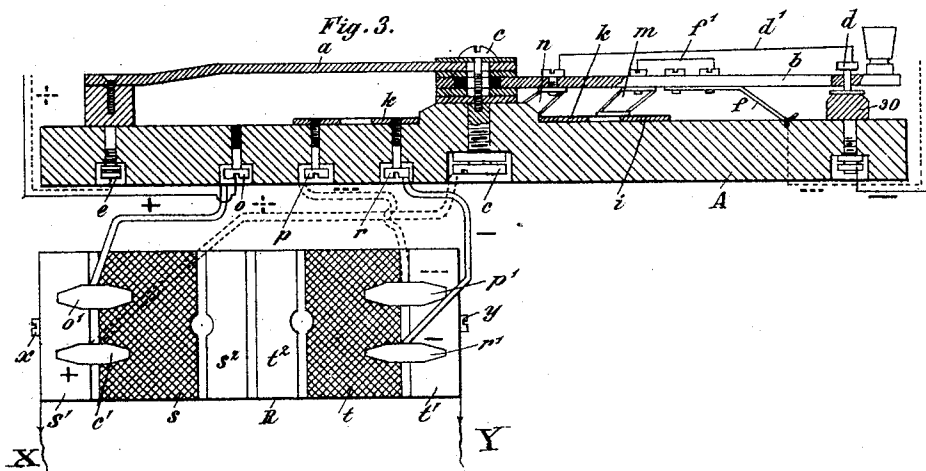
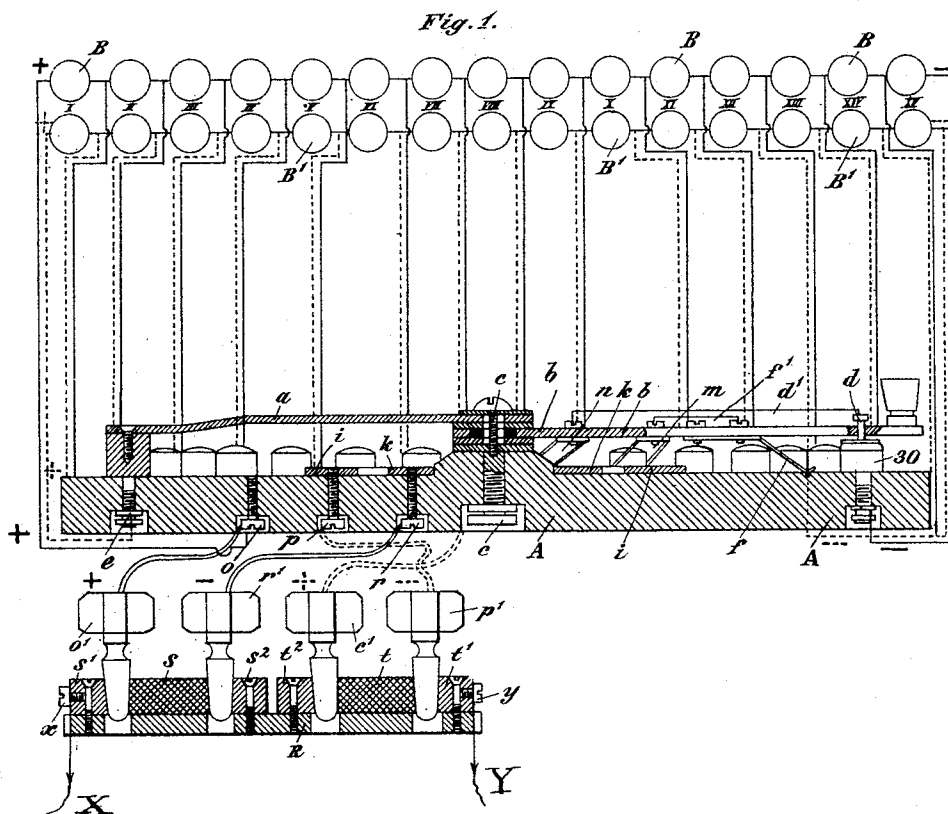


H. K. SPANGENBERG.
BATTERY SWITCH.

No. 530,804.

