D. J. WATROUS.

DRYING APPARATUS.

APPLICATION FILED JULY 21, 1920.

1,419,707.

Patented June 13, 1922.

3 SHEETS—SHEET 1.

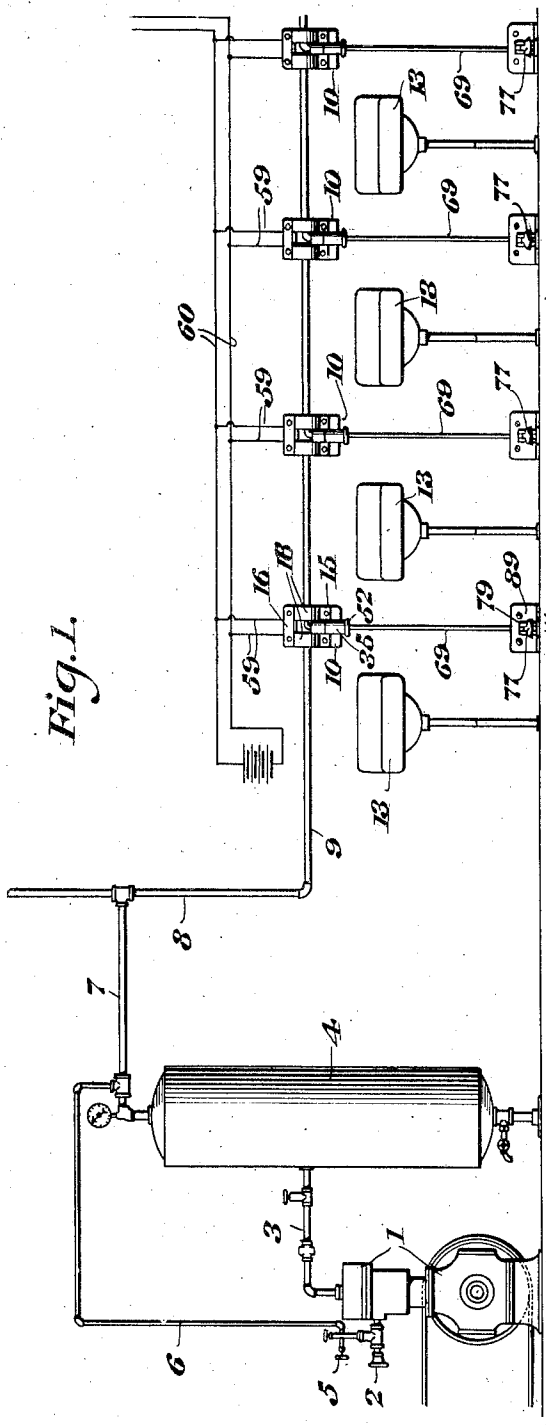


Fig. 1.

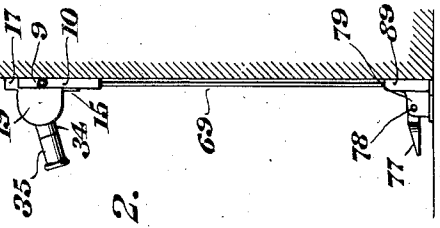


Fig. 2.

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3 SHEETS—SHEET 2.

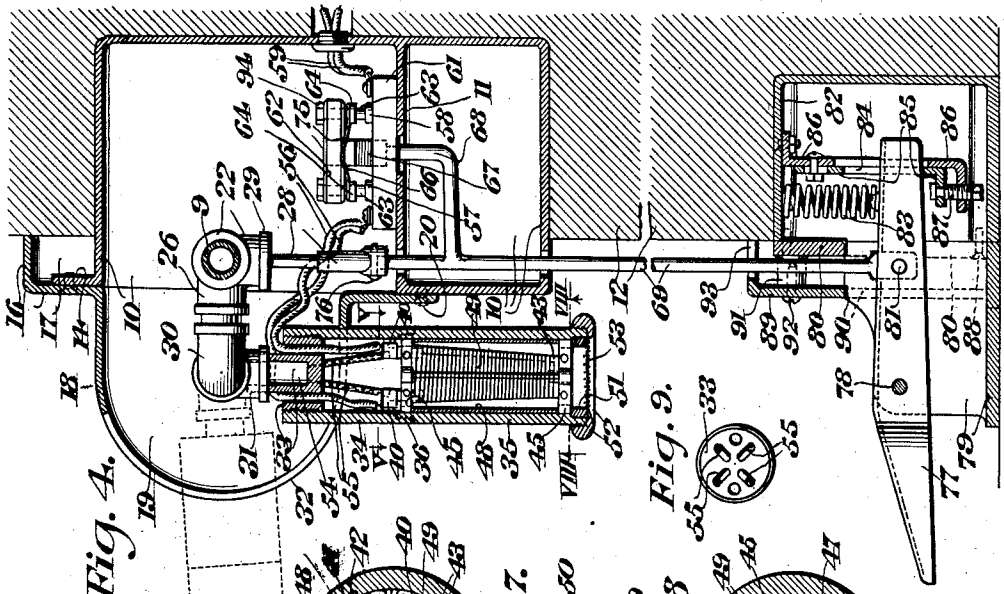


Fig. 4.

Fig. 9.



Fig. 5.



Fig. 7.



Fig. 8.

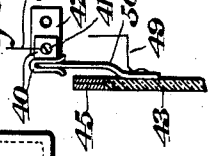


Fig. 6.

Fig. 3.

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3 SHEETS—SHEET 3.

Fig. 10.

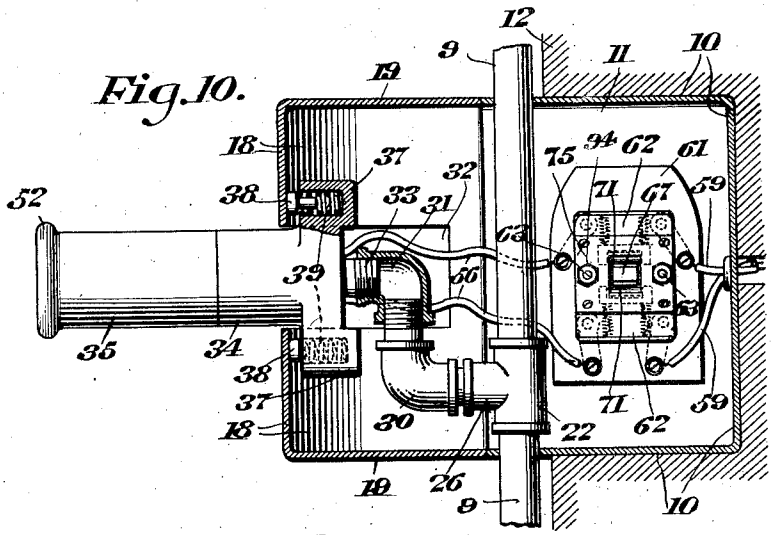


Fig. 11.

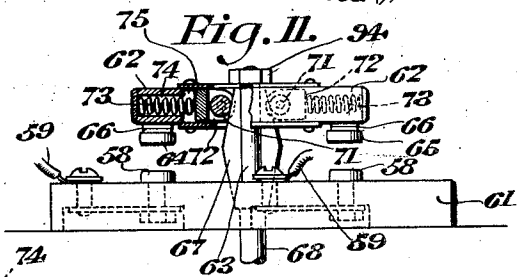


Fig. 13.

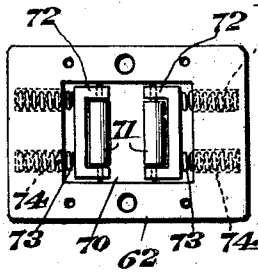
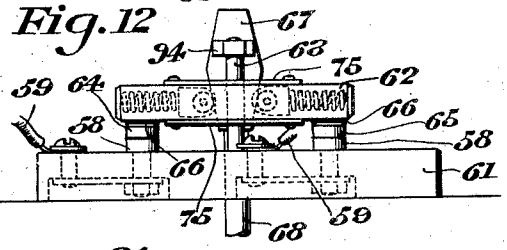


Fig. 12



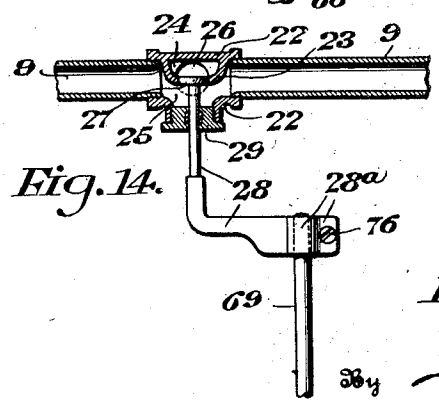


Fig. 14.

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UNITED STATES PATENT OFFICE.

DENTON J. WATROUS, OF GROTON, NEW YORK, ASSIGNOR TO AIRDRY CORPORATION, OF GROTON, NEW YORK, A CORPORATION OF NEW YORK.

DRYING APPARATUS.

1,419,707. Specification of Letters Patent. Patented June 13, 1922.

Application filed July 21, 1920. Serial No. 397,933.

To all whom it may concern:

Be it known that I, DENTON J. WATROUS, a citizen of the United States, and resident of Groton, in the county of Tompkins and State of New York, have invented certain new and useful Improvements in Drying Apparatus (Case No. 12), of which the following is a specification.

This invention relates to improvements in drying apparatus and has for its general object to provide simple and efficient means adapted for economical use in lavatories of buildings, barber and hair-dressing establishments, and similar places for drying the face and hands or the hair of a person in a sanitary and rapid manner, or for use in factories or the like for drying articles of various kinds. A further object of the invention is to provide an apparatus of the type set forth having a plurality of individually controlled devices for heating and discharging blasts of air supplied from a common source of compressed air.

In the accompanying drawings, Figure 1 is a diagrammatic view, showing an installation of the apparatus for use in the lavatories of a building;

Fig. 2 a side elevation of one of the individually controlled air heating and discharging mechanisms;

Fig. 3 a front view of one of the individually controlled air-heating and discharging mechanisms;

Fig. 4 a vertical central sectional view, partly in side elevation, of the parts shown in Fig. 3;

Fig. 5 a transverse section on the line V—V of Fig. 4 through the air-discharge nozzle;

Fig. 6 a detail view showing one of the separable connections between the heating coil terminals and the associated terminal clip with which one of the wires to the switch is connected;

Fig. 7 a detail top plan view of the heating coil and its supporting core;

Fig. 8 a transverse section through the nozzle on the line VIII—VIII of Fig. 4;

Fig. 9 a bottom plan view of the plug to which the nozzle is connected;

Fig. 10 a section on the line X—X of Fig. 3;

Figs. 11 and 12 detail rear elevations of the snap switch in "off" and "on" positions, respectively;

Fig. 13 a plan view of the reciprocable contact-carrying block of the switch with the cover plate removed; and

Fig. 14 a detail vertical sectional view showing one of the outlet valves and its adjustable stem.

In the preferred embodiment of the invention shown in the drawings, 1 designates an air compressor of ordinary construction provided with the usual intake valve 2, discharge pipe 3 leading to the air storage tank 4, and the automatic pressure regulating device 5 connected by pipe 6 with the short horizontal outlet pipe 7 which leads from tank 4 to the vertical standpipe or main air line 8. One or more branch pipe lines 9 extend from pipe 8 on each floor to the lavatory or lavatories on the several floors of the building, each of these branch lines leading through openings in the projecting portions of the side walls of rectangular metal boxes or casing sections 10 set in recesses in one wall 12 of a lavatory adjacent the usual stationary wash basins 13. Each box 10 is preferably located a little to one side and above one of the wash basins, as indicated in Fig. 1, and the front side of the box above the horizontal partition 11 is entirely open. A vertical flange 14 extends upwardly from the front edge of the top wall of box 10. A cover plate of the same width as the box 10 is detachably held to the box over the opening in the front of the box, said plate comprising a flat lower portion 15, an angular upper portion 16 having side walls 17 resting on top of the projecting portion of the box 10, and a forwardly bulged portion 18 having side walls 19 abutting at their inner edges against the forward edges of the side walls of the box. A pair of screws 20 hold the part 15 of the plate against the front wall of the lower compartment of box 10 and a pair of screws 21 hold the vertical front wall of the angular portion 16 of the cover plate against the flange 14 on box 10.

A valve casing 22 is interposed in the pipe line 9 at a point within the upper compartment of box 10, said casing being divided by a partition 23 into chambers 24 and 25. The chamber or passage 25 forms a through communication between adjacent ends of sections of the pipe 9 while chamber 24 communicates with an outlet branch 26. A circular aperture is provided in the partition

23, the edge of which is beveled to form a seat for a valve 27 held on the upper end of the vertical arm of an angular valve stem 28 which extends through a suitable stuffing box in a plug 29 screwed in the bottom of the valve casing. A horizontally disposed elbow fitting 30 is held at one end to the outlet branch 26 and one end of an elbow fitting 31 is screwed or swiveled on the other end of elbow 30 so as to permit rotary movement of elbow 31 relative to elbow 30.

The elbows 30 and 31 are housed within the forwardly bulged portion of the cover plate or removable section of the casing, the wall 18 of which is provided with an elongated vertical slot 32 opposite the elbow 31. A sectional air discharge nozzle is detachably held to the free end of elbow 31 by means of a plug 33 screwed in the inner end of section 34 of the nozzle and having a reduced portion screwed in the free end of elbow 31. The outer section 35 of the nozzle has a screw-thread connection with section 34 of the nozzle at 36 at a point outside the cover plate or front section of the casing. The slot 32 is sufficiently wide to permit the nozzle to be swung up and down until arrested by the ends of the slot which, in the construction shown, is of such length as to permit the nozzle to swing through an arc of approximately 135°. The section 34 of the nozzle which extends through slot 32 is provided at its inner end with two laterally extending arms or projections 37 each of which supports a spring-pressed plunger or friction shoe 38 the shanks of which project within recesses in the outer faces of the arms, the friction surfaces of the heads of the plungers being pressed firmly against the inner surface of part 18 of the cover plate of the casing by coiled springs 39 so as to frictionally hold the nozzle in any position to which it is moved.

A pair of spring wire-terminal clips 40 are secured by short screws 41 to blocks of suitable insulating material 42 which are secured to opposite sides of the nozzle section 34 within and just above the outer end of said nozzle section. An electric heater is removably mounted in the nozzle section 35. The porcelain core or coil support 43 of the heater is fixed tightly on a rod 44 on the projecting ends of which two spacing and supporting devices 45 are rigidly held. Each spacing device 45 comprises a pair of parallel sheet metal bars having complementary central bowed portions forming an opening in the two-part device to receive the rod, the two bars being riveted together at each side of the center thereof by rivets 46 to tightly clamp the devices 45 on the ends of rod 44. The devices 45 are confined at their ends in slots 47 formed in the ends of a metallic tube or heater casing 48 by slitting said tube and turning in the metal along the edges of the slots. The core 43 is thus held against endwise and rotary movement in sleeve 48. A "chromel" or other suitable resistance wire 49 is wound around the core, which is preferably provided with four radially extending fins or longitudinal ribs as shown so as to permit air to pass through the nozzle both inside and outside the heating coil. Two blade-like coil terminals 50 are secured to core 43 at the upper end of the core and the resistance wire 49 forming the coil is wound spirally around the core from one of said terminals to the lower end of the core, then passes through an aperture in one rib of the core and extends upwardly along the opposite side of said rib to the other terminal of the coil, as shown in Figs. 4 and 7. The coil-terminals 50 are adapted to engage in the terminal clips 40 on nozzle section 34 when the heater is slid inwardly through the outer end of the nozzle. The heater is removably held in place by a ring 51 held against an internal annular shoulder on nozzle section 35 by a clamping ring 52 threaded on the outer end of the nozzle section. A fine mesh wire screen 53 is preferably clamped around its edge between rings 51 and 52. Plug 33 in the upper end of the nozzle has a bore 54 in communication with elbow 31 at its inner end and four divergent jet pipes or tubes 55 are secured in the bottom of said plug in communication with the outer end of bore 54, said jet tubes being arranged to direct a jet of air over each of the four sections of the heating coil extending between the fins on the core 43.

Two wires or conductors 56 leading from the terminal clips 40 through apertures in plug 33 are connected with the two stationary contacts 57 of a double pole snap switch, the other two stationary contacts 58 of which switch are connected by wires 59 to line wires 60 extending past each air heating and discharge device in the building and connected with a suitable source of current. The circuit through line wires 60 is a closed circuit and the several heating coils are wired in parallel so that they may be controlled independently by their individual switches. The pairs of stationary contacts 57 and 58 of the switch are mounted on a fiber or other insulating block 61 secured to the partition 11 in box 10. A fiber block 62, having a limited vertical movement on posts 63 secured to block 61, carries the two pairs of contacts 64 and 65 held to block 62 by the two bowed metal plates 66 which electrically connect each pair of contacts. The pair of contacts 64 with their supporting plate 66 are adapted to cooperate with two stationary contacts 57 and 58 to make and break one line of the branch circuit

containing the heating coil and contacts 65 cooperate with the other two stationary contacts 57 and 58 to make and break the other line of the branch circuit. The block 62 is reciprocated by a substantially diamond shaped cam 67 formed on the upper end of an angular arm 68 of a vertical rod 69. The cam 67 is adapted to pass through an opening 70 in block 62 and its cam edges cooperate with a pair of rollers 71 journalled in yokes 72 and forced toward each other by coiled springs 73 seated in sockets 74 at opposite sides of the opening 70 in block 62. Yokes 72 are held against endwise movement by the sides of opening 70 and against vertical movement by metal cover plates 75 secured to the top and bottom of the block over opening 70 and having apertures therein just large enough to permit cam 67 to pass therethrough. Nuts 94 on the upper ends of posts 63 limit the upward movement of block 62 and it will be obvious that, with the parts in "off" position, as shown in Fig. 11, when cam 67 is forced upwardly until its high point passes between the rollers 71, the switch will assume the "on" position shown in Fig. 12 with a snap action, and that when cam 67 is pulled downward the parts will be restored to "off" position.

The valve stem 28 of the air outlet valve 27 is provided with a split socket 28ª provided with a clamping screw 76 to adapt the valve stem to be adjustably clamped on the upper end of the vertical rod 69. When rod 69 is moved upwardly valve 27 is opened to permit air under pressure to rush out through the nozzle from the pipe 9, and the switch controlling the passage of current through the heating coil in the nozzle is simultaneously closed so that the air will be heated as it passes through the nozzle. The rod 69 is operated by a treadle 77 pivoted on a pin 78 mounted in a U-shaped forwardly extending portion or bracket 79 formed on a plate 80. The rear arm of the treadle 77 is pivotally connected at 81 with the lower end of rod 69 and projects through an opening or vertical slot in bracket plate 80 into a box or metal casing 82 set in the wall 12 at the floor level below box 10. A coil spring 83 normally presses the rear end of treadle 77 downward against the bottom of a vertical slot 84 in an adjustable stop plate 85 slidably held to a rigid bracket 86 also slotted to receive the rear end of the treadle and depending from the top wall of box 82. The stop 85 is adjustable relatively to bracket 86 by an adjusting screw 87. Spring 83 is of sufficient strength to automatically restore treadle 77 to the position shown in Fig. 4 to automatically close the valve 27 and open the switch when the foot of the operator is removed from the treadle. Plate 80 is the same size as the rectangular open front side of box 82 and is held to said box by screws 88. A finishing plate 89, provided with side and top flanges and a vertical slot 90 open at its lower end to receive the U-shaped part 79 of the bracket plate, is detachably held to two bosses 91 on bracket plate 80 by screws 92, the top flange of the plate having an open ended slot 93 to receive the rod 69.

What I claim is:

1. A drying apparatus comprising an air supply conduit, means for supplying air under pressure to said conduit, a plurality of air-discharge nozzles connected with said conduit, a plurality of valves for independently controlling the discharge of air from said nozzles, a plurality of electric heating devices for heating the air discharged through said nozzles, a plurality of electric switches each controlling the supply of current to one of said heating devices, and means for operating the valve and switch associated with each nozzle independently of the other valves and switches.

2. A drying apparatus comprising an air supply conduit, means for supplying air under pressure to said conduit, a plurality of air-discharge nozzles connected with said conduit, a plurality of valves for independently controlling the discharge of air from said nozzles, a plurality of electric heating devices for heating the air discharged through said nozzles, a plurality of electric switches each controlling the supply of current to one of said heating devices, and a plurality of manually shiftable devices each operatively connected to simultaneously open the valve and close the switch associated with one of said nozzles.

3. A drying apparatus comprising a plurality of air-blast devices, means common to all of said devices for supplying air under pressure thereto, means forming an electric current-supplying circuit having a plurality of branches connected therewith in parallel, an electric heater and controlling switch therefor in each branch of said circuit, said heaters being arrenged to heat the air which passes through the several air-blast devices, valves associated with the air-blast devices for controlling the passage of air therethrough from the common air-supplying means, and means for operating the valve and switch associated with each air-blast device.

4. A drying apparatus comprising a plurality of air-blast devices, means common to all of said devices for supplying air under pressure thereto, means forming an electric current-supplying circuit having a plurality of branches connected therewith in parallel, an electric heater and controlling switch therefor in each branch of said circuit, said heaters being arranged to heat the air which passes through the several air-blast devices,

valves associated with the air-blast devices for controlling the passage of air therethrough from the common air-supplying means, and a treadle associated with each air-blast device operatively connected to simultaneously actuate the adjacent valve and switch.

5. A drying apparatus comprising a plurality of air-blast devices, means common to all of said devices for supplying air under pressure thereto, means forming an electric current-supplying circuit having a plurality of branches connected therewith in parallel, an electric heater and controlling switch therefor in each branch of said circuit, said heaters being arranged to heat the air which passes through the several air-blast devices, valves associated with the air-blast devices for controlling the passage of air therethrough from the common air-supplying means, a plurality of treadles each operatively connected to open the valve and close the switch associated with one of the air-blast devices when depressed, and means for automatically restoring said treadles to normal position to close the valves and open the switches connected therewith.

6. A drying apparatus comprising an air-supply conduit, means for supplying air under pressure to said conduit, a plurality of air-discharge nozzles connected with said conduit, a plurality of valves for independently controlling the discharge of air from said nozzles, a plurality of electric heating devices for heating the air discharged through said nozzles, a plurality of electric switches each controlling the supply of current to one of said heating devices, a plurality of manually shiftable devices each operatively connected to simultaneously open the valve and close the switch associated with one of said nozzles, and spring means for automatically restoring said devices to normal position when the same are released to close the valves and open the switches.

7. A drying apparatus comprising an air-supply conduit, means for supplying air under pressure to said conduit, a plurality of air-discharge nozzles connected with said conduit, valves for controlling communication between said nozzles and conduit, electric air-heating devices in said nozzles, electric switches controlling the supply of current to said heating devices, and means for operating the valve and switch associated with each nozzle independently of the other valves and switches.

8. A drying apparatus comprising an air-supply conduit, means for supplying air under pressure to said conduit, a plurality of air-discharge nozzles connected with said conduit, valves for controlling communication between said nozzles and conduit, electric air-heating devices in said nozzles, electric switches controlling the supply of current to said heating devices, and a plurality of independently shiftable devices each of which is operatively connected to open the valve and close the switch associated with one of said nozzles when moved in one direction and to close the valve and open the switch when moved in the reverse direction.

9. A drying apparatus comprising an air supply conduit, means for supplying air under pressure to said conduit, a plurality of air-discharge nozzles connected with said conduit, valves for controlling communication between said nozzles and conduit, electric air-heating devices in said nozzles, electric switches controlling the supply of current to said heating devices, a plurality of independently shiftable devices each of which is operatively connected to open the valve and close the switch associated with one of said nozzles when moved in one direction and to close the valve and open the switch when moved in the reverse direction, and resilient means associated with each of said devices for normally forcing said device to its valve-closing and switch-opening position.

10. A drying apparatus comprising an air supply conduit, means for supplying air under pressure to said conduit, a plurality of nozzles, means embodying swivel connections for adjustably supporting the nozzles in communication with said conduit, valves controlling the passage of air from the conduit through said nozzles, electric air-heating devices in said nozzles, electric switches controlling the supply of current to said heating devices, and means for operating the valve and switch associated with each nozzle.

11. A drying apparatus comprising an air supply conduit, means for supplying air under pressure to said conduit, a plurality of nozzles, means embodying swivel connections for adjustably supporting the nozzle in communication with said conduit, valves controlling the passage of air from the conduit through said nozzles, electric air-heating devices in said nozzles, electric switches controlling the supply of current to said heating devices, and a plurality of independently shiftable devices each of which is operatively connected to open the valve and close the switch associated with one of said nozzles when moved in one direction and to close the valve and open the switch when moved in the reverse direction.

12. A drying apparatus comprising an air supply conduit, means for supplying air under pressure to said conduit, a plurality of nozzles, means embodying swivel connections for adjustably supporting the nozzles in communication with said conduit, valves controlling the passage of air from the conduit through said nozzles, electric air-heating devices in said nozzles, electric switches

controlling the supply of current to said heating devices, a plurality of treadles each operatively connected to open the valve and close the switch associated with one of said nozzles when depressed, and spring for forcing the treadles to normal position when relieved of pressure to automatically close the valves and open the switches.

13. The combination of an air-supply pipe, a nozzle having a swivel connection with said pipe, a valve controlling the delivery of air to the nozzle, an electric heater in the nozzle, a switch controlling the supply of current to said heater, and means for simultaneously operating said valve and switch.

14. The combination of a source of air under pressure, a swinging nozzle, an electric heater in said nozzle, a switch controlling the supply of current to said heater, and means for opening and closing communication between said nozzle and source of air and automatically operating said switch to close the circuit through the heater when air is being supplied to the nozzle and break the circuit when the supply of air to the nozzle is cut off.

15. The combination of a source of air under pressure, a swinging nozzle, an electric heater in said nozzle, a switch controlling the supply of current to said heater, means for opening and closing communication between said nozzle and source of air and automatically operating said switch to close the circuit through the heater when air is being supplied to the nozzle and break the circuit when the supply of air to the nozzle is cut off, and means for holding the swinging nozzle in different adjusted positions.

16. A drying apparatus comprising an air supply conduit, means for supplying air under pressure to said conduit, a plurality of nozzles, means embodying swivel connections for adjustably supporting the nozzles in communication with said conduit, valves controlling the passage of air from the conduit through said nozzles, electric air-heating devices in said nozzles, electric switches controlling the supply of current to said heating devices, a plurality of independently shiftable devices each of which is operatively connected to open the valve and close the switch associated with one of said nozzles when moved in one direction and to close the valve and open the switch when moved in the reverse direction, and means for holding the nozzles in different adjusted positions.

17. The combination of a wall box, having a curved wall portion provided with a slot, an air supply conduit passing through said box and provided with an outlet branch enclosed within the box, a nozzle pivotally held to said outlet branch and projecting through said slot, means carried by the nozzle frictionally engaging the curved wall portion of the box to hold the nozzle in adjusted position, and means for controlling the passage of air through said outlet branch to the nozzle.

18. The combination of a wall box having a curved wall portion provided with a slot, an air supply conduit passing through said box and provided with an outlet branch enclosed within the box, a nozzle pivotally held to said outlet branch and projecting through said slot, means carried by the nozzle frictionally engaging the curved wall portion of the box to hold the nozzle in adjusted position, and an electric air-heater mounted in the nozzle.

19. The combination of a wall box having a curved wall portion provided with a slot, an air supply conduit passing through said box and provided with an outlet branch enclosed within the box, a nozzle pivotally held to said outlet branch and projecting through said slot, means carried by the nozzle frictionally engaging the curved wall portion of the box to hold the nozzle in adjusted position, an electric air-heater in the nozzle, a switch in the box, wires leading from the terminals of the heater to said switch, a valve controlling one passage of air through the outlet branch, and means located outside the box operatively connected to operate the valve and switch.

20. An air-heating and discharging device comprising a nozzle divided transversely into two sections detachably connected together, an attachment plug detachably held to the inner end of the nozzle having air and wire passages therethrough, wire terminals mounted within the inner section of the nozzle, and an electric heater mounted in the outer section of the nozzle and provided with terminals having a slip connection with the wire terminals on the inner nozzle section.

In testimony whereof I hereunto affix my signature.

DENTON J. WATROUS.