D. STERN.

SWITCHBOARD FOR DENTAL, MEDICAL, OR SURGICAL PURPOSES.

APPLICATION FILED JULY 6, 1909.

959,641. **Patented May 31, 1910.**

3 SHEETS—SHEET 1.

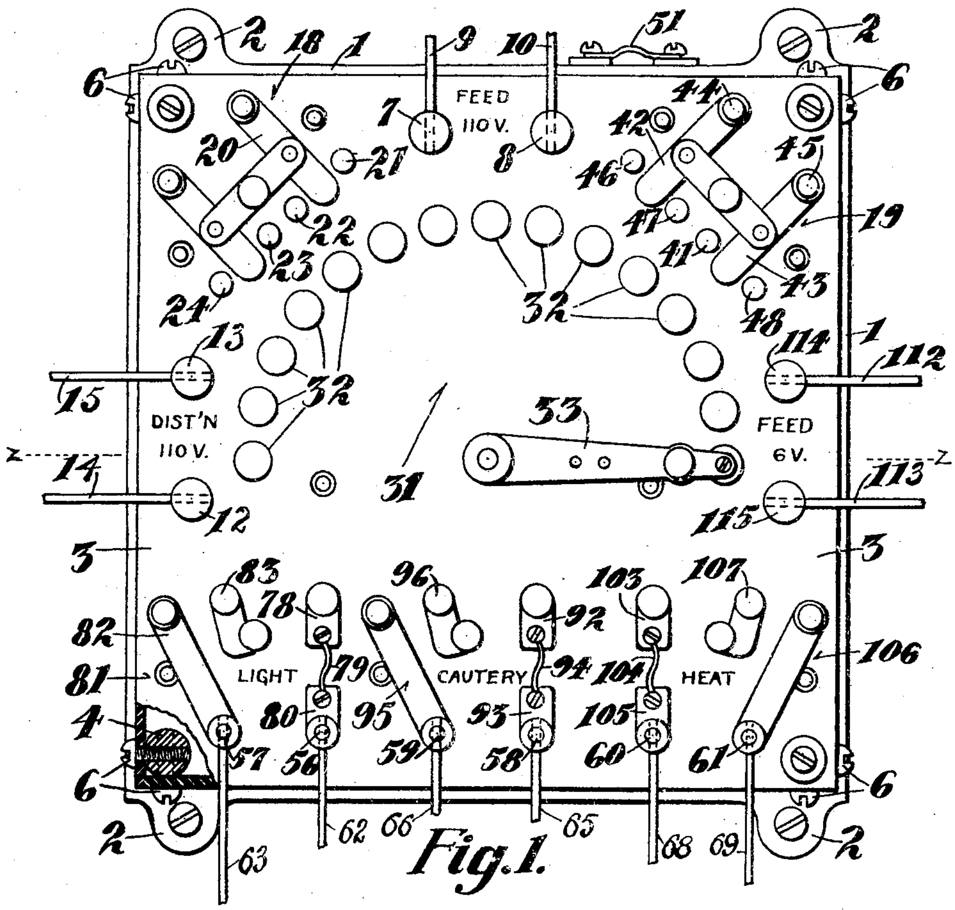

Fig. 1.

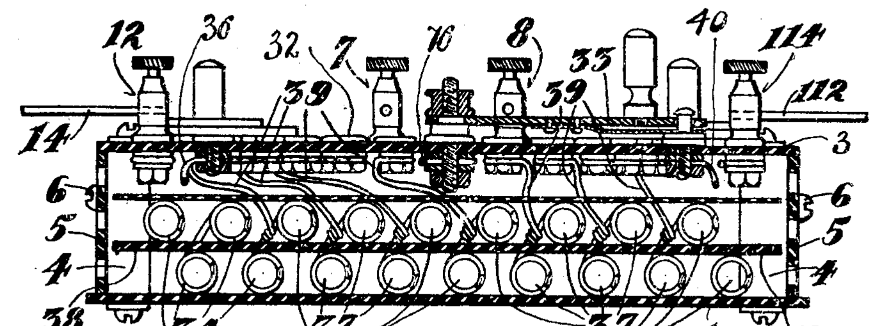

Fig. 2.

