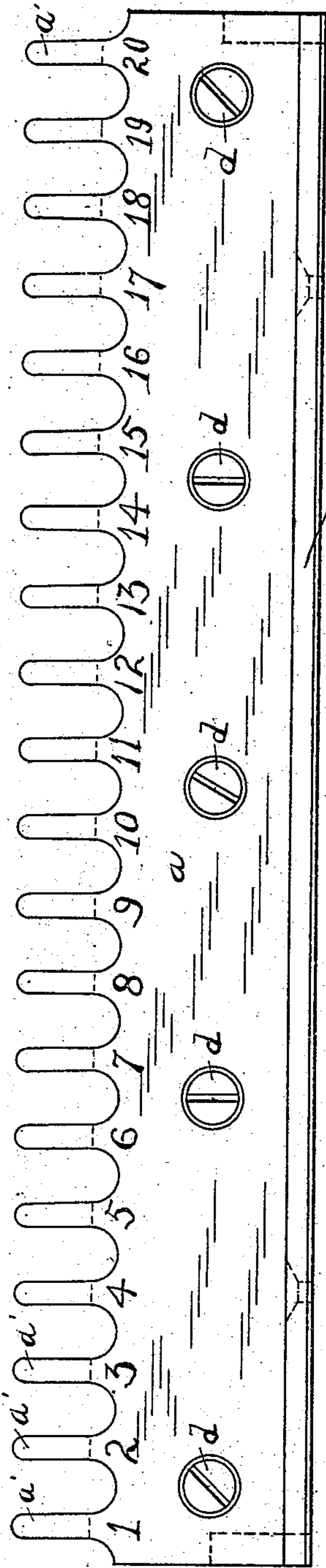


Fig. 1.

