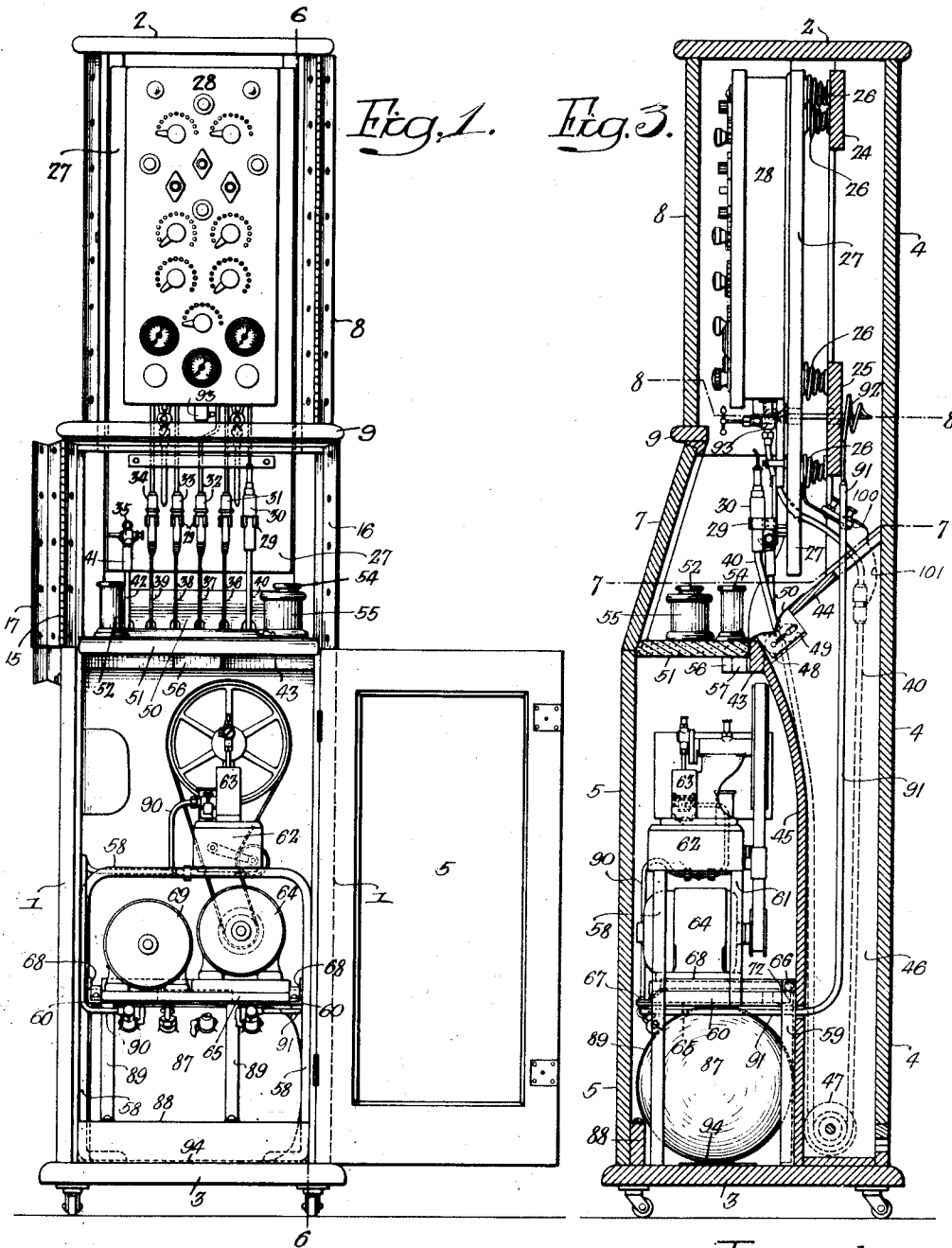


1,257,936.

Patented Feb. 26, 1918.

5 SHEETS—SHEET 1.



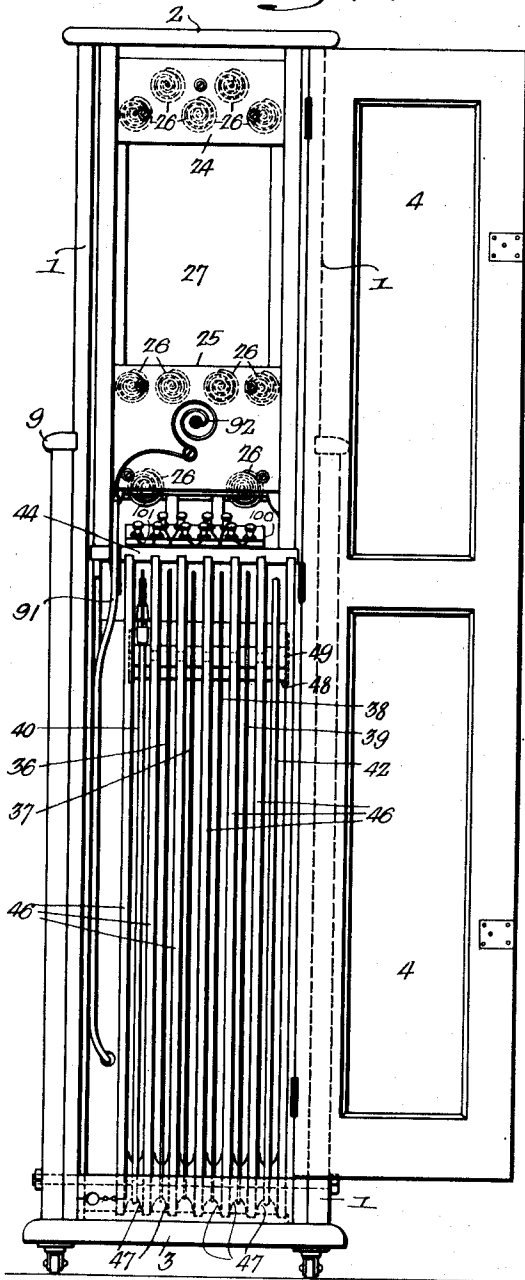
Inventor—
Percy Russell.
by his Attorneys.
Howson & Howson.