Witnesses

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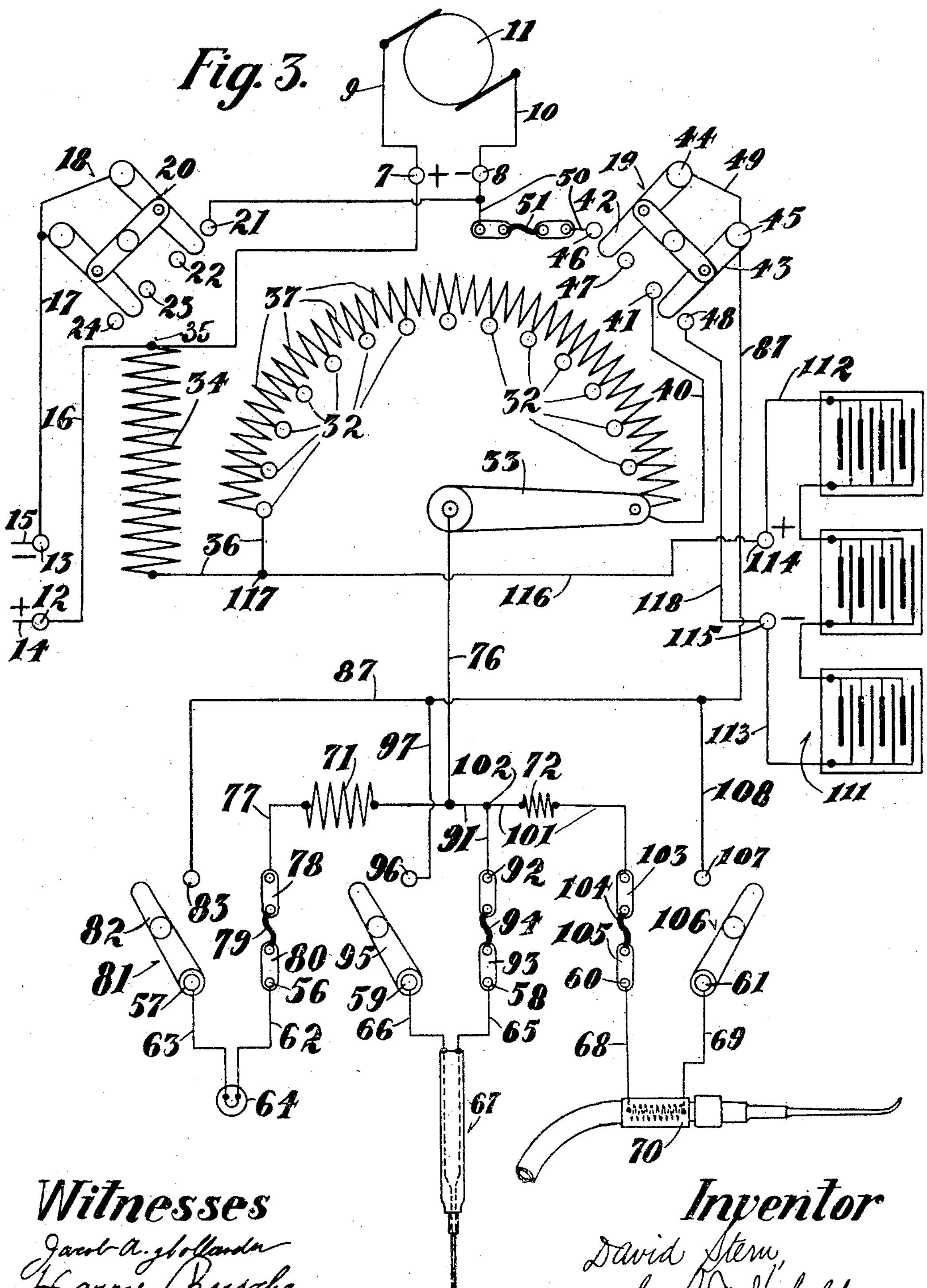
3 SHEETS—SHEET 2.

Fig. 3.