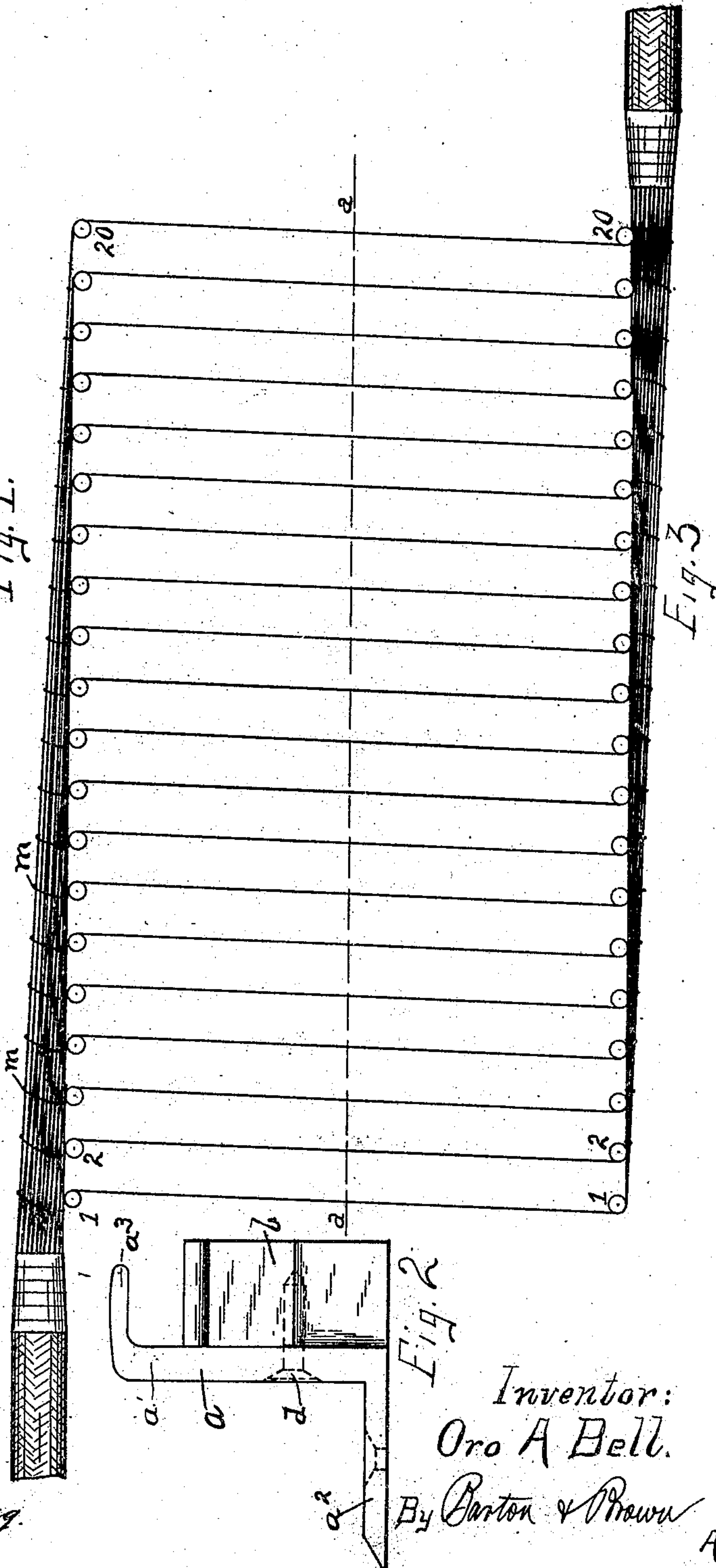


Fig. 2.

Fig. 3.

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# UNITED STATES PATENT OFFICE.

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## METHOD OF PREPARING CABLES FOR MULTIPLE SWITCHBOARDS.

SPECIFICATION forming part of Letters Patent No. 501,859, dated July 18, 1893.

Application filed November 7, 1892. Serial No. 451,251. (No model.)

### *To all whom it may concern:*

Be it known that I, ORO A. BELL, a citizen  
of the United States, residing at Brooklyn, in  
the county of Kings and State of New York,  
5 have invented a certain new and useful Im-  
provement in the Manufacture of Cables for  
Multiple Switchboards, (Case No. 6,) of which  
the following is a full, clear, concise, and ex-  
act description, reference being had to the ac-  
10 companying drawings, forming a part of this  
specification.

My invention relates to wiring multiple  
switch boards, and more particularly to wir-  
ing by means of separate pieces of cable.

15 The objects of my invention are, first, to  
prevent the loss of material in the formation  
of separate cables necessitated by previous  
methods; and, second, to lessen the labor re-  
quired in the formation of the cables.

20 My invention consists in removing the out-  
side serving from a portion of a cable, laying  
aside the mass of conductors thus exposed,  
taking up the wires individually and passing  
them around proper pins, binding the wires  
25 together so that they may retain their posi-  
tions when removed from the forms, and sev-  
ering the conducting wires; whereby the ends  
of two separate cables are at the same time  
and by one operation properly formed for at-  
30 tachment to the spring jack switches.

A multiple switch board is provided with  
several duplicate sections, each section being  
composed of strips of spring jack switches,  
each strip containing usually twenty switches.  
35 The corresponding spring jacks upon the dif-  
ferent sections are connected together by  
conducting wires and it is usual to collect  
all of the conducting wires belonging to the  
spring jacks of corresponding strips into a  
40 single cable. The cables thus formed are  
placed at the back of the board, and in wir-  
ing by separate cables the corresponding  
strips of spring jacks upon adjacent sections  
are connected by short cables which are des-  
45 ignated as separate cables. These separate  
cables or pieces of cable for a single series of  
strips are thus formed into a continuous ca-  
ble placed back of the board. The conduct-  
ing wires in each piece of cable leave the

piece when opposite the spring jack to which 50  
they are attached so that the extremities of  
each will present the appearance of wires  
projecting from the body of the piece at  
equidistant points along said extremities.  
Thus at each end for a distance equal to the 55  
length of a strip of spring jacks the conduct-  
ing wires successively leave the body of the  
piece and pass directly to the terminals of  
the spring jacks. It will be seen that two  
adjacent pieces when placed in position will 60  
overlap at their ends throughout those por-  
tions that are opposite the strips of spring  
jacks to which their wires are connected or,  
in other words, will overlap throughout those  
portions of their extremities from which the 65  
conducting wires project. These overlap-  
ping ends are either bound together or left  
free to suit the particular requirements.

In multiple switch boards as now construct-  
ed, there are usually three conducting wires 70  
passing from a spring jack upon one section  
to a corresponding spring jack upon the next  
section so that instead of one wire leaving the  
body of the cable opposite a spring jack there  
will be three, and each piece of cable will con- 75  
tain sixty wires. Previous to my invention  
these pieces of cable have been formed prin-  
cipally in two ways. By the first method the  
piece is formed directly from single wires  
which are placed around pins so that each 80  
wire may occupy its proper position, the wires  
being then bound together so that they may  
retain their relative positions when removed  
from the pins. A second method has been to  
take a cable of proper length, remove the 85  
serving from the ends throughout a proper  
distance, take up individually the insulated  
wires and place them around pins and bind  
them together in this position. The former  
of these methods requires a great deal of 90  
labor, and the latter though requiring less  
labor than the first is accompanied by an un-  
avoidable waste of material, for the wire that  
projects from the body of the piece at its ex-  
treme end determines the length of cable that 95  
must be used, and as all other wires project  
from the piece a greater distance than the  
extreme wire, the ends of all must be cut



away so that they may correspond in length to the length of the extreme wire.