1,257,936.

Patented Feb. 26, 1918.

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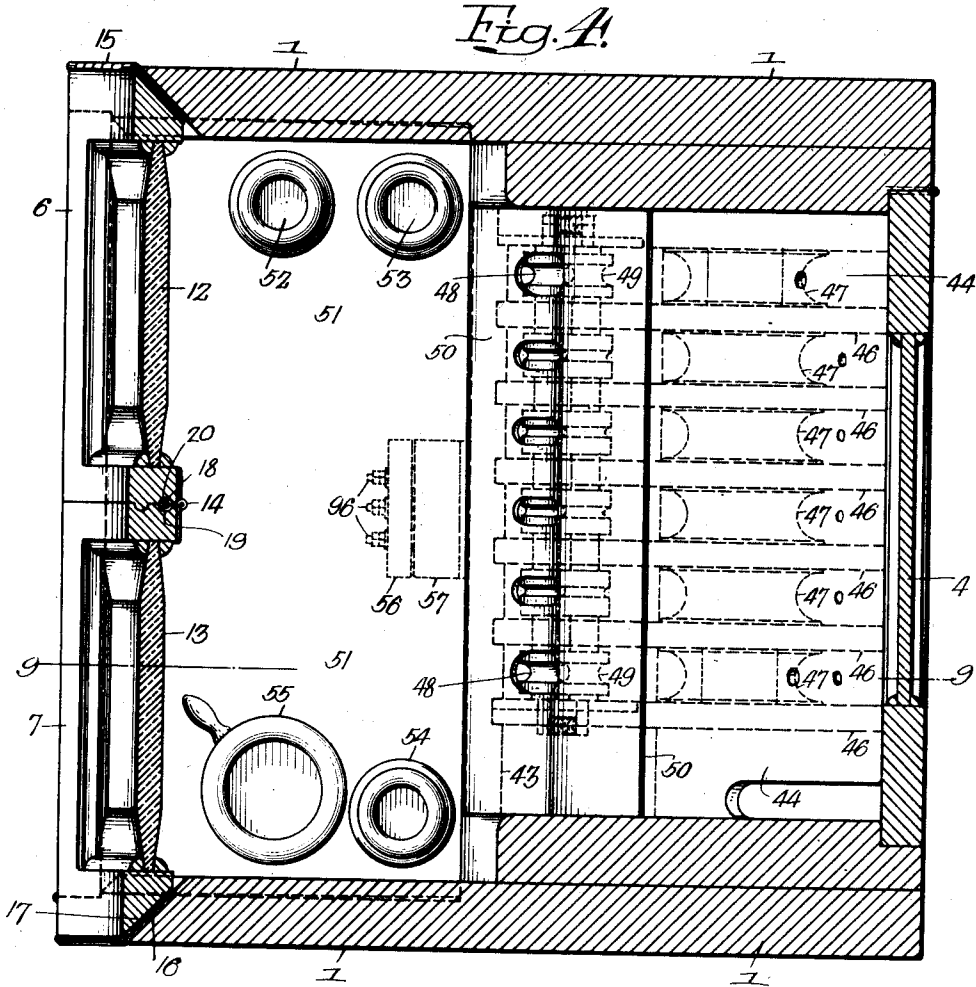
Fig. 2.