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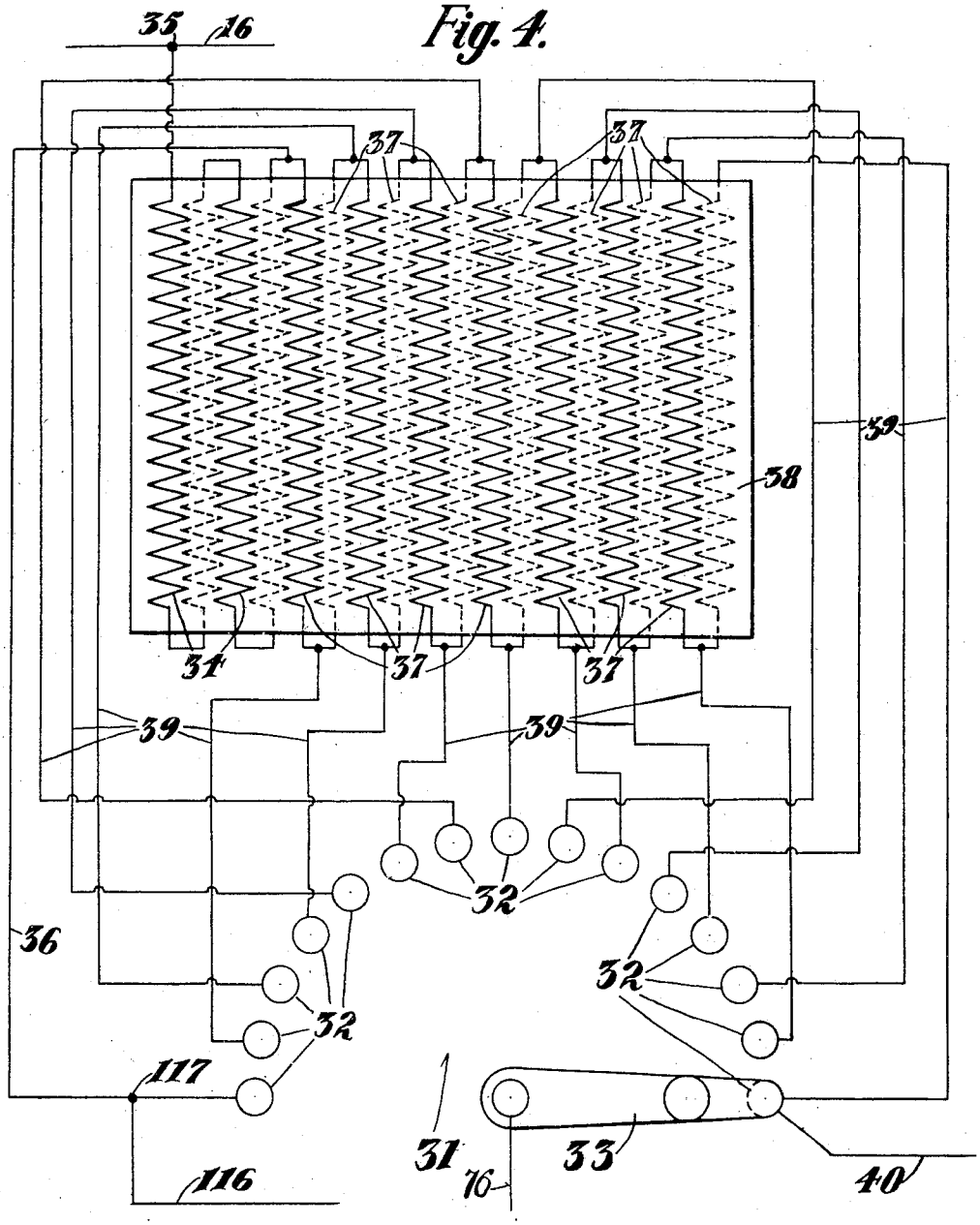
3 SHEETS—SHEET 3.

Fig. 4.



Witnesses

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SWITCHBOARD FOR DENTAL, MEDICAL, OR SURGICAL PURPOSES.

959,641. Specification of Letters Patent. Patented May 31, 1910.

Application filed July 6, 1909. Serial No. 506,169.

To all whom it may concern:

Be it known that I, DAVID STERN, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Switchboards for Dental, Medical, or Surgical Purposes, of which the following is a specification.

It is the object of my invention to provide a new and improved electric switch-board especially adapted for dental, medical or surgical purposes, which is compact in construction and requires little room and in which electric energy may be affected for supplying the proper electric current to lights or instruments requiring different quantities or strengths of electric current.

My improved switch-board is so arranged that electric energy may be received from a source of comparatively high voltage, for instance a usual lighting circuit of one hundred and ten volts direct current, and supplied through the switchboard to lamps for atmospheric illumination, to a heater for heating a sterilizer and boiling water or other substances, to a motor for running a dental or similar engine, for heating an annealer, for heating an oven for drying plaster casts or the like, or other purposes requiring a current of high voltage, the switchboard being so arranged that this current of high voltage may be reduced and regulated for supplying electric energy of low voltage, for instance, for a miniature electric lamp, such as a dental mouth-lamp, for cauterizers, for heating small blades for rendering wax and rubber plastic and spreading the same, for heating thin wires which serve as driers for root-canals in teeth, for electrically warming compressed air and for other purposes requiring only a small voltage, it being my object to further provide the switchboard with means whereby the current of high voltage, reduced to low voltage, as mentioned, may be cut out, while a current of low voltage, for instance, of approximately six volts from a storage or chemical battery is simultaneously cut in, for supplying the miniature lamp and instruments requiring a low voltage with electric energy from such storage or chemical battery.

