Aug. 21, 1934. C. A. PFAHL 1,970,766

HEATING APPARATUS

Filed May 10, 1930 4 Sheets-Sheet 1

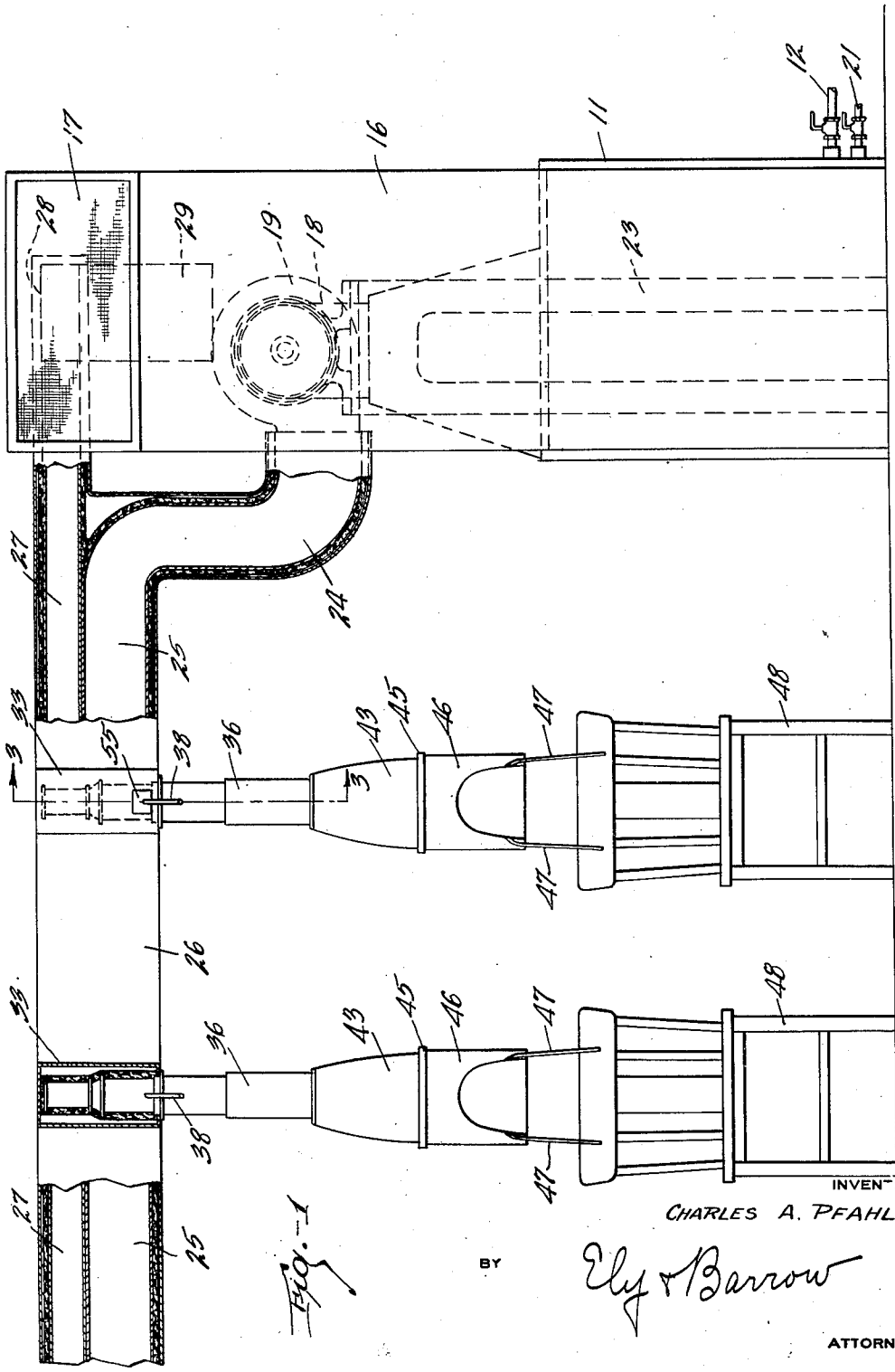


Fig. 1

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HEATING APPARATUS