*Inventor—
Percy Russell.
by his Attorneys—
Howson & Howson*

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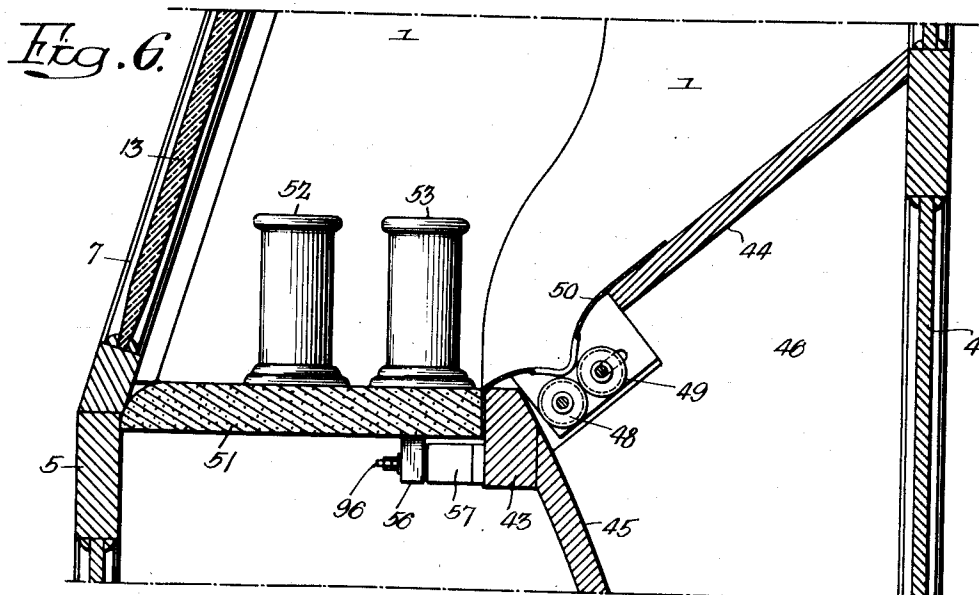
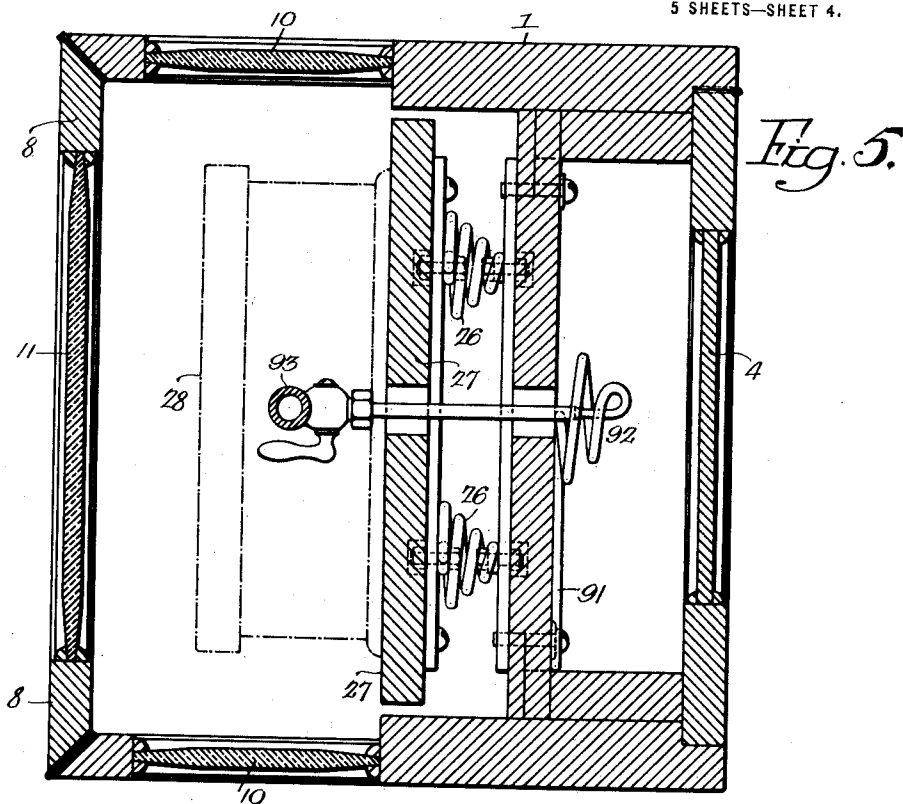
*Inweldon—
Percy Russell.
by his Attorneys—
Howson & Howson*

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P. RUSSELL.
DENTAL CABINET.
APPLICATION FILED NOV. 2, 1916.

Patented Feb. 26, 1918.