I accomplish the objects mentioned by a switchboard of small dimensions, for instance, one having a front of approximately eight inches square, and I provide a switchboard upon which the various changes for supplying the various degrees of current required for the various instruments mentioned, may be made without danger of burning out the instruments or creating short-circuits in the same or in the switchboard.

The invention will be further readily understood from the following description and claims, and from the drawings, in which latter:—

Figure 1 is a front elevation of my improved device. Fig. 2 is a cross-section of the same on the line *z*—*z* of Fig. 1. Fig. 3 is a diagrammatic representation of the electrical connections of my improved device; and, Fig. 4 is a diagrammatic representation of the electrical connections of the rheostat.

1 represents the back-plate which forms the supporting plate for the switch-board, arranged to be fastened to a wall by screws passing through lugs 2.

3 represents the front-plate upon which the switches, binding-posts, and the arm and buttons for the rheostat hereinafter mentioned are supported. These plates are connected by rods 4 to which preferably perforated sides 5 are suitably secured by screws 6, the resistance coils and electric conductors to the binding posts being located in the space between said plates.

7 8 represent the high-voltage feeding binding-posts, with which feed-wires 9 10 are connected. This high-voltage may be instanced as one hundred and ten volts, which is a voltage in common use for feeding electric lights for illuminating purposes and the feed-wires may connect with an ordinary lighting system having a suitable source of electric energy, as a dynamo 11.

12 13 are high-voltage distributing binding-posts with which distributing conductors 14 15 are connected, through which the high voltage received at the feeding binding-posts 7 8 may be supplied to any suitable part, for instance, an incandescent-lamp for atmospheric illumination, an electric heater for sterilizing, an annealing oven for annealing the gold with which dental fillings are made, or tools for other purposes hereinbefore mentioned requiring a high voltage, to any one of which tools the electric energy may be conveyed from the binding-posts 12 13. The electric connection between the high-voltage feeding binding-posts and the

high-voltage distributing binding-posts are formed by means of conductors 16 17, in one of which an electric switch 18 is interposed. This high-voltage switch 18 is shown as a double-arm switch to correspond in appearance and mechanical operation to the low-voltage switch 19 hereinafter described. The switch 18 is shown interposed in the conductor 17, the said conductor having connection with the arm 20 and button 21 of said switch, the buttons 22 23 24 of said switch being neutral.

31 represents the rheostat which occupies the middle portion of the front of the switch-board, and comprises the buttons 32 and the arm 33.

34 is an initial resistance-coil, connected with the conductor 16 at 35 and with the final button of the rheostat by a conductor 36.

37 are resistance-coils for the rheostat.

The resistance coils 34 and 37 are preferably formed of a continuous coil wrapped about an insulating plate 38, the strands of the coil being received at the front and back of said plate 38, adjacent strands being separated or insulated from each other. Conductors 39 connect the ends of said strands successively with the buttons of the rheostat so as to offer increasing electric resistance at successive buttons. An electric conductor 40 connects the initial button of the rheostat with the button 41 of switch 19. The switch 19 comprises the arms 42 43 pivoted on the screws 44 45, and the buttons 46 47 48, the arms being connected by the conductor 49. An electric conductor 50 connects the button 46 with the high-voltage feeding binding-post 8, a fuse 51 being interposed in said conductor. When the arms 42 43 are respectively in contact with the buttons 46 41, a circuit is formed through the initial resistance 34 and the resistance-coils of the rheostat.