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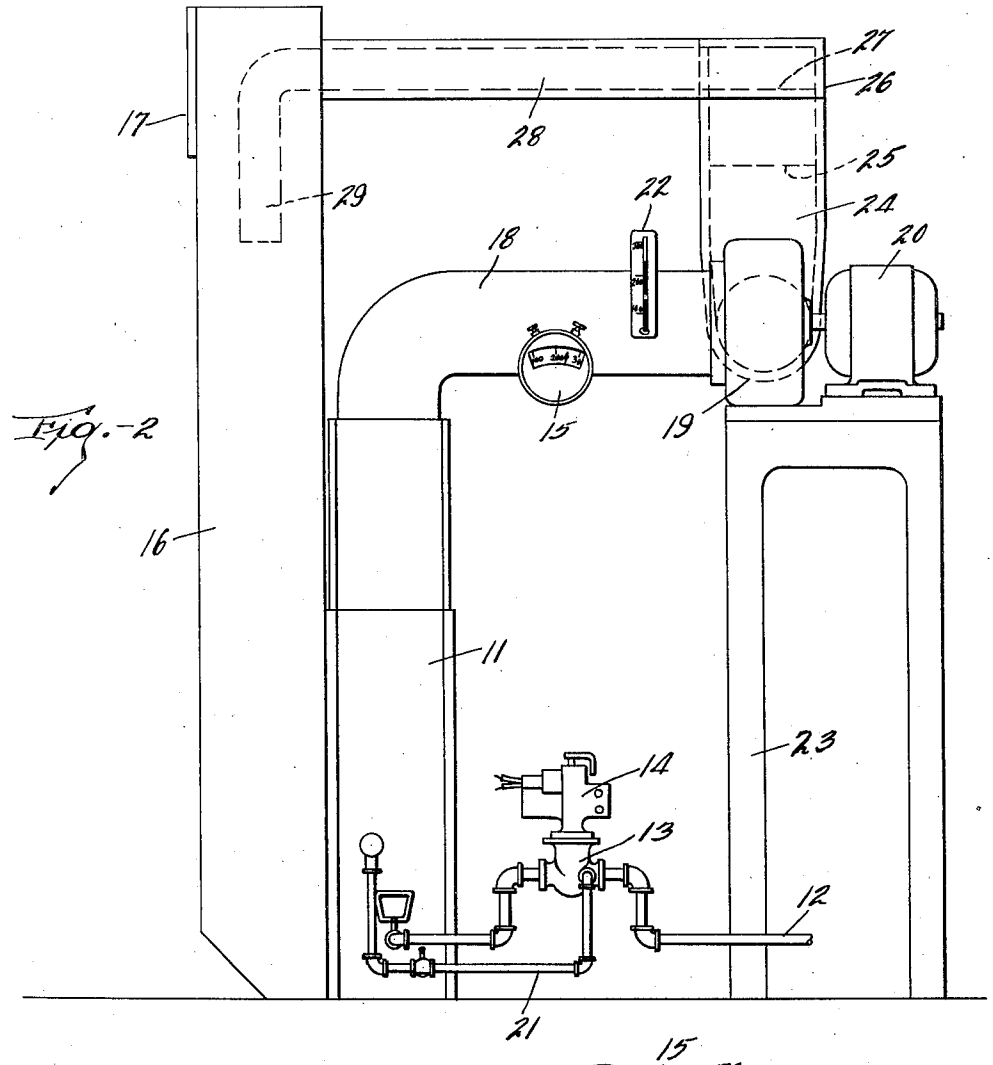


Fig. - 2.

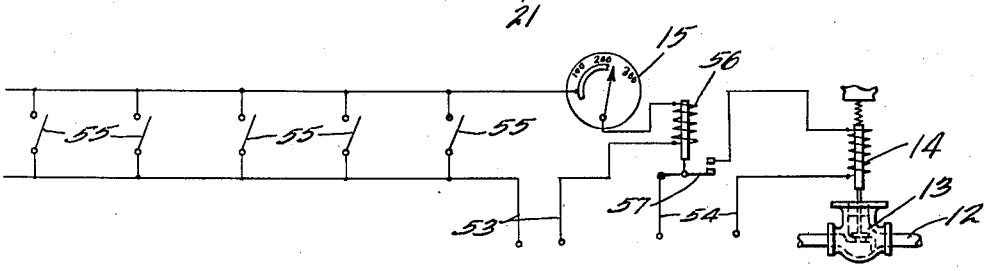


Fig. - 6.