Patented Dec. 11, 1894.



Witnesses:

J. D. Kungsberg
C. P. Hubbard

Inventor:

Heinrich K. Spangenberg
By
Whitaker & Preston
Attys.

(No Model.)

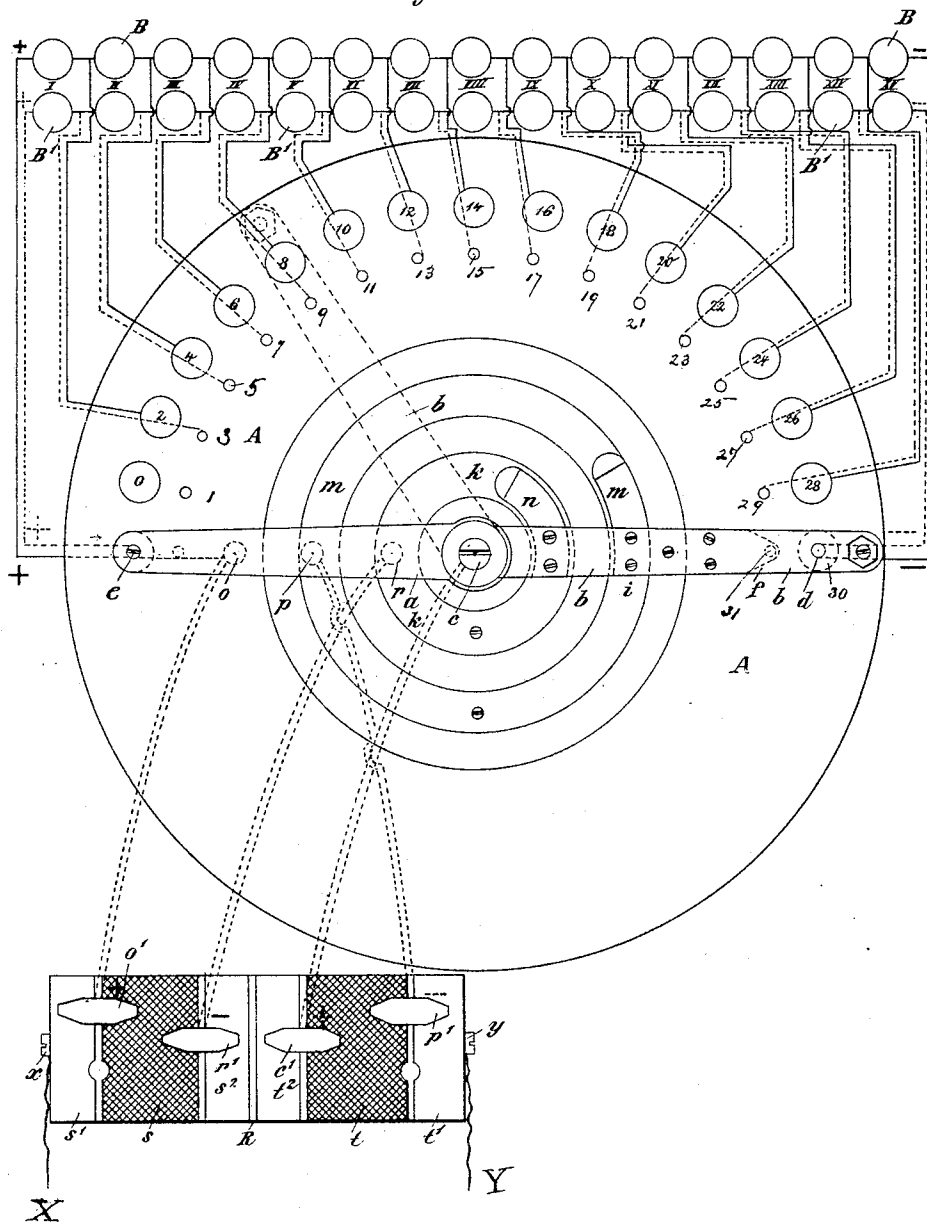
2 Sheets—Sheet 2.

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Fig. 2.



Witnesses:
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Inventor:
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UNITED STATES PATENT OFFICE.

HEINRICH KARL SPANGENBERG, OF LEIPSIC, GERMANY.

BATTERY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 530,804, dated December 11, 1894.

Application filed July 24, 1893. Serial No. 481,359. (No model.)

To all whom it may concern:

Be it known that I, HEINRICH KARL SPANGENBERG, merchant, of 15 II Harkortstrasse, Leipsic, in the Kingdom of Saxony and German Empire, have invented a new and useful Improvement in or Connected with Battery-Switches, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention is an improvement in battery switches and consists in the novel features of construction and combination of parts hereinafter described reference being had to the accompanying drawings which illustrate one form in which I have contemplated embodying my invention and said invention is fully disclosed in the following description and claims.

In the said drawings, Figure 1 is a vertical sectional view of my improved switch board, illustrating diagrammatically the battery cells and the electrical connections. Fig. 2 is a top plan view of the same. Fig. 3 is a view of the switch board in section showing the auxiliary switch board in top plan with the circuit connections differently arranged.

In carrying out my invention I employ preferably two batteries or sets of cells each composed of an equal number of cells, and by means of my improved switch board I can throw into the main line circuit any number of cells of either battery, or I can connect any number of cells of both batteries in series, or I can connect the two batteries in multiple are, using any number of cells in each, said cells of each battery being connected in series.

A represents my main switch board which is provided with a number of contacts arranged in circular or semi-circular form equal to the number of cells in either battery. In this instance I have shown the board A provided with fifteen contact points numbered 0, 2, 4, 6, 8, 10, 12, &c., to 30 inclusive.

In the center of the switch board, concentric to the row of contacts just described is a pivot pin *c*, upon which is mounted a movable arm *b* of non conducting or insulating material, provided with a suitable handle and having a contact pin *d* secured thereto in position to engage any of the said contacts 0, 2, 4, 6, &c., according to the position of said arm. Adjacent to each of the contacts on the board

A is a socket or aperture to receive a spring arm *f* secured to the movable arm *d* to hold it in the desired position and I provide each of said sockets with a metallic contact which is engaged by said spring arm *f*. These sockets I have numbered 1, 3, 5, 7, &c., to 31.

In the central portion of the switch board A I locate two contact rings *i* and *k* insulated from each other and arranged concentrically to the pivot pin *c*, the ring *i* being the outer ring. I also provide the movable arm *b* with a brush or spring arm *m* engaging the ring *i* and a similar brush *n* engaging the ring *k*, the said brushes being insulated from each other.

As will be seen in Figs. 1 and 3, the brush *n* is connected to the contact pin *d* by a wire or bridge *d'* and the brush *m* is connected to the spring arm *f* by a similar wire or bridge *f'*.

B and B' represent two batteries each composed of an equal number of cells, numbered in this instance from I to XV. The positive pole of the first cell of battery D' is connected to a screw or post *e* in the switch board A which is connected by a plate or bridge *a* with the pivot pin *c*. The positive pole of battery B is connected to a screw or post *o*. The cells of each battery are connected in series and in addition the negative poles of the cells of battery B are connected respectively to contacts 2, 4, 6, 8, &c., to 30, while the negative poles of the cells of battery B' are connected in the same manner to the contacts 3, 5, 7, 9, &c., to 31 located in the depressions which engage the spring arm *f*. (See Figs. 1 and 3.) The contacts 0 and 1 are not connected to the battery at all so that by swinging the arm *b* into engagement with this contact the battery will be cut out and the circuit will remain open.

R represents what I term the distributing board which may be separate from or formed integrally with the main switch board. Upon the plate R, which is of insulating material I locate four plates *s' s² t² t'*, the plates *s²* and *t²* which I term the connecting plate or plates being electrically connected or formed integrally and separated from plates *s'* and *t'* by insulating plates *s* and *t* respectively. I also provide four movable plugs or pins *o', c', p', r'* which are adapted to be placed in sockets provided adjacent to said plates as shown. The pin *o'* is connected by a wire with the

screw or post *o*; pin *c'* is connected with the pivot pin *c*; pin *p'* is connected with a binding screw or post *p* connected with the contact ring *i* and the pin *r'* is connected with a similar post *r* connected with the ring *k*.

X and Y represent the main line wires which are connected by screws *x* and *y* to the plates *s'* and *t'* respectively.

Supposing it is desired to use all of the cells of both batteries in series, the parts will be arranged as shown in Figs. 1 and 2. The arm *b* will be made to engage contact point 30, spring arm *f* will engage contact 31 and the pins will be placed in the distributing board as shown, the pin *o'* engaging plate *s'*; pins *r'* and *c'* engaging plates *s²* and *t²* and pin *p'* engaging the plate *t'*. Tracing the current from main line wires through the battery and switch board it will be as follows: from the positive pole of cell 1 of battery B to the post *o*, thence to pin *o'* and through plate *s'* to line wire X returning through line wire Y to plate *t'* and pin *p'*, thence to post *p*, through ring *i*, brush *m*, bridge *f'* to spring arm *f* and contact 31, thence to negative pole of cell 15 of battery B' through the cells of battery B' to No. 1, thence from positive pole of cell 1 of battery B' to post *e*, thence along bridge *a* to center pivot pin *c*, thence to pin *c'* through plates *t²* *s²* to pin *r'*, thence to post *r*, ring *k*, brush *n*, to contact 30, thence to negative pole of cell 15, battery B, thence to positive pole cell 1, battery A through the battery.

To reduce the number of cells in series, it is only necessary to move the arm *b* to the left and two cells will be cut out for every contact passed until contact 0 is reached when the circuit will be opened, and the flow of electricity stopped. Thus any desired strength of current can be instantly obtained.

If it is desired to use only one battery and vary the number of cells in series from 1 to 15 this can be accomplished by inserting either pins *o'* and *r'* or pins *c'* and *p'* in the plates *s'* and *t'*, and the desired number of cells of either battery can then be thrown into circuit by the arm *b*. I may however desire to connect the batteries B and B' in multiple arc, and vary the current from two to thirty cells, and to do this the pins are arranged in the distributing board as shown in Fig. 3. This connects the positive poles of both batteries with the plate *s'* and the negative poles to the plate *t'* and the inten-

sity of the current can be regulated by the arm *b*.

It will be seen that the posts *o* and *c* are the terminals for the positive poles of the two batteries and that the posts *r* and *p* are the terminals for the negative poles.

What I claim, and desire to secure by Letters Patent, is—

1. The combination with two sets of cells, of a switch board for regulating the number of cells in use and a distributing board, provided with means for cutting out one set of cells and for coupling the two sets of cells in series or multiple arc, substantially as described.

2. The combination with two sets of cells, of a switch board for regulating the number of cells in use, connections from the negative pole of one set of cells, to a series of contact points on the switch board connecting from the negative poles of the other set of cells to an independent series of contacts on the switch board and a switch arm provided with devices for engaging both series of contacts, substantially as described.

3. The combination with two sets of cells, of the switch board for regulating the number of cells in use, said switch board being provided with terminals independently connected with the positive and negative poles of each set of cells, the distributing board and pins connected with said terminals, substantially as described.

4. The combination with two sets of cells, of the switch board for regulating the number of cells in use, said switch board being provided with terminals independently connected with the positive and negative poles of each set of cells, the distributing board provided with two plates adapted to be connected with the line wires and a connecting plate or plates insulated from said first named plates and pins connected with said terminals, for engaging said plates for cutting out one set of cells or for connecting said sets of cells in series or multiple arc, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

HEINRICH KARL SPANGENBERG.

Witnesses:

CARL BORNGRAEBER,
HERM. FINDER.