5 SHEETS—SHEET 4.



Inventor—
Percy Russell.
By His Attorneys—
Howson & Howson

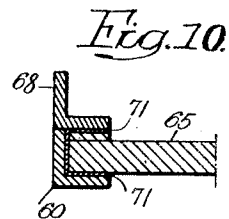
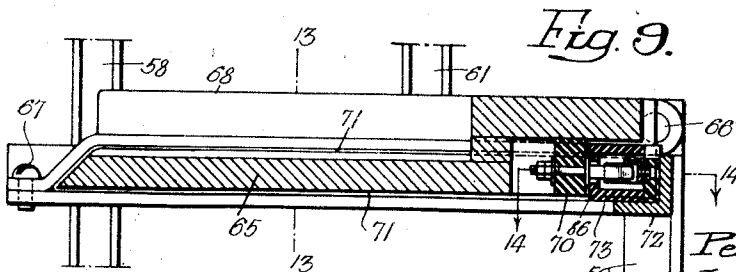
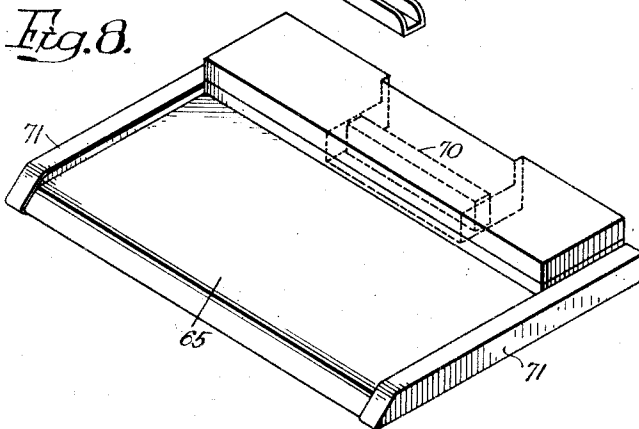
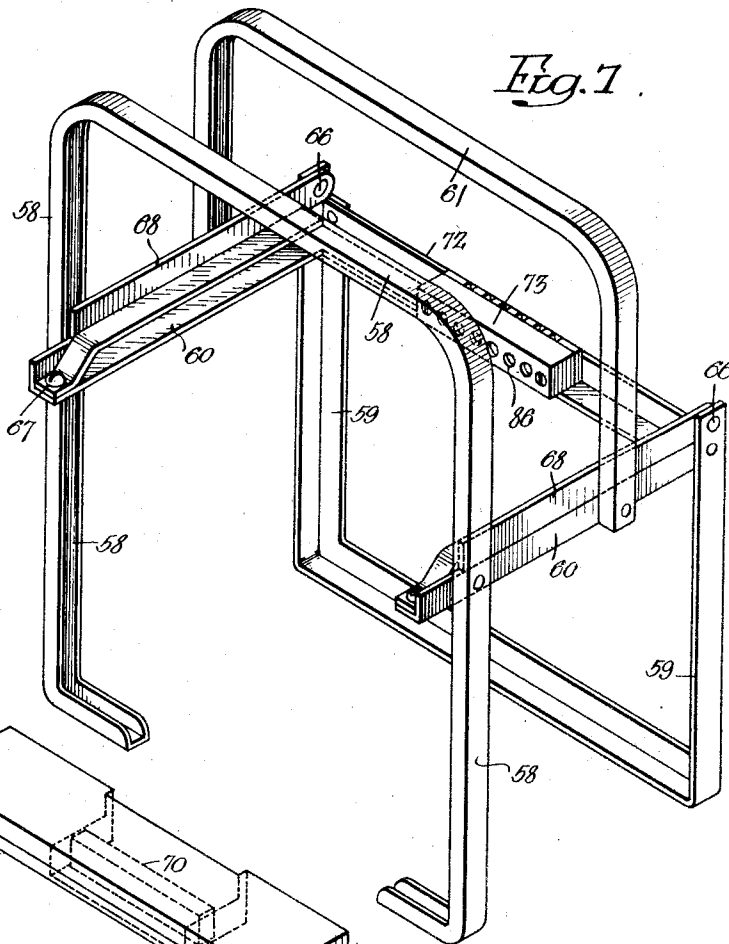
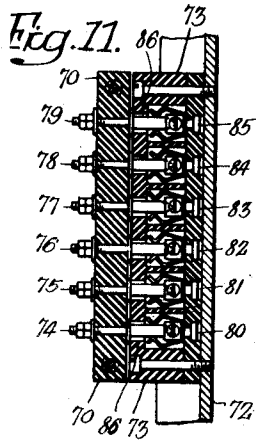
P. RUSSELL.
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APPLICATION FILED NOV. 2, 1916.

Patented Feb. 26, 1918.

5 SHEETS—SHEET 5.

1,257,936.



Inventor—
Percy Russell.
by his Attorneys,
Hewson & Hewson

UNITED STATES PATENT OFFICE.

PERCY RUSSELL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO ELECTRO DENTAL MANUFACTURING COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

DENTAL CABINET.

1,257,936.

Specification of Letters Patent.

Patented Feb. 26, 1918.

Application filed November 2, 1916. Serial No. 129,248.

To all whom it may concern:

Be it known that I, PERCY RUSSELL, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented 5 Dental Cabinets, of which the following is a specification.

One object of this invention is to provide a cabinet for inclosing and protecting the various pieces of apparatus customarily required by a dental surgeon, in which the instruments and their associated structures are so arranged and mounted that they are conveniently accessible to the operator for use as well as for adjustment;—the invention 10 including novel means for resiliently supporting the switch board so as to avoid damage from vibration or shocks, together with novel means for conducting compressed air and electric current to the various instruments controlled by or associated with the apparatus on said board.

A further object of the invention is to provide a dental cabinet with air- and current-supplied instruments so connected to the controlling and supply apparatus therein that they may be withdrawn for the purpose of use and thereafter permitted to automatically assume predetermined positions of repose when released by the operator;— 25 the arrangement being such that the device for so returning or restoring said instruments may be so held as not to become dislodged or disarranged during the shipment or movement of the cabinet.

I also desire to provide a cabinet or other supporting structure with weight actuated extensible conductors, together with a novel construction of guiding and retaining rollers which may be conveniently separated to permit of the removal of said conductors with their attached instruments.