56 57 represent the terminal-posts of a miniature-lamp circuit, 58 59 the terminal-posts of a low-voltage heat-circuit, and 60 61 the terminal-posts of a second low-voltage heat-circuit. The terminal-posts 56 57 are arranged to receive conductors 62 63 for a miniature lamp, indicated at 64, and which may be a mouth-lamp for dental purposes. The terminals 58 59 are arranged to receive conductors 65 66 of a suitable instrument requiring heating, as a cauterizer 67, and the terminals 60 61 are arranged to receive the conductors 68 69 of another suitable instrument, as a heated-air blower, indicated at 70. The heat-instruments require a greater amperage than the miniature lamp, while the miniature lamp would be in danger of burning out if an amperage were supplied to it sufficient to heat the instruments. In order therefore to enable a current of sufficient amperage to be supplied to the heat-instruments and to prevent a current of too great amperage to be supplied to the miniature lamp, while permitting each of the heat and miniature-lamp circuits to be controlled by the rheostat, I introduce a resistance-coil 71 in the miniature-lamp circuit at a point where it will not interfere with the heat circuits of low voltage, and if desired, the second-named heat-circuit may have a low resistance-coil 72 introduced therein for reducing the heat supplied by said second heat circuit compared with said first heat-circuit, the resistance-coil 72 being however of less resistance than the resistance 71. These miniature-lamp and low-voltage heat-circuits are shunt-circuits obtained by shunting a part of the current passing between the high-voltage feeding terminals and through the initial and rheostat resistances, into the conductors for the miniature-lamp and instruments, these shunt-circuits being of comparatively low-voltage. Thus a conductor 76 is electrically connected with the rheostat-arm, and through the latter with the buttons of the rheostat with which the arm makes contact. The conductor 76 connects with one end of the resistance-coil 71, while a conductor 77 connects the other end of said resistance-coil with a plate 78 which is connected by a fuse 79 with a plate 80 of the terminal-post 56.

81 is a switch having an arm 82 pivoted about the terminal-post 57 and arranged to contact the button 83 connected by a conductor 87 with the arms of the low-voltage switch 19.

The resistance-coil 71 retards the flow of current through the miniature-lamp, while the fuse aids in preventing burning out of the lamp-filament.

A conductor 91 connects with the conductor 76 in advance of the resistance-coil 71 and connects with a plate 92, between which and a plate 93 a fuse 94 is located, the terminal-post 58 being on the plate 93.

95 as a switch, with the button 96 of which a conductor 97 connects, the conductor 97 connecting with the conductor 87 leading to the low-voltage switch 19. A conductor 101 connects with the conductor 91 at 102 and with a plate 103 connected by a fuse 104 with a plate 105 of terminal-post 60, the low resistance-coil 72 being interposed in the conductor 101.

106 is a switch, with the button 107 of which a conductor 108 connects, the conductor 108 connecting with the conductor 87 leading to the low-voltage switch 19.

By the arrangement stated a current of sufficient volume may be obtained for heating the instruments while the current is arrested to prevent burning out of the miniature-lamp filament, and a comparatively low voltage is obtained for the miniature-lamp and heat circuits from a comparatively high-

voltage feed. I also provide means whereby I am enabled to supply electric energy to the miniature-lamp and the instruments from a low-voltage supply, as a storage battery, indicated at 111, although this low-voltage supply may if desired be a battery of chemically acting cells. Conductors 112 113 lead from the battery to the battery-feed terminal-posts 114 115 of the switchboard. A conductor 116 connects with the terminal-post 114 and at 117 with the conductor 36 between the initial resistance-coil and the resistance-coils of the rheostat, thus cutting out the initial resistance-coil of the high-voltage circuit when employing the battery supply. A conductor 118 connects the button 48 of the low-voltage switch 19 with the terminal-post 115. When now the arms of the low-voltage switch are brought from contact with the buttons 46 41 into contact with the buttons 47 48, the high-voltage circuit will be opened and the battery circuit closed, an intermediate position of the arms interrupting both circuits. When the high-voltage circuit is closed and the rheostat-arm contacts the first button of the rheostat, being the button at the extreme right of the rheostat, the current will not flow through the miniature-lamp and heat-circuits, but will take the path of less resistance through the conductor 40. When the rheostat-arm is moved into contact with the buttons of the rheostat of less resistance, a shunt circuit will flow through the miniature-lamp and instrument-circuits. When however the high-voltage circuit is interrupted and the low-voltage battery circuit is closed, the circuit for the miniature-lamp and instruments will be direct circuits between said lamp and instruments and the poles of the battery.

As hereinbefore stated, the rheostat occupies the middle of the front of the switchboard. The switches, feeding terminals and terminal-posts are arranged in convenient manner at the front of said switchboard about the rheostat for producing a pleasing appearance, enabling the parts to be arranged in compact form, and permitting ready manipulation of the parts. The high and low-voltage switches 18 19 are located at the upper corners at the left and right of the front of the switchboard, at which points they are most conveniently manipulated and occupy space which would otherwise be wasted. The terminal-posts for the miniature-lamp and instruments are arranged side by side at the bottom of the front-plate of the switchboard for permitting the wires therefrom to the miniature-lamp and instruments to depend from the switchboard, so that the same may be used without interference with each other and the switches, and permitting ready substitution of other wires leading to other instruments than those momentarily employed, thus increasing the capacity of the switchboard. The high-voltage feeding terminals are located above the rheostat between the high and low-voltage switches 18 19. The distributing binding-posts for high voltage are located at one side and the feeding binding-posts for the battery-supply are located at the other side of the rheostat adjacent the edges of the switchboard, providing compactness of construction. The switches employed are provided with laterally moving arms pivoted on pivots whose axes extend at right angles to the plane of the front-plate of the switchboard.

My improvement provides a construction occupying small space for manipulation, all of the parts being conveniently placed for manipulation, and being of compact form and so arranged that mistakes in manipulation may be avoided.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In an electric switchboard for dental, medical or surgical purposes, the combination of electric connections for a dynamo-circuit embracing high-voltage feed terminals, rheostat-resistances, a conductor between one of said feed-terminals and one end of said resistances, and a conductor embracing a low-voltage switch between the other of said feed-terminals and the other end of said resistances, high-voltage distributing terminals, electric conductors embracing a high-voltage switch between said feed-terminals and high-voltage distributing terminals, and a plurality of low-voltage shunt-circuits formed by connection with the arm of said rheostat and said low-voltage switch, said low-voltage shunt-circuits embracing terminals, low-voltage lamp and instruments, and releasable connections between the latter and said last-named terminals, substantially as described.

2. In an electric switchboard for dental, medical or surgical purposes, the combination of a plate, a rheostat embracing buttons and an arm located at the middle of said plate, electric connections for a dynamo circuit embracing high-voltage feed-terminals, the resistances of said rheostat, a conductor between one of said feed-terminals and one end of said resistances, and a conductor embracing a low-voltage switch between the other of said terminals and the other end of said resistances of said rheostat, high-voltage distributing terminals, electric conductors embracing a high-voltage switch between said feed-terminals and high-voltage distributing terminals, and a plurality of shunt-circuits formed by connection with the arm of said rheostat and said low-voltage switch and embracing terminals located below said rheostat-buttons and arm, the said switches being located in separated re-

lation above said rheostat and arm, and said high-voltage feed-terminals being located above said rheostat and arm between said switches, substantially as described.

3. In an electrical switchboard for dental, medical or surgical purposes, the combination of electric connections for a dynamo-circuit embracing an initial resistance, rheostat-resistances, a conductor leading from said rheostat-resistances, and a switch in said conductor, and forming a direct circuit, a low-voltage shunt circuit formed by connection with the arm of said rheostat and said switch and embracing conductors for parts operated by low-voltage current, and a low-voltage battery circuit having connection with said rheostat-resistances and said switch and embracing said shunt-circuit for forming a direct battery-circuit therethrough, substantially as described.

4. In an electric switchboard for dental, medical or surgical purposes, the combination of electric connections for a dynamo-circuit embracing an initial resistance, rheostat-resistances, a conductor leading from said rheostat-resistances, and a switch in said conductor, and forming a direct circuit, a plurality of low-voltage shunt-circuits formed by connection with the arm of said rheostat and said switch and embracing conductors for a miniature lamp and instruments operated by a low-voltage current, a resistance interposed in the shunt-circuit for said miniature-lamp, and a low-voltage battery-circuit having connection with the conductor of said dynamo-circuit between said initial resistance and said rheostat-resistances, and with said switch and embracing said shunt-circuit for forming a direct battery-circuit therethrough, substantially as described.

5. In an electric switchboard of the character described, the combination of a rheostat centrally disposed on the front of said switchboard, high-voltage feeding connections located on said switchboard above said rheostat, a series of low-voltage supply binding-posts located side by side below said rheostat for permitting the supply-wires therefrom to depend therefrom below said switchboard, high-voltage supply binding-posts and a switch therefor at one side of said rheostat, and low-voltage binding-posts and a switch therefor at the other side of said rheostat, said binding-posts and switches being located on the front of said switchboard closely adjacent to said rheostat, substantially as described.

In testimony whereof, I have signed my name hereto in the presence of two subscribing witnesses.

DAVID STERN.

Witnesses:
CONSTANT SOUTHWORTH,
LILLIAN BURNETT.