To facilitate the formation of the piece by my method, the wires belonging to the same line are bound together in strands or groups and each wire is provided with a different color, as in the insulation.

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

Figure 1 is an elevation of one of the duplicate forms upon which the wires are placed in the formation of the ends of the cables. Fig. 2 is an end view thereof. Fig. 3 is a diagram illustrating the manner in which the individual wires are placed around the pins, one wire being shown as placed around each pair of pins.

Like letters refer to like parts in the several figures.

A plate *a* is provided upon one side with a flange *a*<sup>2</sup> by means of which it may be secured in position. To the face of the plate *a* opposite to that carrying the flange is fastened a block *b*, preferably of wood, by means of screws *d d*. The plate *a* also carries at its upper edge a series of equidistant pins *a'* *a'*, each pin bending at right angles to extend over the block *b*, thus forming a receptacle for the wires between the block *b* and the bent portions *a*<sup>3</sup> of the pins. The block *b* is cut away at points between the fingers *a'* *a'* to permit of the free passage of the binding thread between the wires of the cable and the block *b*. Two such forms are placed parallel, with the portions *a*<sup>3</sup> of the pins extending outward, and at such a distance apart that the distance between the pins may be twice the required length of the wires that are to project from the body of the piece. The outer serving having been removed from a cable throughout the necessary distance and at the proper point, a wire, determined by the color of the insulation, is taken from the mass thus laid bare and placed around the pins marked No. 1 upon each form, these pins lying directly opposite. A second wire is placed around pins No. 2, and so on with all the wires of the cable, the proper position of each wire being determined by the color of its insulation.

In Fig. 3 the cable is shown as containing twenty wires, one wire passing around each pair of pins. In wiring multiple switch boards, as before stated, there will be usually three wires passing to each spring jack. These three wires are passed around the same pins. I have found it desirable to form the two conductors constituting the metallic circuit of each line into a single strand by wrapping them with thread before placing them in the cable. I prefer to leave the test wire free. Thus there will be a strand and a single wire to be placed around each pair of pins. All of the wires having been thus placed

around the proper pins, the wires lying in the receptacle of the forms are bound together by thread in such a manner that each wire may maintain its position when removed from the forms. I preferably accomplish this by spirally winding thread or twine *m m* around the conductors in such a manner that the twine may bear against each wire where it leaves the body of the cable. The wires having been thus bound together the parallel portions of the wires running from one form to the other are cut upon a line *a a* and the pieces are removed from the forms. In this manner, the ends of two separate pieces are formed at the same time without waste of material.

To assist the eye and the memory in the selection of the proper wire for each pin I have found it convenient to place a chart in proximity to the forms, the chart being provided, at points opposite each pin, with colors corresponding to those of the wires that are to be placed around the respective pins.

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

1. The method of preparing cable connections, which consists in removing the serving from a portion of a cable, separating the exposed portion into two parts connected by wires leaving said parts at different points, and severing the connecting wires midway between said parts; whereby two pieces of cable are formed with wires of equal length projecting at different points along the extremities thereof, substantially as described.

2. The method of preparing cable connections, which consists in removing the serving from a portion of a cable, separating the exposed portion into two parallel parts connected by wires passing from points along one of said parts to points along the other, and severing said connecting wires; whereby two separate cables are formed with wires of equal length projecting at different points along the extremities thereof, substantially as described.

3. The method, which consists in removing the serving from a portion of a cable, separating the exposed wires into two groups connected by wires leaving said groups each at a different distance from the end thereof and in uniform order, binding together the groups thus formed by passing a thread around the groups where the wires leave the same, and severing the connecting wires; whereby two separate cables are formed with wires of equal length projecting at different points along the extremities thereof, substantially as described.

4. The method of arranging the wires of cables for connecting therewith, which consists in laying bare a portion of the cable, bending aside the said bared portion to shorten the same, separating the different wires of the cable from the mass thereof at



different points along the bared portion, and severing the wires at equal distances from the axis of the cable; whereby two separate cables are formed, each having its wires protruding from its mass to equal distances at different points along its length, substantially as described.

In witness whereof I hereunto subscribe my name this 13th day of October, A. D. 1892.

ORO A. BELL.

Witnesses:

MILLS H. LANDON,  
A. L. PALTZ.