It is further desired that the cabinet shall include novel means for removably supporting the electrical machines and air pump so as to permit of the convenient substitution of alternating current apparatus for direct current machines, which means shall be of such a nature as to suppress or prevent the vibration and noise which would ordinarily occur when these pieces of apparatus were operated, because of the noise-magnifying effect of the cabinet structure.

It is also desired to provide novel and relatively simple means for making and breaking the electrical connections of the apparatus carried by the removable shelf or other supporting structure, with a view to causing such connections to be completed by the act of placing said structure in position.

Another object of the invention is to provide a dental cabinet with certain detail devices for preventing damage to any of its contained apparatus during shipment, for facilitating the removal or replacement of the different pieces of apparatus and for making possible the most convenient manipulation and adjustment of the instruments, etc., under conditions of use.

These objects and other advantageous ends I secure as hereinafter set forth, reference being had to the accompanying drawings, in which,

Figure 1 is a front elevation of the cabinet showing the doors open and illustrating the various pieces of apparatus in their normal positions;

Fig. 2 is a rear elevation of the cabinet with the rear door in its open position to show certain of the interior mechanism;

Fig. 3 is a vertical section on the line 3—3, Fig. 1;

Figs. 4 and 5 are horizontal sections on the lines 4—4 and 5—5, Fig. 3 respectively;

Fig. 6 is a fragmentary vertical section on the line 6—6, Fig. 4;

Figs. 7 and 8 are perspective views illustrating the supporting frame for the air pump and electric machines, and the shelf on which said machines are carried, respectively;

Fig. 9 is a central vertical section taken from front to rear, to illustrate the detail construction of the shelf for supporting the electrical machines and the plug contacts or switches whereby said machines are connected to their controlling apparatus;

Figs. 10 and 11 are respectively vertical and horizontal sections on the lines 10—10 and 11—11, Fig. 9.

In the above drawings 1 represents the two similar paneled or otherwise ornamentally finished sides of a vertically elongated casing or containing structure, having a top 2, a base 3, and a rear door 4 which extends

for its full length. The front of said box or cabinet is closed by a lower door 5, a pair of intermediate doors 6 and 7, and an upper door 8;—there being a transverse
5 bracing member 9 extending across the front and around the side which has a projecting rounded or beaded portion between the bottom of the upper door 8 and the tops of the lower doors 6 and 7.

10 The upper forward portions of the side members 1 have transparent windows 10 and the upper front door 8 likewise has set in it a glass window 11, there being also glass windows 12 and 13 in the doors 6 and 7.
15 These latter doors are pivotally connected by a pair of hinges 14 and the door 6 is movably connected to one side of the cabinet by a hinge 15;—the adjacent or contacting edges of the door 7 and of the adjacent
20 side member 1 being beveled and faced with metal strips 16 and 17, which between the door 6 and its cooperating side member are replaced by the plates of the hinges 15. This construction is particularly advanta-
25 geous in facilitating the attachment of the doors to either side of the cabinet, for the strips and hinges are interchangeable so that either may be applied to either side member.

30 With the above described arrangement of parts the lower chamber of the cabinet, *i. e.*,—that accessible through the lower door 5, is of greater depth than the uppermost portion which is closed by the door 8, while
35 the intermediate part closed by the doors 6 and 7 increases in depth from that of the upper portion to that of the lower part.

Within the upper part of the cabinet I rigidly fix two relatively heavy, transverse
40 bars or plates 24 and 25, and through two series of conical coil springs 26, suspend from these a slate, marble or similar slab 27 of insulating material of such length that it extends from the top of the upper com-
45 partment to a point near the lower part of the intermediate compartment.

On that portion of this plate immediately back of the upper front door 8, I mount the switch board proper 28 which carries the
50 high and low pressure electrical controlling apparatus, as well as certain of the indicating gages and air controlling and regulating valves, etc., but as this in itself forms no part of my invention, I have not shown
55 it in detail. It is sufficient to note that on the lower part of the supporting slab 27 I provide in the present case six clips 29 for the support of various instruments or instru-
60 ment holders 30, 31, 32, 33, 34 and 35, of which those indicated at 31 to 34 inclusive are designed to utilize electric current and are connected to the electrical apparatus on the switch board by flexible conductors 36,
37, 38 and 39. The air blowing instrument
65 30 is similarly connected to the air-regulat-

ing and controlling apparatus on the switch board by a flexible tubular conductor 40, while a second air delivery instrument 41 for attachment to an air heater is similarly connected to the apparatus on the switch
70 board through a flexible conductor 42.

Adjacent a horizontal plane extending across the cabinet at the top of the lower compartment is a brace or supporting member 43 from which an inclined partition 44
75 extends up and back to the plane of the rear door 4. A second partition 45 extends in a gentle curve back and down from the cross member 43 to the base piece 3 of the cabinet, thereby forming in the lower back por-
80 tion of the latter a wide, relatively shallow chamber sub-divided by parallel vertical partitions 46 to provide a series of elongated cells, in each of which extends a loop of one
85 of the conductors 36—42. Each of said loops is held in and returned to its retracted position by means of a weight in the form of a wooden roller 47 mounted in its lowest
90 portion and made of a width but slightly less than the width of the cell in which it is vertically slidable. These rollers serve to draw back into the cabinet the several con-
ductors, together with the various instru-
95 ments attached thereto, when these are released by the operator.

For guiding the forward portion of each loop as it is drawn out of the cabinet, I cut away or omit the forward lower end
100 of the partition 44 and mount in the opening so formed a transversely extending plate 50 having one slot or passage for each of the conductors and carrying on its back face a pair of rollers 48 and 49 adjacent each opening. While each pair of these rollers is
105 drawn together by a spring, the spindle carrying the upper roller is movable in a slot so as to permit it to be forced sufficiently far away from its coacting roller to allow passage of the instrument on the cord normally operative therethrough when it is
110 desired to withdraw this from the front of the cabinet.

The two side cabinet members 1 have recesses in their inner faces extending from
115 their front edges inwardly to the transverse member 43, to provide guideways for a marble slab 51 constituting a table on which are mounted electrically heated cups or con-
tainers 52, 53, 54 and 55 supplied with cur-
120 rent through conductors running from them to a terminal block 56 rigidly mounted on the underside of said table. This block supports a series of contacts (not shown) designed to cooperate with other contacts on
125 a second terminal block 57 supported on the transverse frame member 43, and the arrangement is such that as the marble table is withdrawn from its guides, the contacts carried by the terminal block 56 are with-
130 drawn from electrical engagement with

those of the block 57, it being noted that the detail construction of these cooperating contacts and their supporting blocks may be similar to that shown in Figs. 9 and 11, hereafter described.

Within the chamber formed between the vertical partition 45 and the lower front door 5, is mounted a frame preferably constructed as shown in detail in Fig. 7, with an inverted U-shaped front member 58 made of channel iron and having inwardly bent lower ends constituting feet. A rear member 59 of U-shaped form and made of angle iron, is rigidly connected to the arms of the frame member 58 by horizontal angle sections 60, while a third U-shaped member 61 also of channel section and of relatively shallow depth, has its extremities rigidly fixed to the horizontal sections 60 and extends upwardly therefrom to substantially the same height as the top of the frame member 58. On the top elements of these two frame members 58 and 61 is rigidly though removably fastened a regulator or switch box 62 on which is carried an air pump 63 driven through a belt from an electric motor 64. The latter is mounted on a shelf 65 which is slidably supported on the horizontal frame sections 60 and is ordinarily held in place by a pair of angle pieces 68 pivoted at 66 to the upper ends of the arms of the frame member 59 so as to be movable thereon in a vertical plane;—being detachably held, as by screws 67, to the forward ends of said sections 60. This shelf also supports a motor-generator 69 and carries at its rear portion a terminal block 70.

In order to prevent the transmission of vibration from the shelf 65 to the frame, I provide the ends of said shelf and the portions adjacent thereto with a covering 71 of felt or other non-conductor of vibrations (Figs. 9 and 10) so that at every point where said shelf would be engaged by its supporting structure, such felt is introduced.

The top ends of the U-shaped frame member 59 are connected by a horizontally extending angle section 72 on which is fixed a second terminal block 73 of the detail construction shown in Figs. 12 and 14. By reference to these figures it will be noted that the block 70 which is of insulating material, carries six contact members indicated at 74 to 79 inclusive, each threaded at its outer end for the reception of nuts whereby electrical conductors may be connected to it and at its inner end projecting beyond said insulating block. Each of said latter ends terminates in a head designed to fit between a pair of spring fingers forming part of or connected to terminals 80—85 inclusive, mounted in the terminal block 73. Each pair of these fingers is placed within

of said chambers is provided with an opening 86 for the passage of the terminals 74—79 inclusive.

In placing the shelf 65 in position, the screws 67 are removed and the retaining bars 68 are swung upwardly on their pivots, thereby making it possible to slide said shelf with its apparatus inwardly upon the guide bars 60. The terminal block 73 is so placed that as said shelf approaches its normal inner position, the heads of the terminals 74—79 enter the various openings 86 (Fig. 7), and respectively pass between the spring fingers of the contacts 80 to 85 inclusive. It is to be understood that these contacts, 80 through suitable conductors which have been omitted for the sake of clearness, are connected to the proper controlling devices on the switch board 28. To retain the shelf in place, the retaining bars 68 are swung downwardly so that they tightly engage the felt covering 71 of these side edges, after which the holding screws 67 are put in place and set up.

In the space under the shelf 65 I mount an air tank 87 and hold it in place by a transversely extending cleat or block 88 extending across the cabinet immediately inside of the door 5 upon the base piece 3. In addition said tank is kept from vibrating by flexible straps 89 extending over it from said block and fastened to the base.

The air pump 63 is connected to the tank through a conduit 90, while a second conduit 91 serves to connect said tank to the air distributing and regulating apparatus carried by the switch board 28. As above noted, however, said board, being carried on the springs 26 is free to move to a limited extent in any direction relatively to the other parts of the cabinet, and since it is essential there should be no leakage of the air from this conduit nor likelihood of injury to the latter, I provide a device whereby this movement is permitted while the possibility of resulting injury is reduced to a minimum.

For this purpose the conduit 91 is extended upwardly through one of the compartments opening on the lower rear face of the cabinet and has its upper end fastened to the cross member 25. Said end is then wound in a conical coil 92 similar to the spring coils 26 and its free end is carried at right angles through openings in said cross member and in the switch-board-supporting slab 27, to a controlling valve 93 supported on the switch board 28;—it being noted that said openings are sufficiently large to permit free passage of the conduit without danger of its being engaged by or brought in contact with either the slab 27 or the member 25 when there is relative movement of the parts. As previously noted, the air and electrical conductors, as well as the conduit 91, are

made of flexible material so that the relative movement of the switch board and its supporting slab 27 is made possible without likelihood of breakage or other damage. It is to be noted that the air tank 87 has a piece of felt or other vibration-dampening material 94 placed between it and the base 3.

With the construction of parts above described there is practically no vibration or noise resulting from the operation of the electrical machines 64 and 69 or of the air pump 63, particularly since, because of the peculiar supporting means and structures, the only vibrations transmitted to the cabinet are those traveling independently of the side walls and vertically through the frame members 58 and 59, which may if desired, have sheets or strips of felt placed between their lower portions and the base 3. This construction effectually prevents the sounding board action of the panels 1 or other portions of the cabinet, as would otherwise occur if the machines were supported directly from the sides or other portions of the cabinet.

By the use of the instrument-supporting means employed, it is obvious that I may manipulate the instruments supplied with compressed air or electric current with the utmost convenience, since when they are drawn from the cabinet, the guided roller weights 47 rise in their roller compartments and serve to take up the slack in the conductors when said instruments are returned to their supporting clips. Moreover, whenever it is desirable to inspect one of the conductors or its attached instrument, this may be accomplished by forcing said instrument between the two rollers 48 and 49 which thereupon separate to allow of its passage, after which it and the full length of said conductor is exposed.

It is noted that the rollers 47 may have axial openings and that there are corresponding openings through the lower portions of the partitions 46 as well as through the side members 1 of the cabinet, so that when desired, a bolt may be run through all of said openings in order to hold the rollers, with the conductors engaged thereby, in their lowermost and relatively extended positions with a view to preventing their movement when the cabinet is to be transported. At such a time it is obvious that the cabinet, with the delicate instruments and connections carried by the switch board and its associated parts, will be very effectually protected from injury, since any shocks or blows are absorbed by the springs and owing to the mounting and construction of the air and current conductors, the likelihood of breakage or other injury is reduced to a minimum.

When the cabinet is not in use, all of its apparatus, together with the connections associated therewith, may be protected from

dust and dampness by closing the doors, which are preferably equipped with suitable locks. At the same time the various instruments are visible through the windows, and the cabinet as a whole with its associated apparatus presents a highly ornamental and attractive appearance.

In removing the table 51, the contacts 96 carried by the terminal block 56 attached thereto, disengage the contacts carried by the terminal block 57, which as shown in Fig. 6, is supported by the cross piece 43. When in replacing this shelf with its apparatus it is moved inwardly in its guideways, said two sets of contacts come into proper engagement by the time the parts reach their predetermined normal positions.

In order to prevent the various electrical conductors 36—39 pulling directly upon their switch board connections under the action of gravity upon their respective roller weights, I preferably bring all of said conductors from the switch board to terminals fixed to a board or block 100, Figs. 2 and 3, supported by the slab or plate 27, and to these terminals connect one end of each of the loops. In the case of the instrument 30, which in the case shown is an air heater, I run with its air conductor 40 a cable 101 containing a pair of electrical conductors also leading from suitable terminals on the block 100, so that the heating coils of said instrument are supplied with current delivered through said cable and heat the air flowing under pressure through the tubular portion of said conductor.

One important advantage resulting from removably supporting the shelf 65 with its attached apparatus is the ease and rapidity with which the installation may be changed from one operated by and utilizing direct current to one employing alternating current or vice versa,—for obviously either direct or alternating current apparatus may be provided at will upon said shelf to suit the available current supply—and all of the remaining apparatus is so designed and connected as to be properly operative without change.

I claim:—

1. The combination of a supporting structure; a switch board carried thereby; a looped electrical conductor having one end connected to said switch board; a weight in the form of a grooved roller mounted in the loop of said conductor; and means for guiding said roller to compel it to move in a substantially vertical plane.

2. The combination of a switch board; a series of looped electrical conductors connected thereto; a structure having a series of relatively narrow vertically elongated compartments for the reception of the looped portions of said conductors; with rollers

carried by the loops of said conductors and guided by the walls of said compartments.

3. The combination of a supporting structure; a switch board mounted thereon; a series of supporting clips; a series of instruments removably carried by said clips; conductors connecting said instruments with the switch board; vertically movable, plane sided weights respectively engaging the conductors to maintain them in looped form under tension; and guides engaging the plane sides of said weights.

4. The combination of a supporting structure having an elongated chamber; a switch board mounted thereon; a clip; an instrument removably supported by said clip; a conductor having its ends respectively connected to the switch board and to the instrument; a roller vertically guided by the walls of said elongated chamber and operative in the loop of said conductor.

5. The combination of a containing structure; apparatus therein including a series of looped conductors; rollers operative in the loops of said conductors; and means engaging said rollers to maintain said loops in a predetermined position.

6. The combination of a containing structure; apparatus therein including a series of looped conductors; rollers operative in the loops of said conductors; and means engaging said rollers to maintain said loops in a predetermined position, the same consisting of a bar extending through all of the rollers and held by the supporting structure.

7. The combination of a supporting structure having a series of vertically elongated compartments; a switch board carried by said structure; looped conductors connected to the switch board and extending respectively into said compartments; rollers engaging the loops of said conductors and operative in said compartments; with a bar held by the supporting structure in position to pass through all of said rollers when the conductors engaged by the latter are in their most extended positions.

8. The combination of a containing structure; a switch board in the upper part thereof; a horizontal table in the containing structure below said switch board; instruments having flexible extensible conductors connecting them to the switch board and normally mounted in the space between the latter and the table; with means tending to draw said instruments into the cabinet.

9. The combination of a container having upper, rear lower and front lower compartments; a switch board in the first of said compartments; a series of dental instruments; flexible conductors extending in the rear lower compartment and connecting said instruments with the switch board; current supply apparatus in the lower front compartment also connected to the switch board;

and conductors connecting said apparatus with the switch board.

10. The combination of a container; a partition having openings and dividing said container into upper and lower compartments; a series of dental instruments and a switch board in the upper compartment; with looped conductors connecting the instruments to the switch board and extending through the openings in the partition into the lower compartment.

11. The combination of a container; a partition having openings and dividing said container into upper and lower compartments; a series of dental instruments and a switch board in the upper compartment; looped conductors connecting the instruments to the switch board and extending through the openings in the partition into the lower compartment; with weights operative on the conductors within said lower compartment and tending to draw them into the same.

12. The combination of a containing structure; a partition dividing said structure into upper and lower compartments and provided with a series of openings; a switch board mounted in the upper part of said container; a series of flexible conductors connected to the switch board and having loops extending through the openings of said partition respectively; with a pair of guide rollers mounted adjacent each of the openings for the reception of the conductors passing therethrough.

13. The combination of a containing structure; a partition dividing said structure into upper and lower compartments and provided with a series of openings; a switch board mounted in the upper part of said containing structure; a series of flexible conductors connected to the switch board and having loops extending through the openings of said partition respectively; a pair of guide rollers mounted adjacent each of the openings for the reception of the conductors passing therethrough; and means for supporting one of the rollers of each pair so as to permit of its separation from its cooperating roller to allow withdrawal of the conductor with its attached instrument.

14. The combination of a containing structure; a transversely extending member therein having openings; pairs of rollers mounted on said member respectively adjacent the openings and each including one roller free to move toward and from the other; extensible conductors passing through the openings between the rollers of each pair and including looped portions; instruments connected to the conductors; and means tending to return the conductors with their instruments to the interior of the cabinet after they have been withdrawn for use.

15. The combination of a switch board; a tubular air conductor supplied with air under pressure; an electric cable combined with said conductor and supplied with electric current from said switch board; with an
5 electric air heating instrument connected both to said conductor and to the cable.

16. The combination of a containing structure having an upper and a lower compartment; two sets of doors, one over the other, for the upper compartment and a door for the lower compartment; electrically actuated air compressing apparatus in the lower compartment; a switch board in the upper
15 compartment accessible through the upper doors; with air and electrical instruments connected to said switch board and accessible through the opening closed by the lower door of the upper compartment.

20 17. The combination of a container; a switch board mounted in the upper portion thereof; a source of air in the lower part of the container; with air and electrical instruments connected to said switch board and
25 extensibly mounted in the container between the switch board and the source of air.

18. The combination of an inclosing structure; a switch board mounted therein; electrically actuated instruments mounted below
30 the switch board; and extensible, flexible connections between said instruments and the switch board.

19. The combination of a containing structure; a switch board therein; a table removably mounted in said containing structure;
35

electrical apparatus on said table; and electrical conductors including separable contacts connecting said apparatus with the switch board.

20. The combination of a containing structure; a switch board mounted therein; a
40 table removably mounted in said containing structure; electro-receptive apparatus carried by said table; terminal contacts on the table connected to said apparatus; with co-
45 operating contacts connected to the switch board and mounted to detachably engage the contacts on the table when this occupies a predetermined position.

21. The combination of a containing structure having an upper and two lower compartments; a switch board in the upper compartment; apparatus connected to the switch board and mounted in one of the lower compartments; electrical instruments; with conductors connecting said instruments to the
55 switch board and extending within the second of the lower compartments.

22. The combination of a supporting frame; a shelf slidably mounted in a substantially horizontal position on said frame; electrical apparatus on the shelf; terminal contacts connected to said apparatus and mounted on the shelf; with cooperating supply terminal contacts mounted on the frame
60 in position to be separably engaged by said first contacts when the shelf occupies a predetermined position.
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PERCY RUSSELL.