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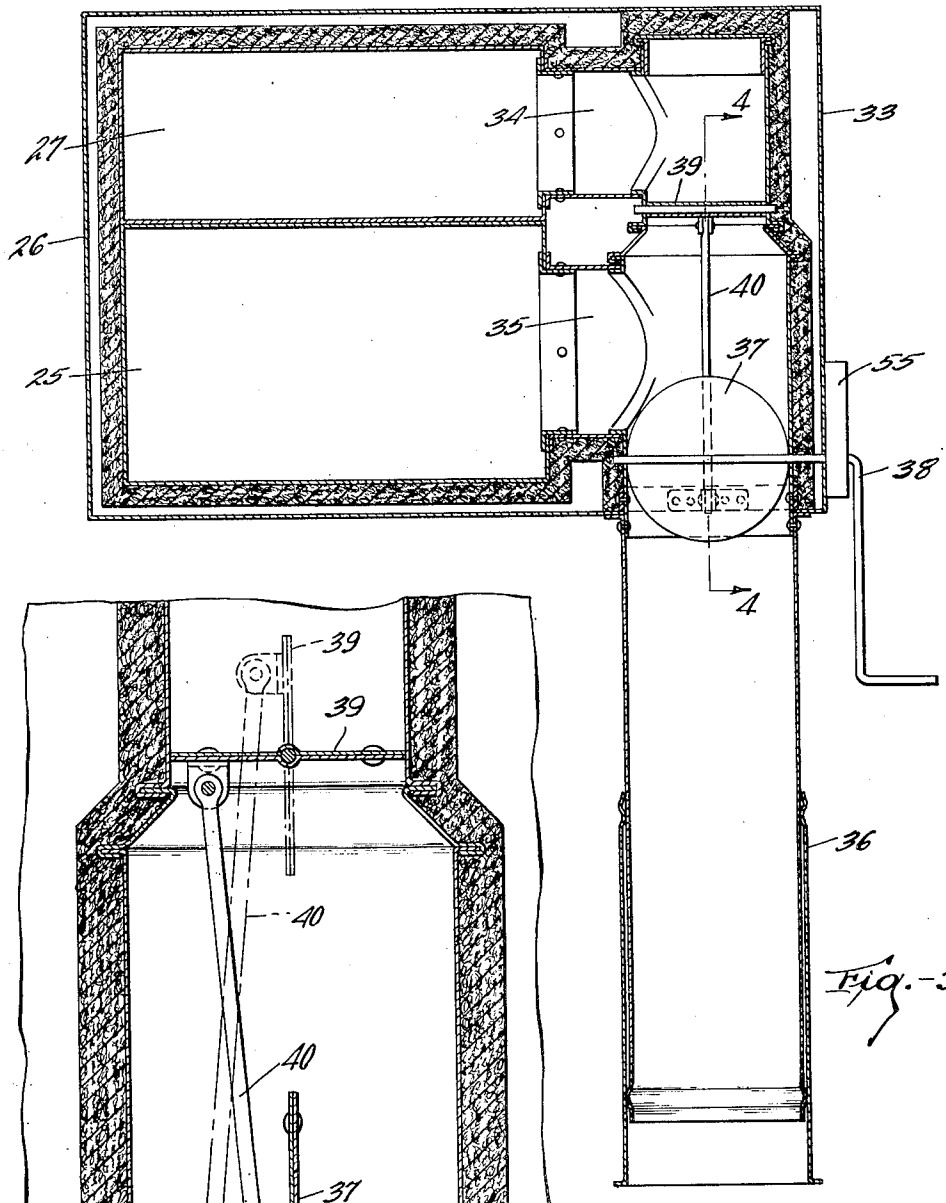


Fig.-3

Fig.-4

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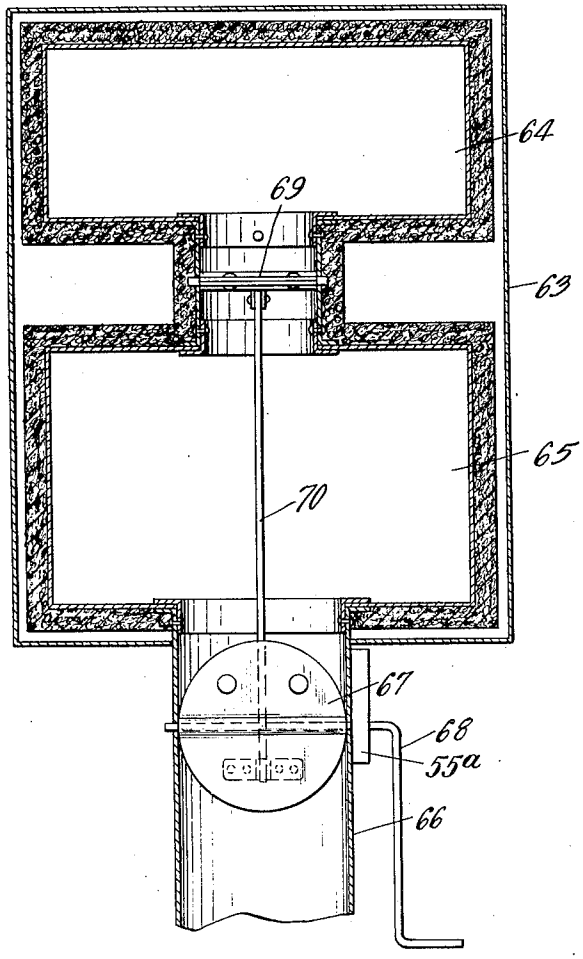


Fig. - 5

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UNITED STATES PATENT OFFICE

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HEATING APPARATUS

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Application May 10, 1930, Serial No. 451,486

10 Claims. (Cl. 237—50)

This invention relates to heating apparatus using hot air and more particularly to apparatus especially adapted for individually drying one or more persons' hair after washing or other wetting for beauty culture purposes.

Heretofore, in large beauty shops or similar places, women's hair, after washing or wetting for curling, waving or the like, has usually been dried by individual electric hot air blowers. Blowers of this type are expensive both as to the initial cost and as to the operating expense thereof. Moreover the jet of hot air they supply is generally small in cross section requiring considerable time for the drying of the hair as well as constant movement of the blower about the head.

Some attempts have also been made to use hot air systems utilizing gas or other types of heating means for the drying of hair, in which a central heating and blowing unit is provided with a plurality of conduits adapted to serve a plurality of individuals. If, however, only certain of the conduits are used and the rest shut off, the conduits that are in use receive too much heat, and if to avoid this, some of the conduits are left open when not in use, the room will become overheated.

It is an object of the present invention to provide a drying or heating apparatus having a central heating unit and a plurality of individual drying or heating stations at which stations the hot air is of the desired temperature regardless of the number of stations in operation.

A more particular object of the invention is to provide drying apparatus having a central heating plant and a plurality of individual drying stations with means for circulating the drying air to said drying stations and to return the hot air from such stations as are not in use to the central heating plant for recirculation.

A further object of the invention is to provide means to maintain the temperature of the drying air substantially uniform regardless of the number of drying stations in operation.

The above and other objects of the invention are achieved by the apparatus illustrated and described below, it being understood that the invention is not limited to the exact details thereof shown and described.

In the drawings,

Figure 1 is a side elevation of the apparatus embodying the invention, parts thereof being broken away to better illustrate the construction;

Figure 2 is an end elevation of the apparatus shown in Figure 1 looking from the right thereof;

Figure 3 is a sectional view taken on line 3—3 of Figure 1;

Figure 4 is a sectional view on line 4—4 of Figure 3;

Figure 5 is a view similar to Figure 3 of a modified form of the apparatus; and

Figure 6 is a diagrammatic wiring diagram of the various parts of the apparatus.

Referring to the drawings, the numeral 11 indicates a central heating unit to which gas or other fuel may be supplied by a line 12. A valve 13 is provided in the line 12 and is operated by a solenoid and plunger 14 controlled by a thermostatic switch 15. A small by-pass pipe 21 extends around the valve 13 and keeps a pilot light burning in the central heater 11. A cold air flue or conduit 16 having an opening 17 near the top of the room serves to provide air for the heater 11.

A hot air conduit 18 upon which is mounted the thermostatic switch 15 and a thermometer 22 connects the heater 11 with a fan or blower 19 driven by a suitable motor 20. A support 23 is provided to carry the blower 19 and motor 20.

The blower 19 is connected by a conduit 24 to the lower passage 25 of a double conduit 26. The upper passage 27 of the double conduit 26 is connected by a suitable return conduit 28 with the cold air flue 16. The conduit 28 extends down into the cold air flue 16 as at 29 to insure that air returned by the conduit 28 will not be lost through the air intake opening 17.

At a plurality of points along the double conduit are provided laterally extending heads 33, which are connected by short passages 34 and 35 with the upper and lower passages 27 and 25 of the double conduit 26. Each head 33 is formed with a downwardly extending telescopic pipe 36.

A valve such as a butterfly valve 37 operated by an outwardly extending handle 38 is provided between the telescoping pipe 36 and the passage 35.

A valve 39 of a type similar to the valve 37 is provided in the head 33 between the passages 34 and 35. Operatively connecting the valves 37 and 39 is a link 40 which, as best seen in Figure 4, is of such a length that when one valve is open the other is closed and vice versa.

Secured to the bottom of each of the telescoping pipes 36 is a flexible hood member 43 of air tight material. A hoop 45 is adapted to cooperate with a slightly smaller hoop (not shown) which

is fixed to the bottom of hood member 43 in the manner of embroidery hoops (see United States Patent No. 1,907,215) to removably hold a hood member 46. Cords 47 may be provided on the hood members 46 which may be tied behind the user's neck.

For the convenience of the individuals using the dryers, chairs 48 may be provided.

Referring to Figure 6, the numerals 53 indicate leads adapted to be connected to a source of low potential current while the numerals 54 indicate leads adapted to be connected to a source of relatively high potential current. The thermostatic switch 15 is of a standard type which can be set to open at any desired temperature and which automatically closes if the temperature falls below that point. Mounted on each head 33 is a switch 55 which is adapted to be operated by the handle 38. The relation of the switch 55 to the valves 39 and 37 is such that when the switch 55 is closed the valve 37 is open and the valve 39 is closed. All of the switches 55 are connected in parallel in the circuit as shown. A solenoid and plunger 56 is connected in the low potential circuit and serves to open and close a switch 57 in the high potential circuit. The solenoid and plunger 14 is connected in the high potential circuit as shown.

Figure 5 illustrates a modified form of double conduit 63, the upper passage being indicated at 64 and the lower at 65. In this type the side heads 33 are eliminated and a telescopic pipe 66 is connected directly to the bottom of the conduit. A valve 67 operated by a handle 68 is provided between the lower passage 65 and the telescopic pipe 66. A second valve 69 is placed between the upper passage 64 and the lower passage 65 and is operatively connected to the valve 67 by a link 70 so that when one valve is open the other is shut. A switch corresponding to switch 55 may be associated with the valve operating mechanism in this form of the invention.

In all forms of the invention the conduits are suitably insulated as is well understood in the art. Moreover the size of the various conduits is determined by the average relative volumes of air they are designed to carry. For this reason the upper passage in the double conduit is, as seen in Figures 3 and 5, somewhat smaller than the lower. It has also been found that the valve between the upper and lower passages of the double conduit should preferably be made somewhat smaller, as shown, than the valve between the lower passage and the telescopic pipe.

The operation of the device is as follows:—

Fresh, clean, sanitary hood members 46 are folded into hood shape and are removably secured to the flexible, air-tight hood members 43 through the agency of the cooperating hoops one of which is shown at 45. The ends of the hood members 46 may be merely overlapped and held by the hoops. However, clips, pins or snaps are preferably used to assist in holding the hood members in shape at points remote from the hoops. The length of each of the telescoping pipes 36 is adjusted so that one or more persons whose hair is to be dried can be seated in the chairs 48 and the hoods brought down into relation with their heads. The cords 47 are tied behind the user's neck which draw the removable hood member snugly about the head. The flexibility of the air-tight hood member 43 allows the user considerable freedom of head movement.

The thermostatic switch 15, which is mounted on the hot air conduit 18, is adjusted or set to the temperature that it is desired to maintain in the apparatus. The motor 20 is started to drive the blower 19 which begins to circulate air through the apparatus.

By throwing levers 38, one or more of the valves 37 are opened which closes one or more of the switches 55. Closing one or more of the switches 55 energizes the solenoid and plunger 56 in the low potential circuit through the thermostatic switch 15 to close the switch 57 in the high potential circuit. The closing of the switch 57 energizes the solenoid and plunger 14 to open the valve 13. Assuming the pilot light in the heater to be burning with fuel supplied through the bypass pipe 21, the opening of the main valve 13 will start the heater 11 into full operation.

The blower 19 will now force the hot air from the heater 11 out through the conduit 24 to the lower passage 25 of the double conduit 26. In the heads 33, where the valves 37 are open, the hot air will be forced down through the telescopic pipes 36. As the flexible hood member 43 secured to the bottom of the telescopic pipe 36 is air tight, the hot air to escape through the pervious hood member 46 must travel down to and through the hair of the person using the dryer.

When the valve 37 is open as in the above operation, the return valve 39 is closed, due to the link 40. If, however, one or more of the individual stations are not in use, the levers 38 thereof are moved to the opposite or closed position, in which position the valves 39 are open and the valves 37 are closed and the switches 55 are open. In this manner, when a station is not in use, the amount of hot air that would be used at such station is returned through valve 39, the upper passage 27 in the double conduit 26 and the conduits 28 and 29 to the cold air intake 16. Any hot air returned as above described reduces the amount of cold air which is used and consequently conserves fuel.

The temperature switch 15 will keep the hot air supplied to the stations at an even temperature regardless of the number of stations being used or of the amount of hot air returned to the heater. The switch 15 can be adjusted to open if the temperature exceeds any certain point which will deenergize the solenoid and plunger 56 of the low potential circuit which will open the switch 57 of the high potential circuit, thus deenergizing solenoid and plunger 14 and causing the valve 13 to close, cutting off the supply of gas to the heater 11. As soon, however, as the temperature drops below the desired point, the switch 15 will open valve 13 as heretofore described. The opening of the valve 13 again supplies fuel to the heater 11, which fuel is ignited by the pilot light therein which has continued to burn. The temperature of the hot air is thus maintained substantially at the desired point.

It will be seen from Figure 6 that one drying station must be in operation to have at least one of the switches 55 closed, otherwise the valve 13 will be closed. In this manner when the last switch 55 is opened, the heater will be shut off by the closing of the valve 13, as occasioned by the cutting off of the current to the solenoids 56 and 14. In this position of the apparatus all of the stations are of course turned off with the valves 37 closed and the valves 39 open and with the switches 55 open. If the lever 38 at any station is now thrown to open the valve 37 and close the valve 39 the switch 55 will be closed to open the fuel valve 13 and start the heater 11. The use

of the switches 55 in this manner provides simple means for starting and stopping the heater.

Any number of the stations may be used at one time and each one in use is provided with a uniform, even heat regardless of the number of others in use. The apparatus is efficient as to fuel because the hot air that is not used for drying is returned to the heater and is recirculated through the apparatus.

While the invention is adapted and has been particularly described for use as a hair dryer, it will be evident that the principles thereof are broadly applicable to the heating and drying art.

As many changes could be made in the construction other than those herein disclosed it is intended that all matter contained in the above description or illustrated in the accompanying drawings shall be interpreted as illustrative only and not in a limiting sense. Accordingly various modifications and applications of the invention can be resorted to without departing from the spirit of the invention or the scope of the appended claims.

What is claimed is:—

1. Hot air heating apparatus comprising an air heating unit having a cold air intake and a hot air outlet, a conduit structure extending from said unit, said conduit structure having a pair of adjacent passages, one of said passages being connected with the hot air outlet of said unit, the other of said passages being connected with the cold air intake of the unit, said conduit having a plurality of openings to the outside thereof from said first-named passage, said conduit having a plurality of openings between said adjacent passages, the latter openings being associated with the openings to the outside of the conduit, valve means in all said openings, and means connecting the valves in each pair of associated openings so that when one valve is open the other will be closed.

2. Hot air heating apparatus comprising a heating unit having a cold air intake and a hot air outlet, a conduit structure extending from said unit, said conduit structure having a pair of adjacent passages, one of said passages being connected with the hot air outlet of said unit, the other of said passages being connected with the cold air intake of the unit, said conduit having a plurality of openings to the outside thereof from said first-named passage, said conduit having a plurality of openings between said adjacent passages, the latter openings being associated with the openings to the outside of the conduit, valve means in all said openings, means connecting the valves in each pair of associated openings so that when one valve is open the other will be closed, and means for maintaining the temperature of the air circulated through the conduit substantially constant when air is being delivered from one or more of said openings to the outside.

3. Hot air heating apparatus comprising an air heating unit having a cold air intake and a hot air outlet, a conduit structure extending from said unit, said conduit structure having a pair of adjacent passages, one of said passages being connected with the hot air outlet of said unit, the other of said passages being connected with the cold air intake of the unit, said conduit having a plurality of openings to the outside thereof from said first-named passage, said conduit having a plurality of openings between said adjacent passages, the latter openings being associated with the openings to the outside of the conduit, valve means in all said openings, means connecting the valves in each pair of associated openings so that when one valve is open the other will be closed, and means for positively circulating air through said apparatus.

4. Hot air heating apparatus comprising an air heating unit, a hot air conduit connected to said unit and formed with hot air outlets, a cold air conduit connected to said unit and extending adjacent said hot air conduit, means connecting said hot and cold air conduits, each of said last-named means being located adjacent one of said hot air outlets, pairs of valves controlling said outlets and said connecting means, and means operatively associating the valves in each pair so that when one valve is open the other valve is closed.

5. Hot air heating apparatus comprising an air heating unit, a hot air conduit connected to said unit and formed with hot air outlets, a cold air conduit connected to said unit, means connecting said hot and cold air conduits, each of said last-named means being located adjacent one of said hot air outlets, pairs of valves controlling said outlets and said connecting means, and means operatively associating the valves in each pair so that when one valve is open the other valve is closed.

6. In hot air heating apparatus, the combination of means for heating air, said means having a cold air intake, means for conducting the hot air from said heating means, a plurality of stations along the hot air conduit comprising outlets from which hot air may be delivered, said hot air conduit being connected to all of said stations at all times regardless of the station or stations which are in operation, conducting means for returning hot air to the cold air intake of the heating means, and means at each station for delivering hot air into the return conducting means only when such station is not in operation, said return conducting means being connected to all stations which are not in operation.

7. In hot air heating apparatus, the combination of means for heating air, said means having a cold air intake, means for conducting the hot air from said heating means, a plurality of stations along the hot air conduit comprising outlets from which hot air may be delivered, said stations being connected to said conduit at all times for delivery of hot air from one or more of said stations, conducting means for returning hot air to the cold air intake of the heating means, means at each station for connecting its outlet to said hot air conduit, means at each station for delivering hot air into the return conducting means only when such station is not in operation, said return conducting means being connected to all stations which are not in operation, and means for positively circulating the air through the conduits.

8. In hot air heating apparatus, the combination of means for heating air, means for conducting the hot air from said heating means, said means having a cold air intake, a plurality of stations along the hot air conduit comprising outlets from which hot air may be delivered, means at each station for connecting said outlet with said hot air conduit whether or not one or more other stations are in operation, conducting means for returning hot air to the cold air intake of the heating means, means at each station for delivering hot air into the return conducting means only when such station is not in operation, said return conducting means being connected to all stations which are not in operation, and means for maintaining the temperature of the hot air sub-

stantially constant during delivery of hot air at one or more stations regardless of the number of stations in operation.

9. A device of the class described comprising means for circulating a stream of hot air comprising a feed conduit and a return conduit, said feed conduit having a plurality of outlets therefrom, means associated with each outlet connecting the feed conduit to the return conduit, and valves controlling each outlet and each connecting means, the valves on the outlets and the associated connecting means being connected together so that when one is open the other is closed.

10. The combination with a central heating unit for heating air and means for distributing said air to a plurality of stations at which it is used, of means operable at each station to deliver hot air therefrom when it is desired to be used, means at each station for returning air not used at said station directly back to said heating unit, said means functioning only when said station is not in use and regardless of the use of the other stations, means at each station for controlling the central heating unit, each of said last means being connected to operate the central unit independently of the others, whereby when all of said stations are not using said air the heating unit will be turned off and when one or more of said stations are using said air the heating unit will be turned